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Idaho Power Company's 2015 Demand-Side Management Annual Report

Send the completed Cover Sheet and the Report in an email addressed to PUC.FilingCenter@state.or.us

Send confidential information, voluminous reports, or energy utility Results of Operations Reports to PUC Filing Center, PO Box 1088, Salem, OR 97308-1088 or by delivery service to 3930 Fairview Industrial Drive SE, Salem, OR 97302.

Print

LISA D. NORDSTROM
Lead Counsel
lnordstrom@idahopower.com

March 23, 2016

VIA ELECTRONIC FILING AND HAND DELIVERY
Attention: Filing Center
Public Utility Commission of Oregon
201 High Street SE, Suite 100
P.O. Box 1088
Salem, Oregon 97308-1088

Re: Docket No. UM 1710
In the Matter of Idaho Power Company's Request for Cost-effectiveness Exceptions for Specific Demand-Side Management Electric Measures and Programs – *2015 Demand-Side Management Annual Report*

Dear Filing Center:

Idaho Power Company ("Idaho Power") did not have any cost-effectiveness exceptions as stated in its October 5, 2015, letter to that effect filed with the Public Utility Commission of Oregon on that same date. Therefore, pursuant to Order No. 15-200, attached is Idaho Power's *2015 Demand-Side Management Annual Report*, including Supplements 1 and 2. A disk containing the Northwest Energy Efficiency Alliance ("NEEA") reports is housed in the back of Supplement 2. Due to the file size, file arrangement, and supplemental nature of the NEEA reports, they will only be provided on disk. Because the *2015 Demand-Side Management Annual Report* is over 100 pages, two copies of the report and its supplements will be hand delivered to the Filing Center on March 24.

The *2015 Demand-Side Management Annual Report*, its supplements, and the NEEA disk are available on Idaho Power's website via the following link: https://www.idahopower.com/EnergyEfficiency/reports.cfm.

If you have any questions regarding this filing, please contact Connie Aschenbrenner at (208) 388-5994 or caschenbrenner@idahopower.com.

Sincerely,

Lisa D. Nordstrom

Lisa D. Nordstrom

LDN:csb
Attachments

P.O. Box 70 (83707)
1221 W. Idaho St.
Boise, ID 83702

March 15, 2016

IDAHO POWER
An IDACORP Company

Demand-Side Management

2015 ANNUAL REPORT

SAFE HARBOR STATEMENT

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Glossary of Acronyms

A/C—Air Conditioning/Air Conditioners

aCOP—Annual Coefficient of Performances

ADM—ADM Associates, Inc.

Ads—Advertisement

AEG—Applied Energy Group

AIA—American Institute of Architects

AMI—Advanced Metering Infrastructure

aMW—Average Megawatt

AR—Agricultural Representative

ASHRAE—American Society of Heating, Refrigeration, and Air Conditioning Engineers

B/C—Benefit/Cost

BCA—Building Contractors Association

BCASEI—Building Contractors Association of Southeast Idaho

BCASWI—Building Contractors Association of Southwestern Idaho

BML—Building Metrics Labeling

BOMA—Building Owners and Managers Association

BPA—Bonneville Power Administration

BSUG—Building Simulation Users Group

CAES—Center for Advanced Energy Studies

CAP—Community Action Partnership

CAPAI—Community Action Partnership Association of Idaho, Inc.

CAZ—Combustion Appliance Zone

CEL—Cost-Effective Limit

CER—Community Education Representative

CFL—Compact Fluorescent Lamp/Light

CFM—Cubic Feet per Minute

CHQ—Corporate Headquarters (Idaho Power)

CLEAResult—CLEAResult Consulting, Inc.

CLRIS—Customer Load and Research Information System

COP—Coefficient of Performance

CR—Customer Representative (field staff)

CR&EE—Customer Relations and Energy Efficiency Department

CSR—Customer Service Representative (call center)

CTR—Click-Through Rate

CWI—College of Western Idaho

DEQ—Department of Environmental Quality

DHP—Ductless Heat Pump

DOE—Department of Energy

DSM—Demand-Side Management

EA5—EA5 Energy Audit Program

EBR—Existing Building Renewal

ECM—Electronically Commutated Motors

EEAG—Energy Efficiency Advisory Group

EISA—*Energy Independence and Security Act of 2007*

EM&V—Evaluation, Measurement, and Verification

EPA—Environmental Protection Agency

EV—Electric Vehicle

FCA—Fixed-Cost Adjustment

FFA—Future Farmers of America

FMP—Facility Management Professional

ft^2—Square Feet

ft^3—Cubic Feet

GIS—Geographic Information System

GMPG—Green Motors Practice Group

GPM—Gallons per Minute

GPS—Geographic Positioning System

H&CE—Heating & Cooling Efficiency Program

HERS—Home Energy Rating System

hp—Horsepower

HPS—Home Performance Specialist

HPWH—Heat Pump Water Heater

HSPF—Heating Seasonal Performance Factor

HVAC—Heating, Ventilation, and Air Conditioning

IAC—Industrial Assessment Center

IBCA—Idaho Building Contractors Association

IBOA—International Building Operators Association

ICC—International Code Council

IDHW—Idaho Department of Health and Welfare

IDL—Integrated Design Lab (in Boise)

IECC—International Energy Conservation Code

IFMA—International Facility Management Association

IPMVP—International Performance Measurement and Verification Protocol

IPUC—Idaho Public Utilities Commission

IRC—Idaho Real Estate Commission

IRP—Integrated Resource Plan

iSTEM—Idaho Science, Technology, Engineering and Mathematics

JACO—JACO Environmental, Inc.

kW—Kilowatt

kWh—Kilowatt-hour

LED—Light-Emitting Diode

LEED—Leadership in Energy and Environmental Design

LEEF—Local Energy Efficiency Funds

LIHEAP—Low Income Home Energy Assistance Program

M&V—Measurement & Verification

MCR—Major Customer Representative

MOU—Memorandum of Understanding

MPER—Market Progress Evaluation Report

MVBA—Magic Valley Builders Association

MW—Megawatt

MWh—Megawatt-hour

n/a—Not Applicable

NEB—Non-Energy Benefit

NEEA—Northwest Energy Efficiency Alliance

NEEM—Northwest Energy Efficient Manufactured

NEMA—National Electrical Manufacturers Association

NFRC—National Fenestration Rating Council

NPR—National Public Radio

NSH—Next Step Home

NWPCC—Northwest Power and Conservation Council

NWRRC—Northwest Regional Retail Collaborative

O&M—Operation and Maintenance

OHCS—Oregon Housing and Community Services

OPUC—Public Utility Commission of Oregon

ORS—Oregon Revised Statute

OSV—On-Site Verification

PCA—Power Cost Adjustment

PCT—Participant Cost Test

PLC—Powerline Carrier

PPG—Program Planning Group

PSC—Permanent Split Capacitor

PTCS—Performance Tested Comfort System

QA—Quality Assurance

QC—Quality Control

RAP—Resource Action Programs

RBSA—Residential Building Stock Assessment

RETA—Refrigerating Engineers and Technicians Association

RETAC—Regional Emerging Technologies Advisory Committee

RFP—Request for Proposal

Rider—Idaho Energy Efficiency Rider and Oregon Energy Efficiency Rider

RIM—Ratepayer Impact Measure Test

ROCEE—Refrigeration Operator Coaching for Energy Efficiency

RPP—Retail Products Platform

RSE—Runyon Saltzman Einhorn

RTF—Regional Technical Forum

RWLR—Reduced Wattage Lamp Replacement

SCCT—Simple-Cycle Combustion Turbine

SCE—Streamlined Custom Efficiency

SEEK—Students for Energy Efficiency Kit

SEM—Strategic Energy Management

SIR—Savings-to-Investment Ratio

SRVBCA—Snake River Valley Building Contractors Association

TLL—Tool Loan Library

TOD—Time of Day

TRC—Total Resource Cost

TRM—Technical Reference Manual

TTTA—Top-Tier Trade Ally

UC—Utility Cost

UES—Unit Energy Savings

UM—Utility Miscellaneous

US—United States

VFD—Variable-Frequency Drive

W—Watt

WAP—Weatherization Assistance Program

WAQC—Weatherization Assistance for Qualified Customers

WHF—Whole-House Fan

WRUN—Western Regional Utility Network

WSOC—Water Supply Optimization Cohort

WWEEC—Wastewater Energy Efficiency Cohort

EXECUTIVE SUMMARY

The pursuit of cost-effective energy efficiency is a primary objective for Idaho Power. Energy efficiency and demand response provide economic and operational benefits to the company and its customers. Idaho Power supports the wise use of energy. The availability of information and programs ensures customers' opportunities to learn about their energy use and participate in programs.

Idaho Power's portfolio of energy efficiency program energy savings for 2015 increased to 162,533 megawatt-hours (MWh), including the estimated savings from the Northwest Energy Efficiency Alliance (NEEA), enough energy to power more than 14,000 average homes a year. This is a 12 percent increase from the 2014 energy savings of 145,476 MWh. In 2015, the company's energy efficiency portfolio was cost-effective from both the total resource cost (TRC) test and the utility cost (UC) test perspectives with ratios of 2.32 and 3.57, respectively. The savings from Idaho Power's energy efficiency programs alone, excluding NEEA savings, increased to 140,633 MWh in 2015 from 118,670 MWh in 2014.

Idaho Power successfully operated all three of its demand response programs in 2015. The total demand reduction achieved from the company's programs was 367 megawatts (MW) from an available capacity of 385 MW. The company reduced its demand response costs with a savings to Idaho Power customers of over $1.6 million from 2014. Almost a million dollars of these savings resulted from Idaho Power's transition of the commercial/industrial demand response program FlexPeak Management—previously administered by a third-party contractor—to the newly renamed Flex Peak Program fully administered by Idaho Power.

Energy efficiency and demand response is an important aspect of Idaho Power's resource planning process. Idaho Power's 2015 achievements in energy savings exceeded the annual savings target identified in Idaho Power's *2015 Integrated Resource Plan* (IRP). On a cumulative basis, the company's energy savings have exceeded the IRP targets every year since 2002 when the Idaho and Oregon Energy Efficiency Riders (Rider) began.

Total expenditures from all funding sources on DSM-related activities increased by nearly 6 percent, to $39 million in 2015 from $37 million in 2014. Energy efficiency program funding comes from the Idaho and Oregon Riders, Idaho Power base rates, and the annual power cost adjustment (PCA). Idaho incentives for the company's demand response programs are recovered through base rates and the annual PCA, while Oregon demand response incentives are funded through the Oregon Rider.

With a goal of using customers' funds wisely, Idaho Power employees and leaders strive to provide conscientious, prudent, and responsible action and activities that result in cost-effective energy efficiency. This report's content offers descriptions of the 2015 activities and savings.

In 2015, Idaho Power received two marketing awards for the residential energy efficiency awareness campaign from the Idaho Advertising Federation Rockie Awards, which recognizes creative excellence in advertising in Idaho. The company was awarded a Silver Award for the fall TV spot and a Citation Award for the residential energy efficiency awareness campaign. Idaho Power enhanced its marketing and public relations efforts in 2015 with the addition of airport signage, broadcast and online radio, television, and an online customer research panel. Additionally Idaho Power had 14 energy efficiency themed guest appearances on KTVB and KPVI.

Idaho Power continued to use stakeholder input to enhance its programs. The company met regularly with its Energy Efficiency Advisory Group (EEAG) and Idaho Power contracted with a professional facilitator to improve the EEAG meetings. To keep growth in the program portfolio, the company relied on its Program Planning Group (PPG), initiated in 2014, to fill the pipeline with ideas for offerings to its energy efficiency programs. Additionally, Idaho Power continued program improvement to make it easier for its customers to participate in programs.

As Idaho Power's energy efficiency efforts mature, the company may face deeper challenges acquiring cost-effective energy savings. Program promotion requires increased emphasis and increased costs while the DSM alternative costs decrease, making achieving cost-effective energy efficiency more complicated.

This *Demand-Side Management 2015 Annual Report* provides a review of the company's DSM activities and finances throughout 2015 and outlines Idaho Power's plans for future DSM activities. This report also satisfies the reporting requirements set out in the Idaho Public Utilities Commission's (IPUC) Order Nos. 29026 and 29419. Additionally, Idaho Power will provide a courtesy copy of the report to the Public Utility Commission of Oregon (OPUC) under Oregon Docket Utility Miscellaneous (UM) 1710.

INTRODUCTION

The pursuit of cost-effective energy efficiency is a primary objective for Idaho Power. Energy efficiency and demand response provide economic and operational benefits to the company and its customers. The enhancement of information and programs ensures customers have opportunities to learn about their energy use and participate in programs.

Idaho Power has effectively operated demand-side management (DSM) programs for over half of the company's 100-year history and has ramped up its programs steadily. Through the years, the company has maintained a successful DSM portfolio, including both energy efficiency and demand response programs. This report focuses on the activities since 2004, when the energy efficiency riders began.

Idaho Power's main objectives for DSM programs are to achieve prudent, cost-effective energy efficiency savings and provide an optimal amount of demand reduction from its demand response programs as determined through the Integrated Resource Plan (IRP) planning process. Idaho Power considers cost-effective energy efficiency the company's least-cost resource and pays particular attention to ensuring the best value to Idaho Power's customers. Idaho Power strives to provide customers with programs and information to help them manage their energy use. The company achieves these objectives through the implementation and careful management of programs that provide energy and demand savings and through outreach and education. Idaho Power endeavors to implement identical programs in its Idaho and Oregon service areas.

Energy efficiency program and demand response funding comes from the Idaho and Oregon Energy Efficiency Riders (Rider), Idaho Power base rates, and the annual power cost adjustment (PCA). Idaho incentives for the company's demand response programs are recovered through base rates and the annual PCA, while Oregon demand response incentives are funded through the Oregon Rider. Total expenditures from all funding sources on DSM-related activities increased by about 6 percent, from \$37 million in 2014 to \$39 million in 2014.

Idaho Power's portfolio of energy efficiency program energy savings for 2015 increased to 162,533 megawatt-hours (MWh), including the estimated Northwest Energy Efficiency Alliance (NEEA) savings. This is a 12-percent increase from the 2015 energy savings of 145,476 MWh and enough to power over 14,000 average-sized homes a year. In 2015, the company's energy efficiency portfolio is cost-effective from both the total resource cost (TRC) test and the utility cost (UC) test perspectives with ratios of 2.32 and 3.57, respectively. The savings from Idaho Power's energy efficiency programs alone (excluding NEEA savings) increased to 140,633 MWh in 2015 from 118,670 MWh in 2014.

Idaho Power successfully operated all three of its demand response programs in 2015. The total demand reduction from the company's programs was 367 megawatts (MW) and an enrolled capacity of 385 MW. The company reduced its demand response costs with a savings to Idaho Power customers of over \$1.6 million from 2014. Almost a million dollars of these savings resulted from Idaho Power's transfer of the commercial/industrial demand response program FlexPeak Management—previously administered by a third-party contractor—to the newly renamed Flex Peak Program fully administered by Idaho Power. Idaho Power's corporate headquarters (CHQ) continued to participate in the Flex Peak Program reducing its peak load when the program was dispatched.

The 2015 savings consisted of 24,532 MWh from the residential sector, 102,074 MWh from the commercial/industrial sector, and 14,027 MWh from the irrigation sector. This represents an 18-percent increase from 2014 program savings. The industrial Custom Efficiency program contributed 40 percent of Idaho Power's direct program savings, while the residential sector Energy Efficient Lighting program contributed 65 percent of the residential savings.

Beyond its energy efficiency incentive programs, Idaho Power further increased its energy efficiency presence in the community by providing energy efficiency and program information through 93 outreach activities, including events, presentations, trainings, and other activities. In addition, Idaho Power field staff delivered 204 presentations to local organizations, addressing energy efficiency programs and wise energy use. At events and presentations, company staff distributed over 21,000 light-emitting diodes (LED) in custom packaging that highlighted the advantages of energy-efficient lighting and encouraged participation in Idaho Power's myAccount online portal. In 2015, Idaho Power's Community Education team provided 124 presentations of *The Power to Make a Difference* to 3,359 students. The community education representatives (CER) and other staff also completed 26 senior citizen presentations on energy efficiency programs and shared information about saving energy to 944 senior citizens in the company's service area. Additionally, Idaho Power's energy efficiency program managers responded with detailed answers to 300 customer questions about energy efficiency and related topics received via Idaho Power's website.

Since 2008, Commercial Education activities have informed and educated commercial customers regarding energy efficiency, increased awareness of and participation in existing commercial energy efficiency and demand response programs and enhanced customer satisfaction regarding the company's energy efficiency initiatives. Raising the knowledge level of commercial and industrial customers regarding the wise use of energy in their daily operations is important to the continued success of Idaho Power's commercial and industrial energy efficiency programs. Educating commercial customers requires working with and supporting multiple stakeholders and organizations. Examples of key stakeholders and specific activities are explained in the commercial/industrial program descriptions, the Commercial and Industrial NEEA Activities section, and the Commercial Education section.

Idaho Power's internal commitment to energy efficiency and sustainability continued in 2015. Several Idaho Power properties were enhanced in 2015 with the goal of improving energy efficiency. Additional CHQ remodel projects were completed in 2015 to the CHQ's sixth and seventh floors. Remodels continued to incorporate energy efficiency items, such as lower partitions, lighting retrofits, and lighting controls. In 2016, Idaho Power will proceed with the CHQ eighth floor remodel. Idaho Power continued to upgrade the company's substation buildings across the service area.

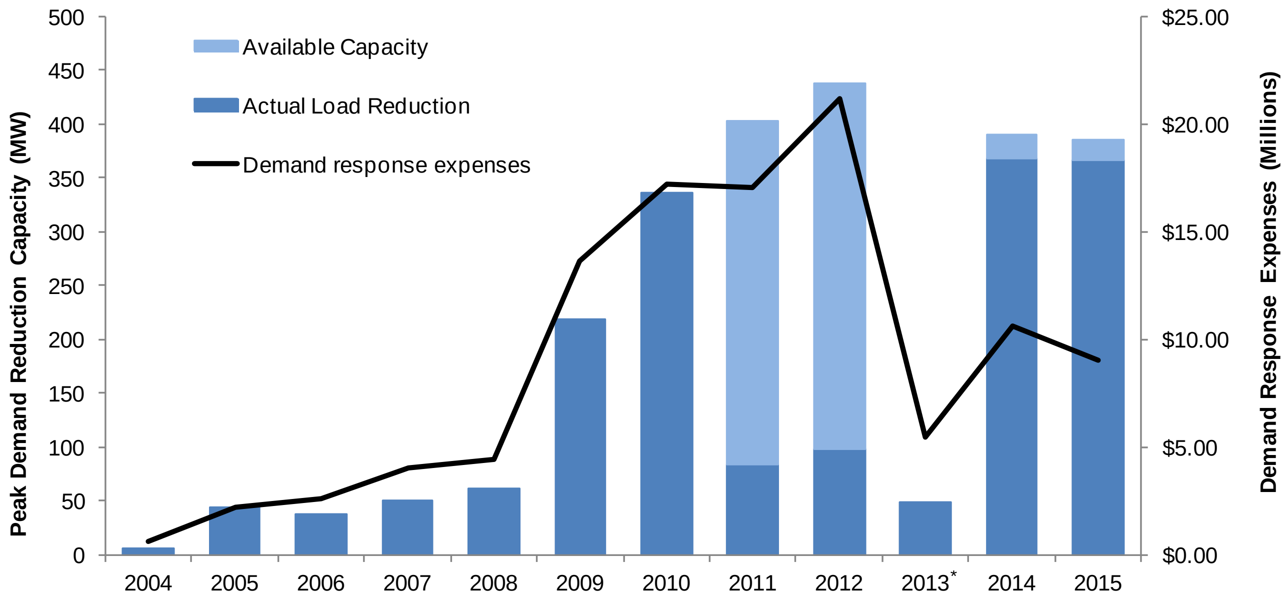
The *Demand-Side Management 2015 Annual Report* consists of the main document and two supplements. *Supplement 1: Cost-Effectiveness* shows the standard cost-effectiveness tests for Idaho Power programs and includes a table that reports expenses by funding source and cost category. In 2015, the company continued its commitment to third-party evaluation activities. Included in *Supplement 2: Evaluation* are copies of all of Idaho Power's 2015 evaluations, evaluations conducted by its regional partners, customer surveys and reports, Idaho Power's evaluation plans, general energy efficiency research, and demand response research. Additionally, the report and supplements will be provided under Oregon Docket UM 1710 to provide the Public Utility Commission of Oregon (OPUC) and its staff information on the company's DSM programs and expenses.

DSM Programs Performance

Idaho Power offers energy efficiency and demand response opportunities to all major customer sectors: residential, commercial, industrial, and irrigation. The commercial and industrial energy efficiency programs are made available to customers in either of these sectors.

Idaho Power groups its DSM activities into four major categories: energy efficiency, demand response, market transformation, and other programs and activities. The other programs and activities are generally designed to provide customer outreach and education encouraging the efficient use of electricity. These activities are coordinated to advance Idaho Power's long-term commitment to pursue all prudent cost-effective energy efficiency, an appropriate amount of demand response, and to enhance customer satisfaction.

Figures 1 and 2 show the demand-reduction capacity and historic energy savings overlaid with the company's DSM expenses.



* Irrigation Peak Rewards and the A/C Cool Credit programs were temporarily suspended in 2013.

Figure 1. Peak demand-reduction capacity and demand response expenses, 2004–2015 (MW and millions [$])

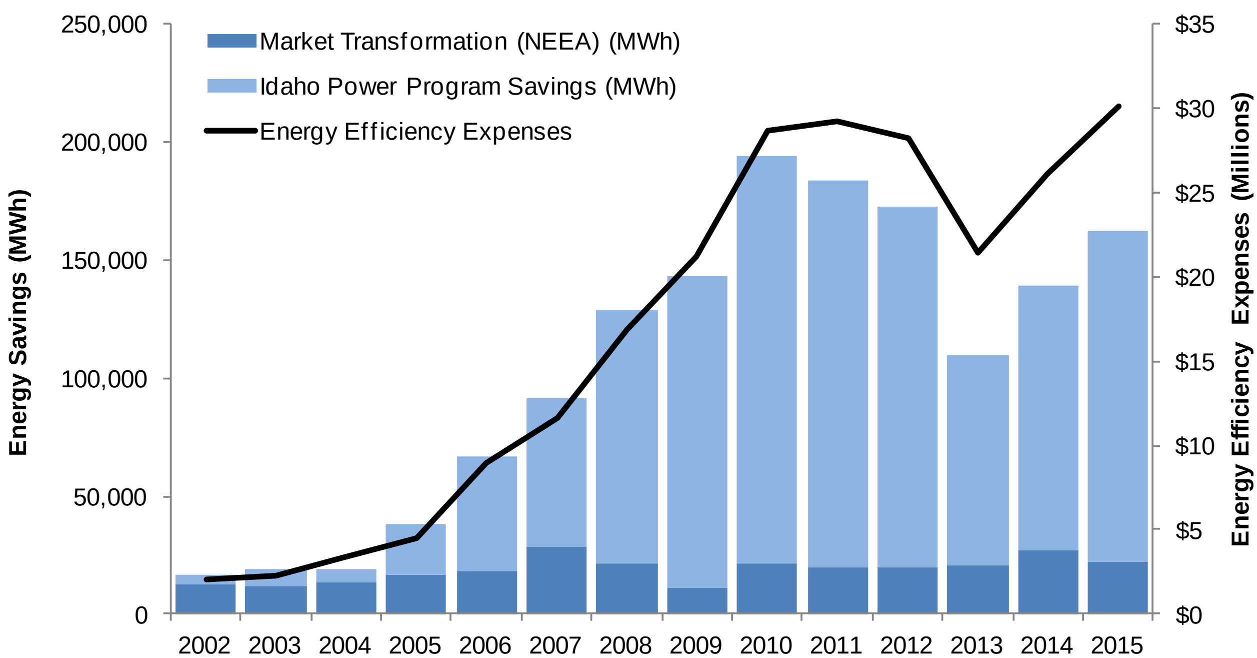


Figure 2. Annual energy savings and energy efficiency program expenses, 2002–2015 (MWh and millions [$])

Figures 3 and 4 show the company's total DSM expenses for all funding sources, separated between energy efficiency expenses and demand response expenses.

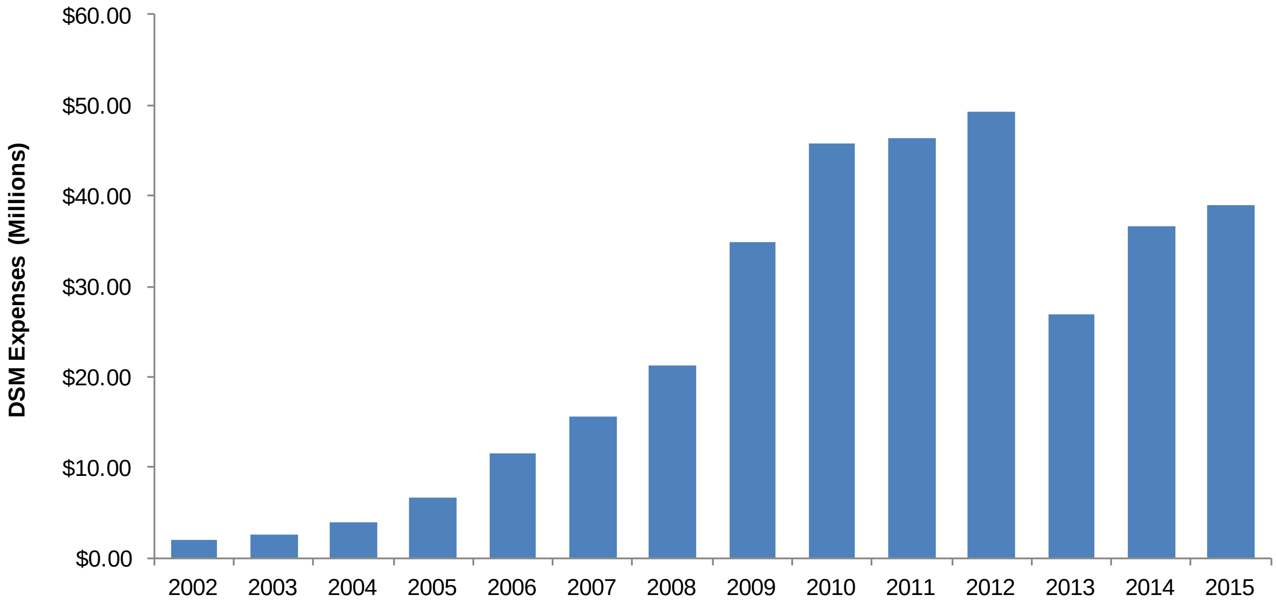


Figure 3. DSM expense history, 2002–2015 (millions [$])

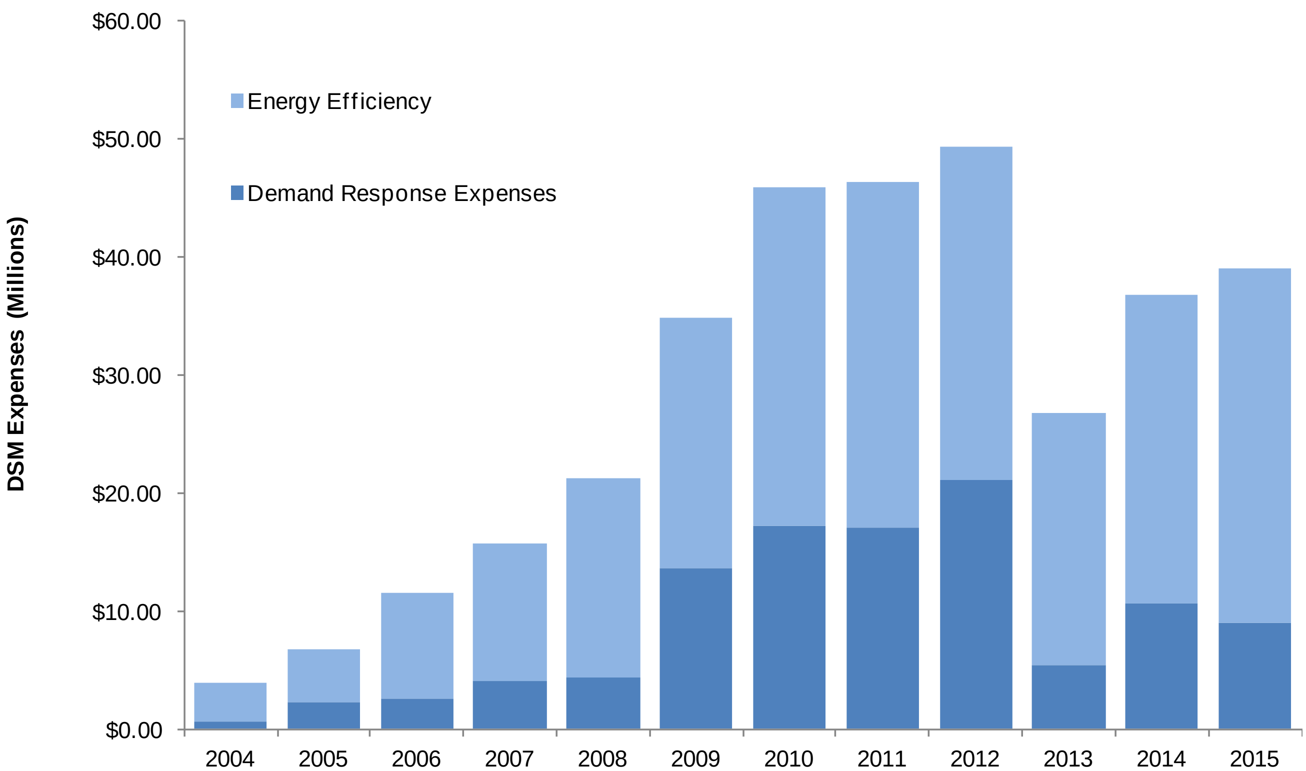


Figure 4. DSM expense history by program type, 2004–2015 (millions [$])

Energy efficiency and demand response are an important aspect of Idaho Power's resource planning process. Idaho Power's 2015 energy savings exceeded the annual savings target identified in Idaho Power's 2015 IRP. On a cumulative basis, the company's energy savings have exceeded the IRP targets every year since 2002 when the energy efficiency riders began. For the 2015 IRP, Idaho Power contracted with a third party to conduct an energy efficiency potential study to estimate the company's energy efficiency potential from 2015 to 2034. The company included all of the achievable energy efficiency potential in the 2015 IRP. Idaho Power considers this achievable potential as a reasonable 20-year planning estimate. It does not consider the achievable potential as a ceiling limiting energy efficiency acquisition.

Figure 5 shows Idaho Power's total annual energy efficiency savings in average megawatts (aMW) overlaid with the company's IRP energy-savings targets (aMW).

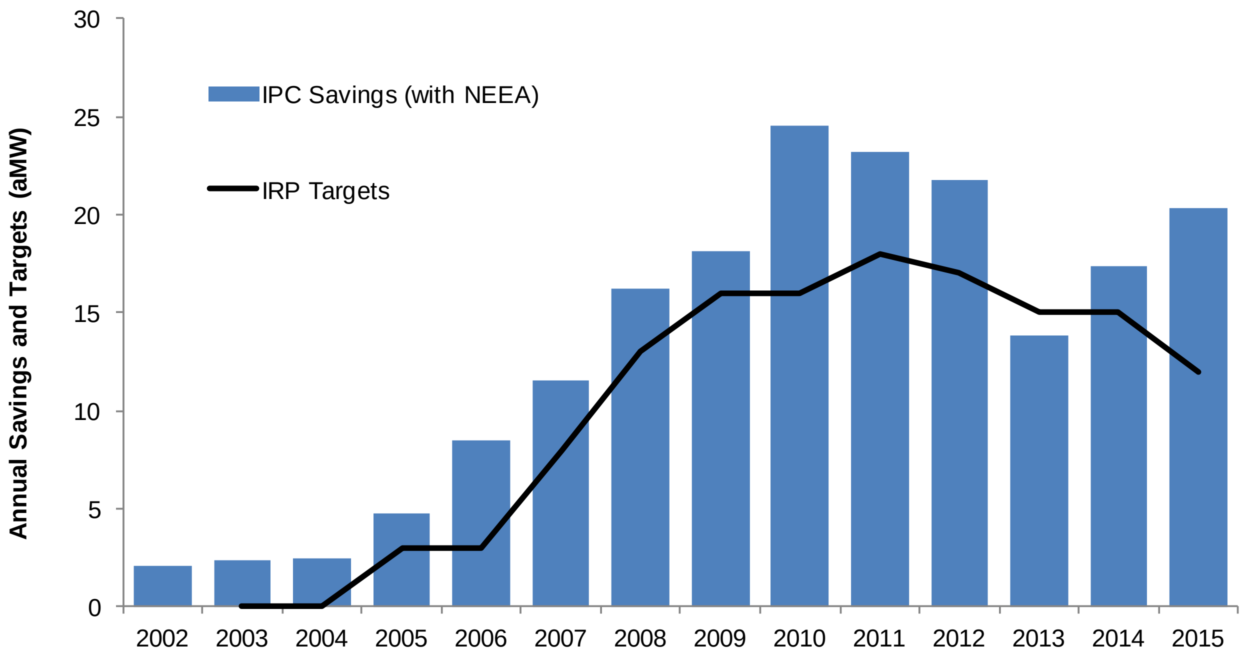


Figure 5. Annual incremental energy efficiency savings (aMW) compared with IRP targets, 2002–2015

Figure 6 shows Idaho Power's total cumulative energy efficiency savings overlaid with the company's cumulative IRP energy-savings targets (aMW).

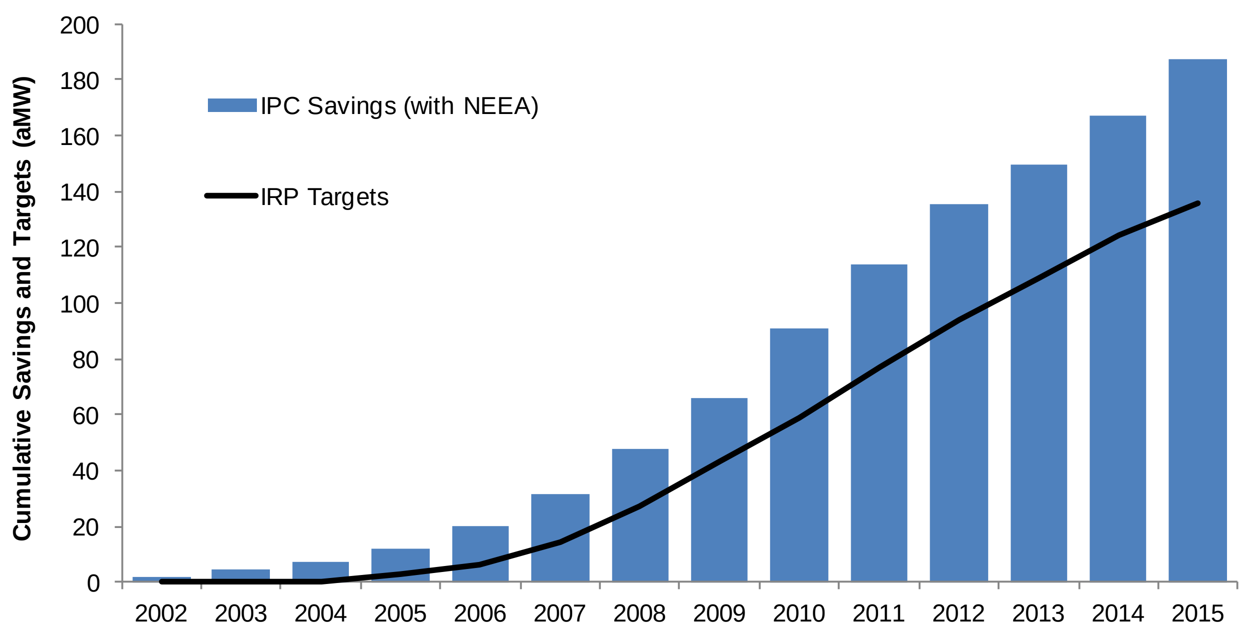


Figure 6. Annual cumulative energy efficiency savings (aMW) compared with IRP targets, 2002–2015

Demand Response Programs

Idaho Power started its modern demand response programs in 2002 and now has over 10 percent of its all-time peak load available under demand response programs. The goal of demand response at Idaho Power is to minimize or delay the need to build new supply-side peaking resources. The company estimates future capacity needs through the IRP planning process and plans resources to mitigate any system peak deficits that exist. Demand response programs are measured by the amount of demand reduction, in MW, available to the company during system peak periods.

In summer 2015, Idaho Power had a combined maximum available demand response capacity of 385 MW at the generation level. The amount of capacity available for demand response varies based on weather, the time of year, and how programs are used and managed. The capacity of 385 MW is calculated using total enrolled MW from participants with an expected maximum realization rate for those participants. This maximum realization rate is not always achieved for every program in any given event. This realization rate is expected to be approximately 73 percent of billing demand for Irrigation Peak Rewards and 100 percent of actual load reduction for A/C Cool Credit and the Flex Peak Program. In 2015, the actual non-coincidental load reduction from all three programs was approximately 367 MW. This number was lower than 378 MW (achieved in 2014) primarily because the Irrigation Peak Rewards did not achieve its maximum realization rate. In 2015, southern Idaho had unseasonably warm weather early in spring and some participants had already stopped irrigating when the program was used. On Monday, June 29, 2015, the company used the Irrigation Peak Rewards program and reached a system peak of 3,320 MW. Had the program not been used, the company estimates the load would have been approximately 3,433 MW, which would have exceeded the previous all-time system peak of 3,407 MW.

Energy Efficiency Programs

Idaho Power's energy efficiency programs focus on reducing energy use by identifying homes, buildings, equipment, or components for which an energy-efficient design, replacement, or repair can achieve energy savings. Energy efficiency programs sometimes include behavioral components, including the Residential Energy Efficiency Education Initiative and the Wastewater Energy Efficiency Cohort offering in the Custom Efficiency program. Energy efficiency programs are available to all customer sectors in Idaho Power's service area. Project measures range from entire residential or commercial building construction to high-efficiency window replacement. Savings from these programs are measured in terms of kilowatt-hour (kWh) or MWh savings. These programs usually supply energy savings throughout the year at different degrees. Idaho Power shapes these savings based on the end use to estimate energy reduction at specific times of the year and day. Idaho Power's energy efficiency offerings include programs in residential and commercial new construction (lost-opportunity savings), residential and commercial retrofit applications, and irrigation and industrial system improvement or replacement. Custom programs under the irrigation and industrial sectors offer a wide range of unique opportunities for Idaho Power and its customers to design and execute energy-saving projects.

Market Transformation

Market transformation is an effort to change the existing market for energy efficiency goods and services by engaging and influencing large national companies to manufacture or supply more energy-efficient equipment. Market transformation can also attempt to identify barriers and opportunities to increase the market adoption of efficiency. Idaho Power achieves market transformation savings primarily through its participation in the NEEA. Idaho Power has been a funding member of

NEEA since its inception in 1997. NEEA's role in this process is to look to the future to find emerging opportunities and to create a path forward to make those opportunities a reality in the region.

NEEA's current, five-year funding cycle began in 2015. As early as 2009, Idaho Power expressed a desire to see a change in the way NEEA services were offered in the 2015 to 2019 funding cycle that would differentiate "core" services of market transformation activities from optional services. This way, utilities could elect to support projects and activities that matched their interests and needs. This effort resulted in a 2015 to 2019 NEEA business plan, which is forecast to obtain 145 aMW of regional energy savings at a cost savings of about $3 million over the next five years to Idaho Power customers as compared to the previous five-year business plan. The NEEA plan also offered some optional programs and activities to prevent overlap of activities when local utilities have the capability to provide the same services at a lower cost or more effectively.

Programs and Activities

Idaho Power recognizes the value of energy efficiency awareness and education in creating behavioral change that helps customers use energy wisely. The goal of other programs and activities is to promote energy efficiency programs, projects, and behavior in customers. These awareness efforts increase customer demand for, and satisfaction with, Idaho Power's programs and activities. These activities include customer outreach, marketing, research, project development, and education programs. This category includes the Residential Energy Efficiency Education Initiative, Easy Savings Program, Commercial Education, and Educational Distributions.

Program Planning Group

In early 2014, Idaho Power convened a Program Planning Group (PPG) to explore new opportunities to expand current DSM programs and offerings. The group consisted of residential program specialists, commercial and industrial engineers, energy efficiency analysts, marketing specialists, energy efficiency program leaders, and the research and analysis leader. The group has expanded to include a departmental specialist and a research assistant. Throughout 2015, the group met regularly to explore new ideas to promote energy efficiency and to evaluate new potential programs and measures. The PPG does not perform program execution. Instead, the group's role is to determine if a measure has energy-saving potential, has market adoption potential, and is potentially cost-effective.

In 2015, Idaho Power incorporated three new ideas from the PPG into the Heating & Cooling Efficiency (H&CE) Program. Included were 1) single-family home duct sealing, which is prescriptive duct-sealing for heat pumps and electric-resistance heated homes; 2) residential electronically commutated motor (ECM), which is the more efficient replacement for failed permanent split capacitor (PSC) motors with ECMs in forced-air systems; and 3) a residential whole house fan pilot, which is the installation of a whole-house fan (WHF) between a home's attic and the conditioned space that displaces forced air and zonal direct expansion cooling. Also in 2015, the company gave LED bulbs to attendees at events for promotional, educational, and market transformation purposes.

In the commercial sector, the company began the water supply cohort—now called the Water Supply Optimization Cohort (WSOC). In September 2015, Idaho Power recruited municipal supply system operators and trained them to identify operation improvements and potential capital projects to improve energy use of their systems. The WSOC will continue through 2016.

Four other PPG ideas were presented to Energy Efficiency Advisory Group (EEAG) and are being implemented in 2016. They are 1) energy efficiency kits mailed out by request; 2) distribution of clothes drying racks for educational purposes; 3) smart thermostats included in the H&CE Program; and 4) multifamily direct-install project. The multifamily direct install project will be evaluated in 2016 to determine if it can be an ongoing effort. Other program modifications presented to EEAG and incorporated into existing programs were an effort to market to and complete projects for multifamily housing units the Home Improvement Program and the inclusion of non-electrically heated homes into the Home Energy Audit program.

Idaho Power will continue to use the PPG to review, evaluate, and deliver new energy efficiency offerings in 2016 and beyond.

Table 1 provides a list of 2015 DSM programs and their respective sectors, operational type, state each was available, and associated energy savings.

Table 1. 2015 DSM programs by sector, operational type, location, and energy savings/demand reduction

Program by Sector	Operational Type	State	Savings/Demand Reduction
Residential			
A/C Cool Credit	Demand Response	ID/OR	36 MW
Easy Savings	Energy Efficiency	ID	625 MWh
Education Distributions	Energy Efficiency	ID	1,669 MWh
Energy Efficient Lighting	Energy Efficiency	ID/OR	15,876 MWh
Energy House Calls	Energy Efficiency	ID/OR	755 MWh
ENERGY STAR® Homes Northwest	Energy Efficiency	ID/OR	821 MWh
Heating & Cooling Efficiency Program	Energy Efficiency	ID/OR	1,502 MWh
Home Energy Audit	Energy Efficiency	ID	136 MWh
Home Improvement Program	Energy Efficiency	ID	304 MWh
Oregon Residential Weatherization	Energy Efficiency	OR	12 MWh
Rebate Advantage	Energy Efficiency	ID/OR	359 MWh
Residential Energy Efficiency Education Initiative	Other Programs and Activities	ID/OR	n/a
See ya later, refrigerator®	Energy Efficiency	ID/OR	720 MWh
Shade Tree Project	Other Programs and Activities	ID	n/a
Simple Steps, Smart Savings™/Home Products Program	Energy Efficiency	ID/OR	771 MWh
Weatherization Assistance for Qualified Customers	Energy Efficiency	ID/OR	550 MWh
Weatherization Solutions for Eligible Customers	Energy Efficiency	ID	433 MWh
Commercial/Industrial			
Building Efficiency	Energy Efficiency	ID/OR	23,232 MWh
Commercial Education	Other Programs and Activities	ID/OR	n/a
Custom Efficiency	Energy Efficiency	ID/OR	55,247 MWh
Easy Upgrades	Energy Efficiency	ID/OR	23,595 MWh
Flex Peak Program	Demand Response	ID/OR	26 MW
Oregon Commercial Audits	Energy Efficiency	OR	n/a
Irrigation			
Irrigation Efficiency Rewards	Energy Efficiency	ID/OR	14,027 MWh
Irrigation Peak Rewards	Demand Response	ID/OR	305 MW
All Sectors			
Northwest Energy Efficiency Alliance	Market Transformation	ID/OR	21,900 MWh

Table 2 shows the 2015 annual energy savings, percent of energy usage, number of customers, and aMW savings associated with each of the DSM program categories. The table also provides a comparison of the 2015 contribution of each sector in terms of energy usage and the number of customers. Unless otherwise noted, all energy savings presented in this report are measured or estimated at the customer's meter, excluding line losses.

Table 2. 2015 program sector summary and energy usage/savings/demand reduction

	Energy Efficiency Program Impacts[a]				Idaho Power System Sales		
	Program Expenses	Energy Savings (kWh)	Average Energy (aMW)	Peak-Load Reduction (MW)[b]	Sector Total (MWh)	Percentage of Energy Usage	Number of Customers
Residential	$ 7,607,478	24,531,834	2.8	–	4,939,269	34.87%	436,102
Commercial/Industrial	15,525,494	102,073,910	11.7	–	7,180,986	50.69%	68,467
Irrigation	1,835,711	14,027,411	1.6	–	2,046,290	14.44%	20,293
Market Transformation	2,582,919	21,900,000	2.5	–	n/a	n/a	n/a
Demand Response	9,000,638	n/a	n/a	367	n/a	n/a	n/a
Other Programs and Activities	597,654	n/a	n/a	–	n/a	n/a	n/a
Total Program Expenses	**$ 37,149,893**	**162,533,155**	**19.0**	**367**	**14,166,545**	**100.00%**	**524,862**

[a] Energy, average energy, and expense data have been rounded to the nearest whole unit, which may result in minor rounding differences.
[b] Includes peak-load reduction from both demand response and energy efficiency programs. Includes 9.7% peak line loss assumptions.

Program Evaluation

Idaho Power considers program evaluation an essential component of its DSM operational activities. The company contracts with third-party contractors to conduct impact, process, and other evaluations on a scheduled and as-required basis.

Third-party contracts are generally awarded using a competitive bid process managed by Idaho Power's Strategic Sourcing department. In some cases, research and analysis is conducted internally and managed by Idaho Power's Research and Analysis team within the Customer Relations and Energy Efficiency (CR&EE) department. Third-party evaluations are specifically managed by the company's energy efficiency evaluator.

Idaho Power uses industry-standard protocols for its internal and external evaluation efforts, including the *National Action Plan for Energy Efficiency—Model Energy Efficiency Program Impact Evaluation Guide*, the *California Evaluation Framework*, the *International Performance Measurement and Verification Protocol* (IPMVP), the *Database for Energy Efficiency Resources*, and the Regional Technical Forum's (RTF) evaluation protocols.

The company also supports regional and national studies to promote the ongoing cost-effectiveness of programs, the validation of energy savings and demand reduction, and the efficient management of its programs. Idaho Power considers primary and secondary research, cost-effectiveness analyses, potential assessments, impact and process evaluations, and customer surveys important resources in providing accurate and transparent program-savings estimates. Recommendations and findings from evaluations and research are used to continuously refine Idaho Power's DSM programs.

In 2015, Idaho Power completed six program impact evaluations and three program process evaluations using third-party contractors. Applied Energy Group (AEG) conducted process and impact evaluations of the Home Improvement Program, Ductless Heat Pump Pilot, and See ya later, refrigerator® programs.

CLEAResult Consulting, Inc. (CLEAResult), conducted impact evaluations of the Irrigation Peak Rewards, A/C Cool Credit, and Flex Peak Program 2015 demand response events.

In 2015, Idaho Power administered surveys on several programs to measure program satisfaction. Participant surveys were conducted for Easy Upgrades, Home Energy Audit, Shade Tree Project, Weatherization Assistance for Qualified Customers (WAQC), and Weatherization Solutions for Eligible Customers.

Throughout 2015, ADM Associates, Inc. (ADM) made several small revisions to the technical reference manual (TRM) for Building Efficiency and Easy Upgrades. These revisions include additional system types to the heating, ventilation, and air conditioning (HVAC) controls section and an expanded description of eligible equipment for air conditioning (A/C) and heat pump systems. Additionally, ADM updated the savings for measures impacted by the International Energy Conservation (IECC) 2012 code.

Final reports from all evaluations, research, and surveys completed in 2015 and an evaluation schedule are provided in *Supplement 2: Evaluation*.

Customer Satisfaction

In 2015, based on surveys conducted in 2014, Idaho Power ranked fourth out of seven utilities included in the west region midsize segment of the J.D. Power and Associates *2015 Electric Utility Business Customer Satisfaction Study*. Sixty-two percent of the business customer respondents in this study indicated they are aware of Idaho Power's energy efficiency programs, and those customers are more satisfied with Idaho Power than customers who are unaware of the programs.

In 2015, based on surveys conducted in the last six months of 2014 and the first six months of 2015, Idaho Power ranked 4 out of 14 utilities included in the west region midsize segment of the J.D. Power and Associates *2015 Electric Utility Residential Customer Satisfaction Study*. Forty-six percent of the residential respondents in this study indicated they are aware of Idaho Power's energy efficiency programs, and those customers are more satisfied with Idaho Power than customers who are unaware of the programs.

Idaho Power employs Burke, Inc., an independent third-party research vendor, to conduct customer relationship surveys to measure the overall customer relationship and satisfaction with Idaho Power. The Burke Customer Relationship survey measures the satisfaction of a number of aspects of the customer's relationship with Idaho Power, including energy efficiency at a very high level. However, it is not the intent of this survey to measure all aspects of energy efficiency programs offered by Idaho Power.

The 2015 results of Idaho Power's quarterly customer relationship survey showed an increase in overall satisfaction from the previous year. Sixty-two percent of customers indicated their needs are met or exceeded by Idaho Power encouraging energy efficiency among its customers. Figure 7 depicts the annual change in the percent of customers who indicated Idaho Power met or exceeded their needs concerning energy efficiency efforts encouraged by Idaho Power.

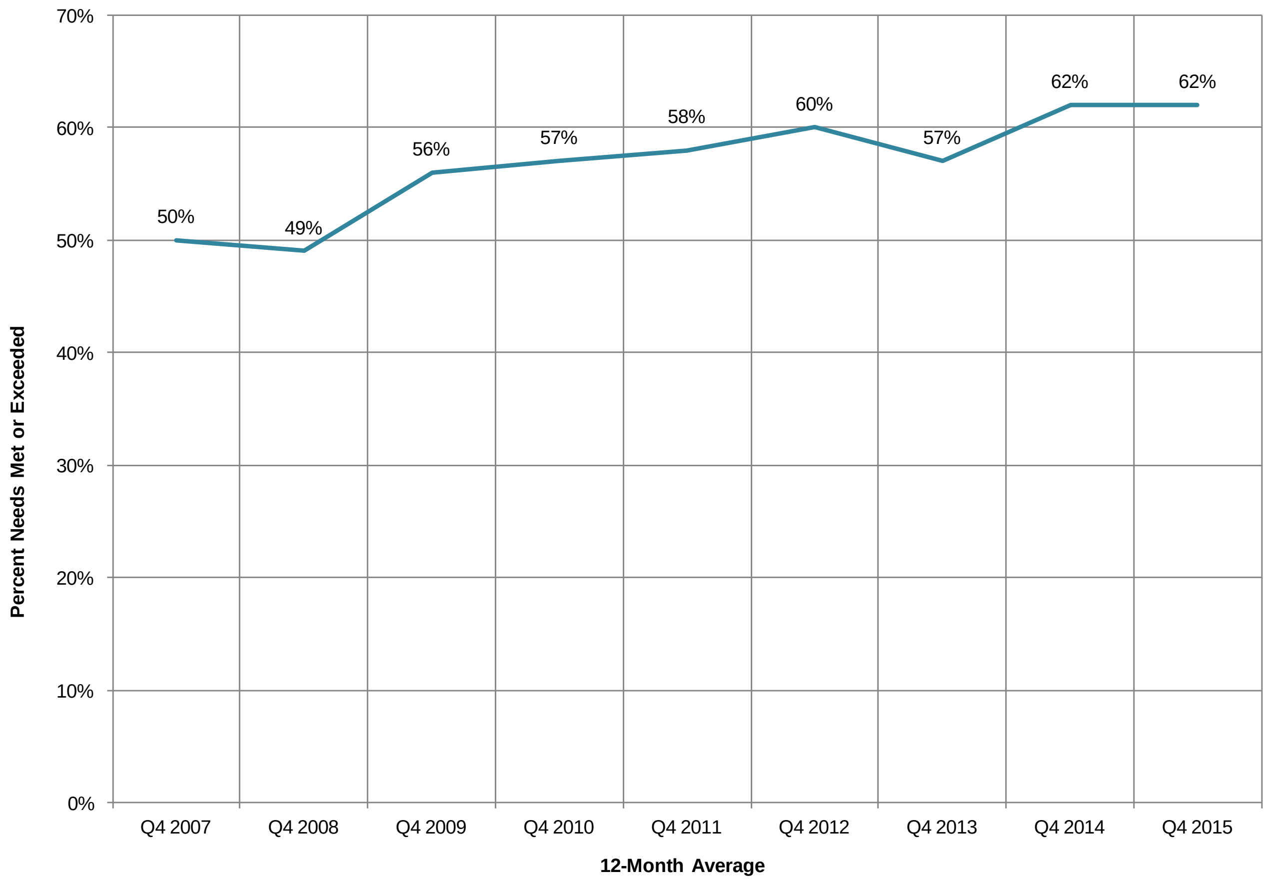


Figure 7. Percent of customers whose needs are met or exceeded by Idaho Power's energy efficiency efforts

Three questions related to energy efficiency programs in the general relationship survey continued in the 2015 survey: 1) Have you participated in any of Idaho Power's energy efficiency programs?, 2) Which energy efficiency program did you participate in?, and 3) Overall, how satisfied are you with the energy efficiency program? In 2015, 40 percent of the survey respondents across all sectors indicated they participated in at least one Idaho Power energy efficiency program, and 92 percent were "very" or "somewhat" satisfied with the program they participated in.

In 2015, Idaho Power created the em**powered** community, an online community of residential customers, to measure customer perceptions on a variety of company-related topics, including energy efficiency. Recruiting for the community was conducted primarily through billing inserts and mailed postcards. The community currently has 818 active members. Idaho Power sends out at least one survey per month to active members. Energy efficiency-related survey topics in 2015 included residential laundry habits, recall of the spring 2015 energy efficiency marketing campaign, and holiday lighting. The average response rate for surveys conducted with the online community is 64.3 percent.

Results of these studies are included in *Supplement 2: Evaluation*.

Idaho Power will not survey most energy efficiency program participants annually. This is due primarily to a concern of over-surveying program participants and because the measures and specifics of most program designs do not change annually. To ensure meaningful research in the future, Idaho Power will conduct program research periodically (every two to three years), unless there have been major program changes.

Cost-Effectiveness

Cost-effectiveness is of primary importance in the design, implementation, and tracking of energy efficiency and demand response programs. Idaho Power's energy efficiency and demand response opportunities are preliminarily identified through the IRP process. Idaho Power uses third-party energy efficiency potential studies to identify achievable cost-effective energy efficiency potential, which is added to the resources included in the IRP. Idaho Power considers this achievable potential as a reasonable 20-year planning estimate; however, the company does not consider the achievable potential as a ceiling limiting energy efficiency acquisition.

Because of Idaho Power's already diverse portfolio of programs, most of the new potential for energy efficiency in Idaho Power's service area is based on additional measures to be added to programs rather than new programs.

Prior to the actual implementation of energy efficiency or demand response programs, Idaho Power performs a cost-effectiveness analysis to assess whether a potential program design will be cost-effective from the perspective of Idaho Power and its customers. The most current and reliable information available is incorporated in these models. When possible, Idaho Power leverages the experiences of other utilities in the region or throughout the country to help identify specific program parameters.

Idaho Power believes all the cost-effectiveness tests are important and they should be considered in relation to each other. The company's goal is for all programs to have benefit/cost (B/C) ratios greater than one for the TRC test, UC test, and participant cost test (PCT) at the program and measure level where appropriate. If a particular measure or program is pursued even though it will not be cost-effective from each of the three tests, Idaho Power works with EEAG to get input. If the measure or program is offered, the company explains why the measure or program was implemented or continued. The company believes this aligns with the expectations delineated in the OPUC Order No. 94-590.

As a result of the two Energy Efficiency Working Group meetings for stakeholders held in conjunction with Idaho Power's 2015 IRP, the company is continuing its investigation of energy efficiency-related transmission and distribution benefits. Idaho Power began the study in 2015 and will continue the analysis in 2016 as part of analysis conducted preliminary to starting the 2017 IRP process, and is anticipating results in mid to late 2016.

When a new program or measure is considered, Idaho Power launches a pilot or a program to evaluate estimates or assumptions in the cost-effectiveness analysis. Following the implementation of a program, cost-effectiveness analyses are reviewed as new inputs from the actual program activity become available, such as actual program expenses, savings, or participation levels. If measures or programs are determined not to be cost-effective after implementation, the program or measures are re-examined, including using input provided from EEAG.

Appendix 4 contains the UC and TRC B/C ratios using actual cost information over the life of each program through 2015. These B/C ratios are provided as a measure of cost-effectiveness for all Idaho Power energy efficiency programs currently being offered where energy savings are realized. As in 2014, the actual historic savings and expenses are not discounted; only the value of the ongoing savings are discounted to reflect today's dollars. A complete description of Idaho Power's methodology, input assumptions, sources, and results is presented in *Supplement 1: Cost-Effectiveness*.

Idaho Power currently uses the DSM alternative costs from the 2013 IRP. Idaho Power also freezes savings assumptions when the budgets and goals are set for the next calendar year unless code and standards changes or program updates necessitate an immediate need to use updated savings. These assumptions will be discussed in more detail in the cost-effectiveness sections for each program.

As part of the public workshops on Case No. IPC-E-13-14, Idaho Power and stakeholders agreed upon a method for valuing demand response programs. The settlement agreement was approved in Idaho Public Utilities Commission (IPUC) Order No. 32923 and OPUC Order No. 13-482. Per the settlement agreements, the annual cost of operating the three demand response programs for the maximum allowable 60 hours should be no more than $16.7 million. This $16.7 million value is the levelized annual cost of a 170-MW simple-cycle combustion turbine (SCCT) over a 20-year life. In 2015, the cost of operating the three demand response programs was $9 million. Idaho Power estimates that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $12.4 million and would have remained below the agreed upon value.

Idaho Power's portfolio of energy efficiency programs is cost-effective, passing both the TRC test and the UC test with ratios of 2.32 and 3.57, respectively. The company's energy efficiency programs' sector portfolios were also cost-effective from a TRC test and UC test perspective.

In 2015, all of Idaho Power's energy efficiency programs were cost-effective, except the Home Improvement Program and the weatherization programs for income-qualified customers.

In 2015, the Home Improvement Program was not cost-effective from the TRC perspective. The RTF reduced savings for single-family home weatherization projects in 2015. With the changes, average savings estimates per project were just under 50 percent of 2014 projects. The lower savings were approved by the RTF in October of 2014 and revised in the spring of 2015. These new savings were a result of the nearly 18-month RTF process to calibrate residential savings models. As a consequence, four of the six measures offered in the Home Improvement Program are no longer cost effective from the TRC perspective. Idaho Power incorporated the new savings for all 2015 projects. In 2016, the company will evaluate the non-cost-effective measures and the impact on program's cost-effectiveness to determine if these measures should be modified or removed from the program. Idaho Power will present possible program modification and seek suggestions from EEAG.

Twenty-four measures in various programs are shown not to be cost-effective from either the UC or TRC perspective. These measures will be discontinued, analyzed for additional non-energy benefits (NEB), modified to increase potential per-unit savings, or monitored to examine their impact on the specific program's overall cost-effectiveness.

Table 3 shows Idaho Power's cost-effectiveness ratios for the UC, TRC, and PCT perspectives for its energy efficiency programs by sector and by portfolio.

Table 3. Idaho Power's cost-effectiveness ratios for the UC, TRC, and PCT perspectives for its energy efficiency programs by sector and by portfolio

	2015 B/C Tests		
Program/Sector	**UC**	**TRC**	**PCT**
Easy Savings	2.61	2.95	N/A
Educational Distributions	2.05	2.60	N/A
Energy Efficient Lighting	4.53	4.23	5.39
Energy House Calls	2.81	2.96	N/A
ENERGY STAR® Homes Northwest	2.10	1.04	1.49
Heating & Cooling Efficiency Program	3.11	1.05	1.36
Home Improvement Program	1.91	0.67	1.05
Rebate Advantage	4.54	3.45	6.46
See ya later, refrigerator ®	1.21	1.53	N/A
Simple Steps, Smart Savings/Home Products Program	3.37	4.83	6.62
Weatherization Assistance for Qualified Customers	0.54	0.43	N/A
Weatherization Solutions for Eligible Customers	0.45	0.50	N/A
Residential Energy Efficiency Sector	**2.31**	**2.11**	**3.82**
Building Efficiency	7.63	3.70	3.56
Custom Efficiency	4.03	1.77	1.37
Easy Upgrades	3.85	2.20	2.51
Commercial/Industrial Energy Efficiency Sector	**4.48**	**2.13**	**1.92**
Irrigation Efficiency	6.00	3.84	3.59
Irrigation Energy Efficiency Sector	**6.00**	**3.84**	**3.59**
Energy Efficiency Portfolio	**3.57**	**2.32**	**2.61**

Details on the cost-effectiveness assumptions and data are included in *Supplement 1: Cost-Effectiveness*.

Future Plans

Idaho Power will continue to pursue all prudent cost-effective energy efficiency as identified by third-party potential studies and an appropriate amount of demand response based on the demand response settlement agreement approved in IPUC Order No. 32923 and OPUC Order No. 13-482. The forecast level of energy efficiency and the needed level of demand response are included in Idaho Power's biennial IRP planning process. Idaho Power includes all achievable cost-effective energy savings as identified in its potential studies in each IRP. Idaho Power considers this achievable potential a reasonable 20-year planning estimate; however, the company does not consider the achievable potential as a ceiling limiting energy efficiency acquisition. The IRP is a public document developed in a public process that details Idaho Power's strategy for economically maintaining the adequacy of its power system into the future. The IRP process balances reliability, cost, risk, environmental concerns, and efficiency to develop a preferred portfolio of future resources to meet specific energy needs of Idaho Power's customers.

The company will continue to explore new potential as identified in the company's third-party energy efficiency potential study and through other third-party resources and conferences and will continue to assess and develop new program offerings through its PPG. Idaho Power will work in consultation with EEAG to expand or modify its energy efficiency portfolio. Plans for individual programs in 2016 are included under each program's *2016 Program and Marketing Strategies*.

In 2016, Idaho Power will continue to enhance its marketing and outreach efforts as described in the Marketing section and within each program section. Idaho Power will continue to work with NEEA on its market transformation activities during the 2015 to 2019 funding cycle.

The company will complete its research and evaluation, measurement, and verification (EM&V) projects included in the evaluation plan in *Supplement 2: Evaluation*.

Idaho Power will incorporate energy efficiency equipment and practices into its own facilities. In 2016, Idaho Power will construct a new Twin Falls Operations Center, build three duplex units between Brownlee and Oxbow dams, construct new crew quarters and an office at Daly Creek, and continue the remodel of its CHQ.

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DSM Expenditures

Funding for DSM programs in 2015 came from several sources. The Idaho and Oregon Rider funds are collected directly from customers on their monthly bills. For 2015, the Idaho Rider was 4 percent of base-rate revenues. The 2015 Oregon Rider was 3 percent of base-rate revenues. Additionally, Idaho demand response program incentives were paid through base rates and the annual PCA mechanism. Energy efficiency and demand response-related expenses not funded through the Rider are included as part of Idaho Power's ongoing operation and maintenance (O&M) costs.

Total DSM expenses funded from all sources were $39 million in 2015. At the beginning of 2015, the Idaho Rider balance was approximately negative $0.8 million, and by December 31, 2015, the positive balance was $6.6 million. At the beginning of the year, the Oregon Rider negative balance was approximately $3.9 million, and by year-end, the negative balance was $4.5 million.

Table 4 shows the total expenditures funded by the Idaho Rider, $28,494,548; the Oregon Rider, $1,724,118; and non-rider funding, $8,822,269, resulting in Idaho Power's total DSM expenditures of $39,040,935. The non-rider funding category includes Idaho Power demand response incentives, WAQC expenses, and O&M costs.

Table 4. 2015 funding source and energy savings

Funding Source	Expenses	MWh Savings
Idaho Rider	$ 28,494,548	153,979,466
Oregon Rider	1,724,118	7,379,131
Non-Rider Funding	8,822,269	1,174,559
Total	**$ 39,040,935**	**162,533,155**

Table 5 and Figure 8 indicate 2015 DSM program expenditures by category. The expenses in the Other Expense category include marketing ($960,055), program evaluation ($104,007), program training ($432,375), and program audits ($115,976). The Purchased Services category includes payments made to NEEA and third-party contractors who help deliver Idaho Power's programs: EnerNOC, Inc., for Irrigation Peak Rewards; CLEAResult Consulting for Energy Efficient Lighting; JACO Environmental, Inc. (JACO), for See ya later, refrigerator®; Honeywell for A/C Cool Credit; Cascade Energy, Inc., for Custom Efficiency; Evergreen Consulting and RM Energy Consulting for Easy Upgrades; and contractors for WAQC and Weatherization Solutions for Eligible Customers. The Materials & Equipment category includes items that directly benefit customers: LED bulbs distributed at customer events ($138,492), and direct install weatherization measures ($125,000).

Table 5. 2015 DSM program expenditures by category

	Total	% of Total
Incentive Expense	$ 24,016,364	61%
Labor/Administrative Expense	3,395,155	9%
Materials & Equipment	287,424	1%
Other Expense	1,598,865	4%
Purchased Services	9,743,128	25%
Total 2015 Rider Expenditures, by Category	**$ 39,040,935**	**100%**

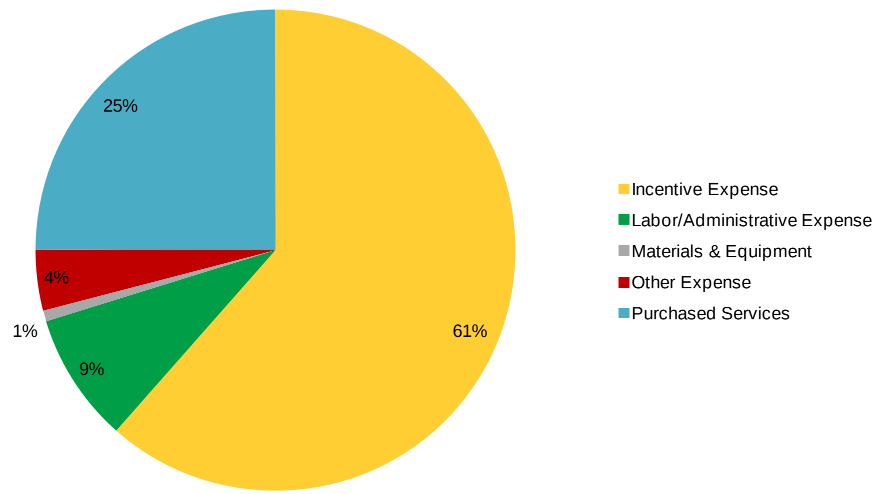

Figure 8. 2015 DSM program expenditures by category

Table 6 and Figure 9 describe the amount and percentage of incentives paid by segment and sector. There are two incentive segments—demand response and energy efficiency—and three sectors—residential, commercial/industrial, and irrigation. The incentives are funded by the Idaho and Oregon Rider, Idaho PCA mechanism, and Idaho Power base rates. Market transformation-related payments made to NEEA and payments made to third-party community action partners under the WAQC and Weatherization Solutions for Eligible Customers programs are not included in the incentive amounts.

Table 6. 2015 DSM program incentives by segment and sector

	Sector Total	% of Total
DR[a]—Residential	$ 440,190	2%
DR—Commercial/Industrial	487,857	2%
DR—Irrigation	6,166,726	26%
EE[b]—Irrigation	1,497,682	6%
EE—Residential	2,972,041	12%
EE—Commercial/Industrial	12,451,868	52%
Total Incentive Expense	**$ 24,016,364**	**100%**

[a] DR = demand response
[b] EE = energy efficiency

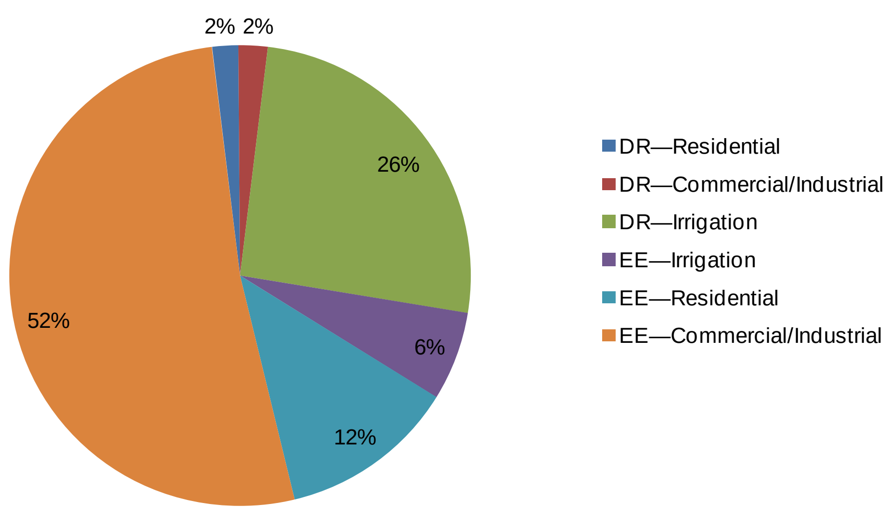

Figure 9. 2015 DSM program incentives by segment and sector

MARKETING

Idaho Power used a variety of marketing, public relations, and research during 2015. The company will continue with new and proven techniques for 2016. The following describes a selection of the methods, approaches, and tactics used by Idaho Power to engage with customers regarding energy efficiency.

Idaho Power added commercial, public, and online radio; network television; an expanded residential awareness campaign; an online customer research panel; and airport signage to the company's marketing tactics in 2015.

In March, June, and September 2015 Idaho Power ran 60-second and 30-second radio spots on major commercial radio stations, Spanish-speaking radio stations, and National Public Radio (NPR) stations in the service area. The message reminded customers they have the power to save energy, save money, and live more comfortably. In March and September, these radio spots ran on Pandora internet radio accessed by mobile and web-based devices. The commercial stations that ran the spots had a variety of station formats to obtain optimum reach, including classic rock, news/talk, country, adult alternative, adult contemporary, and classic hits.

NPR is not measured the same way as commercial radio. Listener numbers do not appear in traditional ratings research. Research from Idaho Power's media buying vendor, Media Partners, finds that 80 percent of public radio listeners say they have a positive impression of a company that supports public radio. Seventy percent of listeners say that underwriting messages have a positive impact on their purchase decisions. Twenty-eight percent of listeners claim to have been directly influenced by public radio in buying a product or service, versus only five to seven percent who claim to have been influenced by messages on a commercial radio station. Media Partners advised that public radio listeners are open to trying new products and services but are less likely to be influenced by the usual means of reaching consumers.

Some of the local NPR stations the company ran advertising on have local data on its listening audience. Media Partners also provided information that Boise State Public Radio (KBSX-FM) broadcasts to more than 100,000 listeners throughout southern and central Idaho's metropolitan and rural areas. Boise State Public Radio's purpose is to be at the civic, cultural, and intellectual forefront of the community to create an informed, engaged public. The Boise State Public Radio listener profile is comprised of 55 percent men and 45 percent women, of which 68 percent are age 35 to 64.

KISU-FM, the public radio station in Pocatello, claims to have more listeners than most commercial stations in the market and is the most listened to public radio station in eastern Idaho. Generally, the audience numbers for non-commercial radio are too small to appear in research, but KISU-FM in Pocatello actually do. The spring 2015 Eastlan Ratings research shows that each week, almost 9,000 people tune in to KISU for at least 15 minutes. Approximately 820 people hear each message. Idaho Power's 44 messages in June on public radio in Pocatello would have delivered approximately 36,080 gross impressions.

KDPI-FM, in Twin Falls, does not appear in the local market ratings. The programming is a mix of music, local news/talk, and nationally syndicated radio programs.

In summary, Idaho Power ran 1,232 60-second radio spots in March, 1,308 30-second radio spots in June, and 1,308 30-second radio spots in September, totaling 3,848 radio spots in 2015.

Commercial radio results indicated that in March, June, and September Idaho Power reached 55 percent of the company's target audience (age 35–64) using a variety of formats to obtain optimum reach, including classic rock, news/talk, country, adult alternative, adult contemporary, and classic hits, including the Spanish radio stations. In commercial radio, frequency is defined as the number of times the target audience should have heard the spots. Frequency is different for each market. Listeners in Idaho Power's targeted geographic markets could have heard the spot 4.9 times in Boise, 3.9 times in Twin Falls, and 6.3 times in Pocatello.

Advertising ran on local NPR stations in Idaho Power's service area and on commercial stations simultaneously. In March, June, and September, NPR stations ran the radio ad 36 times on KBSX-FM in Boise, 40 times on KISU-FM in Pocatello, and 100 times in KDPI-FM in Twin Falls.

Idaho Power ran spots on Pandora internet radio. In March, records show 1,575,135 impressions and 4,065 banner clicks. September yielded 1,487,631 impressions and 3,604 banner clicks.

Another 2015 marketing project was the Residential Energy Efficiency Awareness Campaign. The company received two awards in 2015 for the Residential Energy Efficiency Awareness Campaign from the Idaho Advertising Federation Rockie Awards, which strives to recognize creative excellence in advertising in Idaho. The fall TV spot won a Silver Award, and the complete campaign won a Citation Award.

Figure 10 is an example of the campaign materials in 2015.

Figure 10. Examples from the residential energy efficiency awareness campaign.

The campaign evolved from smaller marketing campaigns completed in 2014, when Idaho Power began using integrated marketing campaigns to increase awareness of the residential programs as a whole, rather than individually. These campaigns use a variety of integrated tactics, including radio, television, newspaper ads, digital ads, Facebook ads, *Connections*, and Idaho Power's website to reach various demographics and use multiple tactics in a one-month period to increase exposure to the message.

The goals of the campaign are to 1) raise awareness of the programs collectively rather than by individual program; 2) use a variety of tactics (television, radio, newspaper ads, online ads, social media, *Connections*) to reach a variety of customer demographics; 3) use all the tactics in the same month to increase customer exposure to the message; 4) and to let customers know they have options when it comes to saving energy.

In 2015, the company increased the number of customers reached and the number of times they were exposed to the message. The company doubled the budget, added network television, and created new images and messages.

In 2015, Idaho Power extended the marketing reach using new tactics, including radio and network television advertising and new graphics and messaging with a bold, colorful look and feel. Messaging focused on a variety of ways to create an energy-efficient home and Energy Savings Made Easy as a central theme, illustrating how easy energy efficiency can be with Idaho Power's help.

Table 7 provides the cumulative results from the 2015 residential energy efficiency awareness campaign.

Table 7. Cumulative results from 2015 residential energy awareness advertising campaign

Marketing Tactic	March 2015	May 2015[a]	June 2015	September 2015
Network television reach		95% of 25–54 year olds		95% of 25–54 year olds
Network television frequency*		5		5
Radio ads	1,232 60-second ads		1,308 30-second ads	1,308 30-second ads
Radio frequency**				
Boise			4.9	4.9
Twin Falls			3.9	3.9
Pocatello			6.3	6.3
NPR				
Pandora (clicks)	4,065			3,604
Pandora (impressions)	1,575,135			1,487,631
Print advertising (impressions)		1,123,588		1,109,534
Online advertising (impressions)		339,725	436,965	654,080
Click-through rate (CTR) [b]		0.067%	0.047%	0.06%
Connections (printed)		410,804		412,742
Facebook ads (customers reached)		190,696		54,407
Facebook frequency*		26.77		25.8
idahopower.com/energyefficiency/residential page views		5,867		8,057

*Number of times target audience saw the spot on average

**Number of times target audience heard the spot on average

[a] A portion of the May digital ads, known as online advertising, targeted business and politics, which were the wrong demographic. Therefore, Media Partners gave Idaho Power a rerun credit in June, which explains the difference between the May and September ad campaign results and the additional numbers for June.

[b] Generally, in the United States energy/utility industry, the average CTR for digital ads is 0.07 percent.

Idaho Power ran the campaigns primarily in May and September 2015. A radio campaign ran in March to reach the spring home improvement market and in June to extend the message.

Pandora internet radio is a music streaming and automated music recommendation service where the company ran Idaho Power radio spots and banner ads in March and September 2015. Pandora includes a banner ad, which Pandora reported had 4,065 clicks to Idaho Power's residential energy efficiency web home page in March.

Additional marketing efforts included *Connections*, distributed with customers' bills, with both the May and September content devoted to energy efficiency. Sent to more than 415,000 customers in their bills, *Connections* has provided opportunities for energy-efficiency messages beyond the two energy efficiency-focused issues. For example, the December issue featured a story about myAccount, including information about using the online tool to understand energy use and identify ways to save energy. Program-specific articles are noted within the program sections.

In 2015, Idaho Power staff spoke to customers attending the Canyon County Fair in a Voice of the Customer video posted on YouTube. Idaho Power asked willing participants about energy efficiency and what they do to save energy. Some of those excerpts—and other YouTube energy efficiency videos—are available on the Idaho Power website at youtube.com/user/idahopower.

In 2015, public relations efforts included energy efficiency messaging and program information in the company's weekly *News Briefs* email to all media in Idaho Power's service area. The purpose of this outreach is to present story ideas to the media for their coverage and provide enough information for media outlets with small staffs to use the item as is. Many reporters followed up on the following broadcast stories and interviews:

- Make a New Year's Resolution to Save Energy—January 5, 2015
- Interactive 'Home' Shows Energy-Saving Tips—March 23, 2015
- Turning Up Awareness On Energy Efficiency—May 4, 2015
- New Energy Efficiency Guide Available Now—July 20, 2015
- Ways to Save Energy and Money When It's Hot—July 13, 2015
- October is National Energy Awareness Month—October 5, 2015
- myAccount Helps Monitor Holiday Electric Use—November 9, 2015
- Prepare Your Home for Winter—November 23, 2015

Idaho Power used network television advertising. In May and September, 95 percent of customers in Idaho Power's target audience (age 25–54) viewing network television in May saw the commercial an average of five times.

Idaho Power's public relations efforts established relationships with two regional television news programs—KTVB (Boise and Twin Falls) and KPVI (Pocatello)—for monthly, live, in-studio energy efficiency segments during their news broadcast. The KTVB segment typically airs between 4:00 p.m. and 5:00 p.m. weekdays, and the KPVI segment between 6:30 a.m. and 7:00 a.m. weekdays. Generally, Idaho Power prepares segments of interest to all customers but often focuses on program-related information. All appearances end with a call-to-action about the energy efficiency program or sends viewers to the Idaho Power website for more information. When possible, Idaho Power prepares similar information for both markets—always informative and providing props that demonstrate the topics discussed. The 2015 topics included the following:

- KPVI: Weatherization Solutions (May), heating and cooling (June), energy efficiency quiz (July), See ya later, refrigerator® (August), windows (September), ideas for October Energy Awareness Month (October), and energy-efficient holiday lighting (November)

- KTVB: Weather-stripping (January), See ya later, refrigerator® (March), air sealing/caulking (April), heating and cooling (May), energy efficiency quiz (June), top seven ideas for October Energy Awareness Month (September), and energy-efficient holiday lighting (November)

On Facebook, Idaho Power reached 190,696 people with 5,860 clicks to the Idaho Power website in May. Each person Idaho Power reached saw the ad 26.77 times. In September, the company reached 183,974 people with 6,079 clicks to the Idaho Power website. Each person the company reached saw the ad 25.8 times.

Print advertising ran in all the major daily newspapers and the weekly newspapers throughout the service area. The ads conveyed individual energy efficiency programs or tips to customers, such as using insulation to keep cool air in and hot air out in summer.

The response to the campaign was measured using Idaho Power's em**powered** community, an online panel of over 800 customers asked to share perceptions and feedback on a variety of topics each month. The following results were obtained regarding the May Energy Efficiency Residential Awareness Campaign:

- Twenty-eight percent of respondents remember seeing or hearing one of the ads from television, radio, print, digital, or social media.

- Fifty-four percent of respondents recalled the television ads, the highest recall among respondents.

- Over 84 percent of respondents indicated they are "very likely" or "somewhat likely" to make energy-saving changes in their home after seeing the ads,

- Over 84 percent are "very interested" or "somewhat interested" in more information about energy savings programs.

- Seventy-nine percent of the respondents who recalled seeing or hearing the ads felt positive about the ads they saw or heard.

A copy of the results of the study is located in *Supplement 2: Evaluation*.

Idaho Power tracked the number of page views to the Residential Energy Efficiency home page on the company's website. Page views ranged from 1,964 in April to 8,057 in September and totaled 42,797 in 2015. The company uses Google Analytics to analyze web activity. Google's definition of page views is the total number of pages viewed, with repeated views of a single page being counted.

To build marketing networks and learn what works in other regions, Idaho Power staff met with counterparts at Portland General Electric in Portland, Oregon in June. The company attended the E Source Utility Marketing Executive Council and the E Source Forum held in October in Denver, Colorado. In April 2015, Idaho Power's Corporate Communications director met with a counterpart at Avista to network and discuss best practices in energy efficiency marketing.

Idaho Power used airport signage as a new tactic in 2015. Each year, 2.8 million people travel through the Boise Airport. Forty-five percent are visitors, 55 percent are residents, and 42 percent are business travelers. To reach the business customer, Idaho Power purchased two backlit display ads and placed one ad at the baggage claim, which garners 1.8 million impressions annually, and the other ad in the main concourse, which garners 2.1 million impressions annually.

A variety of print ads ran in 2015, promoting the energy efficiency programs in sectors (residential, commercial/industrial, and irrigation) and specific programs. From the Farm and Ranch edition of the *Argus Observer* displaying the Irrigation Efficiency Rewards program to *Horizon Air Magazine* advertising all of the commercial energy efficiency programs, Idaho Power bought ads to capture the target audience's attention. Print ads ran in daily and weekly newspapers, trade publications, special-interest magazines, newspapers and booklets, chamber of commerce newsletters, association newsletters, association event programs, conference publications, business publications, and association membership directories. The following programs ran print ads: H&CE Program, Weatherization Solutions for Eligible Customers, ENERGY STAR® Homes Northwest, Irrigation Efficiency Rewards, Building Efficiency, Custom Efficiency, Easy Upgrades, DHP Pilot, and Home Improvement Program. Additional ads encompassed all of the energy efficiency residential and commercial programs.

Eight percent of the company's total social media content promoted energy efficiency in 2015. Idaho Power distributed 131 messages about energy efficiency via Twitter and Facebook, approximately one energy efficiency message every three days.

The contractor portal, which launched in 2014 for participating contractor use, remained available in 2015. The portal provides pre-designed printable marketing collateral. Though the portal was available to participating contractors in the H&CE Program and the Home Improvement Program, the portal did not experience activity in 2015. Idaho Power will monitor the contractor portal and have the customer representatives (CR) continue to promote it to the participating contractors that are in the H&CE Program and the Home Improvement Program. The CRs will remind them that the portal offers pre-designed marketing collateral printable for their use and the benefits of using this portal.

The company will continue to monitor the contractor portal for its effectiveness for participating contractors and make changes as needed.

Idaho Power promotes energy efficiency through the company's *Energy@Work Newsletter*. Written for small- and medium-sized business customers, Idaho Power published this newsletter in July and December 2015. Content included information on reliability improvements, use of myAccount, future energy supply, online outage information, and commercial customer training options.

NEEA and Idaho Power held regular meetings throughout 2015 to coordinate, collaborate, and facilitate marketing. Monthly meetings were held via conference call, and meetings in person occurred in June in Portland and December in Boise. All marketing activities are reviewed each month for progress, results, and collaborative opportunities. Marketing with NEEA was also reviewed, such as the DHP point-of-purchase tactics in Lowe's stores.

Marketing specialists attended EEAG meetings in February, May, August, and November 2015. At each meeting, a binder with all marketing collateral delivered to customers in the previous quarter was reviewed by EEAG members.

At the February 2015 EEAG meeting, the plans for the 2015 Residential Energy Efficiency Awareness Campaign were shared with the group, as well as marketing tactics being used at the Boise Airport, March radio spots, and public relations tactics, such as monthly on-air television (KTVB in Boise and KPVI in Pocatello) appearances to discuss energy efficiency. In addition, activities with NEEA were discussed, including ENERY STAR Homes Northwest, DHPs, and heat pump water heaters.

In the May 2015 EEAG meeting, Idaho Power discussed social media's role in marketing energy efficiency. The new messaging and design for the 2015 Residential Energy Awareness Campaign was shown to the group, including television, print, digital and Facebook ads.

Marketing with NEEA was also reviewed at the May EEAG meeting, such as the DHP point-of-purchase tactics in Lowe's stores. City bus signage for Weatherization Solutions for Eligible Customers, a new tactic, was shown to the group.

At the EEAG meeting in August 2015, the following items were discussed with EEAG: progress on an adaptive and responsive website, sub-branding, and the continuation of public relations opportunities especially the television appearances on KTVB in Boise and KPVI in Pocatello. Results from the May Residential Energy Efficiency Awareness Campaign were shared with the group, as well as anticipated numbers from the September Residential Energy Efficiency Awareness Campaign. An 18-month advertising and outreach study was shared with EEAG showing that 44 percent of all ads in 2014 were for energy efficiency.

In the November 2015 EEAG meetings, the company discussed using the em**powered** community/online panel in early 2016 to look at customers' motivations to participate in energy efficiency. Additions to the Residential Energy Efficiency Awareness Campaign for 2016 were discussed including direct mail, bill inserts and potentially a challenge for energy efficiency prizes. The success of using Facebook boosted posts was also discussed.

Internally in 2015, the company experienced staff turnover in the marketing team with one of the two marketing specialists resigning, requiring shifting workload and responsibilities. In fall 2015, new staff was hired and assignment of responsibilities were reassessed.

In 2016, Idaho Power marketing department plans on several approaches including the Residential Energy Efficiency Awareness Campaign, print materials, dedicated weekly social media posts, and website enhancements.

In 2016, the Residential Energy Efficiency Awareness Campaign will run for four months as opposed to the two months it ran in 2015, providing more frequent exposure to the message Energy Savings Made Easy, a central theme, illustrating how easy energy efficiency can be with Idaho Power's help. The company is creating a stronger call to action on the digital campaigns to increase the CTR. New elements under consideration to bring more customer engagement to the campaign are bill inserts, direct mail, and potentially a promotional challenge, such as to win an energy-efficient appliance.

In 2016, all *Energy@Work Newsletter* issues will start with a customer's success story feature article.

Idaho Power will continue to redesign its website to move to an adaptive framework. The company's interactive approach, which began with myAccount in 2015, is scheduled for completion by first quarter 2017. Idaho Power's new adaptive site will greatly enhance navigation and ease of finding energy efficiency program information. An adaptive website recognizes the device accessing the website and automatically responds or adapts to the dimensions of that device (e.g, a smart phone). Future releases will be responsive/adaptive to tablets and mini tablets.

In 2016, the company will expand its marketing efforts by dedicating weekly social media posts to energy efficiency. Idaho Power will use a form of paid media where the ad matches the look and function of the platform (i.e., newspaper) it appears on and digital ads to promote its energy efficiency guide. Additionally, the company will expand the duration and scope of its integrated energy-savings campaign.

Also in 2016, the marketing team will begin exploring a consistent look and feel for all residential program materials for possible implementation in 2017. The process starts with testing customers' motivations for participating in energy-efficient campaigns with the online panel.

Energy Efficiency Advisory Group

Formed in 2002, EEAG provides input on enhancing existing DSM programs and on implementing energy efficiency programs. Currently, EEAG consists of 14 members from Idaho Power's service area and the Pacific Northwest. Members represent a cross-section of customers from the residential, industrial, commercial, and irrigation sectors, as well as representatives for seniors, low-income individuals, environmental organizations, state agencies, public utility commissions, and Idaho Power. EEAG meetings are generally open to the public and attract a diverse audience. Idaho Power appreciates the input from EEAG and acknowledges the commitment of time and resources of individual members to participate in EEAG meetings and activities.

EEAG met four times in 2015: February 19, May 6, August 26, and November 5. Additionally, EEAG held a conference call on January 9, 2015. During these meetings, Idaho Power discussed and requested feedback on new program ideas and new measure proposals, marketing methods, and specific measure details; provided a status of the Idaho and Oregon Rider funding and expenses; updated ongoing programs and projects; and supplied general information on DSM issues and important issues occurring in the region. Idaho Power relies on input from EEAG to provide a customer and public-interest review of energy efficiency and demand response programs and expenses. The notes from the 2015 EEAG meetings are included in *Supplement 2: Evaluation*.

On January 9, 2015, EEAG members participated in a confidential conference call to discuss the existing FlexPeak Management program that was managed by a third-party contractor. The company wanted feedback as to whether or not Idaho Power should renew the contract or administer the program in-house.

During the February 19, 2015, EEAG meeting, Idaho Power introduced the new professional facilitator for the 2015 EEAG meetings. At the meeting, Idaho Power described the company's new online community, em**powered** community, launched by Idaho Power in 2015. Idaho Power asked for feedback and ideas on options to include in the energy efficiency kits. Members provided feedback and asked multiple follow-up questions. The company also asked EEAG for feedback regarding combining the commercial and industrial programs. Members were generally supportive of the idea and provided feedback.

At the May 6, 2015, EEAG meeting, CLEAResult presented results of the impact evaluations on the A/C Cool Credit and Irrigation Peak Rewards programs. Idaho Power sought feedback from the group on three programs: Weatherization Solutions for Eligible Customers, See ya later, refrigerator®, and Home Products Program with Simple Steps, Smart Savings™ promotion. The group provided good feedback and ideas for Weatherization Solutions for Eligible Customers and See ya later, refrigerator® and was supportive of the company participating in the Home Products—Simple Steps promotion. The company also asked EEAG for feedback regarding a new measure under consideration for the H&CE Program. The group was supportive of Idaho Power starting this as a pilot program.

The August 26, 2015, EEAG meeting highlighted the preliminary year-to-date energy savings of each program. There was a discussion focused on the IRP process. Idaho Power requested feedback from the group on existing programs and new opportunities for smart thermostats, the Home Improvement Program, and Home Energy Audit program. Members sought more details and provided suggestions to the company. The company also asked EEAG for suggestions or ideas to increase participation in the Flex Peak Program for the small commercial customer and if the company should market to additional customer groups for A/C Cool Credit program.

During the November 5, 2015 EEAG meeting, the AEG presented the results of the impact and process evaluations for See ya later, refrigerator®, Home Improvement Program, and the DHP Pilot. Idaho Power sought ideas from EEAG for a new name for the combining of the commercial and industrial programs. Idaho Power also asked for feedback from EEAG on potential tariff changes for the Irrigation Efficiency Rewards program. The group was generally in support of the change. The company sought discussion and feedback from EEAG on the following items: residential energy savings kits, multifamily direct install, and drying racks. EEAG provided many ideas and sought more details.

In addition to the 2015 EEAG meetings, Idaho Power solicited further customer input by meeting directly with stakeholder groups in the residential, commercial, industrial, and irrigation customer sectors. Idaho Power also enhanced its relationships with trade allies, trade organizations, and regional groups committed to increasing the use of energy efficiency programs and measures to reduce electricity load.

DSM Annual Report Structure

This main *Demand-Side Management 2015 Annual Report* is organized primarily by the customer sectors residential, commercial/industrial, and irrigation. Each sector has a description, which is followed by information regarding programs in that sector. Each program description includes a table containing 2015 and 2014 program metrics, followed by a general description, 2015 activities, cost-effectiveness, customer satisfaction/evaluation, and 2016 plans. Each program section contains detailed information relating to program changes and the reasoning behind those changes, including information on cost-effectiveness and evaluation. Following the sector and program sections of the report are descriptions of Idaho Power's activities in market transformation, other programs and activities, and Idaho Power's regulatory initiatives. Appendices 1 through 5 follow the written sections and contain a table on 2015 expenses and savings and historic information for all energy efficiency programs and demand response activities at Idaho Power.

Idaho Power currently divides its service area into three geographic regions: 1) Canyon–West, which combines the former Canyon and Western regions; 2) Capital, which retains the same geographic area; and 3) South–East, which combines the former Southern and Eastern regions.

Appendices 1 through 4 contain financial, energy savings, demand reduction, levelized costs, and program-life B/C ratios from the UC and TRC perspectives. Appendix 5 contains detailed financial and energy-savings information separated by Idaho Power's two jurisdictions, Idaho and Oregon.

Included again this year are two supplements and an attached CD. *Supplement 1: Cost-Effectiveness* contains detailed annual cost-effectiveness information by program and energy-saving measures, as well as detailed financial information separated by expense category and jurisdiction. Provided in Supplement 1 are the B/C ratios from the UC, TRC, ratepayer impact measure test (RIM), and PCT perspectives. As of 2015, Idaho Power is using the DSM alternate costs and other financial inputs from Idaho Power's 2013 IRP.

Supplement 2: Evaluation contains Idaho Power's evaluation plans, copies of completed program evaluation reports, research reports, and reports created by Idaho Power or third parties. A CD containing market progress evaluation reports (MPER) and other reports provided by NEEA is attached to Supplement 2.

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RESIDENTIAL SECTOR OVERVIEW

Description

Idaho Power and its approximately 2,100 employees serve more than one million residents in southern Idaho and eastern Oregon. At the close of 2015, the company was serving 436,102 residential customers in its service area. During 2015, Idaho Power continued to see a steady increase of residential customers adding 7,808 customers. Compared to 2014, the company added 1,702 more customers in 2015. The Boise and southern Idaho economy remains strong. The company is seeing a steady increase of new residential customers and more housing construction. The residential segment represented 35 percent of Idaho Power's total electricity usage and contributed 42 percent of total revenue for the company.

Residential customers used 1.9 percent less energy during 2015 than in 2014. This lower usage can be attributed to a variety of reasons, including, but not limited to, milder temperatures, energy efficiency program activities and customer awareness of energy efficiency. Idaho Power also continued its education and promotion of energy efficiency programs/information to all residential customers through a variety of marketing channels during the year. Idaho Power's marketing efforts are described in the Marketing and individual program sections of this report.

Idaho Power's peak demand during 2015 was 3,402 MW on June 30 at 4:00 p.m., the magnitude of which was diminished by the deployment of the A/C Cool Credit program and Flex Peak Program, which decreased load by about 60 MW during the peak-load period. Idaho Power's all-time system peak of 3,407 MW occurred on July 2, 2014. The company estimates that it would have achieved a new system peak absent the deployment of the Irrigation Peak Rewards program on June 29, 2015.

Table 8 shows a summary of 2015 participants, costs, and savings from the residential energy efficiency programs.

Programs

Table 8. 2015 residential program summary

Program	Participants		Total Cost: Utility	Total Cost: Resource	Savings: Annual Energy (kWh)	Savings: Peak Demand (MW)
Demand Response						
A/C Cool Credit	29,000	participants	$1,148,935	$ 1,148,935		36
Total			**$1,148,935**	**$ 1,148,935**		**36**
Energy Efficiency						
Easy Savings	2,068	kits	$ 127,477	$127,477	624,536	
Education Distributions	28,197	kits/bulbs	432,185	432,185	1,669,495	
Energy Efficient Lighting	1,343,255	bulbs	2,063,383	4,428,676	15,876,117	
Energy House Calls	362	homes	214,103	214,103	754,646	
ENERGY STAR® Homes Northwest	598	homes	653,674	1,412,126	773,812	
ENERGY STAR® Homes Northwest (gas heated)	69	homes			46,872	
Heating & Cooling Efficiency Program	427	projects	626,369	2,064,055	1,502,172	
Home Energy Audit	351	homes	201,957	236,706	136,002	
Home Improvement Program	408	homes	272,509	893,731	303,580	
Oregon Residential Weatherization	19	homes	5,808	10,388	11,910	
Rebate Advantage	58	homes	85,438	117,322	358,683	
See ya later, refrigerator®	1,630	refrigerators/freezers	227,179	227,179	720,208	
Simple Steps, Smart Savings™/ Home Products Program	9,343	appliances/ showerheads	139,096	408,032	770,822	
Weatherization Assistance for Qualified Customers	243	homes/non-profits	1,315,032	2,119,801	550,021	
Weatherization Solutions for Eligible Customers	171	homes	1,243,269	1,243,269	432,958	
Total			**$7,607,478**	**$13,935,050**	**24,531,834**	

Notes:
See Appendix 3 for notes on methodology and column definitions.
Totals may not add up due to rounding.

In 2015, the company modified a few residential programs. The DHP Pilot was incorporated into the H&CE Program, and three new measures were added; the Home Products Program was terminated in early 2015 and replaced by a new program titled Simple Steps, Smart Savings; and Students for Energy Efficiency Kit (SEEK) and LED giveaways were incorporated into the new Educational Distributions program.

Idaho Power markets its residential energy efficiency programs to its customers through online advertising, social media, print ads, radio and television commercials, media and public relations, success stories, brochures, sponsorships, direct mail, retail events, customer visits, meetings with trade allies and contractors, participation in home and garden shows, remodeling events, and county fairs. The company website is an important marketing tool to lead customer to energy efficiency websites. Bill communication included monthly bill inserts and messages and articles in the *Connections* customer newsletter, including two issues (May and September) devoted entirely to energy efficiency topics and programs. *Connections* is mailed in bills monthly to approximately 415,000 customers and available online to those who request paperless billing. Energy efficiency guides included the *Spring/Summer Energy Efficiency Guide* (July) and the *Fall/Winter Energy Efficiency Guide* (January 2016). Table 9 shows a summary of bill inserts by month, program, topic, and number of inserts sent.

Table 9. Summary of bill communications sent in 2015

Month	Program/Topic	Total Inserts
January	Home Energy Audit	99,065
	myAccount	378,537
February	em**powered** community	369,130
	Energy House Calls/Rebate Advantage	369,129
	Commercial Industrial Energy Efficiency Programs	40,389
	Weatherization Solutions for Eligible Customers	353,720
March	Home Energy Audit	10,124
	See ya later, refrigerator®	366,827
April	Home Improvement Program	355,883
	See ya later, refrigerator®	367,617
May	Heat Pumps	349,889
	ENERGY STAR® Homes Northwest	368,851
	Energy Audits and Home Weatherization Financing (OR)	11,742
June	See ya later, refrigerator®	369,296
July	Home Improvement Program	358,180
	See ya later, refrigerator®/ Weatherization Solutions for Eligible Customers	354,484
August	See ya later, refrigerator®/ Weatherization Solutions for Eligible Customers	355,503
September	Heating & Cooling Efficiency Program	371,130
	Home Improvement Program/Energy House Calls	359,356
October	See ya later, refrigerator®	372,023
	Commercial and Industrial energy efficiency programs	39,842
	Weatherization Solutions for Eligible Customers	356,514
November	Home Energy Audit	80,391

The company received favorable feedback from customers and employees related to the mobile capability of www.idahopower.com during 2015.

Presentations to community groups and businesses continued to be a major emphasis during 2015. Idaho Power CRs and CERs made hundreds of presentations in communities served by the company.

Idaho Power conducts the Burke Customer Relationship survey each year. In 2015, 51 percent of residential survey respondents indicated Idaho Power is meeting or exceeding their needs with information on how to use energy wisely and efficiently.

Sixty-one percent of residential respondents indicated Idaho Power is meeting or exceeding their needs by encouraging energy efficiency with its customers. Forty-six percent of Idaho Power residential customers surveyed in 2015 indicated Idaho Power is meeting or exceeding their needs in offering energy efficiency programs, and 29 percent of the residential survey respondents indicated they have participated in at least one Idaho Power energy efficiency program. Of the residential survey respondents who have participated in at least one Idaho Power energy efficiency program, 83 percent are "very" or "somewhat" satisfied with the program.

Forty-six percent of the Idaho Power residential customers included in the *2015 J.D. Power and Associates Electric Utility Residential Customer Satisfaction Study* indicated they are familiar with Idaho Power's energy efficiency programs.

In 2015, the em**powered** community was surveyed regarding residential laundry habits, customer recall of the spring 2015 energy efficiency marketing campaign, and holiday lighting. Results of these studies are included in *Supplement 2: Evaluation*.

A/C Cool Credit

	2015	2014
Participation and Savings		
Participants (participants)	29,000	29,642
Energy Savings (kWh)	n/a	n/a
Demand Reduction (MW)	36	44
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$659,471	$962,286
Oregon Energy Efficiency Rider	$45,825	$56,988
Idaho Power Funds	$443,639	$446,372
Total Program Costs—All Sources	$1,148,935	$1,465,646
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	n/a	n/a
Total Resource Levelized Cost ($/kWh)	n/a	n/a
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	n/a	
Total Resource Benefit/Cost Ratio	n/a	

Description

Originating in 2003, A/C Cool Credit is a voluntary, dispatchable demand response program for residential customers in Idaho and Oregon. Using communication hardware and software, Idaho Power cycles participants' central A/C or heat pumps off and on via a direct-load control device installed on the A/C unit. This program enables Idaho Power to reduce system capacity needs during times when summer peak load is high.

The cycling season is June 15 through August 15. The maximum number of cycling hours available per season is 60 hours, with a minimum of three cycling events per season. The incentive is $15 per season, paid as a $5 bill credit on the July, August, and September bills. The program is not available on weekends or holidays, and the maximum length of an event is four hours.

Customers' A/C units are controlled using switches that communicate by powerline carrier (PLC). A switch is installed on each customer's A/C unit and allows Idaho Power to cycle the customer's A/C unit during a cycling event.

2015 Program Marketing Activities

Per the settlement agreement reached in Idaho Case No. IPC-E-13-14 and Oregon Case No. UM 1653, Idaho Power did not actively market the A/C Cool Credit program in 2015; however, customer communication and retention was active. Idaho Power attempted to recruit customers who had moved into a home that already had a load control device installed and recruit previous participants who changed residences to a location that did not have a load-control device. The existing means of recruiting these two groups—which involved calling, sending letters, visiting the participants' locations if needed, and leaving door hangers for those not home—was supplemented in 2015 with the use of specially created postcards.

Before the cycling season began, participants were sent a postcard reminding them of the program specifics. Three cycling events occurred in 2015 on June 30, July 21, and July 31. At the end of the summer, a thank-you postcard was sent to program participants.

Idaho Power's weekly *News Briefs*—an email to all media in the service area—mentioned the success of the company's demand response programs, including A/C Cool Credit, in helping reduce the peak load during the summer season topics included *High Summer Electricity Demand Hits Early* (June 29) and *Customers Helped Reduce Peak Electrical Loads* (July 13).

Cost-Effectiveness

As part of the public workshops in conjunction with Case No. IPC-E-13-14 and UM 1653, Idaho Power and other stakeholders agreed on a new method for valuing demand response. The settlement agreement, as approved in IPUC Order No. 32923 and OPUC Order No. 13-482, defined that the annual cost of operating the three demand response programs for the maximum allowable 60 hours must not be more than $16.7 million. This $16.7 million value is the levelized annual cost of a 170-MW deferred resource over a 20-year life. In 2015, the cost of operating the three demand response programs was $9 million. It is estimated that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $12.4 million, and the programs would have remained cost-effective.

The A/C Cool Credit program was dispatched for 9 event hours and achieved a maximum demand reduction of 36 MW. The total expense for 2015 was $1,148,935 and would have remained the same if the program was fully used for 60 hours because there is no variable incentive paid for events beyond the three required events.

Customer Satisfaction and Evaluations

Idaho Power contracted with CLEAResult to complete an impact evaluation of the 2015 A/C Cool Credit program. The goal of the evaluation was to estimate demand reduction achieved during three curtailment events and update the existing predictive model to incorporate results from the 2015 curtailment events. CLEAResult completed analyses of curtailment events held on June 30, July 21, and July 31, each with a three-hour duration. Results of the analyses showed maximum single-hour demand reductions of 1.11 kilowatts (kW), 0.65 kW, and 1.04 kW per participant, respectively, for the three events. The average hourly demand reduction was 1.04 kW, 0.62 kW, and 0.74 kW per participant, respectively. The results of the curtailment event analyses showed maximum generation-level demand reductions of 36.3, 21.0, and 23.8 MW, respectively, for the three events. The results of the curtailment event analyses showed maximum meter-level demand reductions of 33.1, 19.1, and 21.7 MW, respectively, for the three events. The results of the impact evaluation demonstrated that Idaho Power's A/C Cool Credit program functions as intended, and if properly maintained, can be relied on to provide dispatchable demand reduction to the electricity grid. Due to the distinct weather patterns between the Boise and Pocatello/Twin Falls regions, each curtailment event analysis included region-specific results. A copy of the report is included in *Supplement 2: Evaluation*.

2016 Program and Marketing Strategies

Per the terms of the settlement agreement, Idaho Power will not actively promote the A/C Cool Credit program to solicit new participants through marketing but will accept new participants who request to participate, regardless of whether they were previous participants in the program. Attempts will continue to be made to recruit previous participants who have moved, as well as new customers moving into homes that already have a load-control device installed.

Easy Savings

	2015	2014
Participation and Savings		
Participants (kits)	2,068	n/a
Energy Savings (kWh)	624,536	n/a
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$0	n/a
Oregon Energy Efficiency Rider	$0	n/a
Idaho Power Funds	$127,477	n/a
Total Program Costs—All Sources	$127,477	n/a
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.021	n/a
Total Resource Levelized Cost ($/kWh)	$0.021	n/a
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	2.61	
Total Resource Benefit/Cost Ratio	2.95	

Description

Three main desired outcomes of the Easy Savings program are to educate recipients about saving energy in their homes by using energy wisely, allow hands-on experience while installing low-cost measures, and reduce the energy burden for energy assistance/Low Income Home Energy Assistance Program (LIHEAP) recipients.

As a result of IPUC Case No. IPC-E-08-10 under Order Nos. 30722 and 30754, Idaho Power committed to fund energy efficiency education for low-income customers and provide $125,000 to Community Action Partnership (CAP) agencies in the Idaho Power service area on a prorated basis. These orders specified that Idaho Power provide educational information to customers who heat their homes with electricity provided by Idaho Power in Idaho. This is accomplished through the development and distribution of kits containing low-cost, self-install energy efficiency items and educational materials.

Initiated in 2009, the Easy Savings program straddles two calendar years. The LIHEAP program cycle starts annually in November at CAP agencies and follows the federal fiscal calendar, while Idaho Power summarizes activities annually based on a January to December cycle. However, the following report summarizes activities from November 2014 through October 2015 and covers future plans for the 2015 to 2016 program.

2014 to 2015 Program and Marketing Activities

By April 2015, 2,068 kits from the 2014 to 2015 program year were distributed by regional CAP agencies to Idaho Power customers approved to receive LIHEAP benefits on their Idaho Power bills.

Each kit contained the following low-cost/no-cost energy-saving items and a survey:

- LED bulb—11.5 watts (W), 800 lumens

- Set of draft-stopping outlet gaskets
- Hot-water temperature card and digital refrigerator thermometer
- 1.5 gallons per minute (GPM) kitchen faucet aerator
- 1.75 GPM three-function showerhead
- LED nightlight with photocell and a set of reminder stickers and magnets
- *Easy Savings Quick Start Guide* to installation
- Mail-in survey and energy-savings information

Cost-Effectiveness

The RTF provides mail-by-request and giveaway deemed savings estimates for LED bulbs and low-flow showerheads. RTF giveaway and mail-by-request deemed savings values are discounted to reflect the potential that all the kit items may not be installed. Since the RTF does not provide giveaway deemed savings for low-flow showerheads, the mail-by-request deemed value was used.

Customer Satisfaction and Evaluations

The mail-in survey inquiring about installation experiences and actions taken to reduce energy use was included in the 2,068 kits distributed. Returned surveys were used to track the effectiveness and educational impact of the program.

There were 124 completed surveys received from customers describing their experience in installing kit items in their homes during the 2014 to 2015 program. The survey included questions about whether the customer took specific actions to reduce energy use as a result of receiving the kit, as well as questions confirming the installation of kit items.

Over 94 percent of household respondents reported they have, or will, lower their heat during the day, and just over 95 percent reported they have, or will, lower their heat at night. Just over 78 percent of the respondents reported installing the LEDs provided in the kit. Just over 70 percent of the respondents reported installing the high-efficiency showerhead.

Overall, survey results showed that almost 46 percent of the respondents installed all kit items. Just over 78 percent of the respondent households reported learning a lot about saving energy and money in their home after completing the *Easy Savings Quick Start Guide*. Copies of the survey and survey results can be found in *Supplement 2: Evaluation*.

During the 2014 to 2015 program, three gift certificates valued at $100 each were provided by Community Action Partnership Association of Idaho, Inc. (CAPAI), to encourage survey completion. A drawing from all returned surveys was held, and three households won a $100 gift certificate.

2015 to 2016 Program and Marketing Strategies

For the 2015 to 2016 program period, Idaho Power sent checks totaling $125,000 in September to the five Idaho regional CAP agencies. Each agency signed a Memorandum of Understanding (MOU) agreeing to use 30 percent of the agency's allotment to cover expenses for administering the program at their agency. The 30 percent includes the provision for an agency-certified energy educator to inform kit recipients about installation techniques and energy efficiency information. In October 2015, an order for 2,000 kits was placed by CAP agencies. Kits were shipped from the vendor and received at CAP agencies in December 2015 for distribution to customers throughout the 2015 to 2016 LIHEAP season. Three LED bulbs and an indoor clothesline were included in the 2015 to 2016 program kits.

Upon completion of kit distribution and receipt of corresponding survey results for the 2015 to 2016 program, Idaho Power and CAPAI will consider program changes for the future.

Educational Distributions

	2015	2014
Participation and Savings		
Participants (kits/bulbs)*	28,197	n/a
Energy Savings (kWh)	1,669,495	n/a
Demand Reduction (MW)		
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$432,185	n/a
Oregon Energy Efficiency Rider	$0	n/a
Idaho Power Funds	$0	n/a
Total Program Costs—All Sources	$432,185	n/a
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.026	n/a
Total Resource Levelized Cost ($/kWh)	$0.026	n/a
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	2.05	
Total Resource Benefit/Cost Ratio	2.60	

* Includes 6,699 student kits and 21,498 LED giveaway blubs.

Description

Designated as a specific program in 2015, the Educational Distributions effort is administered through the Residential Energy Efficiency Education Initiative and seeks to use low- and no-cost channels to get energy efficiency items with energy savings directly into customers' hands. As with the initiative, the goal for these distributions is to drive behavior change and create awareness of and demand for energy efficiency programs in Idaho Power's service area in Idaho.

Items selected for distribution will have an initial cost-effectiveness analysis that indicates the installed measure is either currently cost-effective or is expected to be cost-effective in the near future. Typically, selected items have additional benefits beyond traditional energy savings, such as educating customers about energy efficiency, expediting the opportunity for customers to experience newer technology, or allowing Idaho Power to gather data or validate potential energy savings resulting from behavior change.

Idaho Power recognizes that behavioral measures and programs require appropriate education and guidance to optimize savings and will plan education accordingly. Items may be distributed at events, presentations, through direct mail, or home visits conducted by CRs.

In situations where Idaho Power manages the education and distribution through existing distribution channels, the cost-effectiveness calculations will be based on the actual cost of the items. Conversely, if outside vendors are used to assist with distribution, the cost-effectiveness calculations will include all vendor-related charges.

2015 Program and Marketing Activities

Student Energy Efficiency Kit Program

The SEEK program provides fourth- to sixth-grade students in schools in Idaho Power's service area with quality, age-appropriate instruction regarding the wise use of electricity. Each child that participates receives an energy efficiency kit. The products in the kit are selected specifically to encourage energy savings at home and engage families in activities that support and reinforce the concepts taught at school.

Once a class enrolls in the program, teachers receive curriculum and supporting materials. Students receive classroom study materials, a workbook, and a take-home kit containing three compact fluorescent lamps (CFL), a high-efficiency showerhead, an LED nightlight, a furnace filter alarm, a digital thermometer for measuring water, refrigerator and freezer temperatures, a water-flow rate test bag, and a shower timer. At the conclusion of the program, students and teachers return feedback to the vendor indicating how the program was received and which measures have been installed. The vendor uses this feedback to provide a comprehensive program summary report showing program results and savings.

During the 2014 to 2015 school year, Idaho Power CERs actively recruited fourth- to sixth-grade teachers to participate in SEEK. As a result, Resource Action Programs (RAP) delivered 6,699 kits to 226 classrooms in 77 schools within Idaho Power's service area. This resulted in 1,476 MWh of second-year savings. Unlike other residential programs offered by Idaho Power, SEEK results are reported on a school-year basis.

Teachers continued to be pleased with the program. One-hundred percent of teachers that completed surveys would recommend the program to other colleagues and would conduct the program again. Student engagement remained high as well—73 percent of student surveys were returned, and 70 percent indicated their families changed the way they used energy as a result of the program. Parents also responded favorably, indicating the program was easy to use, they would like to see it continued in local schools, and they would continue to use the kit items at home after completion of the program.

RAP calculated annual savings based on information collected from the participants' home surveys and the installation rate of the kit items. Questions on the survey include the number of individuals in each home, water-heater fuel type, flow rate of the old showerhead, and the wattage of the bulb replaced.

A copy of the complete program summary report is included in *Supplement 2: Evaluation*.

LED Bulbs as Giveaways

LED bulbs are a welcome and effective way to connect Idaho Power with customers and to begin productive conversations around energy efficiency.

With the support of EEAG members in the November 2014 EEAG meeting, Idaho Power began giving away LED bulbs shortly before they became cost-effective. The goal was to get this new technology into customer hands and accelerate market adoption. By mid-year 2015, Idaho Power had negotiated cost-effective pricing and custom packaging emphasizing the benefits of LEDs and the customer convenience of using Idaho Power's myAccount portal.

Both Idaho Power field staff and energy efficiency program managers sought opportunities to educate customers about LEDs and offer customers a free light bulb to use immediately in their own homes. Staff distributed over 1,000 bulbs to participants of the Smart Women, Smart Money conference at the Boise Centre in February. Another 4,700 went home with Spring Home and Garden Show attendees in Pocatello and Boise. Participants in various Earth Day Events and employee sustainability fairs in Hailey and Pocatello, and in Boise at DIRECTV, Whole Foods, the Boise International Market, Vista Neighborhood, and Wells Fargo received LEDs. More were distributed at the Eagle Island Experience, Paint the Town™, the Mountain Home Air Force Base, FitOne™ Expo, and through presentations at chamber and senior centers. By the end of the year, Idaho Power employees had personally delivered a brief energy efficiency message and placed 21,498 bulbs directly into customers' hands.

Cost-Effectiveness

SEEK Program

The cost-effectiveness analysis for the SEEK offering is based on the savings reported by RAP during the 2014 to 2015 school year. The savings for the program are calculated by RAP based on the feedback received from each student through the kit's surveys. The response rate for the survey was nearly 73 percent. The survey gathers information on the efficiency level of the existing measure within the home and which efficient measure is installed. The energy savings will vary for each household based on the measures offered within the kit, the number of items installed, and the existing measure that is replaced. Based on the feedback received from the 2014 to 2015 school year, each kit saved approximately 220 kWh annually per household on average. A copy of the report is included in *Supplement 2: Evaluation*.

LED Bulbs as Giveaways

For the LED giveaway bulbs, Idaho Power used the giveaway deemed savings provided by the RTF. The RTF-deemed savings includes assumptions regarding the installation rate, efficiency levels of the existing equipment, and the location of the installation.

Customer Satisfaction and Evaluations

The SEEK program is evaluated annually regarding participant satisfaction. For more details on the SEEK program, view the most recent annual report, Idaho Power *Energy Wise® Program Summary Report* located in *Supplement 2: Evaluation*.

2016 Program and Marketing Strategies

SEEK Program

Plans for the 2015 to 2016 school year include analyzing program data to identify trends and opportunities. The company will continue to leverage the positive relationships Idaho Power's CERs have within the schools to maintain program participation levels. Kit contents will be updated and the three CFLs will be replaced by three LEDs. Idaho Power will work with RAP to revise the curriculum guide, student guide, and student workbook to reflect the added savings and benefits provided by the LEDs.

LED Bulbs as Giveaways

Plans for educational distributions in 2016 include continuing to offer LEDs to customers at community events, presentations, and customer visits.

Other Educational Distributions

Idaho Power will implement a direct-to-customer residential energy-saving kit program and initiate a pilot project to determine if customers can effectively reduce 25 percent or more of their clothes dryer use by either drying full loads of laundry on a drying rack or clothesline or by reducing drying time by removing items early and allowing them to finish on a drying rack or clothesline.

On February 8, 2016, Idaho Power filed a request with the OPUC seeking authority to implement the Educational Distributions program in Oregon. The company anticipates approval in March 2016, with program implementation later in 2016.

Energy Efficient Lighting

	2015	2014
Participation and Savings		
Participants (bulbs)	1,343,255	1,161,553
Energy Savings (kWh)	15,876,117	12,882,151
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$1,997,292	$1,860,046
Oregon Energy Efficiency Rider	$60,800	$45,959
Idaho Power Funds	$5,291	$3,818
Total Program Costs—All Sources	$2,063,383	$1,909,823
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.013	$0.018
Total Resource Levelized Cost ($/kWh)	$0.028	$0.066
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	4.53	
Total Resource Benefit/Cost Ratio	4.23	

Description

The Energy Efficient Lighting program strives for residential energy savings in Idaho and Oregon through the replacement of less efficient lighting with more efficient technology. Changing to the more energy-efficient bulbs is a low-cost, easy way for all customers to achieve energy savings.

The *2014–2015 Northwest Residential Lighting Long-Term Marketing Tracking Study* describes how Northwest consumers are shifting some of their focus from CFL and traditional incandescent lamps to LED lamps. This demand for LED lamps increased between 2013 and 2014, and the trend is likely to continue. The report also highlighted that consumer satisfaction with LED lamps is higher than with CFLs.

ENERGY STAR® qualified energy-saving bulbs, including CFLs and LEDs, are a more efficient alternative to standard incandescent and halogen incandescent light bulbs. Bulbs come in a variety of wattages, colors, and styles, including bulbs for three-way lights and dimmable fixtures. ENERGY STAR bulbs use 70 to 90 percent less energy and last 10 to 25 times longer than traditional incandescent bulbs.

Initiated in 2002, the Energy Efficiency Lighting program follows a markdown model that provides incentives directly to the manufacturers or retailers, with savings passed on to the customer at the point of purchase. The benefits of this model are low administration costs, better availability of products to the customer, and the ability to provide an incentive for specific products.

2015 Program and Marketing Activities

In 2015, the Energy Efficient Lighting program provided almost 65 percent of all energy savings derived from residential energy efficiency customer programs.

Idaho Power continued to participate in the Bonneville Power Administration (BPA) Simple Steps, Smart Savings™ program focusing on ENERGY STAR CFL and LED bulbs and LED light fixtures. CLEAResult managed the promotion. CLEAResult is responsible for retailer and manufacturer contracts, marketing materials at the point of purchase, and providing support and training to retailers. Under CLEAResult administration, there will be two programs under the Simple Steps, Smart Savings program: the lighting program and the appliance promotion program.

In April 2015, the pricing structure changed for the Simple Steps, Smart Savings program. Prior to this, Idaho Power paid a flat fee for each product sold—a base amount going to buy down the price of the product and the rest going toward administration and marketing. After April 2015, a variable pricing structure was implemented. In this new structure, Idaho Power pays a flat fee for each kWh savings achieved. The minimum base amount that goes directly to buy down the price of the product was reduced; the amount applied to administration and marketing varies and can be used for things like retailer promotions. Promotions may include special product placement, additional discounts, and other retail merchandising tactics designed to increase sales.

In 2015, LED bulbs comprised 32 percent of light bulb sales each month, which was an increase from the 13 to 29 percent of light bulb sales each month in 2014. LED fixtures comprised approximately 3 percent of lighting sales, up from the less than 1 percent of lighting sales in 2014.

Idaho Power continued to collaborate regionally on utility retail lighting programs through participation in the Northwest Regional Retail Collaborative (NWRRC) facilitated by NEEA and by following promotions initiated by the Western Regional Utility Network (WRUN). Both the NWRRC and the WRUN sought to develop collaborative approaches to working with manufactures and retailers to increase uptake of energy-efficient products in the retail market. In 2015, the NWRCC disbanded due to overlap with NEEA's Retail Product Portfolio (RPP) workgroup. Idaho Power continued to participate in the RPP workgroup. The WRUN met twice in 2015 and has not been active since July 2015.

In 2015, Idaho Power worked with 16 participating retailers, representing 93 individual store locations throughout Idaho Power's service area. Of those participating retailers, 40 percent are smaller grocery, drug, and small hardware stores, and the remaining 60 percent are big box retailers.

Several Simple Steps, Smart Savings special promotions were conducted through CLEAResult at retail stores in 2015. These promotions generally involved special product placement and signs. In May, Lowe's supported a 10-day Save Money, Save Energy promotion that highlighted the utilities that supported incentives on lighting products in their stores. Costco used pallets in major isles to display LED bulbs that are part of the promotion in March and October. Home Depot held their annual mega-truckload lighting event during October. The purpose of this event isn't to highlight energy efficient lighting, or a certain product, rather to offer great discounts for the purchase of lighting products. These types of promotions and special product placement help increase the visibility and sales of promotional products. CLEAResult staff continued to conduct monthly store visits in 2015 to check on stock, point-of-purchase signs, and displays.

To provide additional access to Simple Steps, Smart Savings promotional pricing, Idaho Power joined in an online offering with Costco. Through this offering, Idaho Power customers who purchased bulbs online through Costco could access Idaho Power incentives. After selecting the shipping zip code, the customer was prompted to pick their utility service area, thereby making the connection between Idaho Power and the discounted price.

Additional activities in 2015 involved education and marketing. Idaho Power and CLEAResult conducted three educational events at Costco stores in Twin Falls, Nampa, and Boise and seven events at Home Depot stores in Boise, Meridian, Eagle, Nampa, Twin Falls, and Pocatello. At each event, Idaho Power and CLEAResult personnel staffed a table with literature, promotional items, and a lighting display and talked with customers about energy-efficient lighting.

The company continued to host an Energy Efficient Lighting website, made available a Change a Light program brochure, and discussed energy-efficient lighting with customers at community events.

Customers were reminded to consider energy-efficient lighting in an article in the May energy efficiency issue of *Connections*, the newsletter sent with more than 415,000 customer billing statements each month. In the September energy efficiency issue, a See ya later, refrigerator® ad promoted the offer of FREE LED bulbs when customers recycled their refrigerators.

In November, during energy efficiency segments on KTVB-TV news (broadcast in Boise and Twin Falls) and morning news KPVI-TV (broadcast in Pocatello), the discussion focused on the importance of using energy-efficient lighting during the holidays. The weekly *News Brief*, which is a publication produced by Idaho Power for reporters and editors to find the latest information about the company, released a *Holiday Lights: Be Safe and Energy Efficient* brief in December.

Based on a recommendation from TRC Energy Solutions during their 2014 process evaluation, a data dictionary was developed to ensure Idaho Power uses consistent language and terminology by product-type categories. This allows Idaho Power to better track lighting sales and trends.

Cost-Effectiveness

In 2015, Idaho Power generally used the same RTF-deemed savings for both CFLs and LEDs as were used in 2014. Several lamp types were included in the program that had no corresponding savings or cost assumptions available from the RTF. These non-RTF lamp types include high-lumen CFL bulbs and LED reflector fixtures. In early 2015, Idaho Power requested Tetra Tech review the non-RTF bulbs. Tetra Tech recommended the RTF savings and cost assumptions for either the “general purpose and dimmable” bulbs or the “reflector and outdoor” bulbs be assigned to the LED reflector fixtures. After reviewing the hours of use for reflector bulbs and discussing the potential uses of reflector fixtures, Idaho Power decided to assign the “reflector and outdoor” LED bulb savings to these fixtures. For other non-RTF lamp types, Idaho Power used the site savings approved by the BPA for the Simple Steps, Smart Savings promotion.

In August 2015, RTF updated and revisited the assumptions for both CFLs and LEDs to account for market changes due to the federal standards compliance. The number of lamp types was further reduced to combine three-way bulbs with the general purpose and dimmable bulbs. Additionally, the lumen categories were shifted to reflect current consumer trends. Due to the timing of the RTF’s update, BPA has not yet implemented the new savings in the Simple Steps, Smart Savings promotion. As a result, CLEAResults invoicing currently reflects the RTF bulb type and lumen categories from the RTF workbook version 3.3. Idaho Power is still determining the appropriate savings for the program for 2016.

For detailed cost-effectiveness assumptions, metrics, and sources, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

In 2014, Idaho Power administered an impact evaluation of 2013 ex-ante energy savings using Tetra Tech to validate ex-post results. Overall, Tetra Tech found the program has well-established design and delivery processes, supported by the program tracking systems, program documentation, and savings tools and that processes are operating efficiently and with careful attention to detail.

In the evaluation, Tetra Tech recommended Idaho Power consider directly calculating energy savings using standard industry approaches or working with others to develop region-wide savings values when there are no RTF deemed savings. They stated that for lamps that fall well beyond the RTF categories or *Energy Independence and Security Act of 2007* (EISA) affected baseline lamps, Idaho Power should consider several options, including 1) working with NEEA and/or the RTF to develop lamp adjustment factors and baseline assumptions based on regional market knowledge; 2) conducting independent market research to understand the use of these lamps; and/or 3) using energy-savings calculations based on general engineering principles and underlying RTF market adjustment and performance factors.
In response to this recommendation, Idaho Power contracted with Tetra Tech to evaluate savings for non-RTF lamps using general engineering principles and the underlying RTF market adjustment and performance factors. Idaho Power implemented Tetra Tech's savings values for non-RTF lamps in 2015. For other non-RTF lamps, Idaho Power used the savings assumptions from BPA's deemed residential lighting measure list.

2016 Program and Marketing Strategies

Idaho Power will continue to participate in the Simple Steps, Smart Savings lighting program in 2016 by contracting with CLEAResult, who was awarded the BPA implementation contract for 2016.

Idaho Power will continue to monitor the number of participating retailers and geographic spread of these retailers. Idaho Power will also work regionally to develop online promotions that allow customers to access promotional pricing regardless of location.

Marketing and education messaging in 2016 will focus on helping customers purchase the right bulb for their need. CLEAResult will continue to manage marketing at retailers, including point-of-purchase signs, special product placement, and displays. The program specialist and CRs will continue to staff lighting events to help educate customers about the importance of using energy-efficient lighting.

Energy House Calls

	2015	2014
Participation and Savings		
Participants (homes)	362	297
Energy Savings (kWh)	754,646	579,126
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$194,939	$186,732
Oregon Energy Efficiency Rider	$15,057	$8,174
Idaho Power Funds	$4,108	$3,080
Total Program Costs—All Sources	$214,103	$197,987
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.020	$0.024
Total Resource Levelized Cost ($/kWh)	$0.020	$0.024
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	2.81	
Total Resource Benefit/Cost Ratio	2.96	

Description

Initiated in 2002, the Energy House Calls program gives homeowners of electrically-heated manufactured homes an opportunity to reduce electricity use by improving the home's efficiency. Specifically, this program provides free duct-sealing and additional efficiency measures to Idaho Power customers living in Idaho or Oregon in a manufactured or mobile home using an electric furnace or heat pump. Participation is limited to one time per premise.

Services and products offered through the Energy House Calls program include duct testing and sealing according to Performance Tested Comfort System (PTCS) standards set by the RTF and adopted by the BPA; installation of up to eight LED bulbs; up to two low-flow showerheads and bathroom faucet aerators; a kitchen faucet aerator; two replacement furnace filters with installation instructions; testing water heater temperatures for the proper setting; installation of water heater water-line covers when applicable; and energy efficiency educational materials appropriate for manufactured-home occupants. The value of the service to the customer is dependent on the complexity of the repair, and the specific measures installed. Although participation in the program is free, a typical cost for a similar service call would be $400 to $600. Idaho Power provides the customer with the contractor contact information via the Idaho Power website and marketing material. The customer then schedules an appointment directly with one of the recognized, certified sub-contractors specifically trained to provide these services in their region. The contractor verifies the customer's eligibility by initially testing the home to determine if it qualifies for duct-sealing. The actual energy savings and benefits realized by each customer depend on the measures installed and the repairs and/or adjustments made.

2015 Program and Marketing Activities

Concern over declining participation in past years prompted specific actions in 2015, including the introduction of the new direct-install measures and increased marketing activities.

Prior to March 15, 2015, the Idaho Power contractors installed one CFL and one furnace filter and provided one additional furnace filter.

On March 15, 2015, contractors began installing up to eight LED bulbs, two bathroom aerators, one kitchen aerator, one low-flow showerhead, and water heater pipe wrap on the first 3 feet on each side of the tank. Additional claimed savings for these direct-install measures are 112,003 kWh.

Energy House Calls served 362 manufactured homes during 2015, resulting in 754,646 kWh savings, which includes the above direct-install measures. Each year, a number of homes that participate in Energy House Calls, for various reasons, cannot be served because the ducts cannot be sealed and are billed as a test-only job. Some reasons may be the home is too difficult to seal or the initial duct blaster test identifies the depressurization with respect to the outdoors is less than 150 cubic feet per minute and sealing is not needed. Additionally, after sealing the duct work, if the contractor is unable to reduce leakage by 50 percent, the contractor bills the job as a test-only job. Prior to 2015, the total number of participating homes and kWh savings reported by Idaho Power did not include these test-only jobs. Because Idaho Power now offers direct-install measures in addition to the duct-sealing component of the program, all homes are reported, assuming some may not have been duct sealed but did have bulbs and aerators installed. Of the 362 homes that participated in 2015, 34 homes were serviced as test only. Because Idaho Power began offering the installation of the direct-install measures mid-year, only 18 of those homes that were not duct sealed received the new direct-install measures. Of the total participating homes, 49 percent were located in the Canyon–West region, 25 percent were located in the Capital region, and 26 percent were located in the South–East region. Idaho Power marketed the program; coordinated sub-contractors' performance of local duct-sealing, direct-install measures, and energy efficiency services for this program; processed sub-contractor paperwork; and paid sub-contractors directly for work performed.

Participation increased in 2015 relative to 2014, with 362 and 297 homes completed, respectively. In 2014, there were 330 participating manufactured homes, of which 33 were serviced with a test only and therefore were not reported.

Marketing efforts were increased in 2015, and emphasis was placed on the variety of services offered. Idaho Power sent two shared bill inserts, instead of just one as was the case the year prior, to all residential customers in Idaho and Oregon. The February bill insert was shared with the Rebate Advantage program, and the September bill insert was shared with the Home Improvement Program. The company sent two postcard mailings to residents of electrically heated manufactured homes that have not yet participated in the program, whereas only one postcard was sent the prior year. Written in English and Spanish, these postcards helped educate customers about the new measures added to the program. There were 10,584 postcards delivered in March and 8,362 in October.

As in the past, contractors delivered door hangers to homes in areas where they were completing Energy House Calls visits. Idaho Power delivered postcards from the marketing campaign to CAP agencies for distribution to customers who need assistance but do not meet the qualifications to receive weatherization assistance through those agencies. In addition, Idaho Power CRs and customer service representatives (CSR) knowledgeable about the program continued to promote the program to qualified customers.

Cost-Effectiveness

Savings for PTCS specified duct sealing were unchanged for 2015 compared with 2014 savings. The savings will decrease in 2016 based on new RTF-approved savings that reflect both Simple Energy

Enthalpy Model (SEEM) calibration and the move toward prescriptive savings only. In 2015, the RTF approved the removal of PTCS requirements for duct sealing, which should expand the number of potential recipients and lower customer costs. The savings will be lower to account for some duct work that may get sealed that may not have been sealed under PTCS requirements.

Savings and a cost-effectiveness analysis for the new 2015 direct-install measures, including low-flow showerheads, faucet aerators, and LED bulbs, were completed using deemed savings.

For more detailed information about the cost-effectiveness savings and assumptions, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

To monitor quality assurance (QA) in 2015, third-party verifications were conducted by Momentum, LLC on approximately 5 percent of the 328 participant homes, resulting in 16 home inspections. Homes were selected at random. The QA reports indicate customers were pleased with the work sub-contractors completed in their homes. Each home inspection included an on-site visual confirmation that the reported work had been completed. Weather permitting, blower door and duct blaster tests were also conducted to verify the results submitted by the sub-contractor.

Anecdotally, Idaho Power contractors report that customers appreciated receiving the new measures. The most comments they received were in regard to the free LED bulbs. Customers seemed to be pleased with the program.

2016 Program and Marketing Strategies

Each year, Idaho Power prepares its direct-mail marketing list by analyzing kWh use of homes designated as manufactured or mobile in Idaho Power’s customer information system to find those that appear to be electrically heated. After removing those homes that had already participated in the program, the 2015 direct-mail list contained 10,584 customers. An additional percentage of these homes may have had their ducts sealed through Idaho Power’s low-income programs. Idaho Power will continue to monitor these numbers.

Marketing tactics will continue to use customers’ most-preferred methods for receiving information—promotional materials in the Idaho Power bill or a letter/postcard in the mail. In 2016, Idaho Power will distribute a newly designed bill insert and postcard created to appeal to a larger demographic and catch people’s attention to encourage them to read marketing pieces. These inserts will promote program benefits and expected savings, and free participation will be highlighted. The company will conduct a winter targeted-mail campaign directed to residents of manufactured homes that have not yet participated in the program. Contractors and CRs will continue to distribute door hangers in mobile-home parks and program literature at appropriate events and presentations. Idaho Power will continue to mail postcards to CAP agencies for distribution to customers who need assistance but do not meet the qualifications to receive weatherization assistance through those agencies. Throughout the year, the program will continue to explore new ways to reach customers and continue to look for additional cost-effective measures that can add value to the program.

ENERGY STAR® Homes Northwest

		2015	2014
Participation and Savings			
	Participants (homes)*	598	243
	Energy Savings (kWh)	820,684	528,054
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$646,991	$330,523
	Oregon Energy Efficiency Rider	$2,692	$7,612
	Idaho Power Funds	$3,990	$5,141
	Total Program Costs—All Sources	$653,674	$343,277
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.046	$0.055
	Total Resource Levelized Cost ($/kWh)	$0.099	$0.111
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	2.10	
	Total Resource Benefit/Cost Ratio	1.04	

* Includes savings from 69 certified gas-heated ENERGY STAR homes in 2015.

Description

ENERGY STAR Homes Northwest is a regionally coordinated initiative supported by a partnership between Idaho Power and NEEA's Northwest ENERGY STAR Homes to improve and promote the construction of energy-efficient homes using guidelines set forth by the EPA. Initiated at Idaho Power in 2003, this program targets the lost-opportunity energy savings and summer-demand reduction that is achieved by increasing the efficiency of the residential-building envelope and air-delivery system above current building codes and building practices. An ENERGY STAR certified home is a home that has been inspected and tested by an independent, third-party ENERGY STAR rater hired by the builder to meet the stringent ENERGY STAR requirements.

The ENERGY STAR Homes Northwest residential construction program promotes homes that use electric heat pump technology and are at least 15 percent more energy efficient than those built to standard Idaho and Oregon code. The program specifications for ENERGY STAR Homes Northwest are verified by ENERGY STAR raters and are certified by Northwest ENERGY STAR providers—Washington State University Extension Energy Program and Building Energy, Inc.—while Northwest ENERGY STAR providers also conduct program QA.

ENERGY STAR homes are more efficient, comfortable, and durable than homes constructed to standard building codes. Homes that earn the ENERGY STAR label include six required specifications: 1) effective insulation, 2) high-performance windows, 3) air-tight construction and sealed ductwork, 4) energy-efficient lighting, 5) ENERGY STAR qualified appliances, and 6) efficient heating and cooling equipment.

To encourage builders to construct ENERGY STAR homes, builders participating in ENERGY STAR Homes Northwest in 2015 received a $1,000 incentive per home built to the Northwest ENERGY STAR Single and Multifamily Homes Requirements with heat pump technology. Builders who entered their homes in a Parade of Homes received the standard $1,000 incentive plus an additional $500 marketing incentive to cover their expenses for ENERGY STAR signage and brochures. Another benefit to the builders is the right from ENERGY STAR Homes Northwest and the EPA to use the logo and the ENERGY STAR name to promote themselves as an ENERGY STAR qualified builder.

The Idaho Power program collaborates with ENERGY STAR Homes Northwest for program promotion. A large part of the program's role in 2015 was to provide marketing materials and support for the building contractors associations (BCA) throughout Idaho Power's service area.

2015 Program and Marketing Activities

All of the 598 homes certified in 2015 that received incentives through the program were multifamily dwellings. There is a regional trend toward ENERGY STAR multifamily certifications. The increase in the number of participating homes in 2015 as compared to 2014 is due to an increase in multifamily ENERGY STAR homes that employ heat pump technology, constructed and certified in Idaho Power's service area. These 598 homes were constructed in thirteen multifamily ENERGY STAR developments.

The company maintained a strong presence in the building industry by supporting the Idaho Building Contractors Association (IBCA) and several of its local affiliates throughout Idaho Power's service area in 2015. The company ran a half-page ENERGY STAR Homes advertisement in the Building Contractors Association of Southwestern Idaho (BCASWI) contractor newsletter for 10 months, March through December. The company presented the Energy Efficient Design and Construction Awards to builders who integrated energy efficiency features in their parade homes at the BCASWI Parade of Homes awards banquet. In addition, the company participated in the BCASWI builder's expo and the Snake River Valley Building Contractors Association (SRVBCA) builder's expo. Idaho Power supported Parade of Homes events with full-page ENERGY STAR ads in the Parade of Homes magazines of the following BCAs: The Magic Valley Builders Association Parade of Homes (MVBA), the BCASWI Parade of Homes, SRVBCA Parade of Homes, and the Building Contractors Association of Southeast Idaho (BCASEI) Parade of Homes. Bill messages were added to residential customers' billing statements informing them of Parade of Homes events in their area. In addition, the company sponsored the IBCA annual winter and summer meetings.

In May 2015, Idaho Power sent a bill insert to all residential customers in Idaho Power's service area promoting the ENERGY STAR Homes Northwest program.

Cost-Effectiveness

Savings and cost-effectiveness assumptions were unchanged for 2015 compared with 2014.
The townhome/multifamily homes in the Boise–Nampa–Caldwell climate zone were cost-effective from a UC and a TRC perspective with the inclusion of NEBs. No single-family homes were certified in 2015. The RTF deactivated the single-family home ENERGY STAR measure in October 2015.
The measure deactivation was primarily driven by the decline in savings resulting from the federal standards change in heat pumps, but additionally lighting baselines have increased also due to standards changes. Deactivated status with the RTF signifies that the measures do not meet current compliance guidelines. In the case of ENERGY STAR homes, the RTF is not going to update the savings to bring them into compliance because of the region's pending transition from the Northwest ENERGY STAR Homes program to the national EPA ENERGY STAR Homes program and eventually to Next Step Home (NSH). NEEA's NSH program is still in the pilot stage.

Because of Idaho Power's support of NEEA and the ENERGY STAR Homes Northwest brand, Idaho Power is claiming savings for 69 natural gas heated, ENERGY STAR certified homes certified in Idaho Power's Idaho service area in 2015. These savings account for 46,872 kWh of annual savings from efficient cooling equipment, insulation, windows, doors, water heating, ventilation, appliances, and lighting. NEEA does not claim these savings, and they will be included in the program savings totals in appendices 3 and 4 but are not included in program cost-effectiveness.

For more detailed information about the cost-effectiveness savings and assumptions, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

A rater is an independent, third-party contractor hired by the builders to ensure the ENERGY STAR homes are compliant with the Northwest ENERGY STAR Homes specification. Along with verifying the installation of building components and equipment through on-site inspections, prior to being certified, the rater ensures the home passes a blower door test, an air-duct leakage test, and combustion back-draft tests. The rater then enters specification information into the Northwest REM/Rate™ modeling software program to determine if the home qualifies for Northwest ENERGY STAR Homes certification. This is a requirement of receiving the certification.

Program providers—Washington State University and Building Energy, Inc.—certify each rater-verified home within the Northwest ENERGY STAR database. Both providers, in conjunction with NEEA contractors, perform QA and provide technical assistance duties within Idaho. In 2015, the required 4 percent of homes certified in the ENERGY STAR Homes Northwest program underwent both field and file QA. Four multifamily developments in Idaho Power's service area were among the 4 percent. The QA found variances from the Northwest ENERGY STAR specifications with two of the multifamily developments. Idaho Power worked with Northwest ENERGY STAR and NEEA to evaluate these variances. Both developments' specifications were modeled by a NEEA contractor, and the energy savings of both developments was found to be greater than the regional deemed Northwest ENERGY STAR specification; the developments were not decertified.

2016 Program and Marketing Strategies

Idaho Power plans to continue marketing efforts to promote ENERGY STAR homes to home builders and new homebuyers. These marketing efforts include Parade of Homes ads in parade magazines for the BCASWI, SRVBCA, MVBA, and the BCASEI. The company also plans to continue supporting the general events and activities of the IBCA and its local affiliates. Bill inserts will be sent to all residential customers in May. Bill messaging—an inexpensive marketing approach—is planned for two months to support the various BCA Parade of Homes events throughout Idaho Power's service area.

Other marketing tactics will be considered based on past effectiveness, such as direct mail to residential builders.

The program will be promoted in the *Idaho Business Review* in issues directed at residential contractors and builders.

Northwest ENERGY STAR Homes will be completing the transition to the national EPA ENERGY STAR homes program in the first quarter 2016. At that time, the ENERGY STAR label will replace the Northwest ENERGY STAR label, online program resources will transition from the Northwest ENERGY STAR Homes website to those of the EPA, and single-family home certifications will transition from the Northwest REM/Rate modeling software program to the national ENERGY STAR Home Energy Rating System (HERS) Index target using the standard version of REM/Rate modeling software program.

NEEA will continue its transition of the Northwest ENERGY STAR Homes program to the national EPA ENERGY STAR Homes program, engaging local market partners/stakeholders. This transition is slated for the first quarter of 2016.

The EPA's ENERGY STAR Homes program will be available for builders who continue building ENERGY STAR certified homes under the national EPA program, using the national ENERGY STAR HERS Index target and the standard version of REM/Rate modeling software program.

Idaho Power will continue to support NEEA's NSH program, which continues on in a pilot.
NEEA continues to recruit builders throughout the Northwest to build to a high performance specification. NEEA will install monitoring devices in homes to track energy-saving performance. Three phases of the NSH have been established. Homes are now being built within Phase III of the NSH pilot. Homes built during Phase III are incorporating NSH minimum requirements, guidelines, and best practices learned from Phase I and II.

Heating & Cooling Efficiency Program

	2015	2014
Participation and Savings		
Participants (projects)	427	230
Energy Savings (kWh)	1,502,172	1,099,464
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source*		
Idaho Energy Efficiency Rider	$583,663	$340,551
Oregon Energy Efficiency Rider	$25,186	$14,627
Idaho Power Funds	$17,520	$6,836
Total Program Costs—All Sources	$626,369	$362,014
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.028	$0.022
Total Resource Levelized Cost ($/kWh)	$0.092	$0.075
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	3.11	
Total Resource Benefit/Cost Ratio	1.05	

*In 2015, DHP Pilot was incorporated into the H&CE Program.

Description

The H&CE Program provides incentives to residential customers in Idaho Power's Idaho and Oregon service area for the purchase and proper installation of qualified heating and cooling equipment and services.

Initiated in 2007, the objective of the program is to acquire energy savings by providing customers with energy-efficient options for electric space heating and cooling. Incentive payments are provided to the residential customers for all measures. Three of the measures also include a payment to the installing contractor. The available measures in 2015 include ducted air-source heat pumps, ducted open-loop water-source heat pumps, ductless air-source heat pumps, duct sealing, WHFs, ECMs, and evaporative coolers.

Idaho Power requires licensed contractors to perform the installation services related to these measures, with the exception of evaporative coolers, which can be self-installed. The licensed contractors must also be authorized by Idaho Power as participating contractors for the ducted air-source heat pump, ducted open-loop water-source heat pump, ductless air-source heat pump, and duct-sealing measures.

The H&CE Program's list of measures and incentives includes the following:

- Customer incentive for replacing an existing ducted air-source heat pump with a new ducted air-source heat pump is $250 for a minimum efficiency 8.5 Heating Seasonal Performance Factor (HSPF).
- Customer incentive for replacing an existing oil or propane heating system with a new ducted air-source heat pump is $400 for a minimum efficiency 8.5 HSPF. Participating homes must be located in areas where natural gas is unavailable.

- Customer incentive for replacing an existing electric forced air or zonal electric heating system with a new ducted air-source heat pump is $800 for a minimum efficiency 8.5 HSPF.
- Incentive for customers or builders of new construction installing a ducted air-source heat pump in a new home is $400 for a minimum efficiency 8.5 HSPF. Participating homes must be located in areas where natural gas is unavailable.
- Customer incentive for replacing an existing ducted air-source heat pump with a new ducted open-loop water-source heat pump is $500 for a minimum efficiency 3.5 coefficient of performance (COP).
- The customer incentive for replacing an existing electric forced air or zonal electric, oil, or propane heating system with a new ducted open-loop water-source heat pump is $1,000 for a minimum efficiency 3.5 COP. Participating homes with oil or propane heating systems must be located in areas where natural gas is unavailable.
- The incentive for customers or builders of new construction installing a ducted open-loop water-source heat pump in a new home is $1,000 for a minimum efficiency 3.5 COP. Participating homes must be located in areas where natural gas is unavailable.
- The customer incentive for displacing a zonal electric heating system with a new ductless air-source heat pump is $750.
- The customer incentive for duct-sealing services performed in an existing home with an electric forced-air heating system or a heat pump is $350.
- The customer incentive for a WHF installed in an existing home with central A/C, zonal cooling, or a heat pump is $200.
- The customer incentive for replacing a PSC air handler motor with an ECM in an existing home with oil or propane or natural gas forced-air heat, electric forced-air heat, or a heat pump is $50.
- The customer incentive for installing an evaporative-cooler is $150.

2015 Program and Marketing Activities

Idaho Power began offering three new measures through the program on June 30, 2015. The measures provide cash incentives for duct sealing, WHFs, and ECMs. During the development stage of these measures, the company provided updates and requested input from EEAG at quarterly meetings. EEAG's positive and helpful feedback aided program design and execution.

The program underwent significant changes to simplify incentive application processing for both the applicant and Idaho Power. Changes included the consolidation of eight application forms and simplification of layouts for associated worksheets. The screens that Idaho Power uses to enter incentive applications into the Customer Load Research Information System (CLRIS) were simplified with a reduced number of fields to populate. These screens also received one consistent new layout.
The company built a feature into the CLRIS application that allows incentive applications to be stored as file attachments in PDF file format, which provides Idaho Power efficient access to the submitted applications.

On June 30, 2015, Idaho Power also transitioned the DHP Pilot into the H&CE Program as a measure contained within the program. Idaho Power updated the DHP Pilot website content and moved it to the H&CE Program website. Customers now view one program instead of two, thereby reducing complexity and encouraging participation. EEAG reviewed and supported the consolidation prior to its launch date. Idaho Power received 217 applications for the DHP measure in 2015—a 21-percent increase in DHP applicants, with 38 additional approved incentive applications compared to 2014.

Idaho Power completely replaced the H&CE Program Web pages with improved navigation, content, and forms. The nine individual measure screens incorporated a consistent layout in both content type and navigation. The company converted previous content from paragraph format to bullet points and omitted content of lesser value. Idaho Power staff created a two-click navigation strategy to ensure a website visitor arrived at their specific information quickly. To eliminate the need to scan through content geared for multiple audiences, the content was changed and categorized to target the following five primary visitor types—homeowners, property owners, participating contractors, licensed contractors, and builders. Visitors now navigate to a single screen displaying content relevant to them.

The expansion of Idaho Power's network of participating contractors remained a key growth strategy for the program. Authorized participating contractors must be used for the ducted air-source heat pumps, ducted open-loop water-source heat pumps, ductless air-source heat pumps, and duct-sealing measures. Idaho Power's goal was to support contractors currently in the program while adding new contractors. The company held meetings with several prospective contractors to support this strategy. Idaho Power added 21 new companies to the program as authorized participating contractors during 2015. An additional dozen other interested companies will be taken through the authorization process by the program specialist. Due to this high volume, it was necessary to delay interaction with wholesalers.

For a company to become a participating contractor, they must first participate in required training that provides program guidelines and technical information on HVAC equipment. Idaho Power held 11 training sessions for contractors in 2015. Training sessions remain an important part of the program because they create opportunities to invite additional contractors into the program. The sessions also provide refresher training for existing participating contractors and help them increase their customers' participation while improving the contractors' work quality.

Idaho Power uses Honeywell, Inc., a third-party contractor, to review and enter incentive applications into the Idaho Power system. Honeywell reviews and submits incentive applications for Idaho Power payment using a program database portal developed by Idaho Power. This allows Idaho Power to maintain the database within the company's system, which is secure yet accessible to the third-party contractor. They also perform on-site verifications (OSV) and provide technical support to the CRs and contractors. Honeywell offers local program and technical assistance to contractors through on-site visits at their businesses.

Idaho Power used multiple marketing methods for its H&CE Program. In May and September, the company mailed bill inserts to all residential customers. One direct-mail letter targeted homes with electric heat and went to 29,786 residents in March. In January 2015, an advertisement appeared one time in eight newspapers across the company's service area. In May, July, and September, Idaho Power placed an advertisement in a BCASWI newsletter for homebuilders.

Two in-studio energy efficiency news segments—on KTVB (Boise and Twin Falls broadcast markets) and KPVI (Pocatello)—focused on heating and cooling issues. Typically, in these segments viewers are provided important information about energy use, then directed to Idaho Power's website for energy efficiency tips and information on specific programs. Both of these segments (KTVB in May and KPVI in June) educated viewers on the use of programmable thermostats, then suggested visiting the company’s website for information on ways to save energy.

Idaho Power ran DHP Facebook ads from March 5 through June 5, where 273,193 people saw the ad on Facebook and 13,319 people clicked through to the Idaho Power website. The cost-per-click was $0.68. In 2015, the Facebook benchmark cost-per-click was $0.80 for a standard or normal cost-per-click. This means that DHP ad at $0.68 cost-per-click was considered very good, especially for a utility company niche product.

Cost-Effectiveness

Unit Energy Savings (UES) values for the H&CE Program, including DHP were mostly unchanged between 2014 and 2015. In 2016, the RTF will continue analyzing savings for DHPs. For whole-house prescriptive duct sealing, RTF-approved planning UES values were sourced and used for savings and cost-effectiveness analyses. Savings estimate for the two other new measures, ECMs and WHFs, were estimated by reviewing potential studies, engineering estimates, and third-party review by the Integrated Design Lab (IDL).

For the 2015 cost-effectiveness analysis, participant costs for all air-source and water-source heat pumps were estimated by looking at median project costs across three years of data (2013–2015). The use of median costs and 3 years of data helps focus in on the typical costs that a customer experiences and minimize impact from projects with extreme costs. Costs for DHPs were assessed by averaging the costs for a one indoor- and one outdoor-unit installation.

Water-source heat pumps across all climates and air-source heat pump conversions from other electric heat sources to an 8.50 or higher HSPF continue to not be cost-effective. Idaho Power determined that water, and ductless and air-source heat pumps meet at least one of the cost-effectiveness exceptions outlined in OPUC Order No. 94-590. Idaho Power filed UM 1710 to request a cost-effectiveness exception with the OPUC on February 11, 2015. The OPUC granted the company’s request for an exception in Order No. 15-200, issued on June 23, 2015. Air-source heat pumps replacing existing heat pumps are also no longer cost-effective. Federal standards were enacted in January 2015 that raised the minimum efficiency from a 7.7 HSPF baseline to 8.2 HSPF, which was the previous ENERGY STAR specification prior to 2015. The company is monitoring these measures and in consultation with EEAG will determine how to modify the program or measures under the new specification. In 2016, Idaho Power will update all savings for air-source and ductless heat pumps as necessary.

For more detailed information about the cost-effectiveness savings, sources, calculations, and assumptions, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

Honeywell performed random OSVs on 42 (10 percent) of the completed installations in Idaho Power’s service area. These OSVs verified that the information submitted on the paperwork matched what was installed at customers’ sites. Overall, the OSV results were favorable with respect to the contractors’ quality of work. The program specialist continues to work with contractors to help them understand the importance of accurate documentation and quality installations.

Idaho Power contracted with AEG to conduct a process evaluation and an impact evaluation of the DHP pilot for program year 2014 prior to the consolidation into the H&CE program. Key findings are described below, followed by recommendations and Idaho Power’s response in both 2015 and 2016.

The results of the impact analysis show the DHP pilot saved 451,391 kWh, achieving 97.5 percent of its goal. Including NEBs, the ex-ante realization rate is 109.2 percent.

AEG indicated the program is very well run, has an involved program specialist, and adheres to best practices in the industry. In addition, the program has high satisfaction among participating contractors and customers, and the technology is well received.

AEG recommended Idaho Power expand the target market to residential new construction and small commercial businesses. In response to this recommendation, Idaho Power spoke with a local residential homebuilder to help determine the feasibility of expanding into the new-construction industry. It was determined that expanding into this market would not be cost-effective, as it would require multi-head DHP systems, which are considerably more expensive than a single-head system. Idaho Power will continue to work with NEEA to develop a multi-head DHP solution that may provide a cost-effective alternative to the new-construction market.

The evaluation team also recommended Idaho Power work with manufactures to provide training materials and workshops for participating contractors. Currently, the program specialist communicates with manufacturers but does not offer brand-specific training materials or manufacturer-branded workshops to contractors. Idaho Power is careful to remain brand neutral and works with the equipment wholesalers who support the manufacturers.

Idaho Power accessed additional information from other sources. In 2015, NEEA provided five reports updating the DHP Pilot and related topics. A copy of each is included on the CD accompanying *Supplement 2: Evaluation*. The following are highlights from the reports.

NEEA Report E15-304, released February 2015

This report summarized the findings from the DHP and Heat Pump Water Heater (HPWH) message testing study conducted by ILLUME Advising, LLC, on behalf of NEEA. Consumers are somewhat aware of DHP and HPWH technologies. Despite NEEA promoting DHPs since 2008, less than half of survey respondents were aware of the technology. Consumers intend to purchase a heating system or water heater only when their current heating system breaks down. This could be a significant barrier to DHPs given the long life of standard electric heating systems. About a quarter of survey respondents who claimed to be aware of DHP technology characterized themselves as familiar with it. Similarly, only about a quarter of respondents who claimed to be aware of HPWH technology characterized themselves as familiar with it, and very few have ever seen one. For HPWHs, up-front costs, lack of familiarity, and difficulty of self-install were the primary barriers noted by respondents.

NEEA Report E15-290, released June 2015

The key objectives of this study include the following: 1) identify relevant market segments in the Northwest and quantify the maximum technical potential for displacing electric resistance heating in each segment, 2) identify current market barriers and market adoption issues for standard DHPs and other related specialized equipment in the Northwest, and 3) forecast the likely total displacement of electric resistance heating by standard and specialized DHPs over the next 20 years under different market adoption scenarios. The potential model in the study forecasts that the cumulative achievable potential savings for the high-, medium-, and low-penetration scenarios are approximately 180 aMW, 240 aMW, and 440 aMW, respectively, over the 20-year period ending in 2034. The maximum technical potential nearly reaches 1,350 aMW in 2034.

NEEA Report E15-291, released June 2015

This study assessed international DHP markets to determine how international experience can be leveraged to enhance market uptake of this technology in the Northwestern United States (US). Ductless solutions are not nearly as successful in markets where they must displace ducted products. In the US, the key factors inhibiting further adoption of ductless split systems stem from the fact that ducted systems are the standard solution in the market. Study recommendations included partnering with manufacturers to help reduce costs, improving contractor awareness, and providing training. The study suggested the industry facilitate established retail sales channels to help reduce cost, build consumer awareness, and facilitate market entry of lower-cost products.

NEEA Report E15-318, released July 2015

This report is the fourth MPER of the NEEA Northwest Ductless Heat Pump Project (Initiative). General population awareness of DHPs has stayed fairly steady since 2013, and households are continuing to learn about DHPs from a wide variety of sources. Respondents noted that friends and acquaintances are the primary source of information, followed by utility information and installers. There continues to be interest in DHPs, with 8 percent of the general population saying they will definitely install a DHP and 85 percent saying they will consider a DHP purchase. Installers reported that the number of customer requests for DHPs increased from the prior year. Word-of-mouth and information from acquaintances remain the primary source of initial information on DHPs. Households that installed DHPs continue to have high satisfaction with the product and recommend the product to others.

NEEA Report E15-294, released August 2015

This report summarized the lab and field test findings for Mitsubishi's prototype product that combined a ductless heat pump with a heat pump water heater into a single, integrated product. Mitsubishi worked with a water heater partner for the water heater portion of the product. NEEA partnered with Mitsubishi to test the appliance and provide feedback regarding performance. NEEA selected Energy 350 to conduct the testing and reporting.

2016 Program and Marketing Strategies

Idaho Power will provide program training to existing and prospective contractors to assist them in meeting program requirements and further their product knowledge. Sessions will be held on-site at contractor businesses and at Idaho Power facilities.

Developing the existing network of participating contractors remains a key strategy for the Program. The performance of the program is substantially dependent on the contractors' abilities to promote and leverage the measures offered. Idaho Power's primary goal in 2016 is to develop contractors currently in the program while adding new contractors. To meet this objective, the program specialist, along with Idaho Power CRs, will arrange frequent individual meetings to discuss the program with contractors in 2016.

An additional incentive measure is planned for the program: the company plans to offer an incentive to residential homeowners who have a licensed contractor install a smart/connected thermostat for their HVAC system in Idaho and Oregon. The company filed Tariff Advice No. 16-02 seeking approval of the modification with the OPUC on January 20, 2016. The company requested an effective date of March 31, 2016. Eligibility for this new measure would require an existing home to have electric forced air heat or a ducted heat pump. Idaho Power plans to offer the measure as a pilot and perform an energy evaluation of the devices using enrolled customers' billing data.

In the AEG impact and process evaluation, AEG recommended conducting more outreach with contractors. In response to this recommendation, in 2016, Idaho Power will begin a targeted approach to less active participating contractors through the CRs, who will begin exploratory discussions with these contractors to uncover individual barriers resulting in their limited program participation. The CRs will forward the results of these discussions to the program specialist to reduce or eliminate these challenges where possible.

AEG also recommended Idaho Power remind participating contractors about the marketing portal that offers pre-designed marketing collateral printable for contractor use. As part of the 2016 targeted approach, CRs will remind contractors about the benefits of using this portal and report key responses to the program specialist for follow-up.

In responses to AEG’s evaluation, Idaho Power will incorporate the recommendations to ensure the correct inflator is used to convert to current-year values and to not use the present value non-electric system benefits dollars per kWh. Additionally, Idaho Power will use the home address to determine the climate and heating zone when a home’s zip code resides in two counties.

The 2016 marketing strategy will include several tactics previously used, such as bill inserts, newspaper print ads, direct mail, and social media. The company will continue to monitor the contractor portal for its effectiveness for participating contractors and make changes as needed. A video or videos might be added to educate consumers on some or all of the program measures.

Home Energy Audit

	2015	2014
Participation and Savings		
Participants (homes)	351	354
Energy Savings (kWh)	136,002	141,077
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$192,873	$164,579
Oregon Energy Efficiency Rider*	$0	–$248
Idaho Power Funds	$9,084	$6,318
Total Program Costs—All Sources	$201,957	$170,648
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.151	n/a
Total Resource Levelized Cost ($/kWh)	$0.178	n/a
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	n/a	
Total Resource Benefit/Cost Ratio	n/a	

* Reversal of a 2013 charge to the Oregon Rider.

Description

The Home Energy Audit program is an in-home energy evaluation by a certified, third-party home performance specialist (HPS). It is used to identify areas of concern and provide specific recommendations to improve the efficiency, comfort, and health of the home. An audit includes a visual inspection of the crawl space and attic, a health and safety inspection, and a blower door test to identify and locate air leaks. In addition to the energy evaluation, some energy-saving improvements are installed at no additional cost to the customer if appropriate. After the audit is complete, the customer is supplied with a written report of the HPS's findings and recommendations. Available improvements include installation of the following:

- Up to 20 efficient light bulbs (CFLs and LEDs)
- One high-efficiency showerhead
- Pipe insulation from the water heater to the home wall (approximately 3 feet)

The current Home Energy Audit program is based on the insights gained from the Boise City Home Audit project conducted in 2011 and 2012, as described in the *Demand-Side Management 2012 Annual Report*. In 2014, the audit project became an official program under Idaho Power's management.
To qualify for the Home Energy Audit program, participants must live in Idaho and be an Idaho Power customer of record for the home. The home must be an existing all-electric, site-built home.
Renters may participate with prior written landlord permission. Single-family homes, duplexes, triplexes, and fourplexes qualify. Manufactured homes, new construction, or buildings with more than four units do not qualify. Multifamily homes heated by a central heating unit or that are not separately metered are not eligible.

Participating customers pay $99 for the audit and installation of measures, with the remaining cost covered by the Home Energy Audit program. Energy audits of this type normally cost $300 or more, not including the select energy-saving measures, materials, and labor. The cost of the materials potentially installed at each home is approximately $145.

2015 Program and Marketing Activities

Participants for the program were recruited through small batches of 1,000 to 2,000 direct-mail letters. A program brochure was created in 2015 and added to some mailings. Customers interested in participating were directed to a website for additional information and the online application. Those who did not have internet access or were uncomfortable using the application online were able to call Idaho Power and apply via phone.

Seven energy audit HPS companies served the program in 2015. Audits were randomly assigned to the HPSs serving each area, grouping locations for each HPS to save on travel time and expense.

In 2015, Idaho Power completed 351 energy audits, surpassing the 2015 goal of 300. The average age of participating homes was 35 years old. The homes were built between 1910 and 2014. Home sizes ranged from 529 square feet (ft^2) to 8,020 ft^2, with 2,380 ft^2average home size. Figure 11 shows the number of participating homes located in various counties, demonstrating the program's reach across Idaho Power's service area.

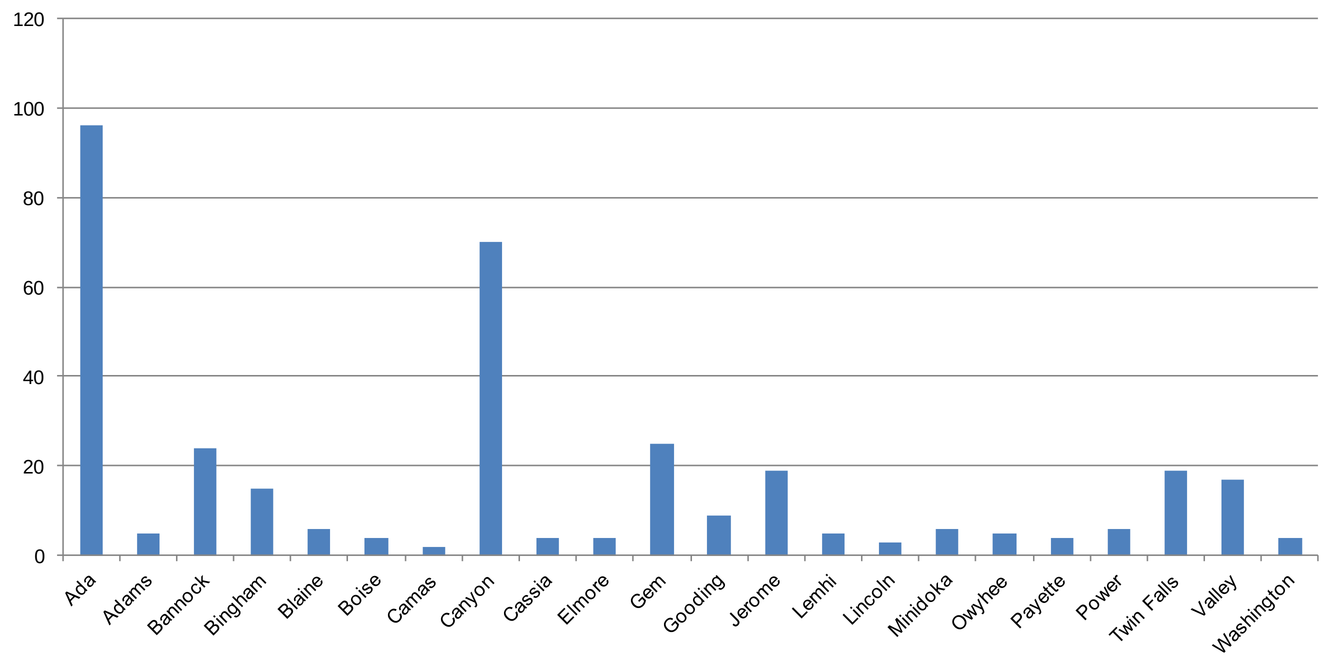

Figure 11. Summary of participating homes by county

The program was designed for all-electric homes only. All written communication sent to customers and the website explained the program was limited to all-electric homes. If the application was taken by phone, the customer was asked if their home had electric heat and water heating, and non-electric sources were declined. In addition, when the HPS contacted the customer to schedule the appointment, the customer was asked if the home used electric heat and water heating. Non-electric sources were declined. The electrically heated homes used a variety of heating styles, with heat pumps being the most common (182), then furnaces (76) and wall heaters (75). Eleven of the 351 participating homes audited were not electrically heated homes, despite numerous efforts to ensure participants had all-electric homes. The contractor conducted the audits of the non-electric homes, and Idaho Power paid the contractor for their completed audits. These non-all-electric homes were audited for several reasons. Some customers do not know what heating fuel their home uses, and they believe they are electrically heated. Upon arriving at these residence, the HPS audits these homes to maintain customer satisfaction and fulfill some of the other objectives of this program—to educate customers on energy efficiency, promote Idaho Power's other energy efficiency programs and provide the customer with a plan for energy efficiency improvements in the future. Some of the direct-install measure savings are not heating-fuel dependent, and only the savings from the non-heating-fuel-dependent measures are counted in the savings. In 2016, the program will be fuel neutral, and savings will be assessed in a similar manner. This program change will allow more customers to participate and learn ways to be energy efficient. Even if the space or water heating source in a home is not electric, often there can be many opportunities to use electricity wisely.

The HPSs collected information on types and quantities of appliances and lighting in each home. The average number of incandescent lights per home was 23, and the average number of fluorescent lights was 12. When performing an audit, the HPS determined which available measures were appropriate for the home, and if the homeowner approved, those measures were installed. Figure 12 indicates the total quantity of items installed by measure.

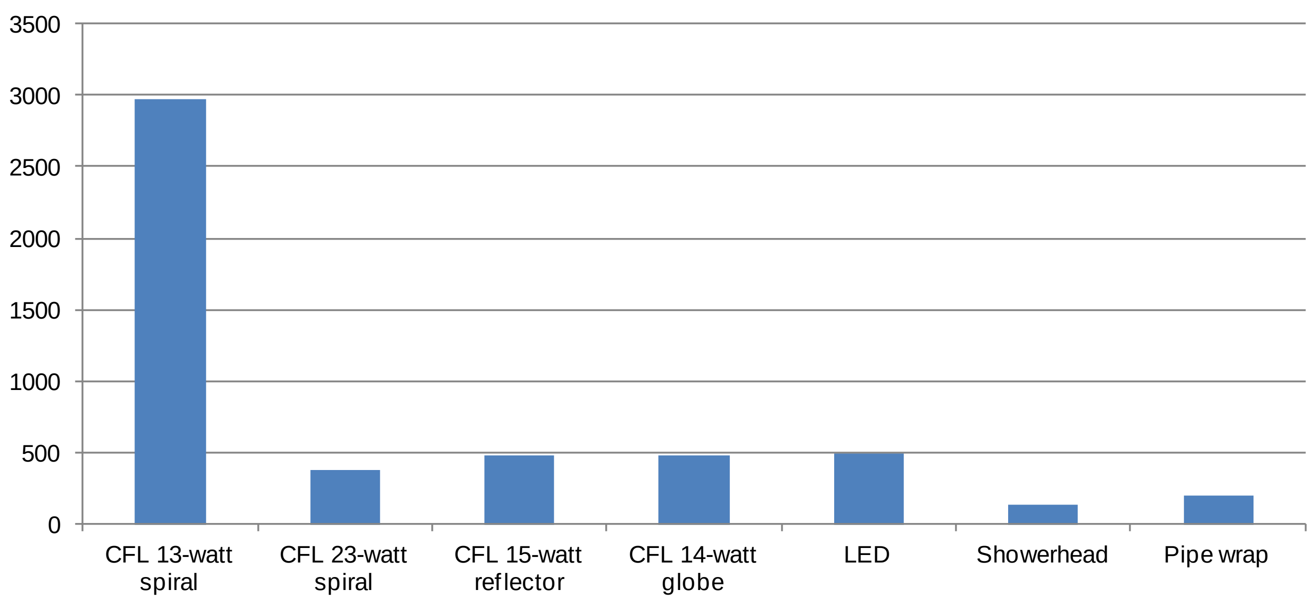

Figure 12. Measures installed in participating homes

The QA goal for the program was inspection of 10 percent of all audits completed in 2015. Idaho Power exceeded its goal in 2015, with 39 completed QAs. All homes selected for the QA audits passed inspection, with one gas/non-all-electric home audited.

One change to the program, which was implemented in 2015 based on customer and HPS feedback and a recommendation from the 2014 process evaluation, was that general-purpose LED bulbs were made available to customers. The cost analysis for LEDs was reviewed, and the general-purpose bulb was found to be a cost-effective measure. Other types of LED bulbs will continue to be monitored, and they will be made available as their costs decrease to the point they become cost-effective.

To ensure participants were receiving their reports and were not having difficulties accessing reports online, in 2015, the HPSs started calling participants 10 to14 days after the audit to verify the participant had received the report. Anyone having issues accessing their report was either sent their report in a PDF via email or mailed a hard copy. Additionally, the phone calls provided the participant with an opportunity to ask questions and gain clarification on the recommendations.

To account for the additional time required for follow-up calls—and to bring the fees more in-line with industry standards—the payment to the auditor was increased in 2015 from $101 to $201. The customer fee remained at $99.

The HPSs went through additional training to ensure thorough understanding of the program, including goals, standards, timelines, and program flow. Training included information for promotion of other energy efficiency programs, instructions on the use of myAccount, review of feedback from surveys, and focus on areas for improvement.

Idaho Power partnered with the University of Idaho's Valley County Extension Office to host an energy efficiency workshop in Cascade in October. Direct-mail letters and posters hung at local businesses invited the community to attend the evening workshop. Attendees learned ways to check their homes for efficiency, how to make improvements, how to use myAccount, and about various Idaho Power programs with an emphasis on the Home Energy Audit program. For attending, each person was given an LED bulb.

Idaho Power created a trade show booth backdrop and interactive Web pages using a cutaway house design to promote the Home Energy Audit program and demonstrate energy-saving tips for customers. The company used the booth backdrop at the 2015 FitOne Show, the Smart Women, Smart Money conference, and the Pocatello Spring Home Show.

In the May energy efficiency issue of *Connections*, the newsletter sent to more than 415,000 customers with their bills, the cover story featured a couple from Garden Valley who had participated in the Home Energy Audit program. Bill inserts were sent to select zip codes in January, March, and November.

In late 2015, Idaho Power used a Facebook boosted post in the Eastern region. A boosted post resembles a traditional Facebook post, but by paying to boost the post, it appears higher in News Feeds, increasing the chance that the targeted audience will see it. Boosting posts can help increase audience engagement and get more people interacting with the content shared on Facebook. While the post did not appear to drive enrollments, it reached 13,476 people with 331 likes, 46 shares, and 369 post clicks. In addition, a short article was placed in the Pocatello-Chubbuck Chamber of Commerce e-newsletter throughout the month of December.

Cost-Effectiveness

One of the goals of the Home Energy Audit program is to increase participants' understanding of how their home uses energy, and if eligible, encourage their participation in Idaho Power's energy efficiency programs. As an educational and marketing program, the traditional cost-effectiveness tests have not been applied to the program.

Idaho Power used the same assumptions during 2015 as were used in 2014. For the items installed directly in the homes, Idaho Power used the RTF savings for direct-install bulbs, which range from 17 to 29 kWh per year. The RTF savings for 2.0 GPM showerheads directly installed in a home are 139 kWh per year. In Idaho Power's *Energy Efficiency Potential Study*, AEG estimates that pipe wraps save 150 kWh per year.

In 2015, the RTF reviewed and updated the savings assumptions for CFLs, LEDs, and showerheads. For direct-install CFLs and LEDs, the RTF shifted the groupings for the low, moderate, and high-use interior space types. For showerheads, the RTF updated several assumptions. The parameters that impacted the savings for showerheads the most were changes to the baseline showerhead, the showers per person per year, and the annual usage of each showerhead. These new savings will be applied in 2016.

Customer Satisfaction and Evaluations

A survey designed to assess customers' experience with program enrollment, scheduling, the auditor, the report value, and information learned was sent to a total of 379 new participants. The response rate was nearly 37 percent, with 140 participants responding. Idaho Power mailed 127 surveys and emailed 252 surveys. Program strengths and areas for improvement were also assessed. Participants that supplied an email address were sent the survey online. Those without an email address were sent a hardcopy of the survey with a postage-paid envelope. Results were reviewed for the program as a whole and for responses related to individual HPSs.

When asked a series of questions about their experience with the program, over 95 percent of respondents "strongly agreed" or "somewhat agreed" they would recommend the program to a friend or relative, and over 92 percent of respondents "strongly agreed" or "somewhat agreed" they were satisfied with their overall experience with the program.

Ninety-five percent of the respondents indicated it was "very easy" or "somewhat easy" to apply for the program. Individual program audit report results were available online, and a hard copy of the report was mailed to participants who did not supply an email address. Over 35 percent of respondents reported accessing their report online, while almost 44 percent reported receiving a paper copy, and almost 21 percent reported receiving their report both ways. Of those who accessed their report online, 55 percent indicated that accessing the report online was "very easy" or "somewhat easy."

HPSs were rated on a number of attributes, including courteousness, professionalism, explanation of work/measurement to be performed, explanation of audit recommendations, and overall experience with the HPS. Respondents rated their HPSs as "good" or "excellent" 92 to 100 percent of the time.

When asked how strongly they agree or disagree with statements around what they learned during the audit process, over 97 percent of respondents "strongly agreed" or "somewhat agreed" they were more informed about the energy use in their home. Almost 87 percent indicated they "strongly agreed" or "somewhat agreed" they were more informed about energy efficiency programs available through Idaho Power. Nearly 87 percent indicated they "strongly agreed" or "somewhat agreed" they learned what no- to low-cost actions they could take.

After the audit, 40 percent of respondents indicated they visited the Idaho Power website, over 53 percent unplugged appliances when not in use, over 39 percent signed up for myAccount, and almost 65 percent shared their experience with relatives and/or friends. Almost 60 percent of the respondents indicated they replaced additional incandescent light bulbs with CFLs or LEDs. Just over 34 percent indicated they serviced their heating equipment, and almost 29 percent serviced cooling equipment. Additional information on the actions respondents indicated they already completed or planned to do within the next year are shown in the survey results included in *Supplement 2: Evaluation*.

Survey participants were asked to identify all of the benefits they experienced from participating in the program. Over 64 percent of respondents indicated the biggest benefit they found in the audit was personal satisfaction, with over 76 percent citing raised awareness of energy use, almost 57 percent citing cost savings, over 48 percent citing home improvement, approximately 49 percent citing comfort, and just over 25 percent citing benefit to the environment. When survey participants were asked to identify all of the barriers they encounter when making energy-saving changes in their home, over 82 percent of respondents indicated the biggest barrier was cost. Figure 13 below shows benefits experienced by category and percent.

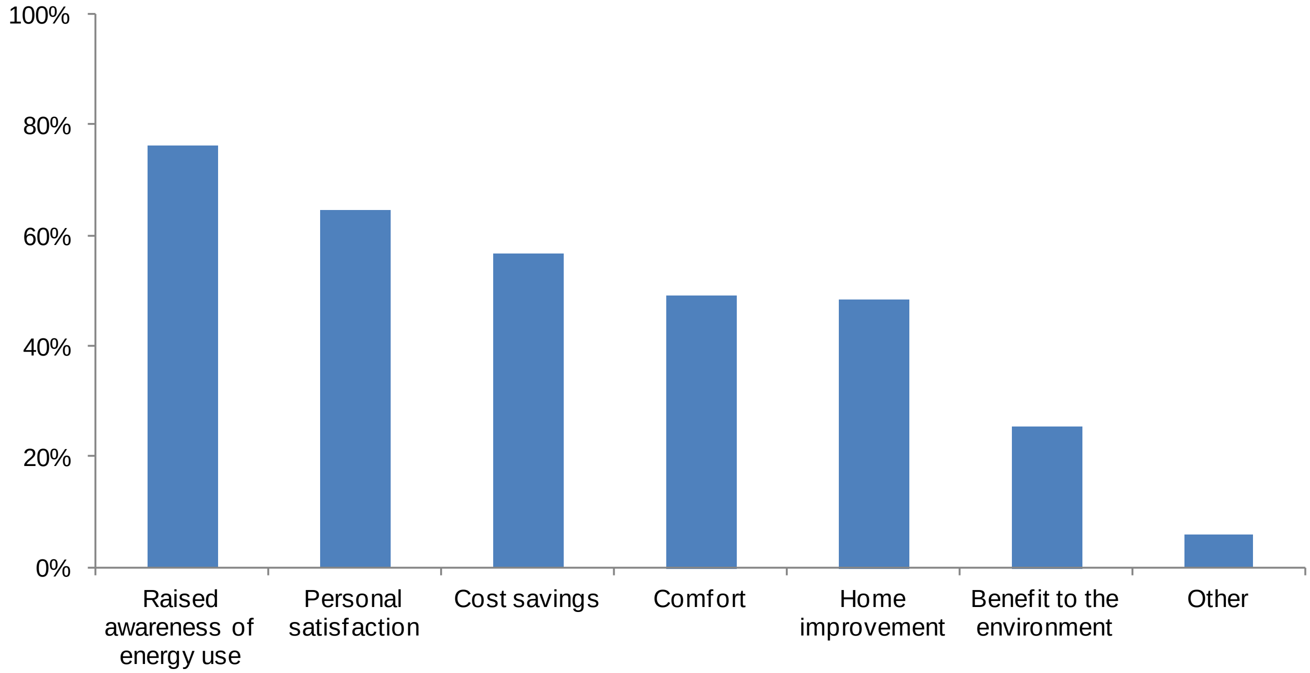

Figure 13. Program participants' benefits experienced

2016 Program and Marketing Strategies

As the cost of other types of LED bulbs decreases and the program's current stock of CFLs depletes, Idaho Power will use LED bulbs wherever possible.

In first quarter 2016, the program will expand by becoming fuel neutral. The 2016 goal is 600 audits, with approximately half being for all-electric homes and half for homes with other fuel sources for space and water heating.

All marketing materials will be updated to reflect the program changes for 2016. In 2016, Idaho Power will continue recruiting participants through small batches of direct-mail letters and through the use of the trade show booth backdrop at select events.

It is mandatory that HPSs either have previous training in Combustion Appliance Zone (CAZ) testing within the last six months, or participate in Idaho Power's CAZ refresher class or attend a refresher class offered through another source. Although all HPSs have previous CAZ training, Idaho Power will provide a refresher course during 2016.

Home Improvement Program

		2015	2014
Participation and Savings			
	Participants (homes)	408	555
	Energy Savings (kWh)	303,580	838,929
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$259,898	$315,616
	Oregon Energy Efficiency Rider	$0	$0
	Idaho Power Funds	$12,611	$9,101
	Total Program Costs—All Sources	$272,509	$324,717
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.046	$0.020
	Total Resource Levelized Cost ($/kWh)	$0.152	$0.055
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	1.91	
	Total Resource Benefit/Cost Ratio	0.67	

Description

The Home Improvement Program has offered incentives to homeowners, multifamily building owners, and property managers since its startup in 2008 for upgrading insulation and windows in electrically heated homes/units. To qualify for an incentive under this program, the home must be a single-family home, a multifamily structure with individually metered units on a residential rate, or a manufactured home in Idaho Power's service area in Idaho. The home/units must have an electric heating system serving at least 80 percent of the home's conditioned floor area. The heating system can be a permanently installed electric furnace, heat pump, or electric zonal heating system. Insulation must be professionally installed between conditioned and unconditioned space by an insulation contractor. Windows must be professionally installed. Customers must use a participating contractor to qualify for the Idaho Power incentive, which is processed by Idaho Power.

The program details include the following:

- Customer incentives to Idaho residential customers, multifamily building owners, and property managers in Idaho Power's service area for additional insulation professionally installed are 15 cents per ft^2 for attic insulation and 50 cents per ft^2 for wall and under-floor insulation.
- Existing attic insulation must be an R-20 or less to qualify, and the final R-Value must meet the local energy code. Idaho Power's service area consists of climate zones 5 and 6, resulting in an R-38 requirement for climate zone 5 and R-49 requirement for climate zone 6.
- The existing insulation level in walls must be R-5 or less, and the final R-Value must be R-19 or fill the cavity.

- The existing insulation level under floors must be R-5 or less, and the final R-Value must be R-30 or fill the cavity.
- Customer incentives are $2.50 per ft^2 of window area to Idaho residential customers for installing energy-efficient windows and/or sliding glass doors with a U-Factor of 0.30 or lower.
- Pre-existing windows/sliding glass doors must be single- or double-pane aluminum or single pane wood.

2015 Program and Marketing Activities

On March 1, 2015, Idaho Power released an updated application form. The application indicated program updates for customers. A new brochure was also created to communicate the changes to customers.

The RTF determined there were no difference in savings when modeling savings with and without air sealing and duct sealing prior to insulating. The RTF performed additional modeling and quality control (QC) checks on the weatherization measures. Effective March, 1 2015, Idaho Power removed air sealing and duct sealing from the insulation incentive requirements.

To promote the program, the company ran a series of newspaper ads multiple times during March and April 2015. Idaho Power placed ads in newspapers in rural areas with a higher concentration of electrically heated homes (a program eligibility requirement). The company sent three informational bill inserts—April, July, and September—and sent a targeted direct-mail letter in June 2015.

Idaho Power ran Facebook ads from June 8 through July 31, resulting in 9,033 clicks on the ad on Facebook pages at $0.66 per click, and 229,865 customers saw the ad on Facebook. In 2015, the Facebook benchmark cost-per-click was $0.80. Anything at or under that level is good; the $0.66 per click is considered above expectations for a utility company niche product.

In the May energy efficiency issue of *Connections*, the newsletter sent to more than 415,000 customers with their bills, the back-page display ad featured the Home Improvement Program. In addition, the September issue included a story about insulation and energy-efficient windows, with specific program information.

As Idaho Power reviewed the participation eligibility of the Home Improvement Program, it became clear there was an opportunity to market the program more specifically to multifamily buildings. At the December 2015 EEAG meeting, members indicated support for targeted marketing of the Home Improvement Program to electrically heated multifamily buildings with five or more individually metered residential rate units. In late 2015, Idaho Power sent letters to property managers and building owners.

Cost-Effectiveness

In 2015, the Home Improvement Program was not cost-effective from the TRC perspective. The RTF reduced savings for single-family home weatherization projects in 2015. With the changes, average savings estimates per project were just under 50 percent of 2014 projects. The lower savings were approved by the RTF in October 2014 and revised in the spring of 2015. These new savings were a result of the nearly 18-month RTF process to calibrate residential savings models. As a consequence, four of the six measures offered in the Home Improvement Program are no longer cost effective from the TRC perspective. Idaho Power incorporated the new savings for all 2015 projects. In 2016, the company will evaluate the non-cost-effective measures and the impact on program's cost-effectiveness to determine if these measures should be modified or removed from the program. Idaho Power will present possible program modification and seek suggestions from EEAG.

For more detailed information about the cost-effectiveness calculations and assumptions, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

For QA purposes, third-party contractors performed random reviews of at least 5 percent of all installations completed in the Home Improvement Program. QA contractors verified the correct installation of measures. In addition, the QA contractor assisted and educated the contractors on program requirements. Of the 27 QA inspections completed in 2015, no major issues were reported.

The program incentive application form included an optional question asking customers how they heard about the program. Of the 383 applications, 356 customers answered the marketing question. The results are as follows:

- 188 respondents (52.8%) heard about the program from a program contractor.
- 84 respondents (23.6%) heard about the program from an Idaho Power bill insert.
- 35 respondents (9.8%) heard about the program from the Idaho Power website.
- 33 respondents (9.3%) received a referral from a friend or acquaintance.
- 10 respondents (2.8%) heard about the program from a direct-mail piece.
- 6 respondents (1.7%) heard about the program from a newspaper, online, or television/radio ad.
- 0 respondents (0%) heard about the program from a home improvement show or fair.

Idaho Power contracted with AEG to conduct an impact and process evaluation for program year 2014. The results of the impact analysis show that in 2014, the Home Improvement Program more than doubled its savings goal, achieving 845 MWh of savings with a realization rate of 100.7 percent.

Key findings from the process evaluation indicate the contractors and the program specialist report participants are satisfied with the program, the savings achieved, and the improved comfort of their homes. Also, the network of installation contractors are engaged in the program. AEG also found marketing is effective, and most contractors would like to see these efforts increased but noted that the target market is small and eligibility criteria (e.g., existing insulation levels) is strict, which may make achieving future participation and savings goals more challenging, although this has not been a problem to date.

AEG also provided recommendations to enhance program effectiveness and improve accuracy of program savings. These recommendations and Idaho Power's responses are described below.

AEG recommended increasing consistency/clarity between supporting documentation and the program database, requiring more standardized documentation to prevent errors in the estimations of savings, and requiring more consistent documentation in the project application and submitted materials to clearly identify all variables necessary for the calculation of savings. The submitted documentation was often disorganized and sometimes incomplete. AEG stated Idaho Power should have a standardized documentation package for each project that includes a similar checklist completed by Idaho Power that verifies all required information has been submitted. The information should then be carefully and completely input in the tracking database.

Recently Idaho Power improved the application, adding a checklist itemizing the documentation required. In 2016, the company will establish a standardized checklist for each project to track and verify information. Idaho Power considered this recommendation and determined some confusion may have arisen due to the fact many pieces of the requested, submitted documentation had to be broken apart, scanned and emailed to the evaluators. Due to this process, the documentation may have appeared more disorganized and incomplete than it was. Idaho Power believes it carefully and completely inputs all of the required program information into the program database, and this process serves Idaho Power's external reporting needs.

The evaluation team recommended using the current versions of the RTF UES workbooks to discern between residential segments, to estimate NEBs, and to improve the overall accuracy of impact estimates. The project application discerns between standard single-family, manufactured, and multifamily homes. These entries should be emphasized, recorded in the tracking database, and used to determine the correct savings for the respective residential building segment. In addition, adopting the current versions of the Single Family and Manufactured Home Weatherization workbooks would allow Idaho Power to estimate NEBs for the Home Improvement Program.

In response, Idaho Power added a field in the Home Improvement Program database discerning between standard single-family, manufactured, and multifamily homes.

AEG recommended adding sliding glass doors to the measure description on the application. Because sliding glass doors are specifically included in the RTF UES workbook for the window upgrade weatherization measures, sliding glass doors should be also included in the measure description in the project application. In response to the recommendation from the AEG evaluation, Idaho Power will add sliding glass doors to the program application.

Additionally, AEG recommended Idaho Power require that contractors match U-factors (taken from the National Fenestration Rating Council [NFRC] window stickers) to each window on the invoice.

In response, Idaho Power considered this recommendation and determined that the current process of U-factor verification correctly captures the U-factor of each window. The evaluation team recommended that since the RTF only prescribes savings for U-30 and U-22 window upgrades, Idaho Power should consider a cutoff (e.g. U-25) where windows with lower than U-25 would be evaluated with savings for U-22 window upgrades. This would require calculating an average U-value weighted by window area. Idaho Power is currently evaluating this recommendation.

Last, AEG recommended marketing efforts be increased. Or, if that is not possible due to cost-effectiveness issues, focus marketing dollars on the more proven strategies, including contractor outreach and bill inserts. Idaho Power will take this recommendation. Three bill inserts are tentatively scheduled for 2016.

2016 Program and Marketing Strategies

Idaho Power plans to market this program through a variety of channels to maintain customer awareness in 2016. Plans include using bill inserts, direct mail, newspaper advertising, and contractor support. A consistent look and feel demonstrating program measures will be used in all program marketing materials.

Idaho Power will continue to market directly to multifamily building owners in 2016.

Oregon Residential Weatherization

	2015	2014
Participation and Savings		
Participants (audits/projects)	19	13
Energy Savings (kWh)	11,910	11,032
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$0	$0
Oregon Energy Efficiency Rider	$5,341	$5,234
Idaho Power Funds	$467	$228
Total Program Costs—All Sources	$5,808	$5,462
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.028	$0.028
Total Resource Levelized Cost ($/kWh)	$0.050	$0.050
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	n/a	
Total Resource Benefit/Cost Ratio	n/a	

Description

Idaho Power offers free energy audits for electrically heated customer homes within the Oregon service area. This is a program required by Oregon Revised Statute (ORS) 469.633 offered under Oregon Schedule 78 since 1980. Upon a customer's request, an Idaho Power CR visits the home to analyze it for energy efficiency opportunities. An estimate of costs and savings for specific measures is given to the customer. Customers may choose either a cash incentive or a 6.5-percent interest loan for a portion of the costs for weatherization measures.

2015 Program and Marketing Activities

During May, Idaho Power sent every Oregon residential customer an informational brochure about energy audits and home weatherization financing. Nineteen Oregon customers responded. Each customer returned a card from the brochure indicating interest in a home energy audit, weatherization loan, or incentive payment. Nineteen customers requested audits, 19 audits were completed, and four incentives paid.

Idaho Power issued four incentives totaling $1,742.32 for 11,910 kWh savings. Three incentives and related savings were for ceiling insulation measures, and one incentive was paid for a combination of wall and attic insulation. There were no loans made through this program during 2015.

Cost-Effectiveness

The Oregon Residential Weatherization program is a statutory program described in Oregon Schedule 78. The cost-effectiveness of this program is defined within this schedule. Pages 3 and 4 of the schedule list the measures determined to be cost-effective and the specified measure life cycles for specific measures. This schedule also includes the cost-effective limit (CEL) for measure lives of 7, 15, 25, and 30 years.

Four savings projects were completed in 2015. Projects consisted of increasing attic, floor, and wall insulation. The projects combined for an annual energy savings of 11,910 kWh at a levelized TRC of 5.0 cents per kWh over the 30 year attic insulation measure life as defined by Oregon Schedule 78. The Oregon savings schedule has higher savings than other weatherization programs, and the levelized costs contain little program cost, resulting in a lower levelized cost than other weatherization programs.

2016 Program and Marketing Strategies

Plans for the upcoming year include notifying customers in their May bill about the program. Idaho Power will complete requested audits and fulfill all cost-effective incentive and loan applications.

Rebate Advantage

	2015	2014
Participation and Savings		
Participants (homes)	58	44
Energy Savings (kWh)	358,683	269,643
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$80,243	$57,155
Oregon Energy Efficiency Rider	$4,351	$5,324
Idaho Power Funds	$843	$753
Total Program Costs—All Sources	$85,438	$63,231
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.014	$0.014
Total Resource Levelized Cost ($/kWh)	$0.020	$0.020
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	4.54	
Total Resource Benefit/Cost Ratio	3.45	

Description

Initiated in 2003, the Rebate Advantage program helps Idaho Power customers in Idaho and Oregon with the initial costs associated with purchasing a new, energy-efficient, ENERGY STAR® qualified manufactured home. This enables the homebuyer to enjoy the long-term benefit of lower electric bills and greater comfort provided by these homes. The program also provides an incentive to the sales consultants to encourage more sales of ENERGY STAR qualified homes and more discussion of energy efficiency with their customers during the sales process.

In addition to offering financial incentives, the Rebate Advantage program promotes and educates buyers and retailers of manufactured homes about the benefits of owning energy-efficient models. The Northwest Energy Efficient Manufactured (NEEM) housing program establishes QC and energy efficiency specifications for qualified homes. NEEM is a consortium of manufacturers and state energy offices in the Northwest. In addition to specifications and quality, NEEM tracks the production and on-site performance of ENERGY STAR qualified manufactured homes.

Idaho Power residential customers who purchased a new, all-electric, ENERGY STAR qualified manufactured home in 2015 and sited it in Idaho Power's service area were eligible for $1,000 through the Rebate Advantage program. Salespersons received $200 for each qualified home they sold.

2015 Program and Marketing Activities

During 2015, Idaho Power paid 58 incentives on new manufactured homes, which accounted for 358,683 annual kWh savings. One bill insert, shared with Energy House Calls, was sent to all Idaho and Oregon customers in February 2015.

Idaho Power continued to support dealerships in 2015 by providing them with Rebate Advantage brochures, banners, and applications as needed. CRs visited these dealerships to distribute materials, promote the program, and answer salespersons' questions.

Cost-Effectiveness

In 2015, Idaho Power used the same savings and assumptions as were used in 2014. The measures remained cost-effective for 2015, but the measure is currently considered an RTF planning measure.

2016 Program and Marketing Strategies

In 2016, the RTF will approve research plans around manufactured home new construction and will look at analyzing savings impacts of new-construction model calibrations. For details, see *Supplement 1: Cost-Effectiveness*.

The program remains the same for 2016. Idaho Power plans to distribute two information bill inserts for 2016—one in March and one in October. Facebook ads will be used throughout the spring and summer to educate and engage potential participants. Additionally, Idaho Power will continue to support dealers by providing program materials as needed.

See ya later, refrigerator®

		2015	2014
Participation and Savings			
	Participants (refrigerators/freezers)	1,630	3,194
	Energy Savings (kWh)	720,208	1,390,760
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$212,674	$562,002
	Oregon Energy Efficiency Rider	$11,497	$12,410
	Idaho Power Funds	$3,007	$1,639
	Total Program Costs—All Sources	$227,179	$576,051
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.048	$0.062
	Total Resource Levelized Cost ($/kWh)	$0.048	$0.062
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	1.21	
	Total Resource Benefit/Cost Ratio	1.53	

Description

The See ya later, refrigerator® program has acquired energy savings through the removal of qualified refrigerators and stand-alone freezers in residential homes throughout Idaho Power's service area in Idaho and Oregon since 2009.

Idaho Power has contracted with JACO to provide most services for this program, including customer service and scheduling, unit pickup, unit recycling, reporting, marketing assistance, and incentive payments. Marketing assistance has been provided by JACO through Runyon Saltzman Einhorn (RSE). RSE is a marketing company that assists utility appliance recycling programs throughout the country. Idaho Power provides participant confirmation, additional marketing, and internal program administration.

Applicants enroll online or by phone. Idaho Power screens each applicant to confirm eligibility. JACO screens each applicant to confirm the refrigerator or freezer unit under consideration met all program eligibility requirements, including being residential grade, at least 10 cubic feet (ft^3) as measured using inside dimensions, no larger than 30 ft^3, and in working condition. The program targeted older, extra units for maximum savings.

2015 Program and Marketing Activities

To maintain cost-effectiveness, the company looked at several program options, including restricting the age of eligible appliances and removing the incentive. After consulting with EEAG, it was determined that removing the incentive was the preferable option. This decision was partially based on maintaining customer satisfaction and the ease of customer participation in the program.

Beginning February 1, 2015, in Idaho and Oregon, Idaho Power stopped offering the $30 incentive to customers for their participation in the program. While a 30-percent reduction was expected to result from the removal of the $30 incentive, See ya later, refrigerator® program participation declined by 43 percent between 2014 and 2015, demonstrated in Figure 14.

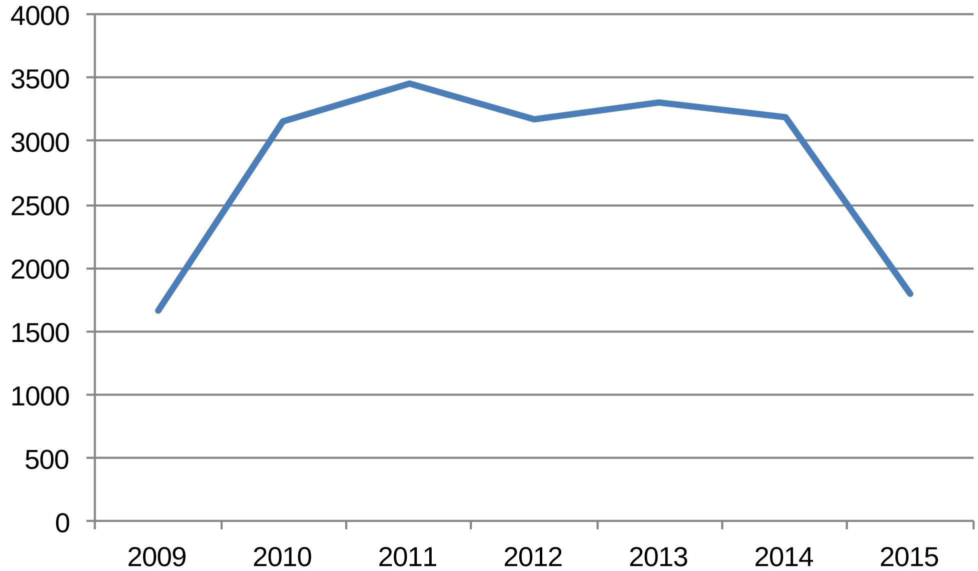

Figure 14. See ya later, refrigerator® participation by year

To increase participation and satisfaction with the program, on July 15 Idaho Power began distributing two free LED bulbs at the time of the pickup.

There was a slight increase in participation during July, as in previous years. Whether or not this increase was due to the addition of the LED bulb incentive or to the natural cycle of enrollment is undetermined.

Idaho Power used an integrated, layered approach to market the program in 2015. All marketing tactics in 2015 used like imagery and messaging to build awareness and recognition. The messaging focused on convenience. Survey data showed 52 percent of participants reported they received the most value from the convenience of the program. Idaho Power and RSE used bill inserts, direct mail, and earned media through two television spots to promote the program.

Bill inserts were sent during March, April, June, July, August, and October. In early July, a direct-mail postcard was sent to a highly targeted audience. Idaho Power identified the target audience for the program as older, empty-nesters who own their home. The company sent the mailing to higher energy users and longer-term customers of Idaho Power that were likely to represent the target audience.

In July, Idaho Power representatives and JACO staff appeared in a live television broadcast in the Boise/Nampa market promoting the program and demonstrating how materials from refrigerators can be recycled and reused. In addition, there were two opportunities to promote the program during news programs in both the Boise/Twin Falls and Pocatello markets. In the March energy efficiency segment on Boise’s KTVB, Idaho Power discussed how much energy older refrigerators use and that spring is the perfect time to recycle them—providing contact information for the program. In August, the program was promoted live on the KPVI morning news.

During October, Idaho Power began placing Facebook boosted posts to help increase enrollments. A boosted post resembles a traditional Facebook post, but it appears higher in News Feeds, increasing the chance the targeted audience will see it. Boosting posts can help increase audience engagement and increase the people interacting with the content shared on Facebook. There were two versions used during this campaign. The first post emphasized the convenience factor of the program. Idaho Power designed the second version for the company's target audience of empty-nesters with the tag line Retire Your Old Fridge. While both posts received several "Likes" on Facebook and were shared by many customers, the first post received more "Likes." Idaho Power also ran digital ads with the Retire Your Old Fridge theme in conjunction with the Facebook boost.

RSE managed a nine-month online Google AdWords™ campaign. Google AdWords brings up an ad based on specific combinations of search terms. As of July, the campaign resulted in 9,087 impressions and a CTR of 3.53 percent.

In late November, Idaho Power learned JACO had entered into receivership and ceased operations. Idaho Power did not have any prior knowledge of this change and was therefore unable to make program preparations. The program was suspended in Idaho on November 23 and in Oregon upon OPUC approval on December 16, 2015. Idaho Power subsequently contracted with Planetary Graffiti, JACO's subcontractor JACO used to pickup units, to pick up the remaining units that had been previously scheduled through JACO. After contacting each customer to reschedule their pickups, it was discovered that only 32 of the original 71 units scheduled needed to be picked up. The remaining 39 pickups were cancelled due to the customer finding alternate ways to remove the units prior to receiving the call to reschedule the pickup, or the customer not returning phone calls after multiple attempts.

Cost-Effectiveness

In 2014, the RTF reviewed and updated savings assumptions for freezer and refrigerator decommissioning. These savings were applied in 2015. Freezer decommissioning savings increased from 478 to 570 annual kWh. Refrigerator decommissioning savings decreased from 424 to 356 annual kWh. The measure life also decreased from 7 years to 6 years. Since refrigerators account for approximately 77 percent of the program, the decrease in savings and measure life impacted the program. These assumptions will apply in 2015 and 2016.

In 2014, the program had a UC and TRC of 0.86. To improve the program's cost-effectiveness, Idaho Power removed the $30 incentive per unit to decrease the program costs. Instead of a monetary incentive, Idaho Power offers participants two LED bulbs for each recycled unit. Idaho Power applies the RTF giveaway savings for LED general purpose bulbs—9 annual kWh per unit.

In late 2015, the RTF revisited and approved new savings for freezer and refrigerator decommissioning, as well as LED bulbs. Idaho Power believes the program could be cost-effective in 2016 and will re-evaluate the cost-effectiveness using the new savings that will apply in 2017. The program now has a UC of 1.21 and TRC of 1.53.

For cost-effectiveness details and assumptions, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

In 2015, AEG conducted a process evaluation of the See ya later, refrigerator® program and an impact evaluation of the program for the year 2014. The results of the impact analysis show that the See ya later, refrigerator® program surpassed its goals, achieving 1,390,760 kWh in savings in 2014 with a 100-percent realization rate.

Other AEG key findings indicated the program is well run and complies with most of the best practices in the industry. AEG stated the See ya later, refrigerator® program has adequate staffing and high customer satisfaction. Other key findings are the program has the necessary QC procedures and is extremely well documented. AEG indicated the wealth of data captured by the program is exemplary and is analyzed by Idaho Power staff to continuously provide insight and improve the program.

Results from the process evaluation were positive, with minimal recommendations. Based on the process evaluation, the following recommendations were made to enhance program effectiveness and improve the transparency of reported savings and are followed by Idaho Power's response to the recommendations.

The group recommended that when no savings associated with a measureexist, Idaho Power explain why in the tracking database. Idaho Power's response to this recommendation is acknowledgement that this can occur when an ineligible unit is picked up. This requires approval and is very infrequent, occurring only once in 2014. As a result of the recommendation, Idaho Power added a new field to the tracking database to capture this additional information.

AEG suggested decreasing the time between scheduling and pickup to seven days or less. Idaho Power's average time between scheduling and pickup is 13 days. In response, Idaho Power acknowledges it would be ideal to have all units picked up within seven days or less, yet due to the expansive Idaho Power service area and the limited number of crews to pick up the units, this recommendation may not be attainable. Pickups are grouped by area when scheduling to try to minimize the time between scheduling and pick up.

AEG also suggested Idaho Power use the updated RTF workbook (v.3.2) in the future and include NEBs in the cost-effectiveness analysis. Idaho Power freezes savings assumptions when the budgets and goals are set for the next calendar year. The most recent RTF workbook available at that time will be used.

Last, AEG suggested Idaho Power experiment with different promotional offerings to increase program participation. In response, Idaho Power began offering two free LED bulbs in July in an attempt to increase participation.

In addition to the formal evaluation conducted by AEG, JACO also tracked individual statistics for each unit collected, including information on how customers heard about the program and when customers enrolled. Statistics about the unit collected include the age of the unit, its location on the customer's property, and other data.

The 2015 unit data showed that 23 percent of units the program picked up were stand-alone freezers, and 77 percent of the units were refrigerators. Seventy-three percent of the units were secondary, 12 percent were primary, and 15 percent were unknown. In 2015, 34 percent of the units collected were manufactured from 1965 to 1990, which generally represents the least efficient years of refrigerator manufacturing. By comparison, in 2014, 50 percent of the units were of this vintage.

JACO and Idaho Power also tracked data related to the marketing effectiveness of the program. Results of customer tracking information indicate 55 percent of customers learned of the program through bill inserts. Sixteen percent of customers learned of the program through a friend or neighbor. Although appliance retailers also refer customers to the program, Idaho Power does not pursue this marketing channel because the program focuses on the removal of secondary units rather than replacing existing units. Retailers sell new units to replace older units. In addition, a retailer selling a new unit will usually pick up and recycle the old one.

Seventy four percent of customers who enrolled used the toll-free telephone number, and 26 percent used the online enrollment form. Idaho Power used the customer information JACO collected and the surveys from Idaho Power evaluations to target future marketing efforts and increase the effectiveness of marketing.

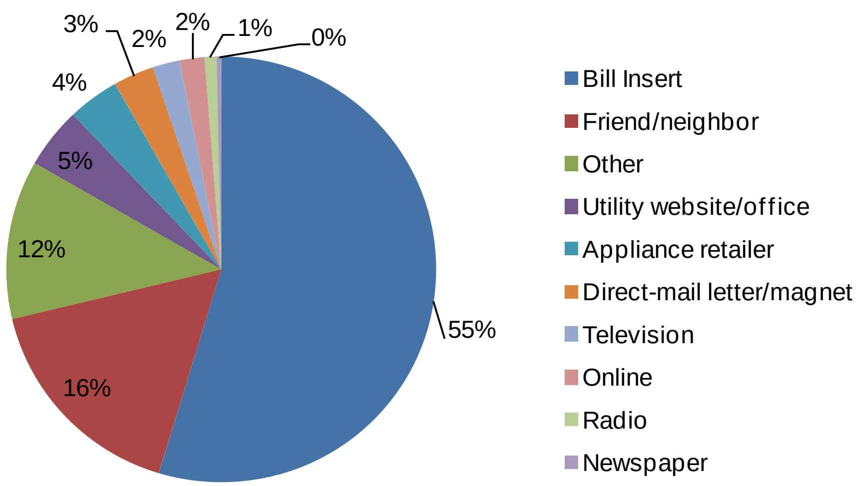

Figure 15. How customers heard about See ya later, refrigerator®

Figure 15 indicates ways customers heard about the program. The Other category includes sources, such as community events, repeat customers, the truck wrap ad, and unknown sources.

2016 Program and Marketing Strategies

Idaho Power is currently in the process of reviewing proposals for potential vendors for the program to consider continuing the program in 2016.

Should the program continue in 2016, marketing tactics will include bill inserts and online Facebook posts. The program would continue to be promoted at community events and by Idaho Power CRs.

Shade Tree Project

		2015	2014
Participation and Savings			
	Participants (trees)	1,925	2,041
	Energy Savings (kWh)	n/a	n/a
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$99,672	$143,750
	Oregon Energy Efficiency Rider*	–$66	$66
	Idaho Power Funds	$5,786	$3,474
	Total Program Costs—All Sources	$105,392	$147,290
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	n/a	n/a
	Total Resource Levelized Cost ($/kWh)	n/a	n/a
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	n/a	
	Total Resource Benefit/Cost Ratio	n/a	

*Reversal of a 2014 charge to the Oregon Rider.

Description

The Shade Tree Project began as a pilot in 2013. According to the US Department of Energy (DOE), a well-placed shade tree can reduce energy used for summer cooling by 15 percent or more. Utility programs throughout the country report high customer satisfaction with shade-tree programs and an enhanced public image for the utility related to sustainability and environmental stewardship. Other utilities report energy savings between 40 kWh per year (coastal climate San Diego) and over 200 kWh per year (Phoenix) per tree planted.

To be successful, trees should be planted to maximize energy savings and ensure survivability. Two developments in urban forestry—the state-sponsored Treasure Valley Urban Tree Canopy Assessment and the Arbor Day Foundation's Energy Saving Trees tool—provided Idaho Power with the tools to develop a shade tree project.

The Shade Tree Project was launched in Ada and Canyon counties, offering free shade trees to residential customers. Participants enroll using the online Energy Saving Trees Tool—developed by the Arbor Day Foundation—and pick up their tree at specific events. Unclaimed trees are donated to the city partners and schools.

Using the online enrollment tool, participants map their home, select from a list of available trees, and evaluate the potential energy savings associated with planting in different locations. During enrollment, participants learn how trees planted to the west and east save more energy over time than trees planted to the south and north.

Ensuring the tree is planted properly helps it grow to provide maximum energy savings. At the tree pickup events, participants received additional education on where to plant trees for maximum energy savings and other tree care guidance from experts. Local specialists included city arborists from Boise, Kuna, Nampa, and Meridian; Idaho Power utility arborists; Canyon County master gardeners; and College of Western Idaho (CWI) horticulture students.

2015 Program and Marketing Activities

In 2015, Idaho Power distributed 1,925 shade trees to residential customers through the Shade Tree Project. Because the best time to plant shade trees is in the spring and fall, Idaho Power held offerings in October and April, with 801 trees and 1,124 trees distributed, respectively. Additionally, the City of Boise held a tree planting workshop in October to provide similar education to the formal Shade Tree Project, during which an additional 35 trees were given to residential customers.

Trees were purchased from regional growers in advance of each event. The species offered for each event depended on the trees available at time the trees were purchased. Idaho Power worked with its own arborists, along with city and state arborists, to select a range of tall growing, deciduous trees that should work well with the climate and soils of the two participating counties.

For the spring offering, Idaho Power used direct mail to market this program and used the state-sponsored Treasure Valley Urban Tree Canopy Assessment to develop a mailing list. The assessment is a geographic information system (GIS)-based study that mapped land use throughout the Treasure Valley, including existing trees and vegetation, buildings, roads, waterways, and parking lots. The study identified areas where a large shade tree could be planted. Idaho Power used the study to identify potential planting sites on residential properties situated to the west of the home. The mailing list was created from the results. The spring mailing was successful, as most trees were reserved within nine days. Idaho Power collected names and emails of people who expressed interest after enrollment closed and created a waiting list of potential participants.

In fall 2015, Idaho Power marketed the program to customers captured on the spring waiting list and using a variety of word-of-mouth tactics. Idaho Power distributed flyers about the project at the FitOne Expo in Boise. Project Partners, such as the cities of Nampa, Kuna, and Boise, shared information through their networks. Idaho Power announced the Shade Tree Project to allied groups, such as the Idaho Conservation League, Idaho Chapter of the US Green Building Council, and Treasure Valley Canopy Network. Information was sent to Green Team leads at large employers, such as Hewlett Packard, Wells Fargo, Ch2MHill, and Citi Bank. A boosted Facebook post was also used, which reached 10,747 people and resulted in 102 likes, 281 link clicks, 35 comments, and 54 shares.

Participants picked up their tree at prescheduled events held throughout the Treasure Valley. Four pickup events were held in the spring and four in the fall, conducted on different days at different locations. By offering several pickup days, locations, and times, 91 percent of enrolled participants picked up their trees.

During summer 2015, Idaho Power implemented an audit component to the project and conducted follow-up site visits at a subset of participant homes. Participants were picked at random from fall 2013 and spring 2014 offerings to ensure the trees would have had at least one full year in the ground prior to the evaluation. Two student evaluators, a recent graduate from the CWI Horticulture program and a Boise State University Environmental Sciences student, visited 312 homes and looked at 442 trees. The students took measurements on the orientation and distance from the home and captured geographic positioning system (GPS) coordinates for each tree. This data will be used to refine energy-savings calculations. The students also recorded variables related to overall tree health. Results were used to identify opportunities to improve education on tree planting and care. Improvements, such as a tree-planting display and informational posters, were implemented in the fall. Additionally, participants now receive a tree-care newsletter approximately six to nine months after participation.

Information about the project was shared with all customers in the September energy efficiency issue of the *Connections* newsletter, sent to more than 415,000 customers with their bills. The cover story focused on how anyone can plant a tree for energy efficiency—*Planting Shade Trees for Energy Savings*. Upon completion of the fall offering, an item appeared in an October *News Briefs* sent to all media in the service area, *Shade Trees Provide Energy Savings—Idaho Power's Shade Tree Project Completes Fall Offering*.

Data for the project, including the data from the 2015 summer audits, is now tracked in Idaho Power's DSM database. The database was also integrated into a screening tool used during enrollment to determine whether participants meet the eligibility requirements for the project.

In 2015, this project was partially funded by a US Forest Service Western Competitive States Grant. The grant funded the trees for the fall offering and one of the summer audit evaluators. The grant also funded the development of several new educational pieces. The pieces included educational posters showing the energy and environmental benefits of urban trees and an automated graphic that showed how trees can shade homes during the summer.

Customer Satisfaction and Evaluations

After each offering, a survey was emailed to participants. Because customers have the option to select up to two trees during each offering, the survey was modified in early 2015. The survey asked questions related to marketing, tree-planting education, and the participant experience with the enrollment and tree pickup processes. Results are compared offering to offering to look for trends to ensure the program processes are still working and identify opportunities for improvement. Data are also collected about where the participant planted the tree and when. This data will be used to refine energy-savings estimates.

For the fall 2014 and spring 2015 offering, the participants were surveyed together, and the response rate was just over 49 percent. Participants were asked how much they would agree or disagree that they would recommend the project to a friend; just over 94 percent of respondents said they "strongly agreed," and almost 5 percent said they "agreed." Participants were asked how much they would agree or disagree that they were satisfied with the overall experience with the Shade Tree Project; over 89 percent of respondents indicated they "strongly agreed," and over 8 percent "somewhat agreed" they were satisfied.

For the fall 2015 offering, the response rate was nearly 61 percent. Participants were asked how much they would agree or disagree that they would recommend the project to a friend; over 96 percent of respondents said they "strongly agreed," and nearly 3 percent said they "agreed." When participants were asked how much they would agree or disagree they were satisfied with the overall experience with the Shade Tree Project, over 93 percent of respondents indicated they "strongly agreed," and just nearly 6 percent "somewhat agreed" they were satisfied. View survey information in *Supplement 2: Evaluation*.

2016 Program and Marketing Strategies

Idaho Power plans to continue the Shade Tree Project in 2016 using the Arbor Day enrollment tool and events to distribute the trees. Idaho Power will continue to market the program through direct mail focusing on customers identified using the urban tree-canopy assessment. In addition, Idaho Power maintains a waiting list of customers that either heard about the program through a friend or relative or did not enroll in the last offering before it filled. Idaho Power will reach out to these customers through direct-mail or email. Idaho Power will continue to leverage allied interest groups and will use social media and boosted Facebook posts if enrollment response rates are not as successful as past years.

Idaho Power will continue to leverage grant funding to supply trees and develop educational materials. For spring 2016, Idaho Power and the grant partners are working on a local-tree-sourcing option, which may reduce program costs. Idaho Power will continue to collect metrics to evaluate program success and effectiveness. Surveys will be sent after each offering.

Simple Steps, Smart Savings™

		2015	2014
Participation and Savings[a]			
	Participants (products)	9,343	n/a
	Energy Savings (kWh)	770,822	n/a
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$130,575	n/a
	Oregon Energy Efficiency Rider	$6,676	n/a
	Idaho Power Funds	$1,845	n/a
	Total Program Costs—All Sources	$139,096	n/a
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.018	n/a
	Total Resource Levelized Cost ($/kWh)	$0.054	n/a
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	3.37	
	Total Resource Benefit/Cost Ratio	4.83	

[a] Includes promotional based appliances, showerheads, and Home Products Program 2015 information.

Description

Initiated in 2015, the Simple Steps, Smart Savings program is a promotional based appliance program that aims to increase sales of qualified energy-efficient appliances in the marketplace. The payments provided by Idaho Power through this program are applied during special promotions, which align with holidays or events throughout the year at retail stores. Incentives are shared between the retailer, manufacturer, and the customer. The amounts provided to each may differ between promotions and between retailers and manufacturers. Retailer and manufacturer incentives may be provided as co-marketing dollars to the retailer or manufacturer to fund activities such as promotional events, special product placement, point-of-purchase signage, retailer activities, event kits, sales associate training, training material, and other marketing activities during the promotional periods. Customer rewards may include, but are not limited to, retailer gift cards or retailer credit to the customer for the purchase of qualified products. These promotions are currently only available in Idaho. Simple Steps, Smart Savings also includes promotions using retailer markdowns and retailer/manufacturer incentives. Markdowns reduce retail-end prices to the customer at the point-of-purchase. Retailer/manufacturer incentives drive the manufacture, distribution, and promotion of more energy-efficient consumer products at the retail level. One measure Idaho Power offered through the retailer markdown model since 2010 is low-flow showerheads.

Through this program, Idaho Power payments go to reduce the cost of the showerheads for customers at the retail level, as well as to retailers and manufacturers to drive the manufacture, distribution, and promotion of these products. In 2015, Idaho Power began providing incentives for appliances.

Idaho Power also participates in the BPA-sponsored, Simple Steps, Smart Savings energy efficient lighting program, which is discussed further in the Energy Efficient Lighting program section of this report.

All Simple Steps, Smart Savings promotions are administered by the BPA and coordinated by CLEAResult.

2015 Program and Marketing Activities

Prior to 2015, Idaho Power provided incentives to customers for the purchase of ENERGY STAR rated refrigerators and freezers through the Home Products Program. In 2014, the baseline threshold used to calculate energy savings was updated, and refrigerator and freezer incentives were no longer cost-effective. Idaho Power discontinued these incentives for new purchases effective January 1, 2015 to Idaho customers and January 14, 2015 to Oregon customers.

Several methods were used to notify stakeholders of the removal of refrigerator and freezer incentives. Idaho Power mailed multiple letters to retailers to alert them of the changes. Idaho Power CRs visited all participating retailers in November to advise them of the change to the program. CRs returned to the retailers during the first week of January to remind them of the change and to pick up all remaining Home Products Program applications still on hand. Idaho Power updated the company's Home Products Program website in November to notify customers of the upcoming discontinuance of the incentives. The company updated the Idaho Power website again in January to let customers know incentives were no longer available through the program.

Though the incentives were discontinued in January for new purchases, the Home Products Program continued to pay incentives for qualifying purchases that had been made within 120 days from the date of purchase prior to that time. Through the Home Products Program, Idaho Power paid 192 appliance incentives during 2015, resulting in 5,722 kWh annual savings. Ninety-three percent of incentives were for refrigerators and 7 percent were for freezers. Additionally, Idaho Power paid incentives on 9,025 showerheads, sold under the regional BPA Simple Steps, Smart Savings promotion, resulting in 749,854 annual kWh savings.

In 2015, Idaho Power participated in two major Simple Steps, Smart Savings appliance promotions. Retailers that participated in the 2015 promotions within Idaho Power's service area were Sears, Sears Hometown, and The Home Depot.

The Labor Day promotion ran for two weeks in September and offered a $30 store gift card or $30 retailer credit to customers for the purchase of any ENERGY STAR-rated clothes washer. Idaho Power customers bought 126 units during this promotion. The Black Friday Promotion offered a $10 store gift card or $10 retailer credit to customers for the purchase of any ENERGY STAR-rated clothes washer and ran the month of November and first week of December. Results from the Black Friday event will be reported in the 2016 report due to the lag time in reporting of sales data. The reduction in incentives from one promotion to the next was a result of a decrease in the savings due to federal standards change, from 132 kWh to 73 kWh as of October 1, 2015, following the new BPA Implementation Manual.

To help support the promotions, table tents and static clings were displayed on all qualifying appliances. These pieces informed customers about the promotion and the incentive they would receive. In-store gift cards were placed in gift card holders that displayed the Idaho Power logo. For purchases from Sears Hometown, where the customer received an instant markdown, customers also received a thank-you card that displayed the Idaho Power logo. In-store events were held at all participating retailers during the promotion. At each event, Idaho Power and CLEAResult personnel staffed a table and answered customer questions about the promotion. To further educate customers about the promotions, CLEAResult created an Idaho Power-branded promotional landing page that highlights promotion details and participating retailers. During the promotions, Idaho Power placed Facebook posts to notify customers of the details.

Cost-Effectiveness

Idaho Power used the same cost-effectiveness UES assumptions in 2015 for the Simple Steps, Smart Savings as were used in 2014 for showerheads in the Home Products Program. In 2015, the RTF reviewed and updated the savings assumptions showerheads. The parameters that impacted the savings for showerheads the most were changes to the baseline showerhead, the showers per person per year, and the annual usage of each showerhead. These new savings will be applied in 2016.

In September 2014, the federal standards for refrigerators and freezers increased 20 to 30 percent depending on the product class. The RTF discussed the impact of these federal standard changes, which raised the baseline used to calculate the electric energy savings estimates. As a result of these higher standards, the annual gross energy savings for refrigerators dropped from 29 to 21 kWh per year, and freezers dropped from 40 to 23 kWh per year. The lower DSM alternate costs from the 2013 IRP as well as the lower savings estimates from the RTF resulted in the measures no longer being cost-effective under the mail-in incentive model. Idaho Power removed refrigerators and freezers from its mail-in rebate program in early 2015. For the appliances purchased in 2014 and incented in 2015, Idaho Power applied the kWh savings from before the federal standards change due the lingering inventory of appliances not meeting the new standard currently in the marketplace.

In 2015, Idaho Power participated in two major appliance promotions. After reviewing the appliances offered in each promotion, it was determined that only clothes washers would be cost-effective. Idaho Power applied the per unit savings from the approved BPA's UES Measure List. While BPA applies the annual generator busbar savings of 132 kWh per unit, Idaho Power applies the annual site savings of 121 kWh per unit. This difference is due to the different line losses applied by Idaho Power and BPA.

For detailed information for all measures within the Simple Steps, Smart Savings program, see *Supplement 1: Cost-Effectiveness*.

2016 Program and Marketing Strategies

Idaho Power has committed to participate in the 2016 Simple Steps, Smart Savings appliance promotions. Five promotions are tentatively scheduled: February for President's Day, May to June for Memorial Day, July for Independence Day, August to September for Labor Day, and November to December for Black Friday. Current participating retailers are Sears, Sears Hometown and The Home Depot. CLEAResult is in the process of working with local independent retailers to encourage their participation in the program. For each promotion, Idaho Power will provide incentives only for products that meet Idaho Power's cost-effectiveness requirements.

Idaho Power will also continue participation in the Simple Steps, Smart Savings energy-efficient showerheads buy-down program in 2016.

CLEAResult will continue to manage marketing at retailers, including point-of-purchase signs, Idaho Power-branded gift card holders, and thank-you cards. When provided, Idaho Power will continue to use Idaho Power-branded promotion landing pages and Facebook posts to notify customers of the promotions.

Weatherization Assistance for Qualified Customers

	2015	2014
Participation and Savings		
Participants (homes/non-profits)	243	255
Energy Savings (kWh)	550,021	533,800
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$0	$0
Oregon Energy Efficiency Rider	$0	$0
Idaho Power Funds	$1,315,032	$1,320,112
Total Program Costs—All Sources	$1,315,032	$1,320,112
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.145	$0.149
Total Resource Levelized Cost ($/kWh)	$0.235	$0.225
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	0.54	
Total Resource Benefit/Cost Ratio	0.43	

Description

The WAQC program provides funding to install weatherization measures in qualified, owner-occupied and rental homes that are electrically heated. In 2015, qualified households included customers in Idaho Power's service areas in Idaho and Oregon with incomes up to 200 percent of the federal poverty-level guidelines. Energy efficiency enhancements allow qualified families to maintain a comfortable home environment while saving energy and money otherwise spent on heating, cooling, and lighting. Participants receive energy efficiency education to help save energy in their homes. Funding is also provided for the weatherization of buildings that house non-profit organizations who serve special-needs populations. In compliance with IPUC Order No. 29505, Idaho Power funds the CAP agencies to administer the WAQC program in its service area.

Initiated in 1989, WAQC is modeled after the DOE weatherization program. The DOE program is managed through the Idaho Department of Health and Welfare (IDHW) in Idaho and by the Oregon Housing and Community Services (OHCS) in Oregon. Federal funds are allocated to the IDHW and OHCS, then to CAP agencies based on US Census data of population and poverty levels within each CAP agency's geographic area. The CAP agencies serve as the administrators of the state Weatherization Assistance Program (WAP) and oversee local weatherization crews and contractors, providing services and measures that improve energy efficiency of the homes. The WAQC funding provided by Idaho Power allows these state agencies to leverage their federal weatherization dollars and serve more Idaho Power customers who heat their homes with electricity by supplementing federal LIHEAP weatherization funds.

Energy-saving home measures provided by this program include upgrades to windows, doors, wall insulation, ceiling insulation, floor insulation, infiltration, ducts, water heaters, and pipes; furnace tune ups, modification, and replacement; and the installation of CFL and LED bulbs. The Idaho WAP calculates savings with the EA5 energy audit program (EA5). Consistent with the Idaho WAP, WAQC offers several measures that have costs but do not save energy or for which savings cannot be

measured. Included in this category are health and safety, vents, furnace repair, and home energy audits. Health and safety measures are necessary to ensure weatherization activities do not cause unsafe situations in a customer's home or compromise a household's existing indoor air quality.
Other non-energy-saving measures are allowed under this program to help facilitate the effective performance of those measures yielding energy savings.

Energy-saving measures provided to non-profit buildings under this program include upgrades to windows, doors, wall insulation, ceiling insulation, floor insulation, infiltration, ducts, water heaters, and pipes; furnace tune-ups, modification, and replacement; and the installation of CFL and LED bulbs. Non-profit building measures that have costs but do not save energy or for which savings cannot be measured are health and safety, vents, furnace repair, and energy audits.

For more details on the WAQC program, view the most recent regulatory report, *Weatherization Assistance for Qualified Customers 2014 Annual Report*, dated April 1, 2015, located in *Supplement 2: Evaluation*. The new *Weatherization Assistance for Qualified Customers 2015 Annual Report* will be filed on April 1, 2016.

2015 Program and Marketing Activities

During 2015, CAP agencies weatherized 225 electrically heated homes in Idaho and 10 in Oregon, totaling 235 weatherized homes. Eight Idaho buildings housing non-profit organizations that serve special-needs populations were also weatherized in 2015.

Idaho Power marketed WAQC throughout 2015 at resource fairs, community special-needs populations' service provider meetings, and CAP agency functions to reach customers who may benefit from the program. Marketing for this program was conducted in cooperation with weatherization managers and CAP agency personnel.

In the September energy efficiency issue of the *Connections* newsletter, sent to more than 415,000 customers with their bills, the program was mentioned in an article about weatherization. The program also was featured as the cover story of the December issue about weatherization professionals and how Idaho Power partners with CAP agencies. In that same issue, information and a link was provided to a recent YouTube video featuring a Weiser couple who had received assistance to weatherize their home through the program. In August, a news item about the program appeared in the weekly *News Briefs* sent to all media in the service area: *Help for Electrically Heated Homes*.

Cost-Effectiveness

The WAQC program has been proven to provide real and substantial per home savings and non-energy benefits. Due to the costs of comprehensive whole house weatherization, the program remains not cost-effective from either a UC or TRC perspective.

No changes were made to average per home average savings for 2015 savings. The RTF conducted billing analysis in 2015 on Idaho Power's manufactured home weatherization projects from 2011 to 2012, and their analysis validated Idaho Power's internal analysis completed in 2012. The RTF analysis led to increased collaboration of statistical software programming and data cleaning recommendations between RTF contract analyst staff and Idaho Power.

In late 2015, Idaho Power initiated an additional billing analysis of 2013 to 2014 weatherization projects. The purpose of the analysis is to determine the impact of increased heat pump replacement as part of projects and to continue to increase understanding of the program impacts. Results will be available in 2016.

For further details on overall program cost-effectiveness assumptions, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

Idaho Power used two independent, third-party verification companies to randomly check approximately 10 percent of weatherization jobs submitted for payment by the program. These verifiers discussed the program with participating customers and confirmed installed measures in their homes. Home verifiers visited 28 homes for feedback about the program. When customers were asked how much they learned about saving electricity, 22, or over 78 percent, answered they learned “a lot” or “some.” When asked about how many ways they tried to save electricity, 25, or approximately 89 percent, responded “a lot” or “some.”

A customer survey was used to assess major indicators of customer satisfaction and program operations consistently throughout the service area. The 2015 Weatherization Programs Customer Survey was provided to all WAQC participants in all regions upon completion of weatherization in their homes. Survey questions gathered information about how customers learned of the program, reasons for participating, how much customers learned about saving energy in their homes, and the likelihood of household members changing behaviors to use energy wisely. Demographic information was gathered to determine future marketing strategies.

Idaho Power received survey results from 211 of the 235 households weatherized by the program in 2015. Some key highlights include the following:

- Almost 46 percent of respondents learned of the program from a friend or relative, and another almost 22 percent learned of the program from an agency flyer. Nearly 5 percent learned about the weatherization program by receiving a letter in the mail.
- Over 86 percent of the respondents reported their primary reason for participating in the weatherization program was to reduce utility bills, and over 44 percent wanted to improve the comfort of their home.
- Almost 82 percent reported they learned how air leaks affect energy usage, and just over 68 percent indicated they learned how insulation affects energy usage during the weatherization process. Over 54 percent of respondents said they learned how to use energy wisely.
- Over 83 percent reported they were very likely to change habits to save energy, and just over 82 percent reported they have shared all the information about energy use with members of their household.
- Over 93 percent of the respondents reported they think the weatherization they received will significantly affect the comfort of their home, and over 98 percent said they were very satisfied with the program.
- Over 85 percent of the respondents reported that the habit they were most likely to change was turning off lights when not in use, and nearly 65 percent said that washing full loads of

clothes was a habit they were likely to change to save energy. Turning the thermostat up in the summer was reported by over 51 percent and turning the thermostat down in the winter was reported by over 66 percent as a habit they and members of the household were most likely to change to save energy.

A summary of the report is included in *Supplement 2: Evaluation*.

Idaho Power participates in the Idaho and Oregon state monitoring process, which involves representatives from the CAP agencies, CAPAI, and IDHW or OHCS reviewing homes weatherized by each of the CAP agencies. Results of the state monitoring review show all CAP-agency weatherization departments are weatherizing in accordance with federal guidelines.

Additionally, the DOE audits state agencies each year. The DOE audits include field work, paperwork, and billing audits, which show that the Idaho WAP and therefore, WAQC, is in compliance with DOE standards.

2016 Program and Marketing Strategies

WAQC will continue using DOE guidelines and leveraging each weatherization job with state WAP funding on each job. The budget and projected number of jobs for 2016 will remain the same as 2015.

Idaho Power will continue working in partnership with the IDHW, OHCS, CAPAI, and individual CAP agency personnel to maintain the targets and guidelines and improve the cost-effectiveness of the WAQC program.

Idaho Power will continue involvement with the State of Idaho's Policy Advisory Council that serves as an oversight group for weatherization activities in Idaho. Through this forum, Idaho Power participates in the weatherization policy for the State of Idaho.

The company plans to continue to selectively market WAQC throughout 2016. The program will be promoted at resource fairs, community special-needs populations' service provider meetings, and CAP agency functions to reach customers who may benefit from the program. Marketing for this program will be conducted in cooperation with weatherization managers.

Weatherization Solutions for Eligible Customers

	2015	2014
Participation and Savings		
Participants (homes)	171	118
Energy Savings (kWh)	432,958	290,926
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$1,204,147	$757,748
Oregon Energy Efficiency Rider	$0	$0
Idaho Power Funds	$39,122	$33,596
Total Program Costs—All Sources	$1,243,269	$791,344
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.175	$0.163
Total Resource Levelized Cost ($/kWh)	$0.175	$0.163
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	0.45	
Total Resource Benefit/Cost Ratio	0.50	

Description

Weatherization Solutions for Eligible Customers is an energy efficiency program designed to serve Idaho Power residential customers who are below poverty level, at poverty level, or slightly above poverty level in Idaho. Initiated in 2008, the program is designed to mirror WAQC. Potential participants are interviewed by the contractor to determine household eligibility as well as ensure the home is electrically heated. If eligible, an auditor inspects the home to determine what energy-saving upgrades will save energy, improve indoor air quality, and increase comfort for the residents.
The installation of energy efficiency measures and repairs are allowed as long as the improvements have a savings-to-investment ratio (SIR) of 1.0 or higher. The amount spent on each home is limited to an annual average of Idaho Power's portion of the cost per home. Homes considered for this program are electrically heated and either owned or rented. If rented, the landlord's permission is needed to perform the upgrades, along with an agreement to maintain the unit's current rent for a minimum of one year and help fund a portion of the cost of weatherization.

Idaho customers eligible for this program have earned incomes between 175 percent and 250 percent of the federal poverty level. These customers typically do not have disposable income to participate in other residential energy efficiency programs, and they typically live in similar housing as WAQC customers.

2015 Program and Marketing Activities

In 2015, Idaho Power hired a new contractor located in the company's Eastern region to provide weatherization services starting in 2016 to customers residing in Lemhi County, Idaho. Contractors used the new Home Audit HAT 14.1 tool throughout 2015 to estimate energy savings.

Marketing was increased in 2015 to reach more customers living in electrically heated and income-eligible households to increase participation in the program. Inserts were included in residential bills in February, July, and October. The program was promoted throughout the year at seasonal, resource, and conservation fairs, as well as other events targeting people with limited incomes and seniors. Advertisements and articles promoted the program in the *Seniors BlueBook*, *Healthy Idaho Magazine*, *Idaho Senior News*, and the *Idaho State Journal* boomers edition. Idaho Power's community relations representatives and CRs promoted the program at meetings in their communities, with specific emphasis on smaller Idaho communities. The program specialist and CRs promoted the program to home health provider groups, religious groups, and members of the Idaho Nonprofit Center. Customer testimonials were posted on social media and the Idaho Power website for this program was updated to provide clarity and show success via a YouTube video of a customer testimonial.

The program was mentioned in articles appearing in May, September, and December issues of the *Connections* newsletter sent to more than 415,000 customers with their bills. Targeting the Pocatello area, the focus of the May live in-studio energy-efficiency segment on the KPVI morning news promoted the Weatherization Solutions for Eligible Customers program. In August, a news item about the program appeared in the weekly *News Briefs* sent to all media in the service area: *Help for Electrically Heated Homes*.

In 2015 landlords who participated in the program were required to fund at least 10 percent of the projects, the company held the average cost per home constant for the weatherization contractors, and regularly met with the contractors to discuss program operations and improvements.

Cost-Effectiveness

While not cost-effective, the savings per home are measurable and significant per home. No changes in per-home savings assumptions were made for 2015 results. Projects completed in 2013 through 2014 were included in the updated billing analysis completed in the latter part of 2015. For more details on the analysis, see the Cost-Effectiveness section for Weatherization Assistance for Qualified Customers. For further details on the overall program cost-effectiveness assumptions, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

Two independent companies performed random verifications of weatherized homes and visited with customers about the program. In 2015, 31 homes were verified, and 27, or 87 percent, of those customers reported they learned "a lot" or "some" about saving electricity in their home. Thirty-one, or 100 percent, reported they had tried "a lot" or "some" ways to save energy in their home.

The 2015 Weatherization Programs Customer Survey was provided to all program participants on completion of weatherization in their homes. Survey questions gathered information about how customers learned of the program, reasons for participating, how much customers learned about saving energy in their homes, and the likelihood of household members changing behaviors to use energy wisely. Demographic information was gathered to determine future marketing strategies.

Idaho Power received survey results from 133 of the 171 households weatherized by the program in 2015. Some key highlights include the following:

- Almost 25 percent of respondents learned of the program through a letter in the mail and another almost 32 percent learned of the program from a friend or relative.

- Over 83 percent of the respondents reported their primary reason for participating in the weatherization program was to reduce utility bills.
- Almost 74 percent indicated they learned how insulation affects energy usage during the weatherization process, and over 80 percent reported they learned how air leaks affect energy usage. Another almost 54 percent of respondents said they learned how to use energy wisely.
- Over 80 percent reported they were very likely to change habits to save energy, and almost 82 percent reported they have shared all of the information about energy use with members of their household.
- Almost 93 percent of the respondents reported they think the weatherization they received will significantly affect the comfort of their home, and nearly 95 percent said they were very satisfied with the program.

A summary of the report is included in *Supplement 2: Evaluation*.

2016 Program and Marketing Strategies

Idaho Power will introduce the Weatherization Solutions for Eligible Customers program in Lemhi County in 2016. New brochures will help spread the word about the program in all communities. Additional marketing for the program will include bill inserts and advertisements in *Healthy IdahoMagazine*, *Seniors BlueBook*, *Idaho Senior News*, and *Idaho State Journal* boomers edition. Idaho Power will send a direct-mail letter to certain residential customers mid-year and use social media.

In 2016, the company will explore with weatherization contractors potential new energy-savings measures to add to the program.

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COMMERCIAL/INDUSTRIAL SECTOR OVERVIEW

Description

Idaho Power's commercial sector consists of over 68,352 customers. In 2015, the commercial sector's number of customers increased by 830, an increase of a little over 1 percent from 2014. The energy usage of commercial customers varies from a few kWh each month to several hundred thousand kWh per month. The commercial sector represents 28 percent of Idaho Power's actual total electricity usage and 25 percent of overall revenue in 2015.

The industrial and special contracts customers are Idaho Power's largest individual energy consumers. There are 115 industrial customers. These customers can account for approximately 21 percent of Idaho Power's total electricity usage and 16 percent of overall revenue in 2015.

Three major programs targeting different energy efficiency projects are available to commercial/industrial customers in the company's Idaho and Oregon service areas. The Building Efficiency program is available for new construction projects and large remodels. These projects typically capture lost opportunity savings and encourage business owners to incorporate energy efficiency measures that are more efficient than current commercial building codes require.
This program continues to be successful, incorporating qualified energy-saving improvements for lighting, cooling, building shells, management-control options, appliances, and refrigeration.
The Custom Efficiency program offers financial incentives for commercial and industrial energy users undertaking more complex projects to improve the efficiency of their electrical systems or processes. Incentive levels are 70 percent of the project cost or 18 cents per kWh for first-year savings, whichever is less.

Easy Upgrades offers a menu of typical retrofit measures with prescriptive incentive amounts for lighting, HVAC, building shells, variable-speed/frequency drives (VFD), food-service equipment, and other commercial measures. These energy-saving measures allow customers the option of incorporating energy efficiency into their business at a lower initial cost.

In May 2015, the FlexPeak Management demand response program was brought under Idaho Power's administration and renamed Flex Peak Program. The Flex Peak Program calls at least three events annually between June 15 and August 15. Idaho Power notifies commercial and industrial customers two hours in advance of each event and each participating customer's load reduction is measured for each event. Incentives are calculated and sent to customers at the end of the program season. The events typically occur during peak-use hours when demand on Idaho Power's system is the greatest. Each event lasts between two and four hours, no more than 15 hours per week or 60 hours per summer season.

Idaho Power also offers the statutory-required Oregon Commercial Audits program to medium and small commercial customers. The program identifies opportunities for commercial building owners to achieve energy savings.

The Custom Efficiency program continued to represent the highest total energy savings among commercial and industrial programs in 2015, with a total savings of 55,247 MWh. The Easy Upgrades program continued to lead the sector in projects completed with 1,222 projects. Combined, all programs completed 1,463 projects that achieved 102,074 MWh of energy savings. Table 10 shows a summary of savings and expenses from the three commercial and industrial energy efficiency programs that produce direct savings and one demand response program.

Programs

Table 10. 2015 commercial/industrial programs

		Total Cost		Savings	
Program	**Participants**	**Utility**	**Resource**	**Energy (kWh)**	**Demand (MW)**
Demand Response					
Flex Peak Program	72 sites	$ 592,872	$ 592,872	n/a	26
Total		**$ 592,872**	**$ 592,872**		**26**
Energy Efficiency					
Building Efficiency	81 projects	$ 2,162,001	$ 6,293,071	23,232,017	
Custom Efficiency	160 projects	9,012,628	20,533,742	55,247,192	
Easy Upgrades	1,222 projects	4,350,865	7,604,200	23,594,701	
Total		**$ 15,525,494**	**$ 34,431,013**	**102,073,910**	

Note: See Appendix 3 for notes on methodology and column definitions.

Idaho Power's commercial and industrial energy efficiency programs had an excellent year in 2015. Total savings were up 29 percent over 2014. The programs continued to develop and strengthen Idaho Power's strategic partnerships. These partnerships include the IDL, engineering and architectural firms, a vast network of trade allies, the Northern Rockies Chapter of International Facilities Managers Association, the International Building Contractors Association (IBOA), and most importantly, Idaho Power customers. Training and education continued to be an important aspect of the company's programs in 2015. Idaho Power continues to provide many different ways for customers to learn about and engage in energy efficiency. Through multiple channels—customer workshops, customer meetings, trainings, audits, cohorts, trade allies, architectural firms, and engineering firms—the company creates face-to-face interactions that allow the company to continue to enhance its overall program performance.

The Green Rewind offering is available to Idaho Power's agricultural, commercial, and industrial customers. The sectors' combined 51 Green Rewind motors achieved a total annual savings of 151,124 kWh in 2015, with 19 commercial/industrial sector motors contributing 61,050 kWh per year and 32 irrigation sector motors contributing 90,074 kWh per year.

Twenty-one service centers in Idaho Power's service area have the necessary equipment and training to participate in the Green Rewind offering. An estimated 1,200 motor rewinds are occurring annually within these service centers. Currently, seven service centers have signed on as Green Motors Practice Group (GMPG) members in Idaho Power's service area. The GMPG will also expand the number of service centers participating in the GMPG's Green Motors Initiative, leading to market transformation and additional southern Idaho and eastern Oregon kWh savings.

Motor service centers are paid $2 per horsepower (hp) by the GMPG for each National Electrical Manufacturers Association (NEMA) Standard hp-rated motor up to 5,000 hp for industrial and agricultural uses that receive a verified Green Rewind. Customers are paid $1 per hp from the service center that completed their rewind. The GMPG requires all service centers to sign and adhere to the GMPG Annual Member Commitment Quality Assurance agreement. The GMPG follows up with a quality check and QA.

Customer satisfaction research by sector includes the Idaho Power quarterly customer relationship surveys that ask questions about customer perceptions related to Idaho Power's energy efficiency programs. Sixty-five percent of Idaho Power's large commercial and industrial customers surveyed in

2015 for the Burke Customer Relationship survey indicated Idaho Power was meeting or exceeding their needs in offering energy efficiency programs. Forty-five percent of survey respondents indicated Idaho Power was meeting or exceeding their needs with information on how to use energy wisely and efficiently. Sixty-nine percent of respondents indicated Idaho Power was meeting or exceeding their needs by encouraging energy efficiency with its customers. Overall, 81 percent of the large commercial and industrial survey respondents indicated they have participated in at least one Idaho Power energy efficiency program. Of the large commercial and industrial survey respondents who have participated in at least one Idaho Power energy efficiency program, 95 percent are “very” or “somewhat” satisfied with the program.

The results from surveying Idaho Power’s small business customers indicated 47 percent of these customers said Idaho Power was meeting or exceeding their needs in offering energy efficiency programs. Fifty-six percent of survey respondents indicated Idaho Power was meeting or exceeding their needs with information on how to use energy wisely and efficiently. Fifty-nine percent of respondents indicated Idaho Power was meeting or exceeding their needs with encouraging energy efficiency with its customers. Overall, 29 percent of the small business survey respondents indicated they have participated in at least one Idaho Power energy efficiency program. Of small business survey respondents who have participated in at least one Idaho Power energy efficiency program, 90 percent are “very” or “somewhat” satisfied with the program.

Sixty-two percent of the Idaho Power business customers included in the *2015 J. D. Power and Associates Electric Utility Business Customer Satisfaction Study* indicated they are familiar with Idaho Power’s energy efficiency programs.

Building Efficiency

	2015	2014
Participation and Savings		
Participants (projects)	81	69
Energy Savings (kWh)	23,232,021	9,458,059
Demand Reduction (MW)	n/a	1.2
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$2,128,309	$1,212,907
Oregon Energy Efficiency Rider	$16,075	$31,052
Idaho Power Funds	$17,617	$14,315
Total Program Costs—All Sources	$2,162,001	$1,258,273
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.008	$0.012
Total Resource Levelized Cost ($/kWh)	$0.024	$0.037
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	7.63	
Total Resource Benefit/Cost Ratio	3.70	

Description

The Building Efficiency program enables customers in Idaho Power's Idaho and Oregon service areas to apply energy efficient design features and technologies in new commercial or industrial construction, expansion, or major remodeling projects. Originated in 2004, the program currently offers a menu of measures and incentives for lighting, cooling, building shell, controls, appliances, and refrigeration-efficiency options. These measures may otherwise be lost opportunities for savings on customers' projects. Commercial and industrial customers taking service under, or who will take service under, Schedule 7 (Small General Service), Schedule 9 (Large General Service), Schedule 19 (Large Power Service), or special contracts customers are eligible to participate. Program marketing is targeted toward architects, engineers, and other design professionals.

Twenty prescriptive measures are offered through this program. The measures are interior-light load reduction, exterior-light load reduction, daylight photo controls, occupancy sensors, high-efficiency exit signs, efficient A/C and heat pump units, efficient variable refrigerant flow units, efficient chillers, air-side economizers, direct evaporative coolers, reflective roof treatment, energy-management control systems, guest room energy management systems, HVAC VFDs, efficient laundry machines, ENERGY STAR® under-counter dishwashers, ENERGY STAR commercial dishwashers, refrigeration head pressure controls, refrigeration floating suction controls, and efficient condensers.

The IDL has been a useful resource for the Building Efficiency program. Idaho Power is a primary sponsor of the IDL, which provides technical assistance and training seminars focused on energy efficiency to local architects, engineers, and designers through Lunch & Learn sessions and the Idaho Building Simulations Users Group (BSUG). Sessions are outlined in the IDL section of *Supplement 2: Evaluation*.

2015 Program and Marketing Activities

The Building Efficiency program completed 81 projects, resulting in 23,232,021 kWh in annual energy savings in Idaho and Oregon. The program increased by145 percent from 9,458,059 kWh in 2014, a significant addition in total kWh savings from last year. The total number of projects increased by 17 percent from 69 projects in 2014 to 81 projects in 2015. Four large projects accounted for 79 percent of the total annual energy savings in 2015.

Maintaining a consistent program is important for large projects with long construction life, though changes are made to enhance customers' options or to meet new code changes. Idaho Power ideally tries to keep the program consistent by making changes less frequently, approximately every other year. The last modification to the program was mid 2014. Implemented modifications remained the same for 2015. New construction and major renovation project design and construction life is much longer than small retrofits and often encompasses multiple calendar years.

In 2014, the Building Efficiency program added a Professional Assistance Incentive equal to 10 percent of the participant's total incentive, up to a maximum amount of $2,500, to improve participants' satisfaction with the incentive process. Nine projects received the Professional Assistance Incentive in 2015.

Idaho Power contracted with ADM to update the TRM to address code changes that occurred January 1, 2015 in Idaho. The changes are currently being evaluated for implementation into the program in 2016.

In 2015, Idaho Power contracted with Greensteps to target the commercial real estate industry. The contract continued support of the Kilowatt Crackdown™ participants, whose buildings competed in the Kilowatt Crackdown competition, which included benchmarking their building in ENERGY STAR Portfolio Manager and implementing low-cost and no-cost efficiency measures. Idaho Power also expanded engagement with participants through Strategic Energy Management (SEM). The Greensteps contract continues into 2016. Idaho Power will provide a summary of the SEM report in the *Demand-Side Management 2016 Annual Report*.

The company marketed Building Efficiency as a single program and as part of Idaho Power's suite of commercial energy efficiency programs. Ads that included all of Idaho Power's commercial programs appeared in association directories, such as the American Institute of Architects (AIA) Directory and the Building Owners and Managers Association (BOMA) Symposium event program. Other advertising publications included *Horizon Air* magazine, the *Business Insider*, the *Idaho Business Review*, *Southeast Idaho Business Journal*, and bill inserts. In 2015, Idaho Power also used the Boise airport terminal display advertising space.

Technical training and assistance continue to be important in educating design professionals in energy efficiency design for new construction and major renovations. Influencing a project early in the design phase will have the most impact and least amount of lost opportunity. Twenty technical training lunches were completed in 2015, with 321 attendees, including architects, engineers, interior designers, and project managers. Technical training sessions were held in Boise, Pocatello, Idaho Falls, and Ketchum. The Building Efficiency program, in conjunction with the Custom Efficiency program, sponsored the Idaho BSUG through the IDL. Topics and sessions are outlined in the IDL section of *Supplement 2: Evaluation*.

Idaho Power CRs visited 17 architectural and engineering firms in Boise and Meridian and 10 in Pocatello in 2015. CRs visited with 212 professionals total to build relationships with the local design community and discuss Idaho Power's commercial energy efficiency programs.

The Building Efficiency program partnered with BOMA Idaho (BOMA Boise in prior years) and NEEA to provide a four-hour commercial real estate educational training session. The Making the Business Case for Energy Efficient Properties session was held in Boise. There were 42 attendees, including architects, engineers, interior designers, property managers, and real estate professionals. AIA and real estate continuing education credits were offered to attendees.

The Building Efficiency program supports a number of associations and events, including placing ads in the AIA directory, and sponsoring the Grow Smart awards, BOMA symposium, American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Technical Conference, and Idaho Energy and Green Building Conference. Idaho Power and NEEA were major sponsors of the Idaho Energy and Green Building Conference held in Boise, Idaho and had two active members on the planning committee. The two-day conference was held November 4 and 5 at The Riverside Hotel, provided four training tracks on energy efficiency and green building, and attracted over 100 participants. The conference targeted policy makers, developers, architects, code officials, engineers, energy professionals, and industrial plant managers and operators. Conference sessions covered a wide variety of topics, including the adoption of green strategies in commercial and residential construction, renovation and building operation, retrofitting green, energy code inspections, the value of energy codes, the benefits of net zero energy and certified green homes, and energy hot topics in Idaho and the Northwest. The residential, commercial, industrial, and code tracks together offered 36.25 hours of continuing education credits by AIA, International Code Council (ICC), and Leadership in Energy and Environmental Design (LEED).

Cost-Effectiveness

To calculate energy savings for the Building Efficiency program, Idaho Power verifies the incremental efficiency of each measure over a code or standard practice installation baseline. Savings are calculated through two main methods. When available, savings are calculated using actual measurement parameters, including the efficiency of the installed measure compared to code-related efficiency. Another method for calculating savings is based on industry standard assumptions when precise measurements are unavailable. Since Building Efficiency is a prescriptive program and the measures are being installed in new buildings, there are no baselines of previous measureable kWh usage in the building. Therefore, industry standard assumptions from the IECC are used to calculate the savings achieved over how the building would have used energy absent of efficiency measures.

Building Efficiency incentives are based on a variety of methods depending on the measure type. Incentives are calculated mainly through a dollar-per-unit equation using square footage, tonnage, operating hours, or kilowatt reduction.

In 2015, Idaho Power used the same savings and assumptions as were used in 2014. To prepare for 2016 program changes, ADM, under contract with Idaho Power, updated the TRM for Building Efficiency. The TRM which provides savings and costs related to existing and new measures for the Building Efficiency program. The TRM was updated to include the IECC 2012 baseline. These new savings will be applied in 2016 when other program changes are implemented. Complete measure level details for cost-effectiveness can be found in *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

Building Efficiency continued random installation verification on 10 percent of projects in 2015. The purpose of the verifications is to confirm program guidelines and requirements are adequate and ensure participants are able to provide accurate and precise information with regard to energy efficiency measure installations. The IDL completed on-site field verifications on 9 of the 81 projects, which encompass approximately 11 percent of the total completed projects in the program. Out of the nine projects verified, three projects had no discrepancies when compared to how they were declared on the final applicaiton. The six projects with minor discrepancies resulted in a total increase of energy-efficient measures for three projects and a total decrease of energy-efficient measures for the other three projects. The minor discrepancies consist of the addition or subtraction of a lighting fixture compared to what was claimed on the application. Random project installation verification will continue in 2016.

2016 Program and Marketing Strategies

The following strategies are planned for 2016:

- Continue to perform random post-project verifications on a minimum of 10 percent of completed projects.
- Continue to sponsor technical training through the IDL to address the energy efficiency education needs of design professionals throughout the Idaho Power service area.
- Continue to support Kilowatt Crackdown participants through continued coaching and technical support to further energy efficiency projects.
- Support organizations focused on promoting energy efficiency in commercial construction.
- Place print ads in the Idaho Business Review when the editorial content is dedicated to commercial property developers and engineers/architects.
- Actively support the 2016 Idaho Energy and Green Building Conference as a member of the conference planning committee. Participate in planning the conference agenda and energy efficiency sessions.
- Continue to sponsor the BOMA symposium and offer energy efficiency training and support to the real estate market.
- Continue Customer Representative relationship building with local design professionals by targeting Idaho Power’s Twin Falls and Canyon regions.
- Create consistent messaging and graphics for all the programs to help customers identify and remember the core concept that Idaho Power has energy-saving programs for businesses.

Custom Efficiency

	2015	2014
Participation and Savings		
Participants (projects)	160	131
Energy Savings (kWh)*	55,247,192	50,363,052
Demand Reduction (MW)	n/a	5.6
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$8,345,435	$6,705,219
Oregon Energy Efficiency Rider	$604,636	$418,537
Idaho Power Funds	$62,558	$49,299
Total Program Costs—All Sources	$9,012,628	$7,173,054
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.016	$0.013
Total Resource Levelized Cost ($/kWh)	$0.035	$0.024
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	4.03	
Total Resource Benefit/Cost Ratio	1.77	

*Includes 61,050 kWh from Green Motor Projects

Description

The Custom Efficiency program targets energy savings by implementing customized energy efficiency projects at customers' sites. Initiated in 2003, the program is an opportunity for commercial and industrial customers in Idaho and Oregon to lower their electrical usage and receive a financial incentive by completing energy efficiency projects. Incentives reduce customers' payback periods for projects that might not be completed otherwise. Program offerings include training and education regarding energy efficiency, energy auditing services for project identification and evaluation, and financial incentives for project implementation.

Interested customers submit pre-applications to Idaho Power for potential projects that have been identified by the customer, Idaho Power, or by a third-party consultant. Idaho Power engineers work with customers and vendors to gather sufficient information to support the energy-savings calculations.

Project implementation begins after Idaho Power reviews and approves a pre-approval application finalizing the terms and conditions of the applicant's and Idaho Power's obligations. A payment application is later submitted when the project is installed and operating. In some cases, large, complex projects may take as long as two years to complete. Every project is verified post-completion by Idaho Power staff or an Idaho Power contractor. Incentive levels for the Custom Efficiency program remained the same at 18 cents per kWh of first year savings with a 70-percent project cost cap on the incentive.

2015 Program and Marketing Activities

Custom Efficiency had another very successful year in 2015. A total of 160 projects, including eight Oregon projects, were completed by 89 customers. Program energy savings increased in 2015 by 10 percent over 2014, from 50,306 MWh to 55,186 MWh.

In 2015, 171 new applications were submitted, totaling 33,677 MWh. There were 129 submitted projects in the pipeline for Custom Efficiency at the end of 2015, representing over 56,183 MWh of potential future savings.

The Custom Efficiency program may reach some level of saturation through program maturity, over 95 percent of the large-power service customers have participated in the program. With the high percentage of industrial customers that have completed projects in the program, deeper energy savings may be challenging to achieve. The company is addressing this ongoing challenge in several ways by continuing to use multiple channels to reach customers and encourage projects. The company has expanded the cohort-type offerings, Streamlined Custom Efficiency (SCE), and expanded ability to conduct energy audit through an expanded list of engineering firms.

Table 11 indicates the program's 2015 annual energy savings by primary project measures.

Table 11. 2015 Custom Efficiency annual energy savings by primary project measure

Program Summary by Measure	Number of Projects	kWh Saved
Lighting	67	8,650,704
Refrigeration	22	15,595,018
HVAC	8	3,041,115
Compressed air	13	8,679,279
Fan	1	1,010,861
Controls	2	466,245
Pump	1	17,850
VFD	45	16,981,476
Other	1	743,594
Total[a]	160	55,186,142

[a] Does not include Green Rewind project counts and savings.

Key components in facilitating customer implementation of energy efficiency projects are facility energy auditing, customer technical training, and education services. The Refrigeration Operator Coaching for Energy Efficiency (ROCEE) and Wastewater Energy Efficiency Cohort (WWEEC) program offerings are also driving a significant number of new projects in addition to increased vendor engagement from the SCE offering. The 2015 activities in the key components are described below.

Facility Energy Auditing

Idaho Power covers the cost of conducting energy scoping audits to encourage its larger customers to adopt energy efficiency improvements. In 2015, a Request for Proposal (RFP) to provide Commercial and Industrial Energy Efficiency Program Services was posted to solicit proposals from energy professionals to provide scoping audits and other general support for the Custom Efficiency program. This RFP resulted in 28 submissions from professionals all over the nation. A selection team of four Idaho Power energy efficiency personnel gathered to evaluate and select top candidates. The team selected 11 different firms. Scopes of work will be in place to allow support from these firms in 2016.

In 2015, Idaho Power consultants completed seven scoping audits and eight detailed audits on behalf of Idaho Power customers. These audits identified over 37,000 MWh per year of savings potential. Most of the customers engaged in these audits used the information to move forward with projects or expressed interest in moving forward in the near future.

Customer Technical Training and Education Services

Technical training and education continue to be important in helping Idaho Power industrial customers identify where they may have energy efficiency opportunities within their facilities. Idaho Power delivered eight technical classroom-based training sessions in 2015. Of the eight sessions, one was a three-day Better Plants training class hosted by J.R. Simplot Company, two were two-day classes, one was a half-day class, and the four others were one-day classes. Topics included compressed air, industrial refrigeration, pump systems, motors, variable speed drives, commercial refrigeration, and drinking water optimization. A schedule of training events is posted on Idaho Power's website.

The level of attendance in 2015 remained high, with 155 Idaho Power-sponsored seats for customers and consultants with additional various Idaho Power staff attending. Customer feedback indicated average satisfaction levels of 93 percent.

Idaho Power's average cost to deliver trainings in 2015 was approximately $6,500 per class. For NEEA's 2015 to 2019 funding period, Idaho Power chose not to participate in NEEAs industrial trainings. From 2010 to 2014, NEEA offered an average of nine trainings per year at an approximate cost of $22,000 per class. Providing these trainings directly to Idaho Power customers, the company realized approximately a 70 percent cost reduction for its customers.

Idaho Power posted prior years' webinar recordings and PDFs on the commercial and industrial training page on the Idaho Power website. Also, on Idaho Power's industrial training page is a listing of all IBOA and International Facility Management Association (IFMA) events. Idaho Power restructured support for both of these organizations in 2015 to cover at least 50 percent of cost for Idaho Power customers to take part in their educational classes.

In 2015, the Idaho Power Custom Efficiency team attended refrigeration training at Winco distribution center during the November Treasure Valley Refrigerating Engineers and Technicians Association (RETA) chapter meeting.

Custom Efficiency program engineers and the major customer reps (MCR) set up numerous visits with the large commercial and industrial customers in 2015. The visits ranged from commercial/industrial efficiency program training to a comprehensive targeted technical training session for a larger audience on potential energy-savings opportunities for different measure types, such as refrigeration, pumps and fans, compressed air, HVAC, lighting, etc. At least nine of the comprehensive targeted technical training sessions were held across the region. Idaho Power is developing a *Targeted Technical Training* flyer for the MCRs to market the training. Because of WWEEC, Custom Efficiency program engineers also set up multiple program marketing meetings with DEQ, EPA, and the area civil engineering firms specializing in water and wastewater designs to educate them on the efficiency programs, audit process, energy efficiency opportunities, and tools and resources available to them. Presentations on Idaho Power programs and offerings were given in Boise at the Idaho Water Reuse Conference, the Pacific Northwest Clean Water Association, and the Idaho Green Building and Energy Conference. Idaho Power also presented at the American Council for an Energy Efficient Economy in Buffalo, New York.

Under the IDL, Idaho Power supported and participated in the BSUG. The goal was to facilitate the Idaho BSUG, which has been designed to improve the energy efficiency-related simulation skills of local design and engineering professionals. Details regarding BSUG topics and additional details are located in the Other Programs and Activities section of the report and in *Supplement 2: Evaluation*.

The IDL also provided a Tool Loan Library (TLL). The goal was to operate and maintain a measurement equipment TLL, including a web-based equipment tool loan tracking system, and provide technical training on how each tool is intended to be used. Details regarding the types and number of loans, types of tools, and additional IDL activities are located in the Other Programs and Activities section of the report and in *Supplement 2: Evaluation*.

As stated in the sector overview, Green Rewind is available to Idaho Power's Custom Efficiency customers. This measure maintains the motor's original efficiency by ensuring certain standards and methods in the motor rewind process. There were 19 Green Rewind motors in the commercial/industrial sector in 2015, contributing 61,050 kWh in annual savings.

In 2015, Custom Efficiency continued two offerings launched in 2013 to increase the total program savings in years to come—ROCEE and SCE.

The ROCEE offering was rolled out early in 2013 to Idaho Power's larger customers with complex refrigeration systems in the western half of Idaho Power's service area. This was a two-year engagement with the eight participating customers that ended in 2015. ROCEE provided a series of technical training workshops with a cohort cluster training approach. Workshops included visits to participants' refrigeration engine rooms to gain hands-on experience viewing and discussing energy efficiency concepts. The goal of the training was to equip refrigeration operators with the skills necessary to identify and implement energy efficiency opportunities on their own and to ensure these energy and cost savings are maintained long term. Sessions included technical training, hands-on learning exercises to demonstrate simple low- and no-cost actions to diagnose problems and save energy, and peer-to-peer sharing of lessons learned as the classes progressed. ROCEE provided energy audits of the participants' facilities in conjunction with a qualified refrigeration system expert. Customers were able to immediately implement low-cost and no-cost energy efficiency improvements by actions as simple as processing set-point changes. Participants had technician and engineering support between each workshop, facilitated by an expert team of energy engineers. Energy savings were tracked via an energy model that was constructed for each participating facility using third-party energy management software that Idaho Power provided as part of the cohort. In some cases, bottom-up calculations or sub-system data logging captured the savings. Year two of the offering consisted of phone call check-ins with the participants and model data updates. The incentives and the energy savings for year two of the offering totaled $32,326.57 and 4,424,149 kWh, respectively. In all cases, the incentive was capped on 70 percent of the eligible costs. Year two incentives and savings were processed in 2015. Additionally, some ROCEE participants completed capital projects that were encouraged and discussed in the workshops and energy audits. These capital projects' savings are captured separately and not included in the above number.

The second program offering rolled out in 2013 was SCE. This offering targets projects that may have typically been too small to participate in the Custom Efficiency program due to the resources required to adequately determine measure savings. Idaho Power contracted SCE out to a company to manage the data collection and analysis for each project. SCE provides custom incentives for small compressed air system improvements, fast-acting doors in cold-storage spaces, refrigeration controllers for walk-in coolers, and process-related VFDs. In 2015, the SCE offering processed 51 projects, totaling 9,275,485 kWh per year of savings and $1,518,994 in incentives paid. This represents a 97 percent increase over the 2014 SCE-related energy savings.

In January 2014, Custom Efficiency launched WWEEC, its third program offering since 2013, to increase the total program savings. Idaho Power received a draft report for year one in late 2015. Year one incentives and savings will be processed in early 2016. Similar to ROCEE, WWEEC is a cohort training approach to low-cost or no-cost energy improvements. WWEEC is a two-year engagement with 11 Idaho Power service area municipalities. WWEEC provided a series of five technical training workshops with a cohort training approach. In addition, WWEEC provided energy audits in conjunction with a qualified wastewater system expert and an energy management assessment conducted by a strategic energy management professional for each participating facility. Customers were able to immediately implement low-cost and no-cost energy efficiency improvements by actions as simple as turning off equipment or adjusting control points for systems. They also implemented many energy management principles, including forming an energy team, setting energy goals, and establishing energy policies in their organization for persistence of savings. Energy savings were tracked via Idaho Power provided third party software and an individual energy model for each facility. WWEEC contributed several capital projects to Idaho Power incentive programs from some of the WWEEC participants. Additionally, multiple pre-planning meetings were held with consultants and municipalities for upcoming new wastewater construction projects.

In September 2015, Idaho Power held a recruiting/training session for municipal water supply operators and public works personnel garnering interest in a third Strategic Energy Management cohort—the WSOC, similar to ROCEE and WWEEC. Representatives from 15 municipalities and 1 private water company attended. The session introduced the upcoming cohort whose goal is to equip water professionals with hands-on training to help operators get the most out of their systems while improving energy efficiency. Idaho Power and the company's consultants gave an overview of how low-cost or no-cost savings can be uncovered in a water supply system. A graduate of a similar Utah cohort presented their system findings. By 2015 year-end, 11 municipalities and the private water company in the September training signed up for the cohort. Enrollment will continue into January 2016.

2015 was the fourth year the Idaho Power CR&EE department filled a summer internship position with a university mechanical engineering student. A Custom Efficiency engineer served as the intern mentor. The intern was involved with many aspects of the day to-day program operation, including, but not limited to: measurement and verification of energy efficiency aspects related to Custom Efficiency program lighting projects; attendance at customer meetings related to energy efficiency; familiarization with, and communication for, all three commercial incentive programs; calculation and review of energy-saving projects; exposure to program marketing and planning activities; and administrative work related to the Custom Efficiency program.

Over the years, the Custom Efficiency program has achieved a high service-area penetration rate. As stated previously, over 95 percent of the large-power service customers have submitted applications for a project. Idaho Power staff met with all of the special contracts customers in 2015 to continue discussions on energy efficiency programs and opportunities. Company staff is actively working to support these customers in new ways and find additional opportunities for cost-effective energy saving projects.

Idaho Power's Custom Efficiency program is unique from the company's other energy efficiency programs by providing individualized energy efficiency solutions to a somewhat limited number of customers. Idaho Power's MCRs often act as the company's sales force. Marketing supports the MCRs by providing collateral to help them inform customers of the measures and benefits available to them.

Idaho Power provides additional marketing and public relations (PR) to commercial/industrial customers who want to publicize the work they have done to become more energy efficient. Upon request, Idaho Power creates large-format checks that are used for media events and/or board meetings. Idaho Power also works with customers on coordinating media events.

In addition to check presentations and the media associated with those events, in 2015 Idaho Power produced and posted a YouTube video in February about a Customer Efficiency project completed in

Sun Valley: *New Snow-Making Guns Bring Energy Efficiency to Sun Valley Company*. In February, Idaho Power posted another video, *Cascade Schools Benefit from Energy Efficient Heating System*. Both were publicized to media in Idaho Power's service area in the weekly *News Briefs* email.

In 2015, Idaho Power designed a new Excellence in Energy Efficiency award to recognize customers whose exemplary efforts in energy efficiency through recent and past projects have earned substantial energy savings and provided significant benefit to their businesses and communities. One large industrial customer was provided the award in 2015, and at least two additional customers are being considered to receive the award in 2016.

Custom Efficiency has been marketed as a single program and also as part of Idaho Power's suite of commercial/industrial energy efficiency programs. Ads that included all Idaho Power commercial programs appeared in *Horizon Air* magazine, the *Business Insider*, the *Idaho Business Review*, *Southeast Idaho Business Journal*, and bill inserts. In 2015, the program also used the Boise airport terminal display advertising space.

Cost-Effectiveness

All projects submitted through the Custom Efficiency program must meet cost-effectiveness requirements, which include TRC, UC, and PCT tests from a project perspective. The program requires that all costs related to the energy efficiency implementation and energy-savings calculations are gathered and submitted with the program application. Payback is calculated with and without incentives, along with the estimated dollar savings for installing energy efficiency measures. As the project progresses, any changes to the project are used to recalculate energy savings and incentives before the incentives are paid to the participant. To aid in gathering or verifying the data required to conduct cost-effectiveness and energy-savings calculations, third-party engineering firms are sometimes used via a scoping audit, detailed audit, or engineering measurement and verification services available under the Custom Efficiency program. Details for cost-effectiveness are in *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

Each project in the Custom Efficiency program is reviewed to ensure energy savings are achieved. Idaho Power engineering staff or a third-party consultant verifies the energy savings methods and calculations. Through the verification process, end-use measure information, project photographs, and project costs are collected.

On many projects, especially the larger and more complex projects, Idaho Power or a third-party consultant conducts on-site power monitoring and data collection before and after project implementation. The measurement and verification process helps ensure the achievement of projected energy savings. Verifying applicants' information confirms demand reduction and energy savings are obtained and are within program guidelines. If changes in scope take place in a project, a recalculation of energy savings and incentive amounts occurs based on the actual installed equipment and performance. The measurement and verification reports provided to Idaho Power include a verification of energy savings, costs, estimates of measure life, and any final recommendations to ensure the persistence of savings.

Because the customers who participate in the Custom Efficiency program are some of Idaho Power's largest customers, program managers or MCRs solicit customer satisfaction feedback for the Custom Efficiency program. This is authenticated in customers' willingness to allow posting the customers' success stories on the Idaho Power website. In 2015, two new success stories were created that describe a successful energy efficiency project and a successful new program offering. The success story posted in 2015, *Idaho Power Incentives Help Turn Wastewater Into Useable Water*, refers to a project the J.R. Simplot Company completed at their Caldwell facility. Idaho Power provided $205,392 in incentives for energy efficiency measures that reduced costs on this project. The facility expects to save about $95,000 in annual utility bills. The project success was further highlighted during a facility tour as part of the Idaho DEQ Water Reuse Conference. Idaho Power drafted a success story in 2015 about the WWEEC offering, anticipated to be published early 2016 along with an energy efficiency tips brochure for wastewater plants. A copy of this 2015 success story is provided in *Supplement 2: Evaluation*.

2016 Program and Marketing Strategies

Additional program offerings are currently under consideration for implementation in 2016. These efforts will be targeted at maintaining a high level of customer participation as well as achieving year- over-year program goals.

Idaho Power expanded the number of engineering firms in late 2015 that support Idaho Power's commercial/industrial programs. These firms have a variety of diverse skills including commercial grocery, commercial buildings, and industrial systems. The increase in engineering firms will allow Idaho Power to expand the number of energy audits currently being provided and help Idaho Power identify untapped potential in specific market sectors, such as the grocery and commercial building sectors.

Idaho Power will report the first year of energy savings, and incentives will be paid in 2016 for the WWEEC offering. The first year of the WSOC will commence in January 2016. Three half-day workshops and a final report-out workshop will be held in 2016. The SCE offering will continue in 2016, and new measures, processes, and other improvements will be evaluated to continuously improve the effectiveness of this offering.

Idaho Power plans to continue expanding the Custom Efficiency program through a number of activities and continued development of strategic partnerships. These activities will include direct marketing of the Custom Efficiency program by Idaho Power MCRs to further educate customers on Idaho Power energy efficiency programs, including identification of potential ways the customer can reduce energy costs and drive program participation. Additionally, the Custom Efficiency team will continue to support the Center for Advanced Energy Studies (CAES) Industrial Assessment Center (IAC) by marketing their IAC services during both customer site visits and at technical training workshops.

Idaho Power will continue to provide site visits by Custom Efficiency engineers and energy scoping audits for project identification and energy-savings opportunities; M&V of larger, complex projects; technical training for customers; and funding for detailed energy audits for larger, complex projects.

In 2016, industry-specific energy efficiency tip brochures will be revised and new ones will be completed and mailed to targeted customers, along with an insert highlighting possible incentives. These tip brochures will also be used by CRs on energy efficiency-related customer visits.

Each year, the company designs and pays for a "Top 10" ad that appears in the *Idaho Business Review*. This ad publicly congratulates companies that had the most energy savings throughout the year. The company will continue this tradition in 2016. Success stories will continue to be written and produced throughout 2016. These stories focus on businesses that took advantage of Idaho Power's Custom Efficiency program and the resulting benefits. Success stories are posted on Idaho Power's website so the highlighted businesses can print and use them to publicize their energy-efficient projects. Idaho Power will continue to assist customers with public relations opportunities by creating certificates for display within the building and having an Idaho Power representative speak at press events if requested.

The Custom Efficiency team will be mentoring another engineering intern in 2016. These internships are important mechanisms that help drive workforce development in the energy efficiency profession.

Idaho Power will continue to support the IDL in 2016. In addition to the specific tasks outlined in the IDL description in the Other Program and Activities section of the main report and in *Supplement 2: Evaluation*, the IDL provides foundational services to customers in the Idaho Power service area. The IDL will provide energy modeling assistance for large, new construction projects. The energy modeling is used by the Custom Efficiency team to support the claimed energy savings not covered by the existing measures through the Building Efficiency program.

Easy Upgrades

	2015	2014
Participation and Savings		
Participants (projects)	1,222	1,095
Energy Savings (kWh)	23,594,701	19,118,494
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$4,155,406	$3,020,323
Oregon Energy Efficiency Rider	$177,713	$112,623
Idaho Power Funds	$17,746	$17,996
Total Program Costs—All Sources	$4,350,865	$3,150,942
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.017	$0.015
Total Resource Levelized Cost ($/kWh)	$0.029	$0.025
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	3.85	
Total Resource Benefit/Cost Ratio	2.20	

Description

Easy Upgrades is Idaho Power's prescriptive measure program for the commercial and industrial retrofit market, initiated in 2007. Customers can also apply for incentives for non-standard lighting incentives. The program encourages commercial and industrial customers in Idaho and Oregon to implement energy efficiency retrofits by offering incentives on a defined list of measures. Eligible measures cover a variety of energy-saving opportunities in lighting, HVAC, building shell, VFDs, food-service equipment, and other commercial measures. A complete list of the measures offered through the Easy Upgrades program is included in *Supplement 1: Cost-Effectiveness*.

2015 Program and Marketing Activities

Easy Upgrades experienced both an increase in program participation and energy savings in 2015. The primary reason for the energy savings increase is due to program changes implemented in the third quarter of 2014. The changes that affected program performance were increasing incentives and modifying how lighting projects were processed as well as increasing trade ally outreach for lighting. In addition, there was an increase in customer's selection of LED technology as part of their lighting retrofit, which increased the savings of many projects.

Marketing tactics included direct-mail in May and November, individualized with the customers' CRs contact information. CRs recorded receiving 57 calls from the November letter.

Idaho Power placed advertisements in the Small Business Administration resource guide, daily newspapers, select weekly papers, the *Idaho Business Review*, Boise Chamber of Commerce newsletter, the *Business Insider*, and the *Southeast Idaho Business Journal*.

Advertising thanked participating contractors, equipment suppliers, and lighting consultants for helping customers save energy and money in 2015.

Other ads conveyed the range of items incentivized by the program. While these ads ran, there were 623 pages views on the Easy Upgrades Web page. Of the 623 page views, 136 came from this virtual URL listed in the ad—idahopower.com/easyupgrades. In August, 66 page views came from the virtual URL, in September, 76 page views came from the virtual URL and in October, 67 page views came from the virtual URL.

The Easy Upgrades program facilitated three technical power quality classes across the Idaho Power service area targeting electrical contractors and large customers. The program offered these classes to trade allies unable to attend classes in 2014. Idaho Power's power quality engineers presented. Feedback from the 2015 and 2014 class attendees indicated this course was valuable in helping them better understand power quality issues associated with newer energy-efficient technology and requirements for participating in the Idaho Power energy efficiency programs. The classes qualified for continuing education credits for licensed electrician and electrical contractor trade allies and 106 attendees received valuable industry-related training.

In addition to the formal training classes held, Idaho Power staff and contractors contacted over 130 trade allies in the field, via telephone, at the trade ally's business, or at a customer location to further educate them on program criteria and to respond to their inquiries. Contacts were made to strengthen relationships, encourage program participation, increase knowledge of the Easy Upgrades program, and to receive trade ally feedback about the market, the program, and trade allies' experiences. This targeted outreach was to electrical contractors, electrical distributors, and HVAC contractors.

Idaho Power continued to contract with Evergreen Consulting Group, LLC, to provide ongoing lighting specialist expertise, project support, and trade ally outreach. Idaho Power continued to contract with Honeywell, Inc., to perform non-lighting project reviews and pre- and post-non-lighting project inspections, as well as with RM Energy Consulting to support lighting project review and lighting inspections.

In 2015, Idaho Power evaluated the viability of implementing new program offerings and strategies and looked at ways to increase penetration in hard-to-reach small businesses. The company met with several third-party companies with experience in delivering energy efficiency offers to the small business sector. While each of the third parties had some interesting observations on serving the small business market, Idaho Power has not yet determined a fit for implementing those offers without significantly conflicting with its current incentive offerings in Easy Upgrades. Idaho Power has concluded that it is reaching small business customers currently and will continue to explore ways to increase program participation from these customers through marketing and improved program delivery.

Cost-Effectiveness

In 2015, Idaho Power used the same savings and assumptions as were used in 2014. For all lighting measures, Idaho Power uses a lighting tool calculator developed by Evergreen Consulting, Group LLC. An initial analysis was conducted to see if the lighting measures shown in the tool were cost-effective based on the average input watts and hours of operation, while the actual savings for each project are calculated based on specific information regarding the existing and replacement fixture. For most non-lighting measures, deemed savings from the TRM or RTF are used to calculate the cost-effectiveness.

Several lighting and non-lighting measures that are not cost-effective remain in the program. These measures include several lighting combinations with mostly exterior applications, high-efficiency A/C units, high-efficiency heat pump units, and wall insulation. After reviewing these measures, Idaho Power determined the measures met at least one of the cost-effectiveness exceptions outlined in OPUC Order No. 94 590. These modifications and cost-effectiveness exceptions were approved by the OPUC in Advice No 14 06 for 2014 and went into effect in Idaho in July and in Oregon in August 2014. Complete measure level details for cost-effectiveness can be found in *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction and Evaluations

In 2015, Idaho Power developed and posted to the company's website one new success story. Titled, *What was dark is now light at Myers Alignment*, the story referenced the lighting retrofit project completed at Myers Alignment classic car restoration shop. Owner Richie Myers said, "More light. Less money. It works out great for us." Idaho Power provided $2,504 in incentives for this energy-efficient project. The owner expects to save over $328 in annual utility bills. A copy of this success story is provided in *Supplement 2: Evaluation*.

Idaho Power conducted an online survey with Easy Upgrades program participants that had participated in the program between June and November, 2015. The survey was sent to 400 program participants. Ninety-two customers responded to the survey for a 23 percent response rate.

Over 45 percent of survey respondents indicated they learned of the Easy Upgrades program through a contractor, supplier, or vendor. Other ways respondents learned of the program were through an Idaho Power employee (over 17 percent) and through a business associate (almost 12 percent.)

Almost 98 percent of the respondents indicated they are "very satisfied" or "somewhat satisfied" with the Easy Upgrades program and over 96 percent said they "definitely would" or "probably would" recommend the program to a business associate.

When respondents were asked if they agreed that the incentive application forms were easy to follow on a scale from 1 to 5, 5 being "strongly agree," the average response was 4.4. When asked if they agreed that their application was processed within the time frame they expected on a scale from 1 to 5, 5 being "strongly agree," the average response was 4.5.

Respondents were asked to rate their contractor in the areas of quality of work, professionalism, knowledge of the equipment, and knowledge of the Easy Upgrades. On a scale from 1 to 5, 5 being "excellent," each average response for each area was 4.6 or greater.

Over 94 percent of the respondents installed lighting or lighting controls under the Easy Upgrades program.

Survey results are included in *Supplement 2: Evaluation*.

2016 Program and Marketing Strategies

The program has identified several new lighting and non-lighting measures to add to the incentive menu and will include those in 2016. Idaho Power continues to monitor what other utilities are doing to serve the various market sectors and will watch for improvements the company can make to the program.

A third-party contractor will conduct an impact evaluation on the program's 2015 projects.

Marketing strategies for 2016 may include some or all of the following: direct mail to small and medium businesses, focus on trade ally outreach, program update workshops, print ads in various publications, trade ally thank-you ads, and other marketing as identified.

Flex Peak Program

	2015	2014
Participation and Savings		
Participants (sites)	72	93
Energy Savings (kWh)	n/a	n/a
Demand Reduction (MW)	26	40
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$86,445	$50,964
Oregon Energy Efficiency Rider	$219,654	$78,131
Idaho Power Funds	$286,773	$1,434,116
Total Program Costs—All Sources	$592,872	$1,563,211
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	n/a	n/a
Total Resource Levelized Cost ($/kWh)	n/a	n/a
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	n/a	
Total Resource Benefit/Cost Ratio	n/a	

Description

The Flex Peak Program is a voluntary program available in Idaho and Oregon service areas designed for Idaho Power's industrial and large commercial customers capable of reducing their electrical energy loads for short periods during summer peak days. The program objective is to reduce the demand on Idaho Power's system during periods of extreme peak electricity use. By reducing demand on extreme system load days during summer months, the program reduces the amount of generation and transmission resources required to serve customers. Flex Peak Program pays participants a financial incentive for reducing load and is active June 15 to August 15, between the hours 2:00 p.m. and 8:00 p.m. on non-holiday weekdays. Reduction events may be called a maximum of 60 hours per season.

Customers with the ability to nominate or provide load reduction of at least 20 kW are eligible to enroll in the program. The 20-kW threshold allows a broad range of customers the ability to participate in the program. Participants receive notification of a load reduction event two hours prior to the start of the event, and events last between two to four hours.

The program originated in 2009 as the FlexPeak Management program. In 2015, Idaho Power took over full administration and changed the name to Flex Peak Program. Idaho Power filed an application with the IPUC on February 4, 2015, in Case No. IPC-E-15-03, and a Tariff Advice with the OPUC on March 10, 2015, in Advice No. 15-03 requesting authority to replace the existing optional FlexPeak Management demand response program managed by a third-party contractor with an optional demand response program to be managed by Idaho Power. The IPUC issued Order No. 33292 on May 7, 2015, while the OPUC approved Advice No. 15-03 on May 1, 2015, authorizing Idaho Power to implement an internally managed Flex Peak Program under Schedule No. 82 in Idaho and Schedule No. 76 in Oregon and continue recovery of its demand response program costs in the manner it had been previously.

2015 Program and Marketing Activities

Idaho Power used direct customer mailings to encourage both past participants and new customers to enroll. Prior to the approval of Schedule No. 82 by the IPUC and Schedule No. 76 by the OPUC several communications were sent to former FlexPeak Management program participants. to advise them about the possible upcoming program changes. After the Commissions granted authorization for the new Idaho Power managed program. Idaho Power had 25 business days for Idaho and 29 business days for Oregon to recruit customers for the Flex Peak Program before the season began on June 15, 2015.

In May 2015, Idaho Power sent program enrollment mailings to all customers who participated in prior seasons from 2012 to 2014. Mailing contents included program details, application, incentive structure, and a list of each customer's eligible service points. Additionally, the Idaho Power program specialist and CRs answered specific customer questions by phone, email, and face-to-face, informing participants of new program details.

Participants had a committed load reduction of 28.1 MW in the first week of the program, which was the peak committed load reduction for the season. This weekly commitment, or nomination, was comprised of 72 sites, of which 57 sites participated in the 2014 season, and 15 new sites were added in 2015. The committed load reduction at the end of the season was 26.37 MW achieved by 71 facility sites. One site dropped out of the program during the season due to the removal and replacement of some customer-owned equipment.

The first event was called on Tuesday, June 30. Participants were notified at 2:00 p.m. regarding the four-hour event from 4:00 p.m. to 8:00 p.m. Total nomination for this event was 27.72 MW. The average load reduction was 23.6 MW, and the highest hourly load reduction was 24.1 MW during 6:00 p.m. and 7:00 p.m. The realization rate for this event was 86.7 percent.

A second event was called on Tuesday, July 21. Participants were notified at 2:00 p.m. for a four-hour event from 4:00 p.m. and 8:00 p.m. Total nomination for this event was 26.4 MW. The average load reduction was 24.9 MW and the highest hourly load reduction was 25.6 during 4:00 p.m. and 5:00 p.m. The realization rate for this event was 96.6 percent.

The third event was called on Tuesday, August 4. Participants were notified at 2:00 p.m. for a 3-hour event from 4:00 p.m. to 7:00 p.m. Total nomination for this event was 26.2 MW. The average load reduction was 13.8 MW and the highest hourly load reduction was 14.6 MW from 6:00 p.m. to 7:00 p.m. The realization rate for this event was 55.4 percent.

The maximum realization rate during the season was 96.6 percent and the average for all three events combined was 79.6 percent. The realization rate is the percentage of load reduction achieved versus the amount of load reduction committed for an event. The highest hourly load reduction achieved was 25.6 MW during the July 21 event.

Idaho Power's weekly *News Briefs*—emailed to all media in the service area—mentioned the success of the company's demand response programs, including Flex Peak Program, in helping reduce the peak load during the summer season: *News Briefs* included the following: *High Summer Electricity Demand Hits Early* (June 29) and *Customers Helped Reduce Peak Electrical Loads* (July 13).

In 2010, Idaho Power identified Idaho Power's CHQ in downtown Boise as a candidate for participation in FlexPeak Management. In August 2010, Idaho Power entered into an agreement with a third-party contractor, similar to the agreement customers enter into to enroll in the program. The Idaho Power

CHQ building has participated each year since and committed to reduce 100 kW of electrical demand during events. Unlike other program participants, Idaho Power does not receive any financial incentives for participation.

Since managing the program internally, Idaho Power still chose to participate with the CHQ building. For the 2015 season, Idaho Power increased the nomination from 100 kW to 150 kW. Idaho Power's CHQ participated in all three demand response events in 2015. The average reduction achieved by the facility across the three events was 239 kW at the meter, which exceeded the nominated amount. The maximum hourly reduction was 412 kW, achieved on July 21. Reductions were mostly obtained by turning off lights, adjusting chiller set-points, decreasing fan speeds, and curtailing elevator use. Besides the benefit of experiencing firsthand what participants experience with the program, Idaho Power now has a facility reduction plan in place that could be executed at any time to reduce electricity use when necessary. Idaho Power plans to enroll more of its facilities in the program for future seasons.

Cost-Effectiveness

As part of the public workshops in conjunction with Case No. IPC E-13-14 and UM-1653, Idaho Power and other stakeholders agreed on a new method for valuing demand response. The settlement, as approved in IPUC Order No. 32923 and OPUC Order No. 13-482, determined that the annual cost of operating the three DR programs for the maximum allowable 60 hours must be no more than $16.7 million. This $16.7 million value is the levelized annual cost of a 170-MW deferred resource over a 20-year life. The cost of operating the three DR programs in 2015 was $9 million. It is estimated that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $12.4 million, which is still below the total annual costs agreed on in the settlement.

The Flex Peak Program was dispatched for three events and achieved a maximum reduction of 25.6 MW. The total 2015 cost of the program was $592,872, had the Flex Peak Program been used for the full 60 hours, the cost would have been approximately $789,472.

Customer Satisfaction and Evaluations

Idaho Power conducted a post-season survey sent via email to all participants enrolled in the program. The survey focused on quantifiable questions that encouraged customer feedback for future program improvement. Idaho Power received responses from 19 of 38 customers for a response rate of 50 percent. Survey results were evaluated on a 5-point rating scale, and the combined average response for all questions was 4.6 out of 5. When customers were asked how satisfied they were with their overall experience in Flex Peak Program the average response was 4.5. Additionally, when asked how likely they would be to re-enroll in the Flex Peak Program, in the future, the average response was 4.9. The results of the survey were favorable and showed that participants were satisfied. The details of the survey results are in *Supplement 2: Evaluation*. Also included in the supplement is the *Flex Peak Program 2015 Report*.

Idaho Power contracted CLEAResult to complete an impact evaluation of the 2015 Flex Peak Program. In 2015, there were 38 customers and a total of 71 sites enrolled in the program. The goals of the impact evaluation were to determine the demand reduction (in MW) and realization rate for three curtailment events during the program's June 15 through August 15 season.

CLEAResult completed analyses of curtailment events held on June 30 between 4:00 p.m. and 8:00 p.m., July 21 between 4:00 p.m. and 8:00 p.m., and August 4 between 4:00 p.m. and 7:00 p.m.

in 2015. The results shown below are different from the reductions included in the CLEAResult report, as these have been converted to generation level reductions while the CLEAResult report included reductions at meter level.

The results of the curtailment event analyses showed maximum generation level demand reductions of 24.0, 25.6, and 14.6 MW, respectively, for the three events. The results of the curtailment event analyses showed maximum meter level demand reductions of 21.9, 23.3, and 13.3 MW, respectively, for the three events. The events achieved realization rates of 86.7 percent, 96.6 percent, and 55.4 percent, respectively, averaging 79.6 percent. All three events included 71 unique sites, with the committed nominated load averaging 26.9 MW across the three events.

The results of the impact evaluation show that Idaho Power's 2015 Flex Peak Program functioned as intended and provided up to 25 MW to the electricity grid at the meter level. In addition, the Flex Peak program is scalable and with additional participants and more diversity among participants, could contribute more reduction as future capacity requirements dictate. A summary of the results is in *Supplement 2: Evaluation*.

2016 Program and Marketing Strategies

In an effort to increase enrollment and encourage participation for the 2016 program season recruitment efforts began in the fourth quarter 2015 and will continue into 2016. Idaho Power CRs or the program specialist will meet with existing participants during the off-season to discuss past-season performance and review program details. New customers will be identified mid-winter through field visits and will receive further communication in early spring. The company plans to publish an article promoting the Flex Peak Program in the *Energy@Work* spring quarterly newsletter sent to all commercial and industrial customers. Flex Peak Program will be marketed with Idaho Power's energy efficiency programs and promoted at program booths during events, such as vendor fairs and professional organizations.

Idaho Power plans to launch a marketing campaign early in 2016 with CRs to recruit new participants. The company is developing new program literature and a new program brochure. This marketing campaign will focus on identifying customer dynamics that make successful program participation and will also highlight available incentive amounts based on customers' load size. The Flex Peak Program will be jointly marketed with Idaho Power's other energy efficiency programs. Marketing campaign goals are to increase the number, size (in terms of nominated load reduction), and diversity of sites enrolled. Through a larger diversity of participants nominated load reduction, the Flex Peak Program would be less prone to volatility in its realization rate.

Oregon Commercial Audits

	2015	2014
Participation and Savings		
Participants (audits)	17	16
Energy Savings (kWh)	n/a	n/a
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$0	$0
Oregon Energy Efficiency Rider	$4,251	$9,464
Idaho Power Funds	$0	$0
Total Program Costs—All Sources	$4,251	$9,464
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	n/a	
Total Resource Levelized Cost ($/kWh)	n/a	
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	n/a	
Total Resource Benefit/Cost Ratio	n/a	

Description

The Oregon Commercial Audits program identifies opportunities for commercial building owners to achieve energy savings. Initiated in 1983, this statutory-required program (ORS 469.865) is offered under Oregon Schedule No. 82. Through this program, free energy audits provide evaluations and educational services to customers. Annual mailings to each customer in the commercial sector communicate program benefits and offerings.

2015 Program and Marketing Activities

Idaho Power sent out its annual mailing to 1,449 Oregon commercial customers in mid-September 2015. Customers received notification of the availability of no-cost or low-cost energy audits, or the Idaho Power *Saving Energy Dollars* booklet. Seventeen customers requested an audit. Of those audits, a third-party contractor completed five audits, Idaho Power personnel completed seven audits, and one customer canceled the audit. Four customers received a requested booklet only. The costs were down in 2015 over 2014 because a third-party contractor performed only five audits.

Idaho Power contracts with EnerTech Services to perform a portion of the requested audits. Energy audits include a review of the customer’s past billing data and an inspection of the building shell, HVAC equipment, operating schedules if available, and lighting systems. Additionally, audits enables discussions regarding incorporating specific business operating practices for energy use improvements. During the audits, customers receive Idaho Power energy efficiency program information.

Cost-Effectiveness

As previously stated, the Oregon Commercial Audits program is a statutory program offered under Oregon Schedule 82, the Commercial Energy Conservation Services Program. Because the required parameters of the Oregon Commercial Audit program are specified in Oregon Schedule 82 and the company abides by these specifications, this program is deemed to be cost effective. Idaho Power claims no energy savings from this program.

Customer Satisfaction and Evaluations

Audits provide the opportunity to discuss utility incentives available to customers who install qualifying energy efficiency measures. Both activities can lead to energy efficiency projects being undertaken. Customers are generally pleased with the audit process because the audits help identify energy-saving opportunities that may not be obvious to the business owner. Business owners can make the decisions to change operating practices or make capital improvements designed to use energy wisely.

2016 Program and Marketing Strategies

The Oregon Commercial Audits program will continue to be an important avenue for Idaho Power to help customers identify energy-saving opportunities. The audits help pinpoint favorable energy-saving actions that customers may pursue through customer behavioral changes or potential capital projects, such as replacing inefficient lighting. Additionally, Idaho Power also uses the audit process to introduce customers to Idaho Power's energy efficiency incentive programs. Idaho Power markets the program through the annual customer notification.

IRRIGATION SECTOR OVERVIEW

Description

The irrigation sector is composed of agricultural customers operating water-pumping or water-delivery systems to irrigate agricultural crops or pasturage. End-use equipment primarily consists of agricultural irrigation pumps and center pivots. The irrigation sector does not include water pumping for non-agricultural purposes, such as the irrigation of lawns, parks, cemeteries, golf courses, or domestic water supply.

In December 2015, the active and inactive irrigation service locations totaled 20,293 system-wide. This was an increase of 2.4 percent compared to 2014, primarily due to the addition of service locations for pumps and pivots to convert land previously furrow-irrigated to sprinkler irrigation systems. Irrigation customers accounted for 2,046,290 MWh of energy usage in 2015, which was an increase from 2014 by over 4.1 percent due to an earlier, drier summer. This sector represented nearly 14 percent of Idaho Power's total electricity usage, and 14 percent of overall revenues. Energy usage for this sector has not grown significantly in many years; however, there is substantial yearly variation in usage due primarily to the impact of weather on customer irrigation needs.

Idaho Power offers two programs to the irrigation sector: 1) Irrigation Efficiency Rewards, an energy efficiency program designed to encourage the replacement or improvement of inefficient systems and components and 2) Irrigation Peak Rewards, a demand response program designed to provide a system peak resource. Idaho Power also pays incentives to customers participating in the Green Rewind offering under Irrigation Efficiency Rewards. Motor service centers are paid $2 per hp for each NEMA Standard hp-rated motor up to 5,000 hp for agricultural uses that receives a verified Green Rewind. Participation in Green Rewind ensures the motor's original efficiency is maintained if it is rewound at an approved service center.

The Irrigation Efficiency Rewards program, in operation since 2003, experienced reduced annual savings, with 18,464 MWh in 2014 and 14, 027 MWh in 2015. Annual savings were down in 2015 likely due to a reduction in agricultural commodity prices, and 2014 was the highest year of energy savings ever for the program. During 2015, the Irrigation Efficiency Rewards program contributed 13,937 MWh, while the 32 motors in Green Rewind contributed 90 MWh per year of energy savings.

In 2015, the Irrigation Peak Rewards program was in its second full season of full operation after temporarily being suspended for the 2013 season. Again in spring 2015, Idaho Power successfully marketed to the majority of prior Peak Rewards participants to continue their participation in the program, with a small increase of 1.5 percent in eligible service points participating over 2014.

Table 12 summarizes the overall expenses and program performance for both the energy efficiency and demand response programs provided to irrigation customers.

Programs

Table 12. 2015 irrigation program summary

		Total Cost		Savings	
Program	Participants	Utility	Resource	Annual Energy (kWh)	Peak Demand (MW)
Demand Response					
Irrigation Peak Rewards	2,259 service points	$ 7,258,831	$ 7,258,831	n/a	305
Total		**$ 7,258,831**	**$ 7,258,831**	**n/a**	**305**
Energy Efficiency					
Irrigation Efficiency Rewards	902 projects	$ 1,835,711	$ 9,939,842	14,027,411	
Total		**$ 1,835,711**	**$ 9,939,842**	**14,027,411**	

Note: See Appendix 3 for notes on methodology and column definitions.

Each year, the company conducts a customer relationship survey. Overall, 47 percent of Idaho Power irrigation customers surveyed in 2015 for the Burke Customer Relationship survey indicated Idaho Power was meeting or exceeding their needs in offering energy efficiency programs. Fifty percent of survey respondents indicated Idaho Power is meeting or exceeding their needs with information on how to use energy wisely and efficiently. Sixty percent of respondents indicated Idaho Power is meeting or exceeding their needs with encouraging energy efficiency with its customers. Overall, 36 percent of the irrigation survey respondents indicated they have participated in at least one Idaho Power energy efficiency program. Of irrigation survey respondents who have participated in at least one Idaho Power energy efficiency program, 93 percent are “very” or “somewhat” satisfied with the program.

Irrigation Efficiency Rewards

	2015	2014
Participation and Savings		
Participants (projects)	902	1,128
Energy Savings (kWh)[a]	14,027,411	18,463,611
Demand Reduction (MW)	n/a	4.6
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$1,714,399	$2,256,235
Oregon Energy Efficiency Rider	$61,295	$144,392
Idaho Power Funds	$60,018	$45,880
Total Program Costs—All Sources	$1,835,711	$2,446,507
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.016	$0.016
Total Resource Levelized Cost ($/kWh)	$0.085	$0.119
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	6.00	
Total Resource Benefit/Cost Ratio	3.84	

[a] Includes kWh savings from Green Rewind projects.

Description

Initiated in 2003, the Irrigation Efficiency Rewards program encourages energy-efficient equipment use and design in irrigation systems. Qualified irrigators in Idaho Power's Idaho and Oregon service area can receive financial incentives and reduce their electricity usage. Incentives for the Irrigation Efficiency Rewards program help customers recover a portion of the costs of installing a new, more efficient irrigation system or energy-efficient improvements to existing systems.

Two options help meet the needs for major or minor changes to new or existing systems. The Custom Incentive Option addresses extensive retrofits of existing systems or new irrigation systems, providing component upgrades and large-scale improvements, and helps pay for more efficient new irrigation systems. For new systems, the incentive is 25 cents per the first year of kWhs saved above standard installation methods, not to exceed 10 percent of the new system's cost. For existing system upgrades, the incentive is 25 cents per the first year of kWhs saved, or $450 per kW demand reduction, whichever is greater, but not to exceed 75 percent of the total project cost. The qualifying energy efficiency measures include any hardware changes that result in a reduction of the potential kWh usage of an irrigation system.

Idaho Power reviews, analyzes, and makes recommendations on each application. On each completed project, before final payment, all project information is reviewed. Prior usage history, actual invoices, and, in many situations, post-usage demand data are available to verify savings and incentives.

The Menu Incentive Option covers a significant portion of the costs of repairing and replacing specific components that help the irrigation system use less energy. This option is designed for systems where small maintenance upgrades provide energy savings from 11 separate measures. These measures are as follows:

- New flow-control type nozzles
- New nozzles for impact, rotating, or fixed-head sprinklers
- New or rebuilt impact or rotating type sprinklers
- New or rebuilt wheel-line levelers
- New complete low-pressure pivot package
- New drains for pivots or wheel-lines
- New riser caps and gaskets for hand-lines, wheel-lines, and portable mainlines
- New wheel-line hubs
- New pivot gooseneck and drop tube
- Leaky pipe repair
- New center pivot base boot gasket

Payments are calculated on pre-determined average kWh savings per component.

In addition to incentives, the program offers customer education, training, and irrigation-system assessments. Idaho Power ARs sponsor, coordinate, conduct, and present educational workshops for irrigation customers, providing expert information and training across Idaho Power's service area. Energy audits conducted by Idaho Power ARs evaluate prospective customers' potential savings. ARs from Idaho Power also engage agricultural irrigation equipment dealers in training sessions, increasing their knowledge of energy-efficient designs and awareness of the program and promoting the program through the irrigation equipment distribution channels. Marketing efforts include direct mailings, ads in agricultural publications, direct customer and equipment dealer interaction, and participation in agricultural workshops and conferences.

Because the irrigation sector is a load comprised primarily of motors, Idaho Power participates in Green Rewinds. It is an opportunity that enables customers to maintain the motor's original efficiency by ensuring proper rewind of the electric motor. Motor service centers are paid $2 per hp for each NEMA Standard hp-rated motor 15 hp to 5,000 hp that receives a verified Green Rewind. The RTF approved the Green Motors Practices rewinding as an energy efficiency measure and approved a table of deemed savings for industrial and agricultural applications. In 2013, the RTF updated the deemed savings values. The RTF numbers did not change for 2015.

2015 Program and Marketing Activities

Of the 930 irrigation efficiency projects completed in 2015, 799 were associated with the Menu Incentive Option, providing an estimated 11,262 MWh of energy savings and 2.2 MW of demand reduction. The Custom Incentive Option had 103 projects, of which 46 were new irrigation systems and 57 were on existing systems. This option provided 2,676 MWh of energy savings and 1.2 MW of demand reduction for the year. Also during 2015, irrigation customers contributed 90,074 kWh of energy savings from 32 motors participating in the Green Rewind opportunity.

Idaho Power agricultural representatives (AR), the program specialist, and the agricultural engineer participated in training annually that maintains or obtains their Certified Irrigation Designer and Certified Agricultural Irrigation Specialist certifications. This training allows Idaho Power to maintain its high level of expertise in the irrigation industry and is sponsored by the nationally based Irrigation Association.

Idaho Power continued to market the program by varying the location of workshops and offering new presentations to irrigation customers. In 2015, Idaho Power provided seven workshops promoting the Irrigation Efficiency Rewards program throughout the service area. Approximately 210 customers attended workshops in Blackfoot, Burley (2), Twin Falls, Mountain Home, Richland, and Ontario. One specific workshop focused on agricultural safety and irrigation efficiency for Spanish-speaking farm workers. For continual training purposes, Idaho Power recorded this workshop and provided a DVD to customers with Spanish-speaking employees. Upon invitation, Idaho Power presented the program at four workshops sponsored by agricultural groups in Blackfoot, Nampa, Boise, and Parma. The company displayed exhibitor booths at regional agricultural trade shows, including the Eastern Idaho Agriculture Expo, Western Idaho Agriculture Expo, the Agri-Action Ag show, the Treasure Valley Irrigation Conference, and the Idaho Irrigation Equipment Association show and conference. In addition, ARs made targeted visits or communicated with a selected number of non-program participants to increase customer education. Idaho Power maintained a database of irrigation dealers and vendors for direct-mail purposes. Irrigation dealers and vendors are a key component to the successful marketing of the program; therefore, face-to-face interactions and direct mailings containing the most up-to-date program information, brochures, and dealer-specific meetings ensured correct program promotion.

In 2015, the company used direct mail to send two publications of the newsletter *Irrigation News* to all irrigation customers in Idaho and Oregon to keep customers informed and to improve customer satisfaction. The newsletter shares valuable information specifically for irrigation customers to clarify processes, helps customers better understand their bills, provides information on energy efficiency and energy efficiency programs, clarifies rates, and supplies safety information. The newsletters stimulated opportunities to communicate with irrigation customers on a variety of topics to improve customer relations and promote the Irrigation Efficiency Rewards program.

Print publications that marketed the Irrigation Efficiency Rewards program consisted of eight print ads in five agricultural print publications and two opportunities in radio advertising during Agri-Action and the Future Farmers of America (now FFA) National FFA Week. Four digital ads using the creative material are being tested with the target audience to determine if they respond well to digital information sources. Digital ads ran in The Capital Press from December 19, 2014, to January 16, 2015, with a guaranteed 60,000 impressions during the cycle, with 91 click-throughs.

Cost-Effectiveness

Idaho Power calculates cost-effectiveness using different savings and benefits assumptions and measurements under the Custom Incentive Option and the Menu Incentive Option of Irrigation Efficiency Rewards.

Each application under the Custom Incentive Option received by Idaho Power undergoes an assessment to estimate the energy savings that will be achieved through a customer's participation in the program. On existing system upgrades, Idaho Power estimates the effectiveness of a project using a service point's previous five years of electricity usage history on a case-by-case basis depending on the applicant's history. On new system installations, the company uses standard practices as the baseline and determines the efficiency of the applicant’s proposed project. Based on the specific equipment to be installed, the company calculates the estimated post-installation energy consumption of the system. The company verifies the completion of the system design through aerial photographs, maps, and field visits by Idaho Power ARs to ensure the irrigation system is installed and used in the manner the applicant’s documentation describes.

Each application under the Menu Incentive Option received by Idaho Power also undergoes an assessment to ensure deemed savings are appropriate and reasonable. Payments are calculated on a prescribed basis by measure. In some cases, the energy savings estimates in the Menu Incentive Option are adjusted downward from deemed RTF savings to better reflect known information in how the components are actually being used. For example, a half-circle center pivot will only save half as much energy per sprinkler head as a full-circle center pivot. All deemed savings are based on seasonal operating hour assumptions by region. If a system’s usage history indicates it has lower operating hours than the assumptions, like the examples above, the deemed savings are adjusted.

Based on the deemed savings from the RTF, all the measures offered under the Menu Incentive Option are cost effective, with the exception of rebuilt or new brass impact sprinklers. Idaho Power determined these brass sprinklers meet at least one of the cost-effectiveness exceptions outlined in OPUC Order No. 94 590. Idaho Power filed UM 1710 to request a cost-effectiveness exception with the OPUC on November 4, 2014, and subsequently re-filed it on February 11, 2015. The OPUC approved of this in Order No. 15-200, issued June 23, 2015. Complete measure level details for cost-effectiveness can be found in *Supplement 1: Cost-Effectiveness*.

2016 Program and Marketing Strategies

Marketing plans for 2016 include conducting 7 to 10 customer-based irrigation workshops. Additionally, Idaho Power will continue to participate in five regional agricultural trade shows. These workshops and trade shows enable discussions between Idaho Power representatives, the company’s customers, irrigation dealers, and trade allies while continually educating them about irrigation best practices, the program, and ways to participate. Each year, workshops are conducted in different local areas. Subjects and presentations are updated to offer new ideas.

Idaho Power will work closely with customers who have participated in the Irrigation Efficiency Rewards program and continue to do photo shoots highlighting efficient irrigation system designs for program promotion. ARs will continue to conduct irrigation system audits to encourage participation in the program.

Through the Idaho Power *Irrigation News* newsletter, the company will continue to provide valuable information to clarify processes, help customers understand their bill, provide information on energy efficiency and energy efficiency programs, clarify rates, and supply safety information, specifically for irrigation customers.

The company created a 2016 media plan aimed at increasing the impact of advertising on this program. Idaho Power will continue to promote the program in print ads in agricultural-focused editions of Idaho newspapers and agriculture magazines using new creative material. The company will continue to participate in five regional trade shows to increase customer interaction and to promote the program.

Irrigation Peak Rewards

	2015	2014
Participation and Savings		
Participants (service points)	2,259	2,225
Energy Savings (kWh)[a]	n/a	n/a
Demand Reduction (MW)	305	295
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$1,018,139	$1,374,724
Oregon Energy Efficiency Rider	$222,614	$104,995
Idaho Power Funds	$6,018,079	$6,117,494
Total Program Costs—All Sources	$7,258,831	$7,597,213
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	n/a	n/a
Total Resource Levelized Cost ($/kWh)	n/a	n/a
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	n/a	
Total Resource Benefit/Cost Ratio	n/a	

Description

Idaho Power's 2015 Irrigation Peak Rewards program is a voluntary program available to Idaho and Oregon agricultural irrigation customers with service locations that had participated in the past. Initiated in 2004, the purpose of the program is to minimize or delay the need to build new supply-side resources. By reducing demand on the most extreme load days in the most extreme summer conditions, the Irrigation Peak Rewards program can reduce the amount of generation and transmission resources Idaho Power needs to build. The program pays irrigation customers a financial incentive for the ability to turn off specified irrigation pumps with the use of one or more load control devices during the program season of June 15 through August 15. The Irrigation Peak Rewards program provides approximately 300 MW of load reduction, which is a capacity near 9 percent of Idaho Power's all-time system peak. This program, along with Idaho Power's other demand response program, is to minimize or delay the need to build new supply-side peaking resources.

In 2015, Idaho Power agricultural irrigation customers in both Idaho and Oregon that had service locations that participated in the past were eligible for participation. Customers could choose between two options: 1) an Automatic Dispatch Option that allows Idaho Power to remotely turn off participants' pumps or 2) a Manual Dispatch Option designed for large service locations with 1,000 hp or greater that allows participating customers, after being notified by Idaho Power, to choose which pumps to manually turn off during a load control event.

For customers participating in either of the dispatch options, load control events could occur up to four hours per day, up to 15 hours per week, but no more than 60 hours per season. Only service locations that had participated in the past were eligible to participate in the program for 2015. Participating customers were guaranteed to experience at least three events per season. Dispatchable load control events could happen between 1:00 p.m. and 9:00 p.m. on weekdays and Saturday. The incentive structure consisted of fixed and variable payments. The fixed portion was paid based on participation during each of the first three events. The variable incentive was applied based on participation in events following the first three. Customers who chose to participate until 9:00 p.m. could receive a higher variable incentive for events that occurred after the first three. A control device attached to the customer's individual pump electrical panels allowed Idaho Power to remotely control the pumps. Participants in the Manual Dispatch Option were required to nominate the amount of kW they were enrolling in the program by June 1 of the program year.

Program rules allow participants the ability to opt out of dispatch events up to five times per service point. The first three opt-outs each incur a penalty fee of $5 per kW, while the remaining two opt-outs each incur a penalty fee of $1 per kW based on the current month's billing kW. The opt-out penalty fees may be prorated to correspond with the dates of program operation and are completed through manual bill adjustments. The fees will never exceed the amount of the incentive that would have been paid.

The incentive amounts that participating customers received per participating service location are listed in Table 13.

Table 13. 2015 program incentives

Option	Fixed Demand Credit ($/billing kW)	Fixed Energy Credit ($/billing kWh)	Variable Energy Credit ($/billing kWh)	Extended Hour Variable Energy Credit ($/billing kWh)
Automatic and manual options	$5.00	$0.0076	$0.148	$0.198

2015 Program and Marketing Activities

In 2015, Idaho Power used workshops, trade shows, and direct customer mailings to make a concerted effort to encourage past participants to re-enroll in the program. The number of service points enrolled to participate in the program for 2015 was 2,259, an increase of 1.5 percent over 2014 enrollment. This accounted for approximately 81 percent of the eligible service points. The three load control events occurred June 29, July 2, and August 11, 2015, with the highest load reduction occurring on June 29, providing an estimated 305 MW at the generation level.

In 2015, the program was only marketed to customers who had service locations that had participated in the program in the past. Idaho Power provided information about the 2015 Irrigation Peak Rewards program at seven workshops throughout the service area. Approximately 210 customers attended workshops in Blackfoot, Burley (2), Twin Falls, Mountain Home, Richland, and Ontario. One specific workshop focused on agricultural safety and irrigation efficiency for Spanish-speaking farm workers. For continual training purposes, Idaho Power recorded this workshop and provided a DVD to customers with Spanish-speaking employees. Upon invitation, Idaho Power presented the program at four workshops sponsored by agricultural groups in Blackfoot, Nampa, Boise, and Parma. The company displayed exhibitor booths at regional agricultural trade shows, including the Eastern Idaho Agriculture Expo, Western Idaho Agriculture Expo, the Agri-Action Ag show, the Treasure Valley Irrigation Conference, and the Idaho Irrigation Equipment Association show and conference. Additionally, numerous one-on-one conversations with Idaho Power ARs informed customers of the 2015 program eligibility requirements and program offering.

The company redesigned an informational flyer to increase appeal and readability by using a brochure format. Idaho Power mailed the new brochure, program enrollment application, and program agreement, to all eligible participants in February 2015.

Cost-Effectiveness

The methods used to determine the cost-effectiveness of the demand response programs was updated in 2014. As part of the public workshops in conjunction with Case No. IPC E-13-14, Idaho Power and other stakeholders agreed on a new method for valuing demand response. The settlement agreement, as approved in IPUC Order No. 32923, defined the annual cost of operating the three demand response programs for the maximum allowable 60 hours must not be more than $16.7 million. This $16.7 million value is the levelized annual cost of a 170-MW deferred resource over a 20-year life. In 2015, the cost of operating the three demand response programs was $9 million. It is estimated that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $12.4 million, and the programs would have remained cost effective.

The Irrigation Peak Rewards program was dispatched for 12 event hours and achieved a maximum demand reduction of 305 MW. The total expense for 2015 was $7.3 million and would have been approximately $10.5 million if the program was fully used for 60 hours.

Customer Satisfaction and Evaluations

Each year, Idaho Power produces an internal annual report for the Irrigation Peak Rewards program. This report includes a load-reduction analysis, cost-effectiveness information, and program changes. A copy is included in *Supplement 2: Evaluation*.

Idaho Power contracted CLEAResult to complete an impact evaluation of the 2015 Irrigation Peak Rewards program. The goals of the impact evaluation were to determine the demand reduction (in MW) during three curtailment events and determine the counterfactual realization rate had an event been called on each business day during the program’s June 15 through August 15 season.

CLEAResult completed analyses of curtailment events held on June 29, July 2, and August 11, 2015, each containing four dispatch groups that curtailed enrolled irrigation pumps in rolling four-hour increments. The results of the curtailment event analyses showed maximum generation level demand reductions of 305.3, 300.3, and 197.7 MW, respectively, for the three events. The results of the curtailment event analyses showed maximum meter level demand reductions of 278.3, 273.8, and 180.2 MW, respectively, for the three events. The events achieved realization rates of 69.0 percent, 67.9 percent, and 44.7 percent, respectively, averaging 60.5 percent.

The results of the counterfactual realization rate analysis demonstrated as in past years, that date has a large influence on the expected realization rate. While the first quarter of the program season (June 15–July 30) showed an average expected realization rate of 68.6 percent, the expected realization rate in the last three quarters of the season (July 1–August 15) drops off significantly, to an average of 49.1 percent. This is due to a higher percentage of pumps being shut off during the baseline period in the first two weeks of August. The 2015 counterfactual realization rate peaks in the last two weeks of June, which was two weeks earlier than 2014 due to an earlier start of the growing season. The analysis determined that the highest realization rate of 73.1 percent occurred June 25. CLEAResult’s analysis shows that had the program experienced a load control event on that day, it would have resulted in a 323 MW load reduction at the utility generation level.

A further breakdown of the load reduction for each event by program option is shown in Table 14.

Table 14. Load reduction for each event by program option

Event	Option 1 & 2 Load Reduced (MW)	Option 3 Load Reduced (MW)	Total Load (MW)
June 29	244.0	61.3	305.2
July 2	238.8	61.6	300.3
August 11	150.6	47.1	197.7

2016 Program and Marketing Strategies

Idaho Power will continue to work with past participants in this program who are eligible to participate in 2016 to encourage their participation.

The company will conduct 7 to 10 workshops throughout the company's regions to familiarize customers with the program details and eligibility requirements. Through direct-mail, each eligible customer will receive an informational packet containing a personalized letter, sign-up worksheet, informational brochure, and contract agreement encouraging their participation for the 2016 program season. Idaho Power ARs will continue one-on-one customer contact to inform and encourage program participation.

Idaho Power filed a request in December 2015 to modify the existing Irrigation Peak Rewards program to allow the company to use more of its Automated Metering Infrastructure (AMI) technology for load control, as well as allow greater flexibility for some customers to participate in the Manual Dispatch Option. Approved in Idaho and Oregon in February 2016, this modification could reduce overall program costs while providing additional flexibility to some participants by enabling more customers to participate in the Manual Dispatch Option.

Market Transformation

Northwest Energy Efficiency Alliance

Market transformation is an effort to change the existing market for energy efficiency goods and services by engaging and influencing large national companies to manufacture or supply more energy-efficient equipment. Market transformation can also attempt to identify barriers and opportunities to increase the market adoption of efficiency. Idaho Power achieves market transformation savings primarily through its participation in NEEA. Idaho Power has been a funding member of NEEA since its inception in 1997. NEEA's role in this process is to look to the future to find emerging opportunities and to create a path forward to make those opportunities a reality in the region.

NEEA's current, five-year funding cycle began 2015. In this cycle the 2015 to 2019 NEEA business plan is forecast to obtain 145 aMW of regional energy savings at a cost savings of about $3 million over the next five years to Idaho Power customers as compared to the previous five-year business plan. The NEEA plan also offered some optional programs and activities to prevent overlap of activities when local utilities have the capability to provide the same services at a lower cost or more effectively.

Idaho Power participates in all of NEEA's committees and workgroups including representation on the Regional Portfolio Advisory Committee and the Board of Directors. In 2015, Idaho Power helped design and implement the Commercial and Industrial Lighting Regional Market Plan. These efforts will continue through the current funding cycle, 2015 to 2019.

NEEA performs several MPERs on various energy efficiency efforts each year. In addition to the MPERs, NEEA provides market-research reports, through third-party contractors, for energy efficiency initiatives throughout the Pacific Northwest. Copies of these reports are included on the CD accompanying *Supplement 2: Evaluation* and on NEEA's website under Market Effects Evaluation.

Commercial and Industrial NEEA Activities

NEEA continued to provide support for commercial energy efficiency activities in Idaho in 2015. This included partial funding of the IDL for trainings and additional tasks.

Technical training and education continue to be important to Idaho Power's industrial customers, helping them identify energy efficiency opportunities within their facilities. In 2015, Idaho Power opted out of the NEEA provided training. This training was managed internally in 2015 to allow for more flexibility in course offerings to reduce the costs of the training. Refer to the Custom Efficiency program section for more details regarding the technical training classes.

The Idaho Building Code Board requested the Idaho Code Collaborative review the 2015 codes and make a recommendation to the board on adoption. NEEA facilitated the first meeting held December 2, 2015, and will facilitate the additional meetings scheduled in 2016.

NEEA partnered with Idaho Power and BOMA Idaho to provide a four-hour commercial real estate educational training session. The *Making the Business Case for Energy Efficient Properties* session—postponed in 2014 due to circumstances beyond Idaho Power's control—was held in Boise on January 29, 2015. Forty-two attendees participated, including architects, engineers, interior designers, property managers, and real estate professionals. The AIA and Idaho Real Estate Commission (IRC) offered credits to attendees.

NEEA facilitated regional lighting webinars for new construction to discuss how utilities can effectively align code changes and utility programs. NEEA is using the code collaborative in Idaho and Montana as examples of success for other regions. NEEA held a webinar on November 23, 2015, and will hold additional webinars in 2016.

NEEA facilitated the conference planning committee and, along with Idaho Power, supported the 2015 Idaho Energy and Green Building Conference held in Boise on November 4 and 5, 2015. Idaho Power had two active members on the conference planning committee.

Idaho Power remained informed on NEEA's initiatives in the commercial lighting arena. The company was also updated on progress at periodic conference calls and meetings. Idaho Power continued participation as a member of the NEEA Commercial Lighting Program Manager Work Group. This group consists of utility stakeholders who work together for the region's success in commercial lighting. The first two initiatives launched from this work group—Reduced Wattage Lamp Replacement (RWLR) and the Top-Tier Trade Ally (TTTA)—continue to move forward.

Results of the RWLR market test pilot evaluation were presented in 2015. The evaluation found that the RWLR program is a viable and needed effort, given the remaining large market potential, which resulted in the decision for NEEA to expand the program across the region. In addition, the evaluation showed the program processes ran smoothly and resulted in high distributor satisfaction and praise for the program; however, the evaluators recommended that NEEA further automate its data processing and quality assurance steps and consider a switch to a more rigorous database tool for data tracking. The focus on distributors was identified as a solid strategy, although the report recommended additional demand-side interventions would be beneficial in transforming the market. The evaluation identified paying distributors incentives above a historical baseline was not a viable program strategy. Consequently, NEEA has adjusted the payment strategy to a per unit incentive coupled with market share target bonuses and staff promotions. Finally, the pilot evaluation pointed out that a range of barriers stand in the way of the program's long term success, and NEEA should continue to seek opportunities to educate distributors, contractors, and end users about reduced wattage T8s and their performance, thus dispelling any misconceptions and concerns with the technology and placing the product top of mind. The results of the 2015 pilot are included in the 2015 NEEA reports located on the CD accompanying *Supplement 2: Evaluation*.

In 2015, NEEA recruited several distributors in Idaho Power's service area to participate in the RWLP initiative. Results of 2015 RWLR activities are being analyzed and these results are expected to be published 2016.

NEEA continued development of the TTTA pilot training curriculum and structure in 2015. Implementation of pilot trainings in selected areas (Idaho included) will begin in 2016.

Idaho Power also participated in the Regional Strategic Market Planning Collaborative for commercial and industrial lighting. The collaborative formed in 2015 to create regional strategic market plans in four market segments. Commercial and industrial lighting was the first segment of focus because it was identified as the collaborative's top priority. Idaho Power is represented on a steering committee formed to monitor and oversee the progress of the regional commercial and industrial lighting plan.

The NEEA Existing Building Renewal (EBR) pilot project in Boise, which began in 2013 and phased through 2016, saw no significant results in 2015. The project has not resulted in any Idaho Power incentive applications.

NEEA completed several assessment studies related to irrigated agriculture to support their scanning activities. Idaho Power has kept appraised of these activities and has reviewed each of these assessments. Copies of the reports are included on the CD accompanying *Supplement 2: Evaluation* and on NEEA's website under NEEA Market Effects Evaluations.

Residential NEEA Activities

NEEA supported a variety of residential programs and associated activities in Idaho Power's service area in 2015. NEEA is directly involved in support for ENERGY STAR® Homes Northwest NSH pilot program, the RPP Initiative, the DHP research project, and the Smart Water Heat Initiative (previously known as the HPWH Initiative). Idaho Power has a member on the board of directors and served on the Residential Advisory Committee, the Efficient Homes Workgroup, the Ductless Heat Pump Workgroup, the HPWH Workgroup, the RPP Workgroup, the Super Efficient Dryers Workgroup, and RETAC. Idaho Power participated in the Northwest Regional Retail Collaborative.

Idaho Power participated in NEEA's Residential Advisory Committee meetings and activities throughout 2015. Additionally, three Idaho Power representatives attended NEEA's Efficiency Exchange in April 2015.

NEEA provides ENERGY STAR Homes Northwest builder and contractor training, manages the regional-homes database, develops regional marketing campaigns, and coordinates the various building specifications and requirements with the EPA and utilities in Idaho, Montana, Oregon, and Washington. A third-party implementer hired by NEEA manages most of these activities.

NEEA launched the NSH Initiative to advance energy-efficient building practices and technologies for single-family homes. During three phases of a market test strategy, NEEA partnered with builders throughout the region to build homes for the NSH pilot. Market tests provided NEEA the opportunity to evaluate costs, challenges, best practices, and actual performance of homes built to NSH performance targets. Market tests also identified market barriers. The third phase is ongoing.

In 2015, Idaho Power participated in NEEA's Efficient Homes Workgroup. This workgroup assists NEEA in taking energy-efficient homes to a higher energy efficiency standard. The primary focus of the workgroup in 2015 was NEEA's NSH pilot program. The goal of this pilot program is to identify the most cost-effective ways to achieve maximum energy savings in residential new construction. NEEA continues to recruit builders throughout the Northwest to build to a high-performance specification. NEEA will install monitoring devices in homes to track energy saving performance. A developer recently built the first Next Step Home in McCall, Idaho, located within Idaho Power's service area. An experimental CO_2 heat pump system heats the home's air and water. This system is currently undergoing UL testing in the United States and has not yet received UL approval. Another NSH is currently under construction in McCall. The home's air and water will be heated with a CO_2 heat pump space and water heating system.

Idaho Power was a member of NEEA's Ductless Heat Pump Workgroup during 2015. NEEA has coordinated the DHP research project since 2009, which includes data collection, design, results analysis, savings calculations, and ongoing promotional activities. The goal of NEEA is to encourage the adoption of these products while displacing the use of existing electric-resistance zonal heating systems in homes. Idaho Power currently offers a $750 cash incentive for qualified homeowners who install a qualified DHP system through the Heating & Cooling Efficiency Program.

Idaho Power participated in NEEA's HPWH Workgroup in 2015. NEEA coordinated a residential HPWH research project in the Northwest region that started approximately six years ago. The goal of the project is to promote the adoption of higher-efficiency HPWHs over traditional resistance-heat water heaters. Idaho Power monitors NEEA's research on this topic.

NEEA completed a Heat Pump Water Heater Model Validation study designed to integrate all previous work in the Northwest on HPWHs with the purpose of establishing a proven UES estimate for the RTF. This project comprehensively draws on laboratory studies and, importantly, two previously conducted field studies. Seventy sites had been previously studied in the field and this project added 50 more. Results indicate that across different combinations of HPWH models and installation locations, average annual coefficient of performances (aCOP) varied between 1.6 and 2.4, which represents a two- to three-fold increase in efficiency over a resistance tank. Overall, the study provided the necessary field observations of the independent determinants of HPWH energy use to predict their behavior with confidence across the general population of houses in the Northwest. On March 2, 2015, NEEA published the *Heat Pump Water Heater Model Validation Study* created by Ecotope. A copy of the NEEA Report E15 306 is included on the CD accompanying *Supplement 2: Evaluation*.

NEEA performed a laboratory assessment on a General Electric brand HPWH to evaluate the performance of the product in northern climates. The testing plan included characterizing the equipment operating modes, observing heat pump efficiency, and measuring noise levels. Testing was also performed using the new US DOE standard written in 2014. Overall results suggest that the product is an efficient HPWH for small to medium hot water loads and is appropriate for some applications in the Pacific Northwest. On April 9, 2015, NEEA published the *Laboratory Assessment of GE GEH50DFEJSRA Heat Pump Water Heater* created by Ecotope. A copy of the NEEA Report E15 013 is included on the CD accompanying *Supplement 2: Evaluation*.

NEEA engaged Evergreen Economics to conduct the first annual market progress evaluation for NEEA's Smart Water Heat Initiative (i.e., HPWH Initiative). In July 2015, NEEA changed the name of from the HPWH Initiative to the Smart Water Heat Initiative. The NEEA website for this initiative was smartwaterheat.com and in August 2015 was replaced with updated content and renamed hotwatersolutionsnw.org. The results indicate manufacturers are engaged and interested in meeting the Northern Climate Specification, a performance product specification created by NEEA. The evaluation identified that most HPWHs were planned purchases, not emergency replacement situations. HPWHs are not generally stocked at all levels of the supply chain, making them sometimes difficult to find in retail stores. Brand familiarity is also important to purchasers. On October 14, 2015, NEEA published the *Northwest Heat Pump Water Heater Initiative Market Progress Evaluation Report #1* created by Evergreen Economics. A copy of the NEEA Report E15 323 is included on the CD accompanying *Supplement 2: Evaluation*.

Idaho Power actively participated in the NEEA RPP Workgroup during 2015. The RPP is based on the Consumer Electronics Energy Forward Initiative, which ended in 2013. The RPP used mid-stream incentives to influence retail stocking practices, ultimately driving manufacturing and standards toward a portfolio of energy-efficient products sold through the retail channel.

In 2015, the NWRCC, which served as the workgroup to the RPP, disbanded due to overlap between the two groups. Idaho Power continued to participate in the advisory workgroup for the RPP.

The 2015 RPP focused on developing a multi-year roadmap, launching an automated data processing solution, and strengthening retailer engagement. NEEA explored expansion of the RPP to new, extra-regional partners and alignment with the National ENERGY STAR retail platform.

RPP continued to offer incentives on televisions, soundbars, dishwashers, and air purifiers. NEEA also commissioned evaluations on the RPP.

In 2015, NEEA formed the Super Efficient Dryers Initiative to support the acceleration of heat pump dryers into the market and Idaho Power participated in the workgroup. The initiative focuses on influencing manufacturer product development and executing strategies to overcome the barriers of this new technology. Barriers include a high incremental cost, limited consumer awareness, and product availability. The initiative offers incentives to reduce the retail price. A second goal of the initiative is lab and field-testing to better understand how heat pump dryers perform in real-world conditions, evaluate consumer preferences, and gather data to support RTF provisional energy savings.

Idaho Power participated in RETAC, the purpose of which is to discuss and provide feedback on various emerging technologies in the region. RETAC met twice in 2015 to review the emerging technology pipeline for BPA, NEEA, and the Northwest Power and Conservation Council (NWPCC) Seventh Power Plan. Technologies of particular interest to the group include CO_2 heat pumps, high performance manufactured homes, and secondary glazing systems.

In preparation for the launch of the next Residential Building Stock Assessment (RBSA), Idaho Power participated in the Sampling Design and Customer Contact Protocol working groups. Idaho Power attended several meetings and provided feedback on the sample design, recruitment letter, screening survey, and on-site assessment protocol. A pre-test of the study will be conducted in the Boise Metro and Portland Metro areas in February 2016. The main study is set to launch in May 2016.

NEEA Funding

In 2015, Idaho Power began the first year of the 2015 to 2019 *Regional Energy Efficiency Initiative Agreement* with NEEA. Per this agreement, Idaho Power is committed to fund NEEA based on a quarterly estimate of expenses up to the five-year total direct funding amount of $16.5 million in support of NEEA’s implementation of market transformation programs in Idaho Power’s service area. Of this amount in 2015, 100 percent was funded through the Idaho and Oregon riders.

In 2015, Idaho Power paid $2,582,919 to NEEA. The Idaho jurisdictional allocation of the payments was $2,453,773, while $129,146 was paid for the Oregon jurisdiction. Other expenses associated with NEEA activities, such as administration and travel, were paid from Idaho and Oregon Riders.

Final NEEA savings for 2015 will be released in June 2016. Preliminary estimates reported by NEEA for 2015 indicate Idaho Power’s share of regional market transformation MWh savings for 2015 is 21,900 MWh. These savings are reported in two categories; codes- and standards-related savings of 12,000 MWh and non-codes and standards related savings of 9,900 MWh.

In the *Demand-Side Management 2014 Annual Report,* preliminary funding share estimated savings reported were 20,000 MWh. The revised estimate included in this report for 2014 final funding share NEEA savings is 26,806 MWh. These saving include savings from code-related initiatives as well as non-code-related initiatives. Idaho Power relies on NEEA to report the energy savings and other benefits of NEEA’s regional portfolio of initiatives. For further information about NEEA, visit their website at neaa.org.

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OTHER PROGRAMS AND ACTIVITIES

Residential Energy Efficiency Education Initiative

Idaho Power recognizes the value of general energy efficiency awareness and education in creating behavioral change and customer demand for, and satisfaction with, its programs. The Residential Energy Efficiency Education Initiative promotes energy efficiency to the residential sector. The company achieves this by creating and delivering educational materials and programs that result in wise and informed choices regarding energy use and increase Idaho Power's energy efficiency program participation.

The Residential Energy Efficiency Education Initiative continued to produce semiannual energy efficiency guides in 2015. Idaho Power distributed these guides primarily via insertion in local newspapers and at events across Idaho Power's service area.

Improvements for the *Energy Efficiency Guides* implemented in 2015 include the following:

- The initiative engaged CRs in group meetings to gather suggestions for improvement. CRs suggested topics for future guides based on customer questions and concerns and offered feedback about format and ways to enhance the value of the guide for use during home visits and as handouts at presentations and other uses.
- An amended distribution schedule allows customers to receive guides during the high-use months of January and July rather than the shoulder months of April and October.
- Guide circulation further increased with the addition of a social media promotion.
- In addition to the indexed pdf guides on Idaho Power's website, the program offered a downloadable, printable version.

Sixteen newspapers in Idaho Power's service area inserted the *Summer Energy Efficiency Guide* and delivered it to 237,144 homes the week of July 19, 2015. The guide focused on the energy and water connection and helping customers understand how the two resources are connected. The guide highlighted efficient ways to stay cool; answered questions about smart thermostats; and offered tips for using water efficiently, reducing hot water use, and purchasing hot water heaters. It also contained tips on how to reduce energy use at home while vacationing.

The release of the summer guide received public relations support through numerous communication channels, including an item in Idaho Power's weekly *News Briefs* email to all media in the Idaho Power service area on July 20 and a feature during a monthly live studio energy efficiency segment on KPVI and KTVB-TV on June 30. The November issue of Idaho Power's *Connections* customer newsletter included an image display for the guide.

The company prepared the *Winter Energy Efficiency Guide* in December 2015 for distribution in January 2016, in accordance with the new distribution plan. Although the guide focused on ways to find the truth about energy saving claims, Idaho Power improved the guide for usefulness and appeal to the senior population. Idaho Power is creating a variety of Energy Efficiency guides to increase circulation and applicability to a variety of customer niches, including families, seniors, or specific topics.

In 2015, the company distributed 5,433 additional guides at energy efficiency presentations and events, which continued to reinforce the overall value of these guides. Links to current guides were given prominent positions on Idaho Power's website during the appropriate seasons. Idaho Power made the full selection of energy efficiency guides available for viewing, downloading, and printing via Idaho Power's website.

The Residential Energy Efficiency Education Initiative distributed energy efficiency messages through a variety of other communication methods during 2015. Idaho Power increased customer awareness of energy-saving ideas via continued distribution of the third printing of the 96-page booklet *30 Simple Things You Can Do To Save Energy*, a joint publishing project between Idaho Power and The Earthworks Group. In 2015, the program distributed 5,040 English and 1,015 Spanish copies directly to customers. This was accomplished via community events and local libraries; by CRs during in-home visits; by participating contractors in the Home Improvement Program, Energy House Calls program, H&CE Program, and See ya later, refrigerator® program; through direct web requests; and in response to inquiries received by Idaho Power's customer service center.

Idaho Power continues to recognize that educated employees are effective advocates for Idaho Power's energy efficiency programs. Idaho Power staff visited each of Idaho Power's geographical regions and the Customer Service Center to meet with CRs and other employees to discuss educational initiatives and answer questions about the company's energy efficiency programs.

The Kill A Watt™ Meter Program remained active in 2015. Idaho Power's Customer Service Center and field staff continued to encourage customers to learn about the energy used by specific appliances and activities within their homes by visiting a local library to check out a Kill A Watt meter. The Kill A Watt meters were featured during live television studio news programs on KTVB and KPVI in Idaho Power's monthly energy efficiency segments.

As in previous years, Idaho Power contined to strengthen the energy education partnership with secondary school educators through continued participation on the Idaho Science, Technology, Engineering and Mathematics (iSTEM) Steering Committee. In 2015, 18 teachers completed the four-day, two-credit professional development seminar facilitated by Idaho Power and co-sponsored by Intermountain Gas and the Idaho National Lab.

Idaho Power continued to engage customers in energy efficiency discussions at many community events throughout Idaho Power's service area. In February, Idaho Power participated in the Smart Women, Smart Money conference and educated nearly 2,000 women about the benefits of LED lighting. In March and April, Idaho Power participated in Pocatello's Spring Home Show and the Portneuf Valley Community Environmental Fair—actively promoting wise energy use and participation in energy efficiency programs while distributing over 5,000 LED light bulbs.

In September 2015, Idaho Power participated in the FitOne Expo in Boise, Idaho. The event continued to be important to the initiative due to the size of the audience and because Idaho Power's prior participation confirmed the demographics of attendees aligned with the company's residential energy efficiency target audience. In 2015, Idaho Power staff at the event educated attendees about the benefits of LED lighting technology, distributed LED bulbs, and gathered contact information from customers interested in participating in a clothes drying rack pilot project.

Idaho Power further increased its energy efficiency presence in the community by providing energy efficiency and program information through 93 outreach activities, including events, presentations, trainings, and other activities documented in the company's Outreach Tracking System. In addition, Idaho Power field staff delivered 204 presentations to local organizations addressing energy efficiency programs and wise energy use. In 2015, Idaho Power's Community Education team provided 124 presentations on *The Power to Make a Difference* to 3,359 students. The CERs and other staff also completed 26 senior citizen presentations on energy efficiency programs and shared information about saving energy to 944 senior citizens in the company's service area. Additionally, Idaho Power's energy efficiency program managers responded with detailed answers to 300 customer questions about energy efficiency and related topics received via Idaho Power's website.

As part of National Energy Awareness Month in October, Idaho Power held its fifth annual student art contest in the Idaho Power service area, bringing energy education into the classroom and inspiring students and families to think more about energy. This year, the contest set a new record with more than 2,100 entries representing all regions. "Ways to Save Energy" was one of the highlighted categories, and both overall and regional winning students and their teachers were recognized.

The Residential Energy Efficiency Education Initiative continued to provide energy efficiency tips in response to media inquiries. In addition to supplying information for various Idaho Power publications, such as the *News Scans* weekly employee newsletter, the *Connections* customer newsletter, and Idaho Power's Facebook page, energy efficiency tips and content was provided for seven monthly KTVB-TV news live studio interview segments and seven monthly KPVI-TV news live studio interview segments.

Idaho Power had previously explored the creation of a high-school kit program, but with the advent of cost-effective LED light bulbs, Idaho Power has since determined that a broader-based residential kit program would be more effective—reaching more customers with fewer resources. The initiative, therefore, prepared an RFP and coordinated the selection of a partner to implement a new direct-to-customer residential kit program early in 2016. When the kit program is implemented, savings and expenses will be reported under Educational Distributions.

The initiative spearheaded an LED distribution effort aimed at getting the newest lighting technology into customer hands along with customer education and answers to their common questions. At events and presentations, company staff distributed over 21,000 LEDs in custom packaging that highlighted the advantages of energy-efficient lighting and encouraged participation in Idaho Power's myAccount online portal. The energy savings resulting from this effort and from the SEEK for the school year 2014 to 2015, are reported in the Educational Distribution Program section of the *Demand-Side Management 2015 Annual Report*.

In 2015, the initiative proposed, researched, and acquired drying racks for a Drying Rack Project. Idaho Power identified an appropriate customer population, created a baseline survey to establish current drying habits, and built an online tool to manage the project's enrollment. The company will implement the project in 2016.

The initiative's 2016 goals are to increase program participation and promote education and energy saving ideas that result in energy-efficient, conservation-oriented behaviors and choices. In addition to producing and distributing educational materials, the initiative will manage the company's new Educational Distribution Program responsible for distributing educational measures that have associated savings. Examples of activities conducted under the Education Distribution Program include LED lighting education, distribution of LED bulbs to customers, the SEEK, and the Drying Rack Project. The new Residential Kit Program proposed for 2016 will also be under the Educational Distribution program.

The initiative will continue to work with the PPG to explore behavioral program opportunities that may include enhancement to kit programs, increased promotion of myAccount, home energy reports, or a pilot program to test other behavioral messages.

Commercial Education

Since 2008, Commercial Education activities have informed and educated commercial customers regarding energy efficiency, increased awareness of and participation in existing commercial energy efficiency and demand response programs, and enhanced customer satisfaction regarding the company's energy efficiency initiatives.

The primary goal is to educate and support trade allies and key stakeholders working in the energy efficiency market by emphasizing building strategic relationships. Additionally, program specialists work closely with Idaho Power CRs assigned to commercial market segments to capitalize on their established relationships with customers.

Commercial Education includes the distribution of informational materials to trade allies and other market players who, in turn, support and promote Idaho Power's energy efficiency programs. CRs conduct site visits to educate customers on energy-saving opportunities at their business and meet with design professionals.

In 2015, Idaho Power carried out its plan to capitalize on effective customer projects by developing three 2015 success stories highlighting customers' energy efficiency projects for posting on Idaho Power's website. Copies of two success stories posted on the website in 2015 are provided in *Supplement 2: Evaluation*. The third completed 2015 success story is scheduled to post in 2016.

Other educational/outreach activities included an August and a March *ENERGY@WORK* newsletter created and mailed to all commercial customers. These newsletters contained business-specific articles of interest, with an emphasis on energy efficiency. Idaho Power's customer newsletter, *Connections*, is distributed monthly in customers' bills. In 2015, two editions were devoted exclusively to energy efficiency content.

Raising the knowledge level of commercial customers in the wise use of energy in their daily operations is important to the continued success of Idaho Power's commercial energy efficiency programs. Educating commercial customers requires working with and supporting multiple stakeholders and organizations. Examples of key stakeholders include the IDL, BOMA, US Green Building Council, ASHRAE, IBOA, and the IFMA Northern Rockies Chapter. Through funding provided by Idaho Power, the IDL performs several tasks aimed at increasing the energy efficiency knowledge of architects, engineers, trade allies, and customers. Specific activities include sponsoring a BSUG, conducting Lunch & Learn sessions held at various design and engineering firms, and offering a TLL. The TLL gives customers access to equipment that enables them to measure and monitor energy consumption on various systems within their operation.

In 2015, Idaho Power supported two organizations that provide professional accreditation to their members. The IBOA offers Building Operator Certification to train building operators in the energy efficiency operation of their facilities. Certification includes multiple trainings on various topics. The IFMA teaches four modules of its Facility Management Professional (FMP) credential. The FMP training equips facility managers with the knowledge and skills to promote, justify, and implement sustainable and energy efficiency projects and programs within their facilities.

Plans for 2016 include 1) working with Idaho Power marketing specialists to increase customer awareness of the company's energy efficiency programs and their specific offerings; 2) coordinating training opportunities for CRs and trade allies to increase their energy expertise; 3) continuing to support key stakeholders that train, educate, and support the advancement of energy efficiency practices; 4) conducting outreach and education activities through the IDL; 5) supporting customers via facility walk-throughs, including energy audits; and 6)implementing an electronic quarterly newsletter for large commercial and industrial customers.

Regional Technical Forum

The BPA and the NWPCC established the RTF in 1999. Since 2004, Idaho Power has supported the RTF by providing annual financial support, regularly attending monthly meetings, and participating on various sub-committees.

The forum's purpose is to advise the BPA; the NWPCC; the region's utilities; and organizations, including NEEA and the Energy Trust of Oregon; on technical matters related to energy efficiency. Activities include the development of standardized protocols for verifying and evaluating energy savings and tracking conservation and resource goals. Additionally, the RTF provides feedback and suggestions for improving the effectiveness of regional energy efficiency programs. The RTF also recommends a list of eligible energy efficiency measures and the estimated savings associated with those measures. Idaho Power uses the information provided by the RTF when conducting research and analysis on new and current measures. The RTF meets monthly to review and provide comments on analyses and other materials prepared by the NWPCC, BPA staff, and RTF contractors. Idaho Power uses the savings estimates and calculations provided by the RTF when applicable to the Idaho climate zones and load characteristics. In 2015, Idaho Power staff participated in all of the RTF's meetings, the Implementers Group subcommittee, and the RTF Policy Advisory Committee.

In 2015, the RTF's finalized quality control reviews on several measures and their associated support workbooks, specifically, for residential weatherization-single family and residential HVAC measures. The RTF also updated savings and assumptions for several measures including residential lighting, refrigerator/freezer decommissioning, and residential clothes washers. More information regarding changes impacting Idaho Power's current measures are in each program's Cost-Effectiveness section.

Throughout 2015, Idaho Power analysts participated in the RTF's Implementers Group subcommittee monthly meetings. The meetings provide a summary of the recent RTF meetings and actions, and alert implementers of any upcoming RTF decision that may affect programs. The group also informs the RTF if there is any measure specification that might limit feasibility.

Idaho Power provided home energy audit results and pre- and post-weatherization billing data for over 150 manufactured homes weatherized as part of Idaho Power's WAQC and Weatherization Solutions for Eligible Customers programs. The data supported a request by RTF members to validate the existing manufactured home calibration using other data sets available in the region. The resulting analysis using Idaho Power data validated the previous energy model calibration and the RTF appreciated the provided data.

At the end of 2015, an Idaho Power analyst was selected to be a voting member of the RTF. An Idaho Power representative will serve on the RTF for a three-year term, effective January 2016.

University of Idaho Integrated Design Lab

Idaho Power is a founding supporter of the IDL. The IDL is dedicated to the development of high performance energy-efficient buildings in the Intermountain West. Idaho Power has worked with the lab since its inception in 2004 as part of efforts to educate customers about the value of energy efficiency to businesses, as well as to the businesses' customers. In 2015, Idaho Power entered into an agreement with the IDL to perform the following tasks.

Building Metrics Labeling

The goal of this task was to expand on the task that began in 2012 with the development of the Building Metrics Labeling (BML) sheet, a graphical display of four building metrics on a single sheet. The metrics displayed are Energy Use Intensity, ENERGY STAR® score, Walkability, and Space Daylit Area. The purpose of the BML sheet is to increase awareness of building energy use and promote energy efficiency during the sale or lease of commercial properties. The final version of the BML tool became available for public use in early 2014.

The IDL continued support, promotion, and improvement of the sheet in 2015. The tool was discussed and/or flyers were distributed at twenty Lunch & Learn presentations to architecture or engineering firms and organizations, multiple Central Addition Planning meetings hosted by the US Green Building Council (USGBC), six BSUG events, a presentation to the mayor and Planning and Development Services staff at the City of Boise, and multiple presentations to real estate brokers and property managers. The report is located in the IDL section of *Supplement 2: Evaluation*.

Lunch & Learn

The goal of the Lunch & Learn task was to educate architects, engineers, and other design and construction professionals about energy efficiency topics through a series of educational lunch sessions.

In 2015, the IDL scheduled 20 technical training lunches in Boise, Pocatello, Ketchum, and Idaho Falls. The trainings were coordinated directly with architecture and engineering firms and organizations and were attended by a total of 321 architects, engineers, interior designers, project managers, and others.

Sixteen sessions were offered in Boise, one in Pocatello, two in Ketchum, and one in Idaho Falls. The topics of the lunch sessions (and quantity of each) were: *Deep Retrofits on Historic Projects* (1), *IECC for Industrial Buildings* (1), *Radiant System Design Considerations* (1), *Daylight Sensing Electric Lighting Controls* (2), *Architectural HVAC Integration Strategies* (2), *Integrated Design Case Studies* (2), *Daylight in Buildings: Schematic Design* (1), *Daylight in Buildings: Getting the Details Right* (3), *Benchmarking and Energy Goal Setting* (2), *Adding to Zero: Chemeketa Community College's Path to Net Zero* (1), *Occupant Customer Experience* (1), *Operations and Maintenance Strategies* (1), *Boise Green Building Code and Idaho Power Efficiency Programs* (1), and *The Importance of Building Performance Modeling for Architects* (1). The report is located in the IDL section of *Supplement 2: Evaluation*.

Building Simulation Users Group

The goal of this task was to facilitate the Idaho Building Simulation Users Group (BSUG), which is designed to improve the energy efficiency-related simulation skills of local design and engineering professionals.

In 2015, 7 monthly BSUG sessions were hosted by the IDL. The sessions were made available remotely and were attended by 86 professionals in person and 230 professionals remotely. Evaluation forms were completed by attendees for each session. On a scale of 1 to 5, with 5 being excellent and 1 being poor, averaging results from all seven questions, the average session rating was 4.1 for 2015.

Finally, each presentation was archived on the BSUG 2.0 website along with general BSUG-related content. The BSUG 2.0 site logged 1,809 page views with 651 specific to Idaho users in 2015. The report is located in the IDL section of *Supplement 2: Evaluation*.

Foundational Services

The goal of this task was to provide energy efficiency technical assistance and project-based training to building industry professionals and customers. When the IDL receives requests for their involvement in building projects, the projects are categorized into one of three types. Phase I projects are simple requests that can be addressed with minimal IDL time. Phase II projects are more complex requests that require more involvement and resources from the lab. Phase III projects are significantly more complex and must be co-funded by the customer.

The Simulation Quality Assurance task combined into the Foundational Services task in 2015. The goal of this task was to provide energy simulation QA by conducting pre- and post-measurements and verifications to compare modeled savings to realized savings on selected projects. The IDL accomplished this by reviewing energy simulation techniques used to estimate facility consumption, conducting on-site measurements used to calibrate and validate the energy model, performing energy management system data extraction, analyzing actual bill and weather data, and creating a report detailing findings and lessons learned from each project. In the past, the Simulation Quality Assurance projects often overlapped into the Foundational Services task when the scope of work was larger than the Simulation Quality Assurance task. Idaho Power and IDL determined the additional task was not warranted because the services can be covered in Foundational Services.

In 2015, the IDL provided technical assistance on a total of 55 projects in the Idaho Power service area. There were 47 Phase I projects, two Phase II projects, and one Phase III project. An additional five projects currently in early stages, and the full scope of work is yet to be determined. Overall, 54 percent of the projects were on new buildings and 46 percent were on existing buildings. The report is located in the IDL section of *Supplement 2: Evaluation*.

Building Efficiency Verification

The goal of this task was to continue random installation verification of over 10 percent of Building Efficiency applications provided incentives. This consisted of conducting a full review of documentation and complete on-site inspections to validate whether noted systems and components had been installed. The purpose of this verification was to confirm program guidelines and requirements were adequately facilitating participants to provide accurate and precise information with regard to energy efficiency measure installations.

This task also included the review of all daylight photo-control incentives to verify site conditions and improve the quality of design and installation.

The IDL completed on-site field verifications for the Building Efficiency program as summarized in the Building Efficiency program’s Customer Satisfaction and Evaluations section presented earlier in this

Demand-Side Management 2015 Annual Report. The report is located in the IDL section of *Supplement 2: Evaluation*.

Tool Lending Library

The goal of this task was to operate and maintain a measurement equipment TLL, including a web-based equipment tool loan-tracking system, and provide technical training on how each tool is intended to be used.

The inventory of the TLL now consists of over 900 individual pieces of equipment. The tools are available for customers, engineers, architects, and contractors in Idaho Power's service area to borrow at no cost to aid in the evaluation of energy efficiency projects and equipment they are considering.

There were 56 tool loan requests in 2015, which included a total of 317 tools loaned. The tools were loaned to 31 unique users,including engineering firms, equipment representatives, educational institutions, industrial plants, and office/commercial facilities. The report is located in the IDL section of *Supplement 2: Evaluation*.

Heat Pump Calculator/Climate Design Tools

The goal of this task was to develop an Excel-based heat pump analysis tool to calculate energy usage and savings based on site-specific variables for commercial buildings. IDL identified a lack of sophisticated heat pump energy-use calculators available with the capability of comparing the energy use of heat pumps in commercial buildings against other technologies in a quick, simple fashion. The tool was initially developed in 2013 and underwent user testing in 2014. In 2015, further testing was done by comparing results from the calculator to results obtained from myriad eQuest energy simulations. Feedback from validation testing was integrated into the current version of the tool, including an improved user interface and the ability to integrate TMY3 weather files for locations where that data is available. A few years ago, the IDL completed a set of Climate Design Tools intended to inform sustainable design and calculate the impacts of five innovative types of systems: earth tubes, passive heating, cross ventilation, stack ventilation, and night flush ventilation/thermal mass. As part of the 2015 scope for this task, the IDL completed the initial integration of these five tools into the Heat Pump Calculator. This unification produced a single platform life-cycle analysis tool for several energy efficiency measures not currently well supported with other tools in the industry. The report for this task is located in the IDL section of *Supplement 2: Evaluation*.

Residential Heat Pump Calculator

In 2015, the IDL enhanced the 2014 computer-based residential energy calculator. This tool calculates energy consumption for residential houses. It has the ability to accept various descriptive user inputs—for example, attic insulation and window performance in an existing house. Users can compare the energy consumption of a house with various types of heating and cooling systems. Idaho Power and the IDL will evaluate the tool in 2016 to determine needed enhancements.

Residential WHF

The IDL released *The 2015 Task #9: Technical Assistance—Whole House Fan Report* (#1408-031-01) October 14, 2015. The report is located in the IDL section of *Supplement 2: Evaluation*.

In 2015, the IDL investigated WHFs at the request of Idaho Power. These high-volume, ceiling-mounted exhaust fans are used to displace mechanical cooling systems. Typical fan blade diameters range generally from 24 to 42 inches. Depending on the size installed, the WHFs' exhausted air ranges from 3,000 to 10,000 cubic feet per minute (CFM). WHFs are mounted in the ceiling and move exhaust air from the conditioned space directly into the attic while drawing cooler outdoor air into the home through open windows. WHFs are a viable option where cooler dry air is available in evening hours during the cooling season.

Commercial Real Estate Support

This task's goal was to provide technical support to the commercial real estate market. IDL worked with Greensteps in 2015 to continue support of the Kilowatt Crackdown participants. IDL's role was to audit buildings, provide audit reports, and provide technical support at follow-up meetings. IDL also worked with building staff to specify energy efficiency projects and ENERGY STAR certification to eligible buildings.

IBOA and IFMA Organization/Chapter Support

The goal of this task was to provide technical support to the local IBOA and IFMA organizations to help them succeed and meet their goals.

The current contract between Idaho Power and the IDL will extend into 2016 for Foundational Services and Commercial Real Estate Support. In 2016, the IDL will continue or expand work on the BML sheets, Lunch & Learn sessions, BSUG, Foundational Services, Building Efficiency Verification, TLL, and Heat Pump Calculator. IDL will also evaluate new tasks in 2016 for potential addition to the contract.

Local Energy Efficiency Funds

The purpose of Local Energy Efficiency Funds (LEEF) is to provide modest funding for short-term projects and activities that do not fit within other categories of energy efficiency programs but still provide energy savings or a defined benefit to the promotion of energy-efficient behaviors or activities. Idaho Power received two applications for LEEF in 2015.

A local insulated stone manufacturer submitted an application regarding energy efficient upgrades to be included in a new facility they were renovating for their expanded operations. Idaho Power personnel met with the company at their Meridian office and discussed their energy efficiency potential. One of the primary measures they discussed was energy savings resulting from increased insulation values associated with the insulated stone product they manufacture. Data was requested to explore cost-effectiveness; however, sufficient data was unavailable to complete the analysis. It was found however, that most measures they were considering were available for incentive through existing commercial incentives programs, and they were directed to those resources.

The second project was submitted by a homeowner regarding potential lighting upgrades and more energy-efficient behavior. Brief follow-up revealed the energy-efficient light bulb replacement project was seen as standard practice and not appropriate for LEEF. The applicant was directed to residential energy efficiency resources found on Idaho Power's web-site.

Building-Code Improvement Activity

Since 2005, the State of Idaho has been on a cycle of adopting a state-specific version of the IECC. The Idaho Building Code Board convened another Energy Code Collaborative in late 2015 in an effort to address implementation of the new series of building-related codes.

The Idaho Building Code Board requested the collaborative review the 2015 codes and suggest recommendations to the board regarding adoption of codes. The first meeting occurred on December 2, 2015.

Idaho Power participated and offered support in those collaborative meetings, which included members of the building industry, local building officials, code development officials, and other interested stakeholders. The Energy Code Collaborative is an ongoing collaborative in which Idaho Power participates. Additional meetings are scheduled in 2016.

Idaho Power's Internal Energy Efficiency Commitment

Idaho Power continued to upgrade the company's substation buildings across the service area, replacing old black built-up roofs with white metal roofs for reflection purposes. CHQ projects continued in 2015. The company remodeled the sixth and seventh floors of the CHQ, and exchanged the old T12 parabolic lighting fixtures with T8 lighting. Remodels continued to incorporate energy efficiency items, such as lower partitions, lighting retrofits, and lighting controls. In 2016, Idaho Power will continue with the eighth floor CHQ remodel. In 2017, the remodeling projects in Idaho Power's downtown building will finish with the completion of the ninth floor of the CHQ.

Through the Sustainability Initiative Project implemented in 2012, Idaho Power has helped fund and execute sustainable, employee-driven initiatives aimed at increasing efficiencies and lowering company costs. Each year, the Sustainability team puts out a call for projects. Qualifying initiatives must demonstrate a financial benefit to the company or an environmental or social gain, or preferably both. Approved projects are given financial assistance through "incubation funding," and the Sustainability team provides consulting services—if necessary—to speed implementation. A new document, available in print and online, catalogues three years of sustainability initiatives, with a brief description of each. From 2012's Greenleaf wet meadows project to last year's rollout of electric vehicles and charging stations, all 26 initiatives are listed at idahopower.com/pdfs/AboutUs/sustainability/Sustain_Projects.pdf.

As in past years, employee-suggested sustainability initiative projects yielded annual energy savings. Lighting in the Emmett Operations Center garage was changed from mercury vapor to T8 lamps, occupancy sensors were installed in the records reference stacks at the Records Center, and building modifications were made to the Investment Recovery facility, resulting in heating and electricity savings.

A major sustainability initiative was the purchase of two Chevy Volt hybrid plug-in electric vehicles (EV) for the Twin Falls and Pocatello service areas and the establishment of an employee workplace EV charging center at CHQ. Idaho Power installed a variety of models of EV charging stations to promote awareness, use, and information dissemination about EVs. Employees now have the opportunity to park and charge their EV while at work. In addition to adding more EVs to the Idaho Power fleet, employee use of EVs will further promote the financial and environmental benefits of EVs.

With an estimated 300,000 kWh saved annually at the Boise Operations Center with the most recent energy efficiency measures, in 2016 Idaho Power will redesign the HVAC delivery system for the Maintenance and Electrical Shops building with construction following in 2017. Because of the dated system and equipment, Idaho Power estimates saving a minimum 300,000 kWh in the coming years.

Idaho Power's internal energy efficiency projects and initiatives are funded by non-rider funds.

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REGULATORY OVERVIEW

Idaho Power believes there are three essential components of an effective regulatory model for DSM: 1) the timely recovery of DSM program costs, 2) the removal of financial disincentives, and 3) the availability of financial incentives. By working with its stakeholders and regulators through negotiations and filings, Idaho Power continues to seek to move DSM regulatory treatment toward achieving all of these goals.

Timely Recovery of DSM Program Costs: Energy Efficiency Rider and Prudence Determination of Expenditures

Since 2002, Idaho Power has recovered most of its DSM program costs through the Rider with the intended result of providing a more timely recovery of DSM costs. In addition, since January 1, 2012, funding of Idaho demand response program incentives is included in base rates and tracked in the annual PCA mechanism.

Annual DSM Expense Review Filing and Order No. 33365

On March 13, 2015, Idaho Power filed Case No. IPC-E-15-06 with the IPUC requesting an order finding the company had prudently incurred $33,495,385 in DSM expenses in 2014, including $25,554,688 in Rider expenses and $7,940,697 in demand response program incentive expenses. The filing included three reports: Demand-Side Management 2014 Annual Report, *Supplement 1: Cost-Effectiveness*, and *Supplement 2: Evaluation*. Due to previous IPUC decisions in Order Nos. 32667, 32690, and 32953 to decline Idaho Power's request to deem prudent the increases in the company's Rider-funded labor-related expenses for 2011and 2012, Idaho Power did not request a prudence determination for labor related expenses of $338,707 in the 2014 filing. The 2014 labor-related expenses of $338,707 bring the cumulative balance of increases in Rider-funded labor-related expenses to $871,551 through 2014. In Order No. 33365, dated August 28, 2015, the IPUC deemed $33,495,385 as prudently incurred.

Energy Efficiency Rider-Funds Transfer

On April 15, 2015, Idaho Power filed the annual PCA Case No. IPC-E-15-14 with the IPUC. As part of that case, the company proposed that the commission approve a transfer of $3,970,036 from the Idaho Rider to customers as a credit, or reduction, in the 2015/2016 PCA on customers' bills. This adjustment is needed to maintain the revenue neutrality associated with the June 2014 update to the normalized level of net power supply expense included in base rates approved by Order No. 33000. In Order No. 33306, the commission approved the transfer.

Removal of Financial Disincentives: Fixed-Cost Adjustment

To address the removal of financial disincentives, Idaho Power has in place a fixed-cost adjustment (FCA) mechanism in Idaho. Under the FCA, rates for Idaho residential and small general service customers are adjusted annually up or down to recover or refund the difference between the fixed costs authorized by the IPUC in the most recent general rate case and the fixed costs Idaho Power actually received the previous year through actual energy sales. This mechanism removes the financial disincentive that exists when Idaho Power promotes energy efficiency programs designed to reduce customer usage. The FCA addresses that, for residential and small general service customers, a large percentage of fixed costs are recovered through their volumetric energy charges.

On May 6, 2015, the IPUC issued Order No. 33295 approving a settlement stipulation that changed the calculation of the FCA. In compliance with the order, beginning in 2015, the calculation of the FCA replaces weather-normalized sales with actual sales.

On May 19, 2015, the IPUC issued Order No. 33302 approving the company's request to implement FCA rates beginning June 1, 2015, for the 2014 fixed-cost deferrals. The overall rate adjustment was a 0.35 percent increase for residential and small general-service customers to collect a combined $16.9 million. This adjustment was an increase of $2 million from the previous year's FCA. Residential customers pay an FCA of 0.3258 cents per kWh, while small general service customers pay an FCA of 0.4099 cents per kWh. The rate will be in place until May 31, 2016.

Promotion of Energy Efficiency through Electricity Rate Design

Idaho Power believes rates offered to customers should reflect their cost of service to provide cost-based price signals and encourage the wise and efficient use of energy.

The above-mentioned FCA settlement stipulation also stated:

> Absent the FCA, the Parties agree that current rate design causes a financial disincentive for the Company to pursue all cost-effective demand-side management. Consequently, the Parties agree to consider modified rate design for residential and small general service customers. This may include, but is not limited to, reduced energy charges, increased monthly service charges, and the introduction of demand charges for these rate classes.

Idaho Power is committed to working with its stakeholders to help it determine how these changes to rate design for the company's residential and small general service customer classes might be best structured and implemented.

Since 2012, Idaho Power has offered a Time-of-Day (TOD) Pilot pricing plan to residential customers in Idaho. The overall goal of this TOD pricing plan is to use the AMI system to offer customers a choice of pricing plans while providing them with tools to manage their energy usage, provide the company with the opportunity to further study the effects of a time-variant rate on customers' usage, and help shape the company's future communication efforts. The plan provides participants the opportunity to shift their usage from higher-priced, on-peak time periods to lower-priced, off-peak time periods and possibly lower their bills. As of the end of 2015, over 1,500 Idaho customers were TOD plan participants. A description of this plan is at Idaho Power's website (idahopower.com/TOD).

Appendices

This report includes five appendices. Appendix 1 contains financial information for 2015, showing the beginning balance, ending balance, and the expenditures for the Idaho and Oregon Riders and NEEA payments and credits. Appendix 2 also contains financial information showing expenses by funding source for each of Idaho Power's energy efficiency and demand response programs or activities. Appendix 3 shows participation, UC, TRC, energy and demand savings, measure life, and levelized costs for Idaho Power's current energy efficiency programs and activities for 2015. Appendix 4 shows similar data as Appendix 3 but also includes data for past years' program performance and B/C ratios from the UC and TRC perspectives for active programs. Appendix 5 contains program savings and costs separated into Idaho Power's Idaho and Oregon jurisdictions and by funding source. In these appendices, the data has been rounded to the nearest whole unit, which may result in minor rounding differences.

Additional information is contained in the supplements provided in separate documents in two formats. *Supplement 1: Cost-Effectiveness* contains detailed cost-effectiveness information by program and energy-savings measure. Provided in Supplement 1 are the B/C ratios from the UC, TRC, RIM, and PCT perspectives. The *2015 DSM Detailed Expenses* by program table reports expenses by funding source and separates the company's DSM expenses by expense type, incentive expenses, labor/administration, materials, other expenses, and purchased services. *Supplement 2: Evaluation* contains copies of Idaho Power's third-party evaluations and reports. A CD is attached in Supplement 2 and contains copies of NEEA Market Effects Evaluations. A searchable, linked table with the title, study manager, evaluation type, and other information are included with each supplement.

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Appendix 1. Idaho Rider, Oregon Rider, and NEEA payment amounts (January–December 2015)

Idaho Energy Efficiency Rider [a]		
2015 Beginning Balance	$	(782,231)
2015 Funding plus Accrued Interest as of 12-31-15		39,800,889
Total 2015 Funds		**39,018,658**
2015 Expenses as of 12-31-15		(28,494,548)
Rider Transfer to PCA (IPUC Order 33306)		(3,970,036)
Ending Balance as of 12-31-2015	**$**	**6,554,074**
Oregon Energy Efficiency Rider		
2015 Beginning Balance	$	(3,907,536)
2015 Funding plus Accrued Interest as of 12-31-15		1,149,169
Total 2015 Funds		**(2,758,367)**
2015 Expenses as of 12-31-15		(1,724,118)
Ending Balance as of 12-31-2015	**$**	**(4,482,485)**
NEEA Payments		
2015 NEEA Payments as of 12-31-2015	$	2,582,919
Total	**$**	**2,582,919**

[a] Liability accounts

Appendix 2. 2015 DSM Expenses by funding source (dollars)

Sector/Program	Idaho Rider	Oregon Rider	Non-Rider Funds	Total
Energy Efficiency/Demand Response				
Residential				
A/C Cool Credit	$ 659,471	$ 45,825	$ 443,639	$ 1,148,935
Easy Savings	0	0	127,477	127,477
Educational Distributions	432,185	0	0	432,185
Energy Efficient Lighting	1,997,292	60,800	5,291	2,063,383
Energy House Calls	194,939	15,057	4,108	214,103
ENERGY STAR® Homes Northwest	646,991	2,692	3,990	653,674
Heating & Cooling Efficiency Program/DHP Pilot	583,663	25,186	17,520	626,369
Home Energy Audit	192,873	0	9,084	201,957
Home Improvement Program	259,898	0	12,611	272,509
Oregon Residential Weatherization	0	5,341	467	5,808
Rebate Advantage	80,243	4,351	843	85,438
See ya later, refrigerator®	212,674	11,497	3,007	227,179
Shade Tree Program	99,672	(66)	5,786	105,392
Simple Steps, Smart Savings™/Home Products Program	130,575	6,676	1,845	139,096
Weatherization Assistance for Qualified Customers	0	0	1,315,032	1,315,032
Weatherization Solutions for Eligible Customers	1,204,147	0	39,122	1,243,269
Commercial/Industrial				
Building Efficiency	2,128,309	16,075	17,617	2,162,001
Custom Efficiency	8,345,435	604,636	62,558	9,012,628
Easy Upgrades	4,155,406	177,713	17,746	4,350,865
Flex Peak Program	86,445	219,654	286,773	592,872
Oregon Commercial Audit	0	4,251	0	4,251
Irrigation				
Irrigation Efficiency Rewards	1,714,399	61,295	60,018	1,835,711
Irrigation Peak Rewards	1,018,139	222,614	6,018,079	7,258,831
Energy Efficiency/Demand Response Total	**$ 24,142,755**	**$ 1,483,597**	**$ 8,452,611**	**$ 34,078,964**
Market Transformation				
NEEA	2,453,773	129,146	0	2,582,919
Market Transformation Total	**$ 2,453,773**	**$ 129,146**	**$ 0**	**$ 2,582,919**
Other Programs and Activities				
Residential				
Residential Energy Efficiency Education Initiative	127,817	7,391	14,695	149,903
Commercial/Industrial				
Commercial Education	61,755	3,262	232	65,250
Other				
Energy Efficient Direct Program Overhead	231,713	12,967	28,179	272,858
Other Programs and Activities Total	**$ 421,285**	**$ 23,620**	**$ 43,105**	**$ 488,011**
Indirect Program Expenses				
Commercial/Industrial Energy Efficient Overhead	141,066	11,387	66,558	219,012
Energy Efficient Accounting & Analysis	710,564	41,196	224,299	976,059
Energy Efficiency Advisory Group	24,976	1,360	857	27,193
Residential Energy Efficient Overhead	584,299	33,036	34,839	652,174
Special Accounting Entries	15,830	775	0	16,605
Indirect Program Expenses Total	**$ 1,476,735**	**$ 87,755**	**$ 326,553**	**$ 1,891,042**
Grand Total	**$ 28,494,548**	**$ 1,724,118**	**$ 8,822,269**	**$ 39,040,935**

Appendix 3. 2015 DSM program activity

		Total Costs		Savings			Nominal Levelized Costs[a]	
Program	Participants	Utility[b]	Resource[c]	Annual Energy (kWh)	Peak Demand[d] (MW)	Measure Life (Years)	Utility ($/kWh)	Total Resource ($/kWh)
Demand Response								
A/C Cool Credit[1]	29,000 homes	$ 1,148,935	$ 1,148,935	n/a	36	n/a	n/a	n/a
Flex Peak Program[1]	72 sites	592,872	592,872	n/a	26	n/a	n/a	n/a
Irrigation Peak Rewards[1]	2,259 service points	7,258,831	7,258,831	n/a	305	n/a	n/a	n/a
Total		**$ 9,000,638**	**$ 9,000,638**	n/a	367			
Energy Efficiency								
Residential								
Easy Savings	2,068 kits	$ 127,477	$127,477	624,536		10	$ 0.021	$ 0.021
Educational Distributions	28,197 kits/bulbs	432,185	432,185	1,669,495		10	0.026	0.026
Energy Efficient Lighting	1,343,255 bulbs	2,063,383	4,428,676	15,876,117		10	0.013	0.028
Energy House Calls	362 homes	214,103	214,103	754,646		18	0.020	0.020
ENERGY STAR® Homes Northwest	598 homes	653,674	1,412,126	773,812		36	0.046	0.099
ENERGY STAR® Homes Northwest (gas fuel)[2]	69 homes			46,872				
Heating & Cooling Efficiency Program/DHP Pilot	427 projects	626,369	2,064,055	1,502,172		20	0.028	0.092
Home Energy Audit[3]	351 audits	201,957	236,706	136,002		10	0.151	0.170
Home Improvement Program	408 projects	272,509	893,731	303,580		45	0.046	0.152
Oregon Residential Weatherization	19 homes	5,808	10,388	11,910		30	0.028	0.050
Rebate Advantage	58 homes	85,438	117,322	358,683		25	0.014	0.020
See ya later, refrigerator®	1,630 refrigerators/freezers	227,179	227,179	720,208		6	0.048	0.048
Simple Steps, Smart Savings™/Home Products Program	9,343 appliances/showerheads	139,096	408,032	770,822		10	0.018	0.054
Weatherization Assistance for Qualified Customers	243 homes/non-profits	1,315,032	2,119,801	550,021		25	0.145	0.235
Weatherization Solutions for Eligible Customers	171 homes	1,243,269	1,243,269	432,958		25	0.175	0.175
Sector Total		**$ 7,607,478**	**$13,935,050**	**24,531,834**		**12**	**$ 0.028**	**$ 0.052**
Commercial								
Building Efficiency	81 projects	2,162,001	6,293,071	23,232,017		12	0.008	0.024
Custom Efficiency[3]	160 projects	9,012,628	20,533,742	55,247,192		11	0.016	0.035
Easy Upgrades	1,222 projects	4,350,865	7,604,200	23,594,701		12	0.017	0.029
Sector Total		**$ 15,525,494**	**$ 34,431,013**	**102,073,910**		**11**	**$ 0.014**	**$ 0.031**
Irrigation								
Irrigation Efficiency Rewards[4]	902 projects	1,835,711	9,393,842	14,027,411		8	0.016	0.085
Sector Total		**$ 1,835,711**	**$ 9,393,842**	**14,027,411**		**8**	**$ 0.016**	**$ 0.085**
Energy Efficiency Portfolio Total		**$ 24,968,682**	**$ 58,305,905**	**140,633,155**		**11**	**$ 0.017**	**$ 0.039**

Appendix 3. 2015 DSM program activity (continued)

		Total Costs		Savings			Nominal Levelized Costs[a]	
Program	Participants	Utility[b]	Resource[c]	Annual Energy (kWh)	Peak Demand[d] (MW)	Measure Life (Years)	Utility ($/kWh)	Total Resource ($/kWh)
Market Transformation								
Northwest Energy Efficiency Alliance [5]		$ 2,582,919	$ 2,582,919	21,900,000				
Other Programs and Activities								
Residential								
Residential Energy Efficiency Education Initiative		149,903	149,903					
Shade Tree Project	1,925 trees	105,392	105,392					
Commercial								
Commercial Education Initiative		65,250	65,250					
Oregon Commercial Audits	17 audits	4,251	4,251					
Other								
Energy Efficiency Direct Program Overhead		272,858	272,858					
Total Program Direct Expense		**$ 37,149,894**	**$ 70,487,117**	**162,533,155**	**367**			
Indirect Program Expenses		$ 1,891,042						
Total DSM Expense		**$ 39,040,935**						

[a] Levelized Costs are based on financial inputs from Idaho Power's 2013 IRP, and calculations include line-loss adjusted energy savings.
[b] The Total Utility Cost is the cost incurred by Idaho Power to implement and manage a DSM program.
[c] The Total Resource Cost is the total expenditures for a DSM program from the point of view of Idaho Power and its customers as a whole.
[d] Demand response program reductions are reported with 9.7-percent peak loss assumptions.
[1] Peak demand represents the peak performance of the program.
[2] Savings claimed for Idaho gas-heated certified homes that were not provided a direct incentive payment by Idaho Power.
[3] Custom Efficiency savings includes 19 Green Motors participants totaling 61,050 kWh of annual savings, not counted in project totals.
[4] Irrigation Efficiency includes 32 Green Motors participants totaling 90,074 kWh of annual savings, not counted in project totals.
[5] Savings are preliminary estimates provided by NEEA. Final savings for 2015 will be provided by NEEA in May 2016.

Appendix 4. Historical DSM expense and performance, 2002–2015

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	Participants	Utility Cost [c]	Resource Cost [d]	Annual Energy (kWh)	Average Energy [e] (aMW)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($kWh)	Utility	Total Resource
Demand Response											
A/C Cool Credit											
2003	204	$ 275,645	$ 275,645			0.0					
2004	420	287,253	287,253			0.5					
2005	2,369	754,062	754,062			3					
2006	5,369	1,235,476	1,235,476			6					
2007	13,692	2,426,154	2,426,154			12					
2008	20,195	2,969,377	2,969,377			26					
2009	30,391	3,451,988	3,451,988			39					
2010	30,803	2,002,546	2,002,546			39					
2011	37,728	2,896,542	2,896,542			24					
2012	36,454	5,727,994	5,727,994			45					
2013	n/a	663,858	663,858			n/a					
2014	29,642	1,465,646	1,465,646			44					
2015	29,000	1,148,935	1,148,935			36					
Total		**$25,305,476**	**$ 25,305,475**								
Flex Peak Program											
2009	33	528,681	528,681			19					
2010	60	1,902,680	1,902,680			48					
2011	111	2,057,730	2,057,730			59					
2012	102	3,009,822	3,009,822			53					
2013	100	2,743,615	2,743,615			48					
2014	93	1,563,211	1,563,211			40					
2015	72	592,872	592,872			26					
Total		**$12,398,611**	**$ 12,398,611**								
Irrigation Peak Rewards											
2004	58	344,714	344,714			6					
2005	894	1,468,282	1,468,282			40					
2006	906	1,324,418	1,324,418			32					
2007	947	1,615,881	1,615,881			37					
2008	897	1,431,840	1,431,840			35					

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	**Participants**	**Utility Cost [c]**	**Resource Cost [d]**	**Annual Energy (kWh)**	**Average Energy [e] (aMW)**	**Peak Demand [f] (MW)**	**Measure Life (Years)**	**Total Utility ($/kWh)**	**Total Resource ($/kWh)**	**Utility**	**Total Resource**
Demand Response											
Irrigation Peak Rewards											
2009	1,512	$ 9,655,283	$ 9,655,283			160					
2010	2,038	13,330,826	13,330,826			250					
2011	2,342	12,086,222	12,086,222			320					
2012	2,433	12,423,364	12,423,364			340					
2013	n/a	2,072,107	2,072,107			n/a					
2014	2,225	7,597,213	7,597,213			295					
2015	2,259	7,258,831	7,258,831			305					
Total		**$ 70,608,981**	**$ 70,608,981**								
Residential Efficiency											
Ductless Heat Pump Pilot											
2009	96	202,005	451,605	409,180	0.05		18	$ 0.031	$ 0.086		
2010	104	189,231	439,559	364,000	0.04		20	0.044	0.103		
2011	131	191,183	550,033	458,500	0.05		20	0.028	0.081		
2012	127	159,867	617,833	444,500	0.05		20	0.024	0.094		
2013	215	237,575	992,440	589,142	0.07		15	0.032	0.132		
2014	179	251,446	884,211	462,747	0.05		15	0.042	0.148		
Total	**852**	**$ 1,231,307**	**$ 3,935,681**	**2,728,069**			**15**	**$ 0.044**	**$ 0.138**		
Easy Savings Kits											
2015	2,068	127,477	127,477								
Total	2,068	**$ 127,477**	**$ 127,477**								
Educational Distributions											
2015	28,197	432,185	432,185	1,669,495							
Total		**$ 432,185**	**$ 432,185**	**1,669,495**							
Energy Efficiency Packets											
2002	2,925	755	755	155,757	0.02		7	0.001	0.001		
Total	**2,925**	**$ 755**	**$ 755**	**155,757**			**7**	**$ 0.001**	**$ 0.001**		
Energy Efficient Lighting											
2002	11,618	243,033	310,643	3,299,654	0.38		7	0.012	0.015		
2003	12,662	314,641	464,059	3,596,150	0.41		7	0.014	0.021		

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	**Participants**	**Utility Cost [c]**	**Resource Cost [d]**	**Annual Energy (kWh)**	**Average Energy [e] (aMW)**	**Peak Demand [f] (MW)**	**Measure Life (Years)**	**Total Utility ($/kWh)**	**Total Resource ($/kWh)**	**Utility**	**Total Resource**
Residential Efficiency											
Energy Efficient Lighting											
2004											
2005	43,760	$ 73,152	$ 107,810	1,734,646	0.20		7	$ 0.007	$ 0.010		
2006	178,514	298,754	539,877	6,302,794	0.72		7	0.008	0.014		
2007	219,739	557,646	433,626	7,207,439	0.82		7	0.012	0.017		
2008	436,234	1,018,292	793,265	14,309,444	1.63		7	0.011	0.013		
2009	549,846	1,207,366	1,456,796	13,410,748	1.53		5	0.020	0.024		
2010	1,190,139	2,501,278	3,976,476	28,082,738	3.21		5	0.020	0.031		
2011	1,039,755	1,719,133	2,764,623	19,694,381	2.25		5	0.015	0.024		
2012	925,460	1,126,836	2,407,355	16,708,659	1.91		5	0.012	0.025		
2013	1,085,225	1,356,926	4,889,501	9,995,753	1.14		8	0.016	0.058		
2014	1,161,553	1,909,823	7,148,427	12,882,151	1.47		8	0.018	0.066		
2015	1,343,255	2,063,383	4,428,676	15,876,117	1.81		10	0.013	0.028		
Total	**8,197,760**	**$ 14,390,263**	**$ 29,721,134**	**153,100,674**			**8**	**$ 0.014**	**$ 0.028**	**4.24**	**2.05**
Energy House Calls											
2002	17	26,053	26,053	25,989	0.00		20	0.082	0.082		
2003	420	167,076	167,076	602,723	0.07		20	0.023	0.023		
2004	1,708	725,981	725,981	2,349,783	0.27		20	0.025	0.025		
2005	891	375,610	375,610	1,775,770	0.20		20	0.017	0.017		
2006	819	336,701	336,701	777,244	0.09		20	0.035	0.035		
2007	700	336,372	336,372	699,899	0.08		20	0.039	0.039		
2008	1,099	484,379	484,379	883,038	0.10		20	0.045	0.045		
2009	1,266	569,594	569,594	928,875	0.11		20	0.052	0.052		
2010	1,602	762,330	762,330	1,198,655	0.14		20	0.054	0.054		
2011	881	483,375	483,375	1,214,004	0.14		20	0.027	0.027		
2012	668	275,884	275,884	1,192,039	0.14		18	0.016	0.016		
2013	411	199,995	199,995	837,261	0.10		18	0.016	0.016		
2014	297	197,987	197,987	579,126	0.07		18	0.030	0.030		
2015	362	214,103	214,103	754,646	0.09		18	0.020	0.020		
Total	**11,141**	**$ 5,155,440**	**$ 5,155,440**	**13,819,052**			**18**	**$ 0.032**	**$ 0.032**	**2.38**	**2.38**

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	**Participants**	**Utility Cost [c]**	**Resource Cost [d]**	**Annual Energy (kWh)**	**Average Energy [e] (aMW)**	**Peak Demand [f] (MW)**	**Measure Life (Years)**	**Total Utility ($/kWh)**	**Total Resource ($/kWh)**	**Utility**	**Total Resource**
Residential Efficiency											
ENERGY STAR Homes Northwest											
2003		$ 13,597	$ 13,597	0							
2004	44	140,165	335,437	101,200	0.01		25	$ 0.103	$ 0.246		
2005	200	253,105	315,311	415,600	0.05		25	0.045	0.056		
2006	439	469,609	602,651	912,242	0.10		25	0.038	0.049		
2007	303	475,044	400,637	629,634	0.07		25	0.056	0.047		
2008	254	302,061	375,007	468,958	0.05		25	0.048	0.059		
2009	474	355,623	498,622	705,784	0.08		25	0.039	0.055		
2010	630	375,605	579,495	883,260	0.10		25	0.033	0.051		
2011	308	259,762	651,249	728,030	0.08		32	0.020	0.051		
2012	410	453,186	871,310	537,447	0.06		35	0.046	0.089		
2013	267	352,882	697,682	365,370	0.04		36	0.053	0.104		
2014	243	343,277	689,021	332,682	0.04		36	0.055	0.111		
2015	598	653,674	1,412,126	773,812	0.09		36	0.046	0.099		
Total	**4,170**	**$ 4,447,589**	**$ 7,442,146**	**6,854,019**			**36**	**$ 0.043**	**$ 0.072**	**2.38**	**1.42**
ENERGY STAR Homes Northwest (gas heated)											
2014	282			195,372	0.04		22				
2015	69			46,872	0.09		22				
Total	**351**			**242,244**							
Heating & Cooling Efficiency Program/Ductless Heat Pump											
2006		17,444	17,444								
2007	4	488,211	494,989	1,595	0.00		18	27.344	27.710		
2008	359	473,551	599,771	561,440	0.06		18	0.073	0.092		
2009	349	478,373	764,671	1,274,829	0.15		18	0.034	0.054		
2010	217	327,669	1,073,604	1,104,497	0.13		20	0.025	0.083		
2011	130	195,770	614,523	733,405	0.08		20	0.018	0.056		
2012	141	182,281	676,530	688,855	0.08		20	0.018	0.066		
2013	210	329,674	741,586	1,003,730	0.11		20	0.022	0.050		
2014	230	362,014	1,247,560	1,099,464	0.13		20	0.022	0.075		
2015	427	626,369	2,064,055	1,502,172	0.17		20	0.028	0.092		
Total	**2,067**	**$ 3,481,357**	**$ 8,294,733**	**7,969,987**			**20**	**$ 0.036**	**$ 0.085**	**2.80**	**1.18**

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	**Participants**	**Utility Cost [c]**	**Resource Cost [d]**	**Annual Energy (kWh)**	**Average Energy [e] (aMW)**	**Peak Demand [f] (MW)**	**Measure Life (Years)**	**Total Utility ($/kWh)**	**Total Resource ($/kWh)**	**Utility**	**Total Resource**
Residential Efficiency											
Home Energy Audit											
2013		$ 88,740	$ 88,740								
2014	354	170,648	170,648	141,077			10				
2015	251	201,957	201,957	136,002							
Total	**605**	**$ 461,345**	**$ 486,194**	**227,079**			**10**				
Home Improvement											
2008	282	123,454	157,866	317,814	0.04		25	$ 0.029	$ 0.037		
2009	1,188	321,140	550,148	1,338,876	0.15		25	0.019	0.032		
2010	3,537	944,716	2,112,737	3,986,199	0.46		45	0.016	0.035		
2011	2,275	666,041	2,704,816	917,519	0.10		45	0.038	0.155		
2012	840	385,091	812,827	457,353	0.05		45	0.044	0.093		
2013	365	299,497	1,061,314	616,044	0.07		45	0.025	0.090		
2014	555	324,717	896,246	838,929	0.10		45	0.020	0.055		
2015	408	272,509	893,731	303,580	0.03		45	0.046	0.152		
Total	**9,450**	**$ 3,337,165**	**$ 9,189,685**	**8,776,314**			**45**	**$ 0.024**	**$ 0.066**	**4.21**	**1.53**
Oregon Residential Weatherization											
2002	24	(662)	23,971	4,580			25	0.010	0.389		
2003		(943)									
2004	4	1,057	1,057								
2005	4	612	3,608	7,927	0.00		25	0.006	0.034		
2006		4,126	4,126								
2007	1	3,781	5,589	9,971	0.00		25	0.028	0.042		
2008	3	7,417	28,752	22,196	0.00		25	0.025	0.096		
2009	1	7,645	8,410	2,907	0.00		25	0.203	0.223		
2010	1	6,050	6,275	320	0.00		30	0.011	0.062		
2011	8	7,926	10,208	21,908	0.00		30	0.021	0.027		
2012	5	4,516	11,657	11,985	0.00		30	0.022	0.056		
2013	14	9,017	14,369	14,907	0.00		30	0.035	0.055		
2014	13	5,462	9,723	11,032	0.00		30	0.028	0.050		
2015	19	5,808	10,388	11,910	0.00		30	0.028	0.050		
Total	**82**	**$ 61,812**	**$ 138,133**	**119,643**			**30**	**$ 0.036**	**$ 0.080**	**2.89**	**1.29**

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	**Participants**	**Utility Cost [c]**	**Resource Cost [d]**	**Annual Energy (kWh)**	**Average Energy [e] (aMW)**	**Peak Demand [f] (MW)**	**Measure Life (Years)**	**Total Utility ($/kWh)**	**Total Resource ($/kWh)**	**Utility**	**Total Resource**
Residential Efficiency											
Rebate Advantage											
2003	73	$ 27,372	$ 79,399	227,434	0.03		45	$ 0.008	$ 0.022		
2004	105	52,187	178,712	332,587	0.04		45	0.010	0.034		
2005	98	46,173	158,462	312,311	0.04		45	0.009	0.032		
2006	102	52,673	140,289	333,494	0.04		45	0.010	0.027		
2007	123	89,269	182,152	554,018	0.06		45	0.010	0.021		
2008	107	90,888	179,868	463,401	0.05		45	0.012	0.025		
2009	57	49,525	93,073	247,348	0.03		25	0.015	0.029		
2010	35	39,402	66,142	164,894	0.02		25	0.018	0.031		
2011	25	63,469	85,044	159,325	0.02		25	0.024	0.033		
2012	35	37,241	71,911	187,108	0.02		25	0.012	0.024		
2013	42	60,770	92,690	269,891	0.03		25	0.014	0.021		
2014	44	63,231	89,699	269,643	0.03		25	0.014	0.020		
2015	58	85,438	117,322	358,683	0.04		25	0.014	0.020		
Total	**904**	**$ 757,638**	**$ 1,534,764**	**3,880,137**			**25**	**$ 0.014**	**$ 0.029**	**7.49**	**3.70**
See ya later, refrigerator®											
2009	1,661	305,401	305,401	1,132,802	0.13		8	0.041	0.041		
2010	3,152	565,079	565,079	1,567,736	0.18		8	0.054	0.054		
2011	3,449	654,393	654,393	1,712,423	0.20		8	0.046	0.046		
2012	3,176	613,146	613,146	1,576,426	0.18		8	0.046	0.046		
2013	3,307	589,054	589,054	1,442,344	0.16		6	0.061	0.061		
2014	3,194	576,051	576,051	1,390,760	0.16		6	0.062	0.062		
2015	1,630	227,179	227,179	720,208	0.08		6	0.048	0.048		
Total	**19,569**	**$ 3,530,303**	**$ 3,530,303**	**9,542,699**			**6**	**$ 0.068**	**$ 0.068**	**1.20**	**1.20**
Simple Steps Smart Savings/Home Products Program											
2007		9,275	9,275	0							
2008	3,034	250,860	468,056	541,615	0.06		15	0.044	0.082		
2009	9,499	511,313	844,811	1,638,038	0.19		15	0.031	0.051		
2010	16,322	832,161	1,025,151	1,443,580	0.16		15	0.057	0.070		
2011	15,896	638,323	1,520,977	1,485,326	0.17		15	0.034	0.080		

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

Program/Year	Participants	Total Costs: Utility Cost [c]	Total Costs: Resource Cost [d]	Savings and Demand Reductions: Annual Energy (kWh)	Savings and Demand Reductions: Average Energy [e] (aMW)	Savings and Demand Reductions: Peak Demand [f] (MW)	Measure Life (Years)	Levilized Costs [a]: Total Utility ($/kWh)	Levilized Costs [a]: Total Resource ($/kWh)	Program Life Benefit/Cost Ratios [b]: Utility	Program Life Benefit/Cost Ratios [b]: Total Resource
Residential Efficiency											
Simple Steps Smart Savings/Home Products Program											
2012	16,675	$ 659,032	$ 817,924	887,222	0.10		14	$ 0.061	$ 0.075		
2013	13,792	405,515	702,536	885,980	0.10		12	0.041	0.071		
2014	10,061	227,176	302,289	652,129	0.07		12	0.031	0.041		
2015	9,343	139,096	408,032	770,822	0.09		10	0.018	0.053		
Total	**94,622**	**$ 3,672,750**	**$ 6,099,051**	**8,304,712**			**12**	**$ 0.049**	**$ 0.081**	**1.83**	**1.10**
Weatherization Solutions for Eligible Customers											
2008	16	52,807	52,807	71,680	0.01		25	0.057	0.057		
2009	41	162,995	162,995	211,719	0.02		25	0.059	0.059		
2010	47	228,425	228,425	313,309	0.04		25	0.056	0.056		
2011	117	788,148	788,148	1,141,194	0.13		25	0.042	0.042		
2012	141	1,070,556	1,070,556	257,466	0.03		25	0.254	0.254		
2013	166	1,267,791	1,267,791	303,116	0.03		25	0.240	0.240		
2014	118	791,344	791,344	290,926	0.03		25	0.163	0.163		
2015	171	1,243,269	1,243,269	432,958	0.05		25	0.175	0.175		
Total	**817**	**$ 5,605,335**	**$ 5,605,335**	**3,022,368**			**30**	**$ 0.129**	**$ 0.129**	**0.72**	**0.72**
Window AC Trade-Up Pilot											
2003	99	6,687	10,492	14,454			12	0.051	0.079		
Total	**99**	**$ 6,687**	**$ 10,492**	**14,454**			**12**	**$ 0.051**	**$ 0.079**		
Residential—Weatherization Assistance for Qualified Customers (WAQC)											
WAQC—Idaho											
2002	197	235,048	492,139								
2003	208	228,134	483,369								
2004	269	498,474	859,482	1,271,677	0.15		25	0.029	0.050		
2005	570	1,402,487	1,927,424	3,179,311	0.36		25	0.033	0.045		
2006	540	1,455,373	2,231,086	2,958,024	0.34		25	0.037	0.056		
2007	397	1,292,930	1,757,105	3,296,019	0.38		25	0.029	0.040		
2008	439	1,375,632	1,755,749	4,064,301	0.46		25	0.025	0.032		

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	Participants	Utility Cost [c]	Resource Cost [d]	Annual Energy (kWh)	Average Energy [e] (aMW)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)	Utility	Total Resource
Residential—(WAQC)											
WAQC—Idaho											
2009	427	$ 1,260,922	$ 1,937,578	4,563,832	0.52		25	$ 0.021	$ 0.033		
2010	373	1,205,446	2,782,597	3,452,025	0.39		25	0.026	0.060		
2011	273	1,278,112	1,861,836	2,648,676	0.30		25	0.036	0.053		
2012	228	1,321,927	1,743,863	621,464	0.07		25	0.159	0.210		
2013	245	1,336,742	1,984,173	657,580	0.08		25	0.152	0.226		
2014	244	1,267,212	1,902,615	509,620	0.06		25	0.185	0.277		
2015	233	1,278,159	2,072,901	529,426	0.06		25	0.179	0.291		
Total	**4,643**	**$ 15,436,598**	**$ 23,791,917**	**27,751,955**			**25**	**$ 0.041**	**$ 0.064**	**2.82**	**1.83**
WAQC—Oregon											
2002	31	24,773	47,221	68,323	0.01		25	0.027	0.051		
2003	29	22,255	42,335	102,643	0.01		25	0.016	0.031		
2004	17	13,469	25,452	28,436	0.00		25	0.035	0.067		
2005	28	44,348	59,443	94,279	0.01		25	0.035	0.047		
2006							25				
2007	11	30,694	41,700	42,108	0.00		25	0.054	0.074		
2008	14	43,843	74,048	73,841	0.01		25	0.040	0.068		
2009	10	33,940	46,513	114,982	0.01		25	0.023	0.031		
2010	27	115,686	147,712	289,627	0.03		25	0.030	0.038		
2011	14	46,303	63,981	134,972	0.02		25	0.026	0.035		
2012	10	48,214	76,083	26,840	0.00		25	0.134	0.212		
2013	9	54,935	67,847	24,156	0.00		25	0.170	0.210		
2014	11	52,900	94,493	24,180	0.00		25	0.162	0.290		
2015	10	36,873	46,900	20,595	0.00		25	0.133	0.169		
Total	**221**	**$ 568,232**	**$ 833,728**	**1,044,982**			**25**	**$ 0.040**	**$ 0.059**	**2.77**	**1.89**
WAQC—BPA Supplemental											
2002	75	55,966	118,255	311,347	0.04		25	0.013	0.028		
2003	57	49,895	106,915	223,591	0.03		25	0.017	0.036		
2004	40	69,409	105,021	125,919	0.01		25	0.041	0.062		
Total	**172**	**$ 175,270**	**$ 330,191**	**660,857**			**25**	**$ 0.020**	**$ 0.037**	**5.75**	**3.05**
WAQC Total		**$ 16,180,101**	**$ 24,955,836**	**29,457,794**			**25**	**$ 0.041**	**$ 0.063**	**2.85**	**1.85**

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	**Participants**	**Utility Cost [c]**	**Resource Cost [d]**	**Annual Energy (kWh)**	**Average Energy [e] (aMW)**	**Peak Demand [f] (MW)**	**Measure Life (Years)**	**Total Utility ($/kWh)**	**Total Resource ($/kWh)**	**Utility**	**Total Resource**
Commercial											
Air Care Plus Pilot											
2003	4	$ 5,764	$ 9,061	33,976			10	$ 0.021	$ 0.033		
2004		344	344								
Total	**4**	**$ 6,108**	**$ 9,405**	**33,976**			**10**	**$ 0.022**	**$ 0.034**		
Building Efficiency											
2004		28,821	28,821								
2005	12	194,066	233,149	494,239	0.06	0.2	12	$ 0.043	$ 0.052		
2006	40	374,008	463,770	704,541	0.08	0.3	12	0.058	0.072		
2007	22	669,032	802,839	2,817,248	0.32	0.5	12	0.015	0.040		
2008	60	1,055,009	1,671,375	6,598,123	0.75	1.0	12	0.017	0.028		
2009	72	1,327,127	2,356,434	6,146,139	0.70	1.3	12	0.024	0.043		
2010	70	1,509,682	3,312,963	10,819,598	1.24	0.9	12	0.016	0.035		
2011	63	1,291,425	3,320,015	11,514,641	1.31	0.9	12	0.010	0.026		
2012	84	1,592,572	8,204,883	20,450,037	2.33	0.6	12	0.007	0.036		
2013	59	1,507,035	3,942,880	10,988,934	1.25	1.1	12	0.012	0.032		
2014	69	1,258,273	3,972,822	9,458,059	1.08	1.2	12	0.012	0.037		
2015	81	2,162,001	6,293,071	23,232,017	2.65		12	0.008	0.024		
Total	**632**	**$ 12,969,051**	**$ 34,603,023**	**103,223,576**			**12**	**$ 0.014**	**$ 0.037**	**5.46**	**2.05**
Custom Efficiency											
2003		1,303	1,303								
2004	1	112,311	133,441	211,295	0.02		12	0.058	0.069		
2005	24	1,128,076	3,653,152	12,016,678	1.37		12	0.010	0.033		
2006	40	1,625,216	4,273,885	19,211,605	2.19		12	0.009	0.024		
2007	49	3,161,866	7,012,686	29,789,304	3.40	3.6	12	0.012	0.026		
2008	101	4,045,671	16,312,379	41,058,639	4.69	4.8	12	0.011	0.044		
2009	132	6,061,467	10,848,123	51,835,612	5.92	6.7	12	0.013	0.024		
2010	223	8,778,125	17,172,176	71,580,075	8.17	9.5	12	0.014	0.027		
2011	166	8,783,811	19,830,834	67,979,157	7.76	7.8	12	0.012	0.026		
2012	126	7,092,581	12,975,629	54,253,106	6.19	7.6	12	0.012	0.021		
2013	73	2,466,225	5,771,640	21,370,350	2.43	2.4	12	0.010	0.024		

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	**Participants**	**Utility Cost [c]**	**Resource Cost [d]**	**Annual Energy (kWh)**	**Average Energy [e] (aMW)**	**Peak Demand [f] (MW)**	**Measure Life (Years)**	**Total Utility ($/kWh)**	**Total Resource ($/kWh)**	**Utility**	**Total Resource**
Commercial											
Custom Efficiency											
2014	131	$ 7,173,054	$ 13,409,922	50,363,052	5.75	5.6	12	$ 0.013	$ 0.024		
2015	160	9,012,628	20,533,742	55,247,192	6.31		11	0.016	0.035		
Total	**1,226**	**$ 59,442,333**	**$131,928,913**	**474,916,065**			**12**	**$ 0.014**	**$ 0.031**	**5.59**	**2.52**
Easy Upgrades											
2006		31,819	31,819								
2007	104	711,494	1,882,035	5,183,640	0.59	0.8	12	0.015	0.040		
2008	666	2,992,261	10,096,627	25,928,391	2.96	4.5	12	0.013	0.043		
2009	1,224	3,325,505	10,076,237	35,171,627	4.02	6.1	12	0.011	0.032		
2010	1,535	3,974,410	7,655,397	35,824,463	4.09	7.8	12	0.013	0.024		
2011	1,732	4,719,466	9,519,364	38,723,073	4.42		12	0.011	0.022		
2012	1,838	5,349,753	9,245,297	41,568,672	4.75		12	0.012	0.020		
2013	1,392	3,359,790	6,738,645	21,061,946	2.40		12	0.014	0.029		
2014	1,095	3,150,942	5,453,380	19,118,494	2.18		12	0.015	0.025		
2015	1,222	4,350,865	7,604,200	23,594,701	2.69		12	0.017	0.029		
Total	**10,808**	**$ 31,966,305**	**$ 68,303,001**	**246,175,007**			**12**	**$ 0.014**	**$ 0.030**	**5.37**	**2.51**
Holiday Lighting											
2008	14	28,782	73,108	259,092	0.03		10	0.014	0.035		
2009	32	33,930	72,874	142,109	0.02		10	0.031	0.066		
2010	25	46,132	65,308	248,865	0.03		10	0.024	0.034		
2011	6	2,568	2,990	66,189	0.01		10	0.004	0.005		
Total	**77**	**$ 111,412**	**$ 214,280**	**716,255**			**10**	**$ 0.019**	**$ 0.037**	**2.89**	**1.50**
Oregon Commercial Audit											
2002	24	5,200	5,200								
2003	21	0	4,000								
2004	7	0	0								
2005	7	5,450	5,450								
2006	6										
2007		1,981	1,981								
2008		58	58								

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	Participants	Utility Cost [c]	Resource Cost [d]	Annual Energy (kWh)	Average Energy [e] (aMW)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)	Utility	Total Resource
Commercial											
Oregon Commercial Audit											
2009	41	$ 20,732	$ 20,732								
2010	22	5,049	5,049								
2011	12	13,597	13,597								
2012	14	12,470	12,470								
2013	18	5,090	5,090								
2014	16	9,464	9,464								
2015	17	4,251	4,251								
Total	**205**	**$ 83,342**	**$ 87,342**								
Oregon School Efficiency											
2005		86	86								
2006	6	24,379	89,771	223,368	0.03		12	$ 0.012	$ 0.044		
Total	**6**	**$ 24,465**	**$ 89,857**	**223,368**			**12**	**$ 0.012**	**$ 0.044**		
Irrigation											
Irrigation Efficiency Program											
2003	2	41,089	54,609	36,792	0.00	0.0	15	0.106	0.141		
2004	33	120,808	402,978	802,812	0.09	0.4	15	0.014	0.048		
2005	38	150,577	657,460	1,012,883	0.12	0.4	15	0.014	0.062		
2006	559	2,779,620	8,514,231	16,986,008	1.94	5.1	8	0.024	0.073		
2007	816	2,001,961	8,694,772	12,304,073	1.40	3.4	8	0.024	0.103		
2008	961	2,103,702	5,850,778	11,746,395	1.34		8	0.026	0.073		
2009	887	2,293,896	6,732,268	13,157,619	1.50	3.4	8	0.026	0.077		
2010	753	2,200,814	6,968,598	10,968,430	1.25	3.3	8	0.030	0.096		
2011	880	2,360,304	13,281,492	13,979,833	1.60	3.8	8	0.020	0.113		
2012	908	2,373,201	11,598,185	12,617,164	1.44	3.1	8	0.022	0.110		
2013	995	2,441,386	15,223,928	18,511,221	2.11	3.0	8	0.016	0.098		
2014	1,128	2,446,507	18,459,781	18,463,611	2.11	4.6	8	0.016	0.119		
2015	902	1,835,711	9,939,842	14,027,411	1.30		8	0.016	0.085		
Total	**8,862**	**$ 23,149,577**	**$106,378,922**	**144,614,252**			**8**	**$ 0.023**	**$ 0.108**	**4.80**	**1.60**

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	Participants	Utility Cost [c]	Resource Cost [d]	Annual Energy (kWh)	Average Energy [e] (aMW)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)	Utility	Total Resource
Other Programs											
Building Operator Training											
2003	71	$ 48,853	$ 48,853	1,825,000	0.21		5	$ 0.006	$ 0.006		
2004	26	43,969	43,969	650,000	0.07		5	0.014	0.014		
2005	7	1,750	4,480	434,167	0.05		5	0.001	0.002		
Total	**104**	**$ 94,572**	**$ 97,302**	**2,909,167**			**5**	**$ 0.007**	**$ 0.007**		
Commercial Education Initiative											
2005		3,497	3,497								
2006		4,663	4,663								
2007		26,823	26,823								
2008		72,738	72,738								
2009		120,584	120,584								
2010		68,765	68,765								
2011		89,856	89,856								
2012		73,788	73,788								
2013		66,790	66,790								
2014		76,606	76,606								
2015		65,250	65,250								
Total		**$ 669,360**	**$ 669,360**								
Comprehensive Lighting											
2011		2,404	2,404								
2012		64,094	64,094								
Total		**$ 66,498**	**$ 66,498**								
Distribution Efficiency Initiative											
2005		3,497	3,497								
2006		4,663	4,663								
2007		26,823	26,823								
2008		72,738	72,738								
Total		**$ 66,498**	**$ 66,498**								

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	Participants	Utility Cost [c]	Resource Cost [d]	Annual Energy (kWh)	Average Energy [e] (aMW)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility (/kWh)	Total Resource (kWh)	Utility	Total Resource
Other Programs											
DSM Direct Program Overhead											
2007		$ 56,909	$ 56,909								
2008		169,911	169,911								
2009		164,957	164,957								
2010		117,874	117,874								
2011		210,477	210,477								
2012		285,951	285,951								
2013		380,957	380,957								
2014		478,658	478,658								
2015		272,858	272,858								
Total		**$ 2,138,552**	**$ 2,138,552**								
Local Energy Efficiency Fund											
2003	56	5,100	5,100								
2004		23,449	23,449								
2005	2	14,896	26,756	78,000	0.01		10	$ 0.024	$ 0.042		
2006	480	3,459	3,459	19,027	0.00		7	0.009	0.009		
2007	1	7,520	7,520	9,000	0.00		7	0.135	0.135		
2008	2	22,714	60,100	115,931	0.01		15	0.019	0.049		
2009	1	5,870	4,274	10,340	0.00		12	0.064	0.047		
2010	1	251	251		0.00						
2011	1	1,026	2,052	2,028			30	0.036	0.071		
2012											
2013											
2014	1	9,100	9,100	95,834			18				
Total	**545**	**$ 93,385**	**$ 142,061**	**330,160**			**14**	**$ 0.028**	**$ 0.043**	**2.80**	**1.84**

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	**Participants**	**Utility Cost [c]**	**Resource Cost [d]**	**Annual Energy (kWh)**	**Average Energy [e] (aMW)**	**Peak Demand [f] (MW)**	**Measure Life (Years)**	**Total Utility (/kWh)**	**Total Resource (kWh)**	**Utility**	**Total Resource**
Other Programs											
Other C&RD and CRC BPA											
2002		$ 55,722	$ 55,722								
2003		67,012	67,012								
2004		108,191	108,191								
2005		101,177	101,177								
2006		124,956	124,956								
2007		31,645	31,645								
2008		6,950	6,950								
Total		**$ 495,654**	**$ 495,654**								
Residential Economizer Pilot											
2011		101,713	101,713								
2012		93,491	93,491								
2013		74,901	74,901								
Total		**$ 270,105**	**$ 270,105**								
Residential Education Initiative											
2005		7,498	7,498								
2006		56,727	56,727								
2007											
2008		150,917	150,917								
2009		193,653	193,653								
2010		222,092	222,092								
2011		159,645	159,645								
2012		174,738	174,738								
2013		416,166	416,166								
2014	6,312	423,091	423,091	1,491,225			10				
2015		149,903	149,903								
Total	**6,312**	**$ 1,954,430**	**$ 1,954,430**	**1,491,225**			**10**				
Shade Tree Project											
2014	2,041	147,290	147,290								
2015	1,925	105,392	105,392								
Total	**3,966**	**$ 252,682**	**$ 252,682**								

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	**Participants**	**Utility Cost [c]**	**Resource Cost [d]**	**Annual Energy (kWh)**	**Average Energy [e] (aMW)**	**Peak Demand [f] (MW)**	**Measure Life (Years)**	**Total Utility (/kWh)**	**Total Resource (kWh)**	**Utility**	**Total Resource**
Other Programs											
Solar 4R Schools											
2009		$ 42,522	$ 42,522								
Total		**$ 42,522**	**$ 42,522**								
Market Transformation											
Consumer Electronic Initiative											
2002		160,762	160,762								
Total		**$ 160,762**	**$ 160,762**								
NEEA											
2002		1,286,632	1,286,632	12,925,450	1.48						
2003		1,292,748	1,292,748	11,991,580	1.37						
2004		1,256,611	1,256,611	13,329,071	1.52						
2005		476,891	476,891	16,422,224	1.87						
2006		930,455	930,455	18,597,955	2.12						
2007		893,340	893,340	28,601,410	3.27						
2008		942,014	942,014	21,024,279	2.40						
2009		968,263	968,263	10,702,998	1.22						
2010		2,391,217	2,391,217	21,300,366	2.43						
2011		3,108,393	3,108,393	20,161,728	2.30						
2012		3,379,756	3,379,756	19,567,984	2.23						
2013		3,313,058	3,313,058	20,567,965	2.35						
2014		3,305,917	3,305,917	26,805,600	3.06						
2015		2,582,919	2,582,919	21,900,000	2.50						
Total		**$ 26,128,213**	**$ 26,128,213**	**263,898,611**							
Annual Totals											
2002		1,932,520	2,366,591	16,791,100	1.92	0					
2003		2,566,228	3,125,572	18,654,343	2.12	0					
2004		3,827,213	4,860,912	19,202,780	2.19	7					
2005		6,523,348	10,383,577	37,978,035	4.34	44					
2006		11,174,181	20,950,110	67,026,303	7.65	44					

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	**Participants**	**Utility Cost [c]**	**Resource Cost [d]**	**Annual Energy (kWh)**	**Average Energy [e] (aMW)**	**Peak Demand [f] (MW)**	**Measure Life (Years)**	**Total Utility (/kWh)**	**Total Resource (kWh)**	**Utility**	**Total Resource**
Annual Totals											
2007		$ 14,896,816	$ 27,123,018	91,145,357	10.40	59					
2008		20,213,216	44,775,829	128,508,579	14.67	75					
2009		33,821,062	53,090,852	143,146,365	16.34	236					
2010		44,643,541	68,981,324	193,592,637	22.10	358					
2011		44,877,117	79,436,532	183,476,312	20.94	420					
2012		47,991,350	77,336,341	172,054,327	19.64	454					
2013		26,100,091	54,803,353	109,505,690	12.23	55					
2014		35,648,260	71,372,414	145,475,713	16.40	390					
2015		37,149,893	70,487,117	162,533,155	18.27	367					
Total Direct Program		**$ 331,364,836**	**$ 589,093,543**	**1,489,090,696**							
Indirect Program Expenses											
DSM Overhead and Other Indirect											
2002		128,855									
2003		(41,543)									
2004		142,337									
2005		177,624									
2006		309,832									
2007		765,561									
2008		980,305									
2009		1,025,704									
2010		1,189,310									
2011		1,389,135									
2012		1,335,509									
2013		741,287									
2014		1,065,072									
2015		1,891,042									
Total		**$ 11,100,030**									

Appendix 4. Historical DSM expense and performance, 2002–2015 (continued)

		Total Costs		Savings and Demand Reductions				Levilized Costs [a]		Program Life Benefit/Cost Ratios [b]	
Program/Year	Participants	Utility Cost [c]	Resource Cost [d]	Annual Energy (kWh)	Average Energy [e] (aMW)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility (/kWh)	Total Resource (kWh)	Utility	Total Resource
Total Expenses											
2002		2,061,375									
2003		2,524,685									
2004		3,969,550									
2005		6,700,972									
2006		11,484,013									
2007		15,662,377									
2008		21,193,521									
2009		34,846,766									
2010		45,832,851									
2011		46,266,252									
2012		49,326,859									
2013		26,841,378									
2014		36,713,333									
2015		39,040,935									
Total 2012–2015		**$ 342,464,866**									

[a] Levelized Costs are based on financial inputs from Idaho Power's *2013 Integrated Resource Plan* and calculations include line loss adjusted energy savings.
[b] Program life benefit/cost ratios are provided for active programs only.
[c] The Total Utility Cost is all cost incurred by Idaho Power to implement and manage a DSM program.
[d] The Total Resource Cost is the total expenditures for a DSM program from the point of view of Idaho Power and its customers as a whole.
[e] Average Demand = Annual Energy/8,760 annual hours.
[f] Peak Demand is reported for programs that directly reduce load or measure demand reductions during summer peak season. Peak demand reduction for demand response programs is reported at the generation level assuming 9.7 percent peak line losses.
[1] Savings are preliminary funder share estimates. Final results will be provided by NEEA in May 2016.

Appendix 5. 2015 DSM program activity by state jurisdiction

	Idaho				Oregon			
Program	**Participants**		**Utility Costs**	**Demand Reduction/ Annual Energy Savings**	**Participants**		**Utility Costs**	**Demand Reduction/ Annual Energy Savings**
Demand Response								
A/C Cool Credit[1]	28,623	homes	1,103,107	36	377	homes	45,828	0.5
Irrigation Peak Rewards[1]	2,203	service points	7,035,398	297	56	service points	223,433	8
Flex Peak Program[1]	66	sites	373,218	12	6	sites	219,654	14
Total			**8,511,723**	**345**			**488,915**	**22**
Energy Efficiency								
Residential								
Easy Savings	2,068	kits	127,477	624,536	0	kits	0	0
Educational Distributions	28,197	kits/bulbs	432,185	1,669,495	0	kits/bulbs	0	0
Energy Efficient Lighting	1,290,323	bulbs	2,002,582	15,358,150	52,932	bulbs	60,800	517,967
Energy House Calls	337	homes	199,047	705,149	25	homes	15,057	49,497
ENERGY STAR® Homes Northwest	598	homes	650,982	773,812	0	homes	2,692	0
ENERGY STAR® Homes Northwest (gas fuel)	69	homes	0	46,872	0	homes	0	0
Heating & Cooling Efficiency Program/DHP Pilot	415	projects	601,183	1,466,057	12	projects	25,186	36,115
Home Energy Audit	351	audits	201,957	136,002	0	audits	0	0
Home Improvement Program	408	projects	272,509	303,580	0	projects	0	0
Oregon Residential Weatherization	0	homes	0	0	19	homes	5,808	11,910
Rebate Advantage	55	homes	81,087	340,589	3	homes	4,351	18,094
See ya later, refrigerator®	1,592	refrigerators/ freezers	215,681	703,277	38	refrigerators/ freezers	11,497	16,931
Simple Steps, Smart Savings™/Home Products Program	8,817	appliances/ showerheads	132,420	729,013	523	appliances/ showerheads	6,676	41,809
Weatherization Assistance for Qualified Customers	233	homes/ non-profits	1,278,159	529,426	10	homes/ non-profits	36,873	20,595
Weatherization Solutions for Eligible Customers	171	homes	1,243,269	432,958	0	homes	0	0
Sector Total			**7,438,537**	**23,818,916**			**168,941**	**712,918**
Commercial								
Building Efficiency	81	projects	2,145,926	23,232,017	0	projects	16,075	0
Custom Efficiency	152	projects	8,407,993	50,554,517	8	projects	604,636	4,692,675
Easy Upgrades	1,181	projects	4,173,151	22,866,677	41	projects	177,713	728,024
Sector Total			**14,727,070**	**96,653,211**			**798,424**	**5,420,699**

Appendix 5. 2015 DSM program activity by state jurisdiction (continued)

	Idaho			Oregon		
Program	**Participants**	**Utility Costs**	**Demand Reduction/ Annual Energy Savings**	**Participants**	**Utility Costs**	**Demand Reduction/ Annual Energy Savings**
Irrigation						
Irrigation Efficiency Rewards	887 projects	1,773,253	13,856,301	15 projects	62,459	171,110
Sector Total		**1,773,253**	**13,856,301**		**62,459**	**171,110**
Market Transformation						
Northwest Energy Efficiency Alliance [1]		2,453,773	20,805,000		129,146	1,095,000
Other Programs and Activities						
Residential						
Energy Efficiency Education Initiative		142,512			7,391	
Shade Tree Project		105,459			(66)	
Commercial						
Commercial Education		61,987			3,262	
Oregon Commercial Audits		0			4,251	
Other						
Energy Efficiency Direct Program Overhead		259,645			13,214	
Total Program Direct Expense		**35,473,958**			**1,675,936**	
Indirect Program Expenses		1,795,599			95,443	
Total Annual Savings			**155,133,428**			**7,399,727**
Total DSM Expense		**37,269,557**			**1,771,378**	

[1] Savings are preliminary funder share estimates provided by NEEA. Final savings for 2015 will be provided by NEEA May 2016.

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March 15, 2016

IDAHO POWER
An IDACORP Company

Supplement 1: Cost-Effectiveness

Demand-Side Management

2015 ANNUAL REPORT

Printed on recycled paper

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Supplement 1: Cost-Effectiveness

Cost-Effectiveness

Idaho Power considers cost-effectiveness of primary importance in the design, implementation, and tracking of energy efficiency and demand response programs. Idaho Power's energy efficiency and demand response opportunities are preliminarily identified through the Integrated Resource Plan (IRP) process. Idaho Power uses third-party energy efficiency potential studies to identify achievable cost-effective energy efficiency potential that is added to the resources included in the IRP. Idaho Power's Program Planning Group (PPG) explores new opportunities to expand current demand-side management (DSM) programs and offerings. Because of Idaho Power's diversified portfolio of programs, most of the new potential for energy efficiency in Idaho Power's service area is based on additional measures to be added to existing programs rather than developing new programs.

Prior to the actual implementation of energy efficiency or demand response programs, Idaho Power performs a cost-effectiveness analysis to assess whether a potential program design or measure will be cost-effective from the perspective of Idaho Power and its customers. Incorporated in these models are inputs from various sources that use the most current and reliable information available. When possible, Idaho Power leverages the experiences of other utilities in the region and/or throughout the country to help identify specific program parameters. This is accomplished through discussions with other utilities' program managers and researchers. Idaho Power also uses electric industry research organizations, such as E Source, the Edison Electric Institute (EEI), Consortium for Energy Efficiency (CEE), American Council for an Energy-Efficient Economy (ACEEE), Advanced Load Control Alliance (ALCA), and Association of Energy Service Professionals (AESP), to identify similar programs and their results.

Additionally, Idaho Power relies on the results of program impact evaluations and recommendations from consultants. In 2015, Idaho Power contracted with ADM Associates, Inc. (ADM); Applied Energy Group (AEG); CLEAResult Consulting, Inc. (CLEAResult); and Tetra Tech, MA for program evaluations and research.

Idaho Power's goal is for all programs to have benefit/cost (B/C) ratios greater than one for the total resource cost (TRC) test, utility cost (UC) test, and participant cost test (PCT) at the program and measure level where appropriate. If a particular measure or program is pursued even though it will not be cost-effective from each of the three tests, Idaho Power works with the Energy Efficiency Advisory Group (EEAG) to get input. If the measure or program is indeed offered, the company explains why the measure or program was implemented or continued. The company believes this aligns with the expectations of the Idaho Public Utilities Commission (IPUC) and Public Utility Commission of Oregon (OPUC).

In the OPUC Order No. 94-590, issued in Utility Miscellaneous (UM) 551, the OPUC outlines specific cost-effectiveness guidelines for energy efficiency measures and programs managed by program administrators. It is the expectation of the OPUC that measures and programs pass both the UC and TRC tests. Measures and programs that do not pass these tests may be offered by a utility if they meet one or more of the following additional conditions specified by Section 13 of Order No. 94-590.

A. The measure produces significant non-quantifiable non-energy benefits (NEB)

B. Inclusion of the measure will increase market acceptance and is expected to lead to reduced cost of the measure

C. The measure is included for consistency with other DSM programs in the region

D. Inclusion of the measure helps increase participation in a cost-effective program

E. The package of measures cannot be changed frequently, and the measure will be cost-effective during the period the program is offered

F. The measure or package of measures is included in a pilot or research project intended to be offered to a limited number of customers

G. The measure is required by law or is consistent with OPUC policy and/or direction

If Idaho Power determines a program or measures is not cost-effective but meets one or more of the exceptions set forth by Order No. 94-590, the company files an exceptions request with the OPUC to continue offering the measure or program within it its Oregon service area.

Idaho Power endeavors to offer identical programs in both its Oregon and Idaho jurisdictions since some customers, contractors, and trade allies operate in both states. Program consistency is important for the participants' overall satisfaction with the programs. Offering different program designs would create confusion in the marketplace, could inhibit participation, and would add to administration costs. In addition, program infrastructure is designed to implement consistent programs across the service area.

Methodology

For its cost-effectiveness methodology, Idaho Power relies on the Electric Power Research Institute (EPRI) *End Use Technical Assessment Guide* (TAG); the *California Standard Practice Manual* and its subsequent addendum, the National Action Plan for Energy Efficiency's (NAPEE) *Understanding Cost Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*; and the *National Action Plan on Demand Response*. Traditionally, Idaho Power has primarily used the TRC test and the UC test to develop B/C ratios to determine the cost-effectiveness of DSM programs. These tests are still used because, as defined in the TAG and *California Standard Practice Manual*, they are most similar to supply-side tests and provide a useful basis to compare demand-side and supply-side resources.

For energy efficiency programs, each program's cost-effectiveness is reviewed annually from a one-year perspective. The annual energy-savings benefit value is summed over the life of the measure or program and is discounted to reflect 2015 dollars. The result of the one-year perspective is shown in *Supplement 1: Cost-Effectiveness*. Appendix 4 of the main *Demand-Side Management 2015 Annual Report* includes the program cost-effectiveness to-date by including the culmination of actual historic savings values and expenses as well as the ongoing energy-savings benefit over the life of the measures included in a program.

The goal of demand response programs is to minimize or delay the need to build new supply-side resources. Unlike energy efficiency programs, demand response programs must acquire and retain participants each year to maintain a level of demand reduction capacity for the company. Demand response programs are expensive and generally have a higher initial investment than energy efficiency programs.

As part of the public workshops on Case No. IPC-E-13-14, Idaho Power and other stakeholders agreed on a new methodology for valuing demand response. The settlement agreement, as approved in IPUC Order No. 32923 and OPUC order No. 13-482, defined the annual cost of operating the three demand response programs for the maximum allowable 60 hours to be no more than $16.7 million. This $16.7 million value is the levelized annual cost of a 170-megawatt (MW) deferred resource over a 20-year life. The demand response value calculation will include this value even in years when the IRP shows no peak-hour capacity deficits. The annual value calculation will be updated with each IRP based on changes that include, but are not limited to, need, capital cost, or financial assumptions. In 2015, the cost of operating the three demand response programs was $9 million. Idaho Power estimates that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $12.4 million and would have remained cost-effective.

As in 2014, Idaho Power has consolidated the measure definition for the attic-, floor-, and wall-insulation and window measures in the Home Improvement Program. The company has also consolidated the lighting measures in the Easy Upgrades program.

Assumptions

Idaho Power relies on research conducted by third-party sources to obtain savings and cost assumptions for various measures. These assumptions are routinely reviewed and updated as new information becomes available. For many of the measures within *Supplement 1: Cost-Effectiveness*, savings, costs, and load shapes were derived from either the Regional Technical Forum (RTF) or the *Idaho Power Energy Efficiency Potential Study* conducted by EnerNOC Utility Solutions Consulting Group (EnerNOC) in 2012. In 2013, EnerNOC provided Idaho Power with updated end-use load shapes. Those updated load shapes have been applied to each program and measure when applicable. AEG acquired EnerNOC and refreshed the energy efficiency potential analysis in 2014.

The RTF regularly reviews, evaluates, and recommends eligible energy efficiency measures and the estimated savings and costs associated with those measures. As the RTF updates these assumptions, Idaho Power applies them to current program offerings and assesses the need to make any program changes. Idaho Power staff participates in the RTF by attending monthly meetings and contributing to various sub-committees. Because cost data from the RTF information is in 2006 dollars, measures with costs from the RTF have been escalated by 13.7 percent in 2015. This percentage is provided by the RTF at http://rtf.nwcouncil.org/measures/support/files/RTFStandardInformationWorkbook_v2_2_1.xlsx.

Idaho Power also uses a technical reference manual (TRM) developed by ADM for the Building Efficiency and Easy Upgrades programs. Idaho Power retained ADM as a consultant throughout 2015 to advise the company and provide updates to the TRM.

Idaho Power also relies on other sources, such as the Northwest Power and Conservation Council (NWPCC), Northwest Energy Efficiency Alliance (NEEA), the Database for Energy Efficiency Resources (DEER), the Energy Trust of Oregon (ETO), the Bonneville Power Administration (BPA), third-party consultants, and other regional utilities. Occasionally, Idaho Power will also use internal engineering estimates and calculations for savings and costs based on information gathered from previous projects.

The company freezes savings assumptions when the budgets and goals are set for the next calendar year unless code and standard changes or program updates necessitate a need to use updated savings. As a general rule, the 2015 energy savings reported for most programs will use the assumption set at the beginning of the year. These assumptions are discussed in more detail in the cost-effectiveness sections for each program.

The remaining inputs used in the cost-effectiveness models are obtained from the IRP process. *Appendix C—Technical Appendix* of Idaho Power's 2013 IRP is the source for the financial assumptions, including the discount rate and escalation rate. These DSM alternative costs vary by season and time of day and are applied to an end-use load shape to obtain the value of that particular measure or program. The DSM alternative energy costs are based on both the projected fuel costs of a peaking unit and forward electricity prices as determined by Idaho Power's power supply model, AURORAxmp® Electric Market Model. The avoided capital cost of capacity is based on a gas-fired, simple-cycle turbine. In the 2013 IRP, the annual avoided capacity cost is $102 per kilowatt (kW). When multiplied by the effective load carrying capacity (ELCC) of 93.4 percent, the annual avoided capacity cost is $95.27/kW. The ELCC reduces the avoided capacity-cost benefit based on the availability of a resource.

As recommended by the *NAPEE Understanding Cost-Effectiveness of Energy Efficiency Programs*¸ Idaho Power's weighted average cost of capital (WACC) of 6.77 percent is used to discount future benefits and costs to today's dollars. However, determining the appropriate discount rate for participant cost and benefits is difficult because of the variety of potential discount rates that can be used by the different participants as described in the TAG. Since the participant benefit is based on the anticipated bill savings of the customer, Idaho Power believes the WACC is not an appropriate discount rate to use. Because the customer bill savings is based on Idaho Power's 2015 average customer segment rate and is not escalated, the participant bill savings is discounted using a real discount rate of 3.66 percent, which is based on the 2013 IRP's WACC of 6.77 percent and an escalation rate of 3 percent.

The formula to calculate the real discount rate is as follows:

$$((1 + \text{WACC}) \div (1 + \text{Escalation})) - 1 = \text{Real}$$

Line-loss percentages are applied to the metered-site energy savings to find the energy savings at the generation level. The *Demand-Side Management 2015 Annual Report* shows the estimated electrical savings at the customer meter level. Cost-effectiveness analyses are based on generation-level energy savings. The demand response program reductions are reported at the generation level with the line losses. In 2014, Idaho Power reviewed the system loss coefficients from 2012. Based on this study, the line-loss factors were updated and reduced from 10.9 to 9.6 percent. The summer peak line-loss factor was reduced from 13 to 9.7 percent.

Conservation Adder

The *Pacific Northwest Electric Power Planning and Conservation Act* (Northwest Power Act) states:

> …any conservation or resource shall not be treated as greater than that of any non-conservation measure or resource unless the incremental system cost of such conservation or resource is in excess of 110 per centum of the incremental system cost of the nonconservation measure or resource.

As a result of the Northwest Power Act, most utilities in the Pacific Northwest add a 10-percent conservation adder in energy efficiency cost-effectiveness analyses. In OPUC Order No. 94-590, the OPUC commission states:

> We support the staff's position that the effect of conservation in reducing uncertainty in meeting load growth is included in the ten percent cost adder and that no separate adjustment is necessary.

Additionally, in IPUC Order No. 32788 in Case No. GNR-E-12-01, "Staff noted that Rocky Mountain Power and Avista use a 10% conservation adder when calculating the cost-effectiveness of all their DSM programs." Staff recommended the utilities have the option to use a 10-percent adder, and the IPUC agreed with the recommendation to allow utilities to use the 10-percent adder in the cost- effectiveness analyses for low-income programs.

After reviewing the practices of other utilities in the Pacific Northwest as well as the OPUC Order No. 94-590 and IPUC Order 32788, Idaho Power includes the 10-percent conservation adder in all energy efficiency measure and program cost-effectiveness analyses.

Net-to-Gross

Net-to-gross (NTG), or net-of-free-ridership (NTFR), is defined by *NAPEE's Understanding Cost Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers* as a ratio that does as follows:

> Adjusts the impacts of the programs so that they only reflect those energy efficiency gains that are the result of the energy efficiency program. Therefore, the NTG deducts energy savings that would have been achieved without the efficiency program (e.g., 'free-riders') and increases savings for any 'spillover' effect that occurs as an indirect result of the program. Since the NTG attempts to measure what the customers would have done in the absence of the energy efficiency program, it can be difficult to determine precisely.

Capturing the effects of Idaho Power's energy efficiency efforts on free-ridership and spillover is difficult. Due to the uncertainty surrounding NTG percentages, Idaho Power used an NTG of 100 percent for all measure cost-effectiveness analyses. For the program cost-effectiveness analyses, the B/C ratios shown are based on a 100-percent NTG. A sensitivity analysis was conducted to show what the minimum NTG percentage needs to be for the program to remain (or become) cost-effective from either the TRC or UC perspective. These NTG percentages are shown in the program cost-effectiveness pages of *Supplement 1: Cost-Effectiveness*.

Results

Idaho Power determines cost-effectiveness on a measure basis, where relevant, and program basis. As part of *Supplement 1: Cost-Effectiveness* and where applicable, Idaho Power publishes the cost effectiveness by measure, calculating the PCT and ratepayer impact measure (RIM) test at the program level, listing the assumptions associated with cost-effectiveness, and citing sources and dates of metrics used in the cost-effectiveness calculation.

The B/C ratio from the participant cost perspective is not calculated for Easy Savings, Educational Distributions, Energy House Calls, See ya later, refrigerator®, Weatherization Assistance for Qualified Customers (WAQC), and Weatherization Solutions for Eligible Customers programs. These programs have few or no customer costs. For energy efficiency programs, the cost-effectiveness models do not assume ongoing participant costs.

For most programs, the *Demand-Side Management 2015 Annual Report* Appendix 4 contains program UC and TRC B/C ratios using actual cost information over the life of the program through 2015. *Supplement 1: Cost-Effectiveness* contains annual cost-effectiveness metrics for each program using actual information from 2015 and includes results of the PCT. Current customer energy rates are used in the calculation of the B/C ratios from a PCT and RIM perspective. Rate increases are not forecasted or escalated. A summary of the cost-effectiveness by program can be found in Table 3.

In 2015, most of Idaho Power's energy efficiency programs were cost-effective, except the Home Improvement Program and the weatherization programs for income-qualified customers.

The Home Improvement Program has a UC of 1.91 and TRC of 0.67. The RTF reduced savings for single-family home weatherization projects in 2015. With the changes, average savings estimates per project were just under 50 percent of 2014 projects. The lower savings were approved by the RTF in October 2014 and revised in spring 2015. These new savings were a result of the nearly 18-month RTF process to calibrate residential savings models. As a consequence, four of the six measures offered in the Home Improvement Program are no longer cost-effective from the TRC perspective. Idaho Power incorporated the new savings for all 2015 projects. In 2016, the company will evaluate the non-cost-effective measures and the impact on the program's cost-effectiveness to determine if these measures should be modified or removed from the program. Idaho Power will present possible program modification and seek suggestions from EEAG.

WAQC had a TRC of 0.43, and Weatherization Solutions for Eligible Customers had a TRC of 0.50. The cost-effectiveness ratios have remained steady compared to 2014. Idaho Power performed a billing analysis of the 2012 weatherization projects. In 2014 and 2015, Idaho Power claimed annual 1,551 kilowatt-hours (kWh) per home in WAQC. The savings for manufactured homes is 2,568 kWh per year. The annual savings for non-profits is 1.03 kWh/heated square foot (ft^2). For Weatherization Solutions for Eligible Customers, the billing analysis shows the per-home annual savings increased. In 2014 and 2015, Idaho Power claimed 2,108 kWh per home. The savings for manufactured homes increased to 3,426 kWh per year. Idaho Power adopted the following IPUC staff's recommendations from Case No. GNR E-12-01 for calculating the programs' cost-effectiveness:

- Applied a 100-percent NTG.
- Claimed 100 percent of energy savings for each project.
- Included indirect administrative overhead costs. The overhead costs of 4.84 percent were calculated from the $1,891,042 of indirect program expenses divided by the total DSM expenses of $39,040,935 as shown in Appendix 3 of the *Demand-Side Management 2015 Annual Report*.
- Applied the 10-percent conservation preference adder.
- Amortized evaluation expenses over a three-year period.
- Claimed one dollar of NEBs for each dollar of utility and federal funds invested in health, safety, and repair measures.

Twenty-four individual measures in various programs are shown to not be cost-effective from either the UC or TRC perspective. These measures will be discontinued, analyzed for additional NEBs, modified to increase potential per-unit savings, or monitored to examine their impact on the specific program's overall cost-effectiveness. For several measures, Idaho Power filed cost-effectiveness exception requests with the OPUC in compliance with Order No. 94-590. Measures and programs that do not pass these tests may be offered by the utility if they meet one or more of the additional conditions specified by Section 13 of Order No. 94-590. These exception requests were approved under Order No. 15-200 on June 23, 2015. The filings and exception requests are noted below.

Table 1. 2015 non-cost-effective measures

Program	Number of Measures	Notes
Building Efficiency	2	Cost-effectiveness exception request filed and approved with OPUC Advice No. 14-10. OPUC Order No. 94-590, Section 13. Exceptions A, B, C, and D.
Easy Upgrades	5	Cost-effectiveness exception request filed and approved with OPUC Advice No. 14-06. OPUC Order No. 94-590, Section 13. Exceptions A, C, and D.
Energy Efficient Lighting	2	Program is cost-effective with a UC of 4.53 and TRC of 4.23. The two non-cost-effective measures have a UC range of 4.63 and 9.12 and a TRC range of 0.82 and 0.94. These bulbs represent 0.5% of overall bulbs in the program.
Heating & Cooling Efficiency Program	9	Cost-effectiveness exception request for ductless heat pumps (DHP) filed with the OPUC under UM-1710. OPUC Order No. 94-590, Section 13. Exceptions A and C. Approved under Order No. 15-200. Other measures to be reviewed in 2016 pending updates from the RTF.
Home Improvement Program	4	The measures have a UC range of 1.32 and 2.43 and a TRC range of 0.49 and 0.92. The measures and the program will be reviewed in 2016.
Irrigation Efficiency Rewards	1	Cost-effectiveness exception request filed with the OPUC under UM-1710. OPUC Order No. 94-590,Section 13. Exceptions A, C, and D. Approved under Order No. 15-200.
Simple Steps, Smart Savings™/ Home Products Program	1	Non-cost-effective measure removed from the program in 2015.
Total	**24**	

Following the annual program cost-effectiveness results are tables that include measure-level cost-effectiveness. Exceptions to the measure-level tables are programs that are analyzed at the project level. These programs include Easy Savings, Custom Efficiency, the custom option of Irrigation Efficiency Rewards, WAQC, and Weatherization Solutions for Eligible Customers.

The measure-level cost-effectiveness includes inputs of measure life, energy savings, incremental cost, incentives, program administration cost, and net benefit. Program administration costs include all non-incentive costs: labor, marketing, training, education, purchased services, and evaluation. Energy and expense data have been rounded to the nearest whole unit, which may result in minor rounding differences.

2015 DSM Detailed Expenses by Program

Included in this supplement is a detailed breakout of program expenses as shown in Appendix 2 of the *Demand Side Management 2015 Annual Report*. These expenses are broken out by funding source major-expense type (incentives, labor/administration, materials, other expenses, and purchased services).

Table 2. 2015 DSM detailed expenses by program (dollars)

Sector/Program	Idaho Rider	Oregon Rider	Idaho Power	Total Program
Energy Efficiency/Demand Response				
Residential				
A/C Cool Credit	**$ 659,471**	**$ 45,825**	**$ 443,639**	**$ 1,148,935**
Labor/Administrative Expense	52,308	3,237	9,254	**64,800**
Materials and Equipment	(91,953)	4	0	**(91,949)**
Other Expense	29,363	1,545	0	**30,909**
Purchased Services	669,753	35,233	0	**704,986**
Incentives	0	5,805	434,385	**440,190**
Easy Savings	**0**	**0**	**127,477**	**127,477**
Labor/Administrative Expense	0	0	2,477	**2,477**
Materials and Equipment	0	0	125,000	**125,000**
Educational Distributions	**432,185**	**0**	**0**	**432,185**
Materials and Equipment	138,492	0	0	**138,492**
Other Expense	293,693	0	0	**293,693**
Energy Efficient Lighting	**1,997,292**	**60,800**	**5,291**	**2,063,383**
Labor/Administrative Expense	41,027	2,437	5,291	**48,754**
Other Expense	(144,406)	(4,832)	0	**(149,238)**
Purchased Services	313,585	15,886	0	**329,471**
Incentives	1,787,086	47,310	0	**1,834,396**
Energy House Calls	**194,939**	**15,057**	**4,108**	**214,103**
Labor/Administrative Expense	28,192	1,700	4,108	**34,001**
Materials and Equipment	2,258	109	0	**2,367**
Other Expense	12,675	520	0	**13,196**
Purchased Services	151,813	12,727	0	**164,540**
ENERGY STAR® Homes Northwest	**646,991**	**2,692**	**3,990**	**653,674**
Labor/Administrative Expense	29,759	1,777	3,990	**35,526**
Materials and Equipment	26	1	0	**28**
Other Expense	18,551	879	0	**19,430**
Purchased Services	656	35	0	**690**
Incentives	598,000	0	0	**598,000**
Heating & Cooling Efficiency Program/DHP Pilot	**583,663**	**25,186**	**17,520**	**626,369**
Labor/Administrative Expense	109,960	6,709	17,520	**134,188**
Other Expense	71,457	3,865	0	**75,322**
Purchased Services	141,046	6,113	0	**147,159**
Incentives	261,200	8,500	0	**269,700**
Home Energy Audit	**192,873**	**0**	**9,084**	**201,957**
Labor/Administrative Expense	53,556	0	9,084	**62,640**
Materials and Equipment	4,182	0	0	**4,182**
Other Expense	42,232	0	0	**42,232**
Purchased Services	92,902	0	0	**92,902**

Table 2. 2015 DSM detailed expenses by program (dollars) (continued)

Sector/Program	Idaho Rider	Oregon Rider	Idaho Power	Total Program
Home Improvement Program	**$ 259,898**	**$ 0**	**$ 12,611**	**$ 272,509**
Labor/Administrative Expense	75,113	0	12,611	**87,724**
Other Expense	49,674	0	0	**49,674**
Purchased Services	8,906	0	0	**8,906**
Incentives	126,204	0	0	**126,204**
Oregon Residential Weatherization	**0**	**5,341**	**467**	**5,808**
Labor/Administrative Expense	0	3,481	467	**3,948**
Other Expense	0	118	0	**118**
Incentives	0	1,742	0	**1,742**
Rebate Advantage	**80,243**	**4,351**	**843**	**85,438**
Labor/Administrative Expense	6,173	370	843	**7,386**
Materials and Equipment	52	3	0	**55**
Other Expense	8,018	379	0	**8,397**
Purchased Services	11,000	600	0	**11,600**
Incentives	55,000	3,000	0	**58,000**
See ya later, refrigerator®	**212,674**	**11,497**	**3,007**	**227,179**
Labor/Administrative Expense	26,241	1,534	3,007	**30,782**
Materials and Equipment	7,529	396	0	**7,926**
Other Expense	3,338	5,406	0	**8,744**
Purchased Services	164,346	3,951	0	**168,297**
Incentives	11,220	210	0	**11,430**
Shade Tree Program	**99,672**	**(66)**	**5,786**	**105,392**
Labor/Administrative Expense	32,948	(66)	5,786	**38,668**
Materials and Equipment	52	0	0	**52**
Other Expense	21,131	0	0	**21,131**
Purchased Services	45,541	0	0	**45,541**
Simple Steps, Smart Savings™/ Home Products Program	**$ 130,575**	**$ 6,676**	**$ 1,845**	**$ 139,096**
Labor/Administrative Expense	31,812	1,772	1,845	**35,428**
Other Expense	(2,018)	(216)	0	**(2,233)**
Purchased Services	31,883	1,450	0	**33,333**
Incentives	68,898	3,670	0	**72,568**
Weatherization Assistance for Qualified Customers	**0**	**0**	**1,315,032**	**1,315,032**
Labor/Administrative Expense	0	0	51,038	**51,038**
Materials and Equipment	0	0	24	**24**
Other Expense	0	0	1,793	**1,793**
Purchased Services	0	0	1,262,177	**1,262,177**
Weatherization Solutions for Eligible Customers	**1,204,147**	**0**	**39,122**	**1,243,269**
Labor/Administrative Expense	11,022	0	39,122	**50,144**
Materials and Equipment	7,784	0	0	**7,784**
Other Expense	28,893	0	0	**28,893**
Purchased Services	1,156,448	0	0	**1,156,448**
Residential Total	**$ 6,694,624**	**$ 177,359**	**$ 1,989,821**	**$ 8,861,805**

Table 2. 2015 DSM detailed expenses by program (dollars) (continued)

Sector/Program		Idaho Rider		Oregon Rider		Idaho Power		Total Program
Commercial/Industrial								
Building Efficiency	$	**2,128,309**	$	**16,075**	$	**17,617**	$	**2,162,001**
Labor/Administrative Expense		141,986		8,396		17,617		**167,999**
Materials and Equipment		4		0		0		**4**
Other Expense		36,004		1,895		0		**37,899**
Purchased Services		120,689		5,783		0		**126,473**
Incentives		1,829,626		0		0		**1,829,626**
Custom Efficiency		**8,345,435**		**604,636**		**62,558**		**9,012,628**
Labor/Administrative Expense		451,887		27,075		62,558		**541,520**
Materials and Equipment		71		4		0		**75**
Other Expense		206,022		4,978		0		**211,001**
Purchased Services		847,491		24,380		0		**871,870**
Incentives		6,839,963		548,199		0		**7,388,162**
Easy Upgrades		**4,155,406**		**177,713**		**17,746**		**4,350,865**
Labor/Administrative Expense		258,420		14,538		17,746		**290,704**
Other Expense		72,500		3,816		0		**76,315**
Purchased Services		712,278		37,489		0		**749,766**
Incentives		3,112,208		121,871		0		**3,234,079**
Flex Peak Program		**86,445**		**219,654**		**286,773**		**592,872**
Labor/Administrative Expense		75,681		4,680		13,291		**93,651**
Materials and Equipment		18		0		0		**18**
Other Expense		2,378		159		0		**2,537**
Purchased Services		8,368		440		0		**8,809**
Incentives		0		214,375		273,482		**487,857**
Oregon Commercial Audit		**0**		**4,251**		**0**		**4,251**
Labor/Administrative Expense		0		3,255		0		**3,255**
Other Expense		0		996		0		**996**
Commercial/Industrial Total	$	**14,715,594**	$	**1,022,330**	$	**384,693**	$	**16,122,617**
Irrigation								
Irrigation Efficiency		**1,714,399**		**61,295**		**60,018**		**1,835,711**
Labor/Administrative Expense		209,230		12,947		59,162		**281,339**
Materials and Equipment		738		39		0		**777**
Other Expense		45,749		2,408		856		**49,013**
Purchased Services		5,094		1,807		0		**6,901**
Incentives		1,453,588		44,094		0		**1,497,682**
Irrigation Peak Rewards		**1,018,139**		**222,614**		**6,018,079**		**7,258,831**
Labor/Administrative Expense		47,230		2,922		24,682		**74,834**
Materials and Equipment		92,306		15		0		**92,320**
Other Expense		4,403		232		0		**4,635**
Purchased Services		874,199		46,116		0		**920,315**
Incentives		0		173,330		5,993,396		**6,166,726**
Irrigation Total	$	**2,732,537**	$	**283,909**	$	**6,078,097**	$	**9,094,542**
Energy Efficiency/Demand Response	$	**24,142,755**	$	**1,483,597**	$	**8,452,611**	$	**34,078,964**
Market Transformation								
NEAA		**2,453,773**		**129,146**		**0**		**2,582,919**
Purchased Services		2,453,773		129,146		0		**2,582,919**
Market Transformation Total	$	**2,453,773**	$	**129,146**	$	**0**	$	**2,582,919**

Table 2. 2015 DSM detailed expenses by program (dollars) (continued)

Sector/Program		Idaho Rider		Oregon Rider		Idaho Power		Total Program
Other Programs and Activities								
Residential								
Residential Education Initiative	$	**127,817**	$	**7,391**	$	**14,695**	$	**149,903**
Labor/Administrative Expense		83,675		5,177		14,695		**103,546**
Materials and Equipment		74		4		0		**78**
Other Expense		42,382		2,121		0		**44,503**
Purchased Services		1,686		89		0		**1,775**
Residential Total	$	**127,817**	$	**7,391**	$	**14,695**	$	**149,903**
Commercial/Industrial								
Commercial Education		**61,755**		**3,262**		**232**		**65,250**
Labor/Administrative Expense		1,322		82		232		**1,635**
Other Expense		60,434		3,181		0		**63,614**
Commercial/Industrial Total	$	**61,755**	$	**3,262**	$	**232**	$	**65,250**
Other								
Energy Efficiency Direct Program Overhead		**231,713**		**12,967**		**28,179**		**272,858**
Labor/Administrative Expense		132,378		8,189		28,179		**168,745**
Materials and Equipment		30		2		0		**31**
Other Expense		99,305		4,777		0		**104,082**
Other Total	$	**231,713**	$	**12,967**	$	**28,179**	$	**272,858**
Other Programs and Activities Total	$	**421,285**	$	**23,620**	$	**43,105**	$	**488,011**
Indirect Program Expense								
Commercial/Industrial Energy Efficiency Overhead		**141,066**		**11,387**		**66,558**		**219,012**
Labor/Administrative Expense		84,390		7,945		66,558		**158,893**
Materials and Equipment		73		0		0		**73**
Other Expense		37,103		1,942		0		**39,045**
Purchased Services		19,500		1,500		0		**21,000**
Energy Efficiency Accounting and Analysis		**710,564**		**41,196**		**224,299**		**976,059**
Labor/Administrative Expense		401,673		24,853		219,968		**646,494**
Materials and Equipment		17		1		0		**18**
Other Expense		19,287		1,019		4,331		**24,637**
Purchased Services		289,587		15,323		0		**304,910**
Energy Efficiency Advisory Group		**24,976**		**1,360**		**857**		**27,193**
Labor/Administrative Expense		4,878		303		857		**6,037**
Other Expense		20,098		1,058		0		**21,156**
Residential Energy Efficiency Overhead		**584,299**		**33,036**		**34,839**		**652,174**
Labor/Administrative Expense		125,716		8,444		34,839		**168,999**
Materials and Equipment		66		3		0		**69**
Other Expense		437,744		23,022		0		**460,766**
Purchased Services		20,773		1,567		0		**22,340**
Special Accounting Entries		**15,830**		**775**		**0**		**16,605**
Special Accounting Entry		15,830		775		0		**16,605**
Indirect Program Expenses Total	$	**1,476,734**	$	**87,755**	$	**326,553**	$	**1,891,042**
Totals	$	**28,494,548**	$	**1,724,118**	$	**8,822,269**	$	**39,040,935**

Table 3. Cost-effectiveness summary by program

Program/Sector	2015 Benefit/Cost (B/C) Tests			
	Utility Cost (UC)	Total Resource Cost (TRC)	Ratepayer Impact Measure (RIM)	Participant Cost (PCT)
Easy Savings	2.61	2.95	0.58	N/A
Educational Distributions	2.05	2.60	0.54	N/A
Energy Efficient Lighting	4.53	4.23	0.69	5.39
Energy House Calls	2.81	2.96	0.56	N/A
ENERGY STAR® Homes Northwest	2.10	1.04	0.69	1.49
Heating & Cooling Efficiency Program/DHP Pilot	3.11	1.05	0.79	1.36
Home Improvement Program	1.91	0.67	0.61	1.05
Rebate Advantage	4.54	3.45	0.66	6.46
See ya later, refrigerator®	1.21	1.53	0.49	N/A
Simple Steps, Smart Savings™/ Home Products Program	3.37	4.83	0.68	6.62
Weatherization Assistance for Qualified Customers	0.54	0.43	0.35	N/A
Weatherization Solutions for Eligible Customers	0.45	0.50	0.31	N/A
Residential Energy Efficiency Sector	**2.31**	**2.11**	**0.62**	**3.82**
Building Efficiency	7.63	3.70	1.10	3.56
Custom Efficiency	4.03	1.77	1.32	1.37
Easy Upgrades	3.85	2.20	0.96	2.51
Commercial/Industrial Energy Efficiency Sector	**4.48**	**2.13**	**1.16**	**1.92**
Irrigation Efficiency	6.00	3.84	1.45	3.59
Irrigation Energy Efficiency Sector	**6.00**	**3.84**	**1.45**	**3.59**
Energy Efficiency Portfolio	**3.57**	**2.32**	**1.00**	**2.61**

Cost-Effectiveness Tables by Program

Easy Savings

Segment: Residential
2015 Program Results

Cost Inputs (net present value [NPV])			Ref
Program Administration	$	127,477	
Program Incentives		–	I
Total Utility Cost	**$**	**127,477**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	–	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	333,022	$	127,477	2.61
Total Resource Cost Test		376,636		127,477	2.95
Ratepayer Impact Measure Test		333,022		576,570	0.58
Participant Cost Test		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	624,536			
NPV Cumulative Energy (kWh)	5,612,433	$	302,747	
10% Credit (Northwest Power Act)			30,275	
Total Electric Savings		**$**	**333,022**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	449,094	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	43,614	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (Weighted Average Cost of Capital [WACC])	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	39%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Notes: Non-energy benefits include the NPV of water savings from low-flow showerheads and PV of periodic bulb (capital) replacement costs.
No participant cost.

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Educational Distributions

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	432,185	
Program Incentives		–	I
Total Utility Cost	**$**	**432,185**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	–	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	884,615	$	432,185	2.05
Total Resource Cost Test		1,124,237		432,185	2.60
Ratepayer Impact Measure Test		884,615		1,632,692	0.54
Participant Cost Test		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	1,669,495			
NPV Cumulative Energy (kWh)	15,049,917	$	804,195	
10% Credit (Northwest Power Act)			80,420	
Total Electric Savings		**$**	**884,615**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	1,200,507	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	239,622	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	49%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Notes: Energy savings as reported by the *Resource Action Plan* for the 2014 to 2015 student kits. NEBs for kits include NPV of avoided gas.
NEBs for giveaway bulbs include PV of periodic bulb (capital) replacement costs.
No participant cost.

Year: 2015 **Program**: Education Distributions **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
General Purpose LED Give away	Efficient Technology: LED Lamp Type: General Purpose and Dimmable Lumen Category: 665 to 1,439 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	13	9.00	$6.72	$3.92	–		$0.259	2.89	4.57	1
Student Energy Efficiency Kit (SEEK) Program	2014–2015 kit offering. Kits include: high-efficiency showerhead, showertimer, 13-W CFL, 18-W CFL, 23-W CFL, FilterTone alarm, digital thermometer, LED nightlight.	No kit	Kit	IPC_Student Kits	10	220.33	$129.05	$23.19	–		$0.259	2.26	2.67	2

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of net present value (NPV) of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes a 10-percent conservation adder from the Northwest Power Act.
[d] No participant cost.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResLightingCFLandLEDLamps_v3_3.xlsm. 2014.
[2] Resource Action Programs. *2014–2015 Idaho Power Energy Wise Program Summary Report*. 2015.

Energy Efficient Lighting

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	228,987	
Program Incentives		1,834,396	I
Total Utility Cost	**$**	**2,063,383**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	4,199,689	M

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	15,876,117			
NPV Cumulative Energy (kWh)	135,702,304	$	8,500,171	
10% Credit (Northwest Power Act)			850,017	
Total Electric Savings		**$**	**9,350,188**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	11,416,258	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	9,401,578	NEB

Notes: NEBs include PV of periodic bulb (capital) replacement costs.

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	9,350,188	$	2,063,383	4.53
Total Resource Cost Test		18,751,765		4,428,676	4.23
Ratepayer Impact Measure Test		9,350,188		13,479,641	0.69
Participant Cost Test		22,652,232		4,199,689	5.39

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + ((M-I) * NTG)
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	22%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Year: 2015 **Program**: Energy Efficient Lighting **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Decorative and Mini-base CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: Decorative and Mini-Base Lumen Category: 250 to 664 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	9	9.00	$4.80	$9.49	$1.61	$1.71	$0.014	2.61	8.21	(1)
Decorative and Mini-base CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: Decorative and Mini-Base Lumen Category: 665 to 1439 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	9	16.00	$8.52	$13.66	$0.06	$1.64	$0.014	4.57	78.99	(1)
Decorative and Mini-base CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: Decorative and Mini-Base Lumen Category: 1440 to 2600 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	9	20.00	$10.66	$-	$0.06	$2.00	$0.014	4.67	31.34	(2)
General Purpose CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: General Purpose and Dimmable Lumen Category: 250 to 664 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	9	8.00	$4.26	$10.05	$0.06	$0.50	$0.014	6.96	84.76	(1)
General Purpose CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: General Purpose and Dimmable Lumen Category: 665 to 1439 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	9	8.00	$4.26	$2.80	$0.06	$0.56	$0.014	6.34	41.83	(1)
General Purpose CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: General Purpose and Dimmable Lumen Category: 1440 to 2600 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	8	14.00	$6.65	$2.74	$0.06	$0.50	$0.014	9.55	37.12	(1)
Globe CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: Globe Lumen Category: 250 to 664 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	6.00	$4.18	$10.55	$0.06	$1.74	$0.014	2.29	104.54	(1)

Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Benefit: Annual Gross Energy Savings (kWh/yr)[b]	Benefit: NPV Avoided Costs[c]	Benefit: Non-Energy Benefit (NEB)	Cost: Gross Incremental Participant Cost[d]	Cost: Incentive/ Unit	Cost: Admin Cost ($/kWh)[e]	Benefit/Cost Tests: UC Ratio[f]	Benefit/Cost Tests: TRC Ratio[g]	Source
Globe CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: Globe Lumen Category: 665 to 1439 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	8.00	$5.57	$16.49	$0.06	$1.55	$0.014	3.35	130.63	(1)
Reflectors and Outdoor CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: Reflectors and Outdoor Lumen Category: 250 to 664 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	8	11.00	$5.22	$23.12	$0.06	$1.31	$0.014	3.57	134.42	(1)
Reflectors and Outdoor CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: Reflectors and Outdoor Lumen Category: 665 to 1439 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	7	18.00	$7.48	$20.91	$0.06	$1.82	$0.014	3.61	91.91	(1)
Three-Way CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: Three-Way Lumen Category: 1440 to 2600 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	8	33.00	$15.67	$29.38	$6.04	$1.99	$0.014	6.39	6.93	(1)
General Purpose CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: General Purpose and Dimmable Lumen Category: 3860 Lumen Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	8	69.00	$32.76	$29.40	$10.12	$0.50	$0.014	22.35	5.61	(3)
General Purpose CFL Retailer	Efficient Technology: Compact Fluorescent Lamp Type: General Purpose and Dimmable Lumen Category: 4200 Lumen Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	8	87.00	$41.30	$27.75	$12.34	$0.50	$0.014	24.04	5.09	(3)
Decorative and Mini-base LED Retailer	Efficient Technology: LED Lamp Type: Decorative and Mini-Base Lumen Category: 250 to 664 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	13.00	$9.05	$10.48	$8.35	$2.02	$0.014	4.11	2.29	(1)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
General Purpose LED Retailer	Efficient Technology: LED Lamp Type: General Purpose and Dimmable Lumen Category: 250 to 664 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	10.00	$6.96	$11.12	$2.48	$2.08	$0.014	3.13	6.90	(1)
General Purpose LED Retailer	Efficient Technology: LED Lamp Type: General Purpose and Dimmable Lumen Category: 665 to 1439 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	11.00	$7.65	$3.97	$6.98	$2.32	$0.014	3.09	1.63	(1)
General Purpose LED Retailer	Efficient Technology: LED Lamp Type: General Purpose and Dimmable Lumen Category: 1440 to 2600 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	22.00	$15.31	$3.89	$20.18	$3.00	$0.014	4.63	0.94	(1) (4)
Globe LED Retailer	Efficient Technology: LED Lamp Type: Globe Lumen Category: 250 to 664 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	8.00	$5.57	$10.55	$4.28	$2.16	$0.014	2.45	3.67	(1)
Reflectors and Outdoor LED Retailer	Efficient Technology: LED Lamp Type: Reflectors and Outdoor Lumen Category: 250 to 664 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	16.00	$11.13	$25.89	$16.44	$2.35	$0.014	4.33	2.22	(1)
Reflectors and Outdoor LED Retailer	Efficient Technology: LED Lamp Type: Reflectors and Outdoor Lumen Category: 665 to 1439 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	27.00	$18.79	$20.86	$11.53	$3.00	$0.014	5.56	3.33	(1)
Reflectors and Outdoor LED Retailer	Efficient Technology: LED Lamp Type: Reflectors and Outdoor Lumen Category: 1440 to 2600 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	60.00	$41.75	$43.66	$25.57	$3.00	$0.014	10.87	3.23	(1)
Three-Way LED Retailer	Efficient Technology: LED Lamp Type: Three-Way Lumen Category: 665 to 1439 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	17	27.00	$25.61	$-	$30.70	$2.43	$0.014	9.12	0.82	(2) (4)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Three-Way LED Retailer	Efficient Technology: LED Lamp Type: Three-Way Lumen Category: 1440 to 2600 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	17	60.00	$56.92	$-	$44.34	$3.00	$0.014	14.82	1.26	(2)
LED Fixture Retailer	Efficient Technology: LED Lamp Type: Fixture Lumen Category: 250 to 664 lumens Space Type: ANY	Baseline bulb	Fixture	ENRes_SF_Lighting	12	16.00	$11.13	$25.89	$14.46	$5.61	$0.014	1.91	2.52	(1) (5)
LED Fixture Retailer	Efficient Technology: LED Lamp Type: Fixture Lumen Category: 665 to 1439 lumens Space Type: ANY	Baseline bulb	Fixture	ENRes_SF_Lighting	12	27.00	$18.79	$20.86	$10.14	$5.37	$0.014	3.27	3.77	(1) (5)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResLightingCFLandLEDLamps_v3_3.xlsm. 2014.
[2] BPA. Residential_Lighting_Measures_Effective_04_01_2015_retail_corrected. 2015.
[3] Tetra Tech. Appendix — IPC 2014 EEL Project 20150223.xlsx. 2015.
[4] Measure not cost-effective. Will monitor in 2016.
[5] RTF Reflectors and Outdoor LED lamp savings applied to LED Reflector fixtures. Tetra Tech. *IPC PY2014EEL Savings Development Recommendations*. 2015.

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Energy House Calls

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	214,103	
Program Incentives		–	I
Total Utility Cost	**$**	**214,103**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	–	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	601,642	$	214,103	2.81
Total Resource Cost Test		633,608		214,103	2.96
Ratepayer Impact Measure Test		601,642		1,070,276	0.56
Participant Cost Test		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	754,646			
NPV Cumulative Energy (kWh)	9,306,552	$	546,947	
10% Credit (Northwest Power Act)			54,695	
Total Electric Savings		**$**	**601,642**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	856,173	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	31,966	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	36%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Notes: No participant cost.

Year: 2015 **Program**: Energy House Calls **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
PTCS Duct Sealing	Single Wide (<= 1000 sq. ft.) Manufactured Home Duct Tightness - PTCS Duct Sealing - Heating Zone 1 (Electric FAF Heating System w/CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	1,496.00	$1,192.34	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Single Wide (<= 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 1 (Electric FAF Heating System w/o CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	1,433.00	$1,142.13	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Single Wide (<= 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 1 (Electric Heat Pump Heating System)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	887.00	$706.96	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Single Wide (<= 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 2 (Electric FAF Heating System w/CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	2,361.00	$1,881.76	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Single Wide (<= 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 2 (Electric FAF Heating System w/o CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	2,290.00	$1,825.18	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Single Wide (<= 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 2 (Electric Heat Pump Heating System)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	1,664.00	$1,326.24	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Single Wide (<= 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 3 (Electric FAF Heating System w/CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	3,074.00	$2,450.04	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Single Wide (<= 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 3 (Electric FAF Heating System w/o CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	3,023.00	$2,409.39	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Single Wide (<= 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 3 (Electric Heat Pump Heating System)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	2,324.00	$1,852.27	$–	$–	$–	$0.284	2.81	2.81	(1)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
PTCS Duct Sealing	Other (> 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 1 (Electric FAF Heating System w/CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	1,881.00	$1,499.19	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Other (> 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 1 (Electric FAF Heating System w/o CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	1,799.00	$1,433.84	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Other (> 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 1 (Electric Heat Pump Heating System)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	1,093.00	$871.14	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Other (> 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 2 (Electric FAF Heating System w/CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	2,898.00	$2,309.76	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Other (> 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 2 (Electric FAF Heating System w/o CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	2,791.00	$2,224.48	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Other (> 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 2 (Electric Heat Pump Heating System)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	2,022.00	$1,611.57	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Other (> 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 3 (Electric FAF Heating System w/CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	3,710.00	$2,956.94	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Other (> 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 3 (Electric FAF Heating System w/o CAC)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	3,645.00	$2,905.14	$–	$–	$–	$0.284	2.81	2.81	(1)
PTCS Duct Sealing	Other (> 1000 sq. ft.) Manufactured Home Duct Tightness - Heating Zone 3 (Electric Heat Pump Heating System)	Pre-existing duct leakage	Home	ENRes_MH_Heater	18	2,813.00	$2,242.02	$–	$–	$–	$0.284	2.81	2.81	(1)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
General Purpose LED Direct Install	Efficient Technology: LED Lamp Type: General Purpose and Dimmable Lumen Category: 665 to 1439 lumens Space Type: ANY	Baseline bulb	Lamp	ENRes_SF_Lighting	12	18.00	$12.53	$17.43	$–	$–	$0.284	2.45	5.86	(2)
Low flow faucet aerator	1.0-1.5 gpm kitchen or bathroom faucet aerator	Non- low flow faucet aerator	Aerator	ENRes_SF_WtrHtr	10	106.00	$62.68	$–	$–	$–	$0.284	2.08	2.08	(3)
Water heater pipe covers	Up to 6 feet	No existing coverage	Pipe wrap	ENRes_SF_WtrHtr	15	150.00	$127.29	$–	$–	$–	$0.284	2.99	2.99	(3)
Low flow showerheads	1.75 gpm Primary Shower Electric Water Heating Direct Install	Primary showerhead 2.2 Gpm or higher	Showerhead	ENRes_SF_WtrHtr	10	265.00	$156.69	$24.31	$–	$–	$0.284	2.08	2.41	(4)
Low flow showerheads	2.0 gpm Primary Shower Electric Water Heating Direct Install	Primary showerhead 2.2 Gpm or higher	Showerhead	ENRes_SF_WtrHtr	10	166.00	$98.15	$15.55	$–	$–	$0.284	2.08	2.41	(4)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] No participant cost.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResHeatingCoolingDuctSealingMH_v2_4.xlsm. 2012.
[2] RTF. ResLightingCFLandLEDLamps_v3_3.xlsm. 2014.
[3] AEG. Idaho Power *Energy Efficiency Potential Study*. 2012.
[4] RTF. ResShowerheads_v2_1.xlsm. 2011.

ENERGY STAR® Homes Northwest

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	55,674	
Program Incentives		598,000	I
Total Utility Cost	**$**	**653,674**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	1,356,452	M

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	773,812			
NPV Cumulative Energy (kWh)	12,486,002	$	1,247,201	
10% Credit (Northwest Power Act)			124,720	
Total Electric Savings		**$**	**1,371,921**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	1,337,578	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	90,896	NEB

Notes: 2009 International Energy Conservation Code (IECC) adopted in Idaho in 2011.
Oregon Residential Specialty Code adopted in Oregon in 2011.

Summary of Cost-Effectiveness Results

Test		Benefit		Cost	Ratio
Utility Cost Test	$	1,371,921	$	653,674	2.10
Total Resource Cost Test		1,462,817		1,412,126	1.04
Ratepayer Impact Measure Test		1,371,921		1,991,252	0.69
Participant Cost Test		2,026,474		1,356,452	1.49

Benefits and Costs Included in Each Test

Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + ((M-I) * NTG)
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations

Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	92%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Year: 2015 **Program**: ENERGY STAR Homes Northwest **Market Segment**: Residential **Program Type**: Energy Efficiency

Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Benefit: Annual Gross Energy Savings (kWh/yr)[b]	Benefit: NPV Avoided Costs[c]	Benefit: Non-Energy Benefit (NEB)	Cost: Gross Incremental Participant Cost[d]	Cost: Incentive/ Unit	Cost: Admin Cost ($/kWh)[e]	Benefit/Cost Tests: UC Ratio[f]	Benefit/Cost Tests: TRC Ratio[g]	Source
ENERGY STAR home	Home in Idaho or Montana with Heat Pump - Heating Zone 1 Cooling Zone 3	Single family home built to International Energy Conservation Code 2009 Code. Adopted 2011.	Home	Prog_Energy Star Homes NW	37	3,778.00	$6,801.15	$–	$3,870.25	$1,000.00	$0.072	5.35	1.64	(1)
ENERGY STAR home	Home in Oregon with Heat Pump. BOP1 Equipment Upgrade - Heating Zone 1 - Cooling Zone 3	New Single Family dwelling up to four units, permitted in Oregon under the 2011 Oregon Residential Specialty Code.	Home	Prog_Energy Star Homes NW	45	3,234.00	$6,420.20	$1,738.59	$3,610.42	$1,000.00	$0.072	5.21	2.12	(2)
ENERGY STAR home	Multifamily - Heat Pump - Heating Zone 1 Cooling Zone 3	Multi-family home built to International Energy Conservation Code 2009 Code. Adopted 2011.	Home	Prog_Energy Star Homes NW	36	1,294.00	$2,294.18	$152.89	$2,268.32	$1,000.00	$0.072	2.10	1.04	(3)

[a] Average measure life.
[b] Estimated kWh savings measured at the customers meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResNewSFEStarWAIDMT_v2_2.xls. 2012.
[2] RTF. ResNewSFEStarOR_v3_0.xlsm. 2014
[3] RTF. ResMFEstarHomes2012_v1_1.xlsm. 2012.

Heating & Cooling Efficiency Program/DHP Pilot

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	356,669	
Program Incentives		269,700	I
Total Utility Cost	**$**	**626,369**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	1,707,386	M

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	1,502,172			
NPV Cumulative Energy (kWh)	19,538,483	$	1,771,423	
10% Credit (Northwest Power Act)			177,142	
Total Electric Savings		**$**	**1,948,565**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	1,834,201	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	219,272	NEB

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	1,948,565	$	626,369	3.11
Total Resource Cost Test		2,167,837		2,064,055	1.05
Ratepayer Impact Measure Test		1,948,565		2,460,570	0.79
Participant Cost Test		2,323,173		1,707,386	1.36

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + ((M-I) * NTG)
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	85%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Year: 2015 **Program**: Heating & Cooling Efficiency Program **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Evaporative Cooler	Evaporative cooler single family	Central Air Conditioning	Unit	ENRes_SF_CAC	12	416.00	$621.80	$–	$–	$150.00	$0.237	2.50	2.50	(1)
Evaporative Cooler	Evaporative cooler manufactured home	Central Air Conditioning	Unit	ENRes_MH_CAC	12	309.00	$507.64	$–	$–	$150.00	$0.237	2.27	2.27	(1)
Evaporative Cooler	Evaporative cooler multi-family	Central Air Conditioning	Unit	ENRes_MF_CAC	12	296.00	$435.10	$–	$–	$150.00	$0.237	1.98	1.98	(1)
Water source heat pump	Open loop water source heat pump for existing and new construction- 14.00 EER 3.5 COP	Electric resistance/ Oil Propane	Unit	ENRes_SF_HeatPump	20	8,927.00	$11,578.54	$–	$8,037.00	$1,000.00	$0.237	3.72	1.14	(2)
Water source heat pump	Open loop water source heat pump - 14.00 EER 3.5 COP	Air source heat pump	Unit	ENRes_SF_HeatPump	20	2,648.00	$3,434.52	$–	$8,505.00	$500.00	$0.237	3.05	0.38	(2) (3)
Heat Pump Conversion	Single Family Home HVAC Conversions - Convert to Heat Pump 8.50 HSPF Heating Zone 1	Forced air furnace w/o central air conditioning	Unit	ENRes_SF_Heater	20	5,306.00	$4,758.12	$–	$5,991.00	$800.00	$0.237	2.31	0.66	(3) (4)
Heat Pump Conversion	Single Family Home HVAC Conversions - Convert to Heat Pump 8.50 HSPF Heating Zone 2	Forced air furnace w/o central air conditioning	Unit	ENRes_SF_Heater	20	6,961.00	$6,242.23	$–	$5,991.00	$800.00	$0.237	2.55	0.82	(3) (4)
Heat Pump Conversion	Single Family Home HVAC Conversions - Convert to Heat Pump 8.50 HSPF Heating Zone 3	Forced air furnace w/o central air conditioning	Unit	ENRes_SF_Heater	20	7,876.00	$7,062.75	$–	$5,991.00	$800.00	$0.237	2.65	0.90	(3) (4)
Heat Pump Conversion	Single Family Home HVAC Conversions - Convert to Heat Pump 8.50 HSPF Heating Zone 1 Cooling Zone 3	Forced air furnace with central air conditioning	Unit	ENRes_SF_HeatPump	20	4,380.00	$5,680.97	$–	$3,622.00	$800.00	$0.237	3.09	1.22	(4)
Heat Pump Conversion	Single Family Home HVAC Conversions - Convert to Heat Pump 8.50 HSPF Heating Zone 2 Cooling Zone 1	Forced air furnace with central air conditioning	Unit	ENRes_SF_HeatPump	20	6,719.00	$8,714.71	$–	$3,622.00	$800.00	$0.237	3.64	1.67	(4)
Heat Pump Conversion	Single Family Home HVAC Conversions - Convert to Heat Pump 8.50 HSPF Heating Zone 2 Cooling Zone 2	Forced air furnace with central air conditioning	Unit	ENRes_SF_HeatPump	20	6,451.00	$8,367.11	$–	$3,622.00	$800.00	$0.237	3.59	1.62	(4)
Heat Pump Conversion	Single Family Home HVAC Conversions - Convert to Heat Pump 8.50 HSPF Heating Zone 2 Cooling Zone 3	Forced air furnace with central air conditioning	Unit	ENRes_SF_HeatPump	20	6,035.00	$7,827.55	$–	$3,622.00	$800.00	$0.237	3.51	1.55	(4)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Heat Pump Conversion	Single Family Home HVAC Conversions - Convert to Heat Pump 8.50 HSPF Heating Zone 3 Cooling Zone 1	Forced air furnace with central air conditioning	Unit	ENRes_SF_HeatPump	20	7,634.00	$9,901.49	$–	$3,622.00	$800.00	$0.237	3.79	1.82	(4)
Heat Pump Upgrade	Existing Single Family Home Heat Pump - upgraded to 8.50 HSPF All Climates	Heat pump	Unit	ENRes_SF_HeatPump	20	2,597.00	$3,368.37	$–	$1,499.00	$250.00	$0.237	3.89	1.59	(1)
Heat Pump Upgrade	Existing Single Family Home Heat Pump - upgraded to 9.0 HSPF/14 SEER Heating Zone 1	Heat pump	Unit	ENRes_SF_HeatPump	15	128.00	$128.82	$–	$57.99	$–	$0.237	4.25	1.46	(5) (6)
Heat Pump Upgrade	Existing Single Family Home Heat Pump - upgraded to 9.0 HSPF/14 SEER Heating Zone 2	Heat pump	Unit	ENRes_SF_HeatPump	15	116.00	$116.75	$–	$57.99	$–	$0.237	4.25	1.37	(5) (6)
Heat Pump Upgrade	Existing Single Family Home Heat Pump - upgraded to 9.0 HSPF/14 SEER Heating Zone 3	Heat pump	Unit	ENRes_SF_HeatPump	15	115.00	$115.74	$–	$57.99	$–	$0.237	4.25	1.36	(5) (6)
Ductless Heat Pump	No supplemental fuel screen. Heating zone 2, cooling zone 1.	Zonal Electric	Unit	ENRes_SF_HeatPump	15	2,585.00	$2,601.66	$517.66	$4,800.00	$750.00	$0.237	1.91	0.58	(7) (8)
Ductless Heat Pump	No supplemental fuel screen. Heating zone 3, cooling zone 1.	Zonal Electric	Unit	ENRes_SF_HeatPump	15	292.00	$293.88	$2,871.08	$4,800.00	$750.00	$0.237	0.36	0.65	(7) (8)
Ductless Heat Pump	No supplemental fuel screen. Heating zone 2, cooling zone 2.	Zonal Electric	Unit	ENRes_SF_HeatPump	15	2,746.00	$2,763.70	$692.33	$4,800.00	$750.00	$0.237	1.97	0.63	(7) (8)
Ductless Heat Pump	No supplemental fuel screen. Heating zone 1, cooling zone 3.	Zonal Electric	Unit	ENRes_SF_HeatPump	15	3,131.00	$3,151.18	$1,081.33	$4,800.00	$750.00	$0.237	2.11	0.76	(7) (8)
Ductless Heat Pump	No supplemental fuel screen. Heating zone 2, cooling zone 3.	Zonal Electric	Unit	ENRes_SF_HeatPump	15	3,016.00	$3,035.44	$875.82	$4,800.00	$750.00	$0.237	2.07	0.71	(7) (8)
Prescriptive Duct Sealing	Duct Tightness - PTCS Duct Sealing - Average Heating System. Weighted average of Heating Zones 1-3.	Pre-existing duct leakage	Unit	ENRes_SF_Heater	20	1,588.69	$1,424.65	$–	$611.71	$350.00	$0.237	1.96	1.44	(9)
Electronically Commutated Motor (ECM) Blower Motor	ECM Blower Motor	Permanent split capacitor (PSC) motor	Unit	ENRes_SF_HVAC	18	515.00	$609.29	$–	$300.00	$50.00	$0.237	3.54	1.44	(10)
Whole House Fan	Whole House Fan	Displaced forced air dx cooling	Unit	ENRes_SF_CAC	18	446.00	$916.18	$–	$700.00	$200.00	$0.237	3.00	1.14	(11)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives. Based on median customer costs and RTF survey data.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] Idaho Power *Energy Efficiency Potential Study* by EnerNOC Utility Solutions Consulting. IPC Residential LoadMAP.
[2] Savings from Ecotope, Inc., heat pump sizing specifications and heat pump measure savings estimates. December 2009.
[3] Measure not cost-effective. Measure to be monitored in 2016. Measure included in the program to increase participation and to encourage adoption of higher-efficiency equipment.
[4] Savings from RTF. Res_SFHPConversion_V2_6.xlsm.2012.
[5] RTF. ResHeatingCoolingHeatPumpUpgradeSF_v2_8.xlsm.
[6] Customers receive incentive for going to an efficiency of at least an 8.5 HSPF heat pump. Incremental savings claimed for projects with an efficiency greater than a 9.0 HSPF. No additional incentive paid.
[7] RTF. ResHeatingCoolingDuctlessHeatPumpUpgradeSF_v2_.xlsm. 2014.
[8] Measure not cost-effective. Will continue to monitor in 2016.
[9] RTF. ResHeatingCoolingPrescriptiveDuctSeal_v1_0.xlsm. Weighted average of 2015 program participants in heating zone 1 (45%), heating zone 2 (43%), and heating zone 3 (12%). 2013.
[10] Idaho Power engineering calculations based on Integrated Design Lab inputs. 2015.
[11] AEG. Idaho Power *Energy Efficiency Potential Study*. 2012.

Home Improvement Program

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	146,305	
Program Incentives		126,204	I
Total Utility Cost	**$**	**272,509**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	747,426	M

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	303,580			
NPV Cumulative Energy (kWh)	5,126,717	$	472,888	
10% Credit (Northwest Power Act)			47,289	
Total Electric Savings		**$**	**520,177**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	579,536	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	76,057	NEB

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	520,177	$	272,509	1.91
Total Resource Cost Test		596,235		893,731	0.67
Ratepayer Impact Measure Test		520,177		852,045	0.61
Participant Cost Test		781,798		747,426	1.05

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + ((M-I) * NTG)
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	N/A
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Year: 2015 **Program**: Home Improvement Program **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	**Measure Descriptions**	**Replacing**	**Measure Unit**	**End Use**	**Measure Life (yrs)[a]**	**Annual Gross Energy Savings (kWh/yr)[b]**	**NPV Avoided Costs[c]**	**Non-Energy Benefit (NEB)**	**Gross Incremental Participant Cost[d]**	**Incentive/ Unit**	**Admin Cost ($/kWh)[e]**	**UC Ratio[f]**	**TRC Ratio[g]**	**Source**
Multi Family - Attic Insulation	Greater than R38. Electric heat. Program weighted average.	Attic Insulation R20 or less	Square Feet	ENRes_MF_Heater	45	1.01	$1.63	$–	$0.65	$0.15	$0.482	2.56	1.43	(1)
Multi Family - Windows	U-Factor of 0.30 or lower. Electric heat. Program weighted average.	Single pane metal, Single pane wood or double pane metal.	Square Feet	ENRes_MF_Heater	45	13.89	$22.39	$–	$23.43	$2.50	$0.482	2.43	0.74	(1) (2) (3)
Single Family - Attic Insulation	Greater than R38. Electric heat. Program weighted average.	Attic Insulation R20 or less	Square Feet	ENRes_SF_Heater	45	0.47	$0.76	$0.16	$0.85	$0.15	$0.482	2.01	0.85	(3) (4)
Single Family - Floor Insulation	Greater than R30 or fill floor cavity. Electric heat. Program weighted average.	Floor Insulation R5 or less	Square Feet	ENRes_SF_Heater	45	0.68	$1.10	$0.23	$1.12	$0.50	$0.482	1.32	0.92	(3) (4)
Single Family - Wall Insulation	Greater than R11 or fill wall cavity. Electric heat. Program weighted average.	Wall Insulation R5 or less	Square Feet	ENRes_SF_Heater	45	1.49	$2.40	$0.51	$1.11	$0.50	$0.482	1.97	1.59	(4)
Single Family - Window	U-Factor of 0.30 or lower. Electric heat. Program weighted average.	Single pane metal, Single pane wood or double pane metal.	Square Feet	ENRes_SF_Heater	45	5.81	$9.36	$2.31	$21.05	$2.50	$0.482	1.77	0.49	(3) (4)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] Based on average 2015 customer costs.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. Weighted average of savings by heating and cooling zone, heating and cooling system, and insulation level or U-Factor. ResWXMF_v2_2.xls. 2011.
[2] RTF. Incremental costs from ResWxMF_v2_2.xls. 2011.
[3] Measure not cost-effective. Will monitor in 2016.
[4] RTF. Weighted average of savings by heating and cooling zone, heating and cooling system, and insulation level or U-Factor. ResWXSF_v3_4.xls. 2015.
[5] RTF. Incremental costs from ResWxSF_v3_4.xls. 2015.

Rebate Advantage

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	27,438	
Program Incentives		58,000	I
Total Utility Cost	**$**	**85,438**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	89,884	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	388,148	$	85,438	4.54
Total Resource Cost Test		404,264		117,322	3.45
Ratepayer Impact Measure Test		388,148		591,871	0.66
Participant Cost Test		580,550		89,884	6.46

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	358,683			
NPV Cumulative Energy (kWh)	5,148,128	$	352,861	
10% Credit (Northwest Power Act)			35,286	
Total Electric Savings		**$**	**388,148**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	506,433	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	16,116	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + ((M-I) * NTG)
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	23%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Year: 2015 **Program**: Rebate Advantage **Market Segment**: Residential **Program Type**: Energy Efficiency

Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Benefit: Annual Gross Energy Savings (kWh/yr)[b]	Benefit: NPV Avoided Costs[c]	Benefit: Non-Energy Benefit (NEB)	Cost: Gross Incremental Participant Cost[d]	Cost: Incentive/ Unit	Cost: Admin Cost ($/kWh)[e]	Benefit/Cost Tests: UC Ratio[f]	Benefit/Cost Tests: TRC Ratio[g]	Source
ENERGY STAR manufactured home	New Energy Star Manufactured Home with Heat Pump - Heating Zone 1 Cooling Zone 3	Manufactured home built to Housing and Urban Development (HUD) code.	Home	Res_HVAC	23	3,254.00	$5,455.76	$269.93	$1,565.18	$1,000.00	$0.076	4.37	3.16	(1)
ENERGY STAR manufactured home	New Energy Star Manufactured Home with Heat Pump - Heating Zone 2 Cooling Zone 1	Manufactured home built to Housing and Urban Development (HUD) code.	Home	Res_HVAC	25	4,346.00	$7,737.09	283.34	$1,565.18	$1,000.00	$0.076	5.82	4.23	(1)
ENERGY STAR manufactured home	New Energy Star Manufactured Home with Heat Pump - Heating Zone 2 Cooling Zone 2	Manufactured home built to Housing and Urban Development (HUD) code.	Home	Res_HVAC	25	4,390.00	$7,815.42	$283.34	$1,565.18	$1,000.00	$0.076	5.86	4.27	(1)
ENERGY STAR manufactured home	New Energy Star Manufactured Home with Heat Pump - Heating Zone 2 Cooling Zone 3	Manufactured home built to Housing and Urban Development (HUD) code.	Home	Res_HVAC	25	4,472.00	$7,961.40	283.34	$1,565.18	$1,000.00	$0.076	5.94	4.33	(1)
ENERGY STAR manufactured home	New Energy Star Manufactured Home with Heat Pump - Heating Zone 3 Cooling Zone 1	Manufactured home built to Housing and Urban Development (HUD) code.	Home	Res_HVAC	26	5,516.00	10,089.34	$289.69	$1,565.18	$1,000.00	$0.076	7.11	5.23	(1)
ENERGY STAR manufactured home	New EcoRated Manufactured Home with Heat Pump - Heating Zone 1 Cooling Zone 3	Manufactured home built to Housing and Urban Development (HUD) code.	Home	Res_HVAC	24	3,619.00	$6,258.85	$276.76	$1,977.35	$1,000.00	$0.076	4.91	2.90	(1)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. NewMH_EStar_EcoRated_v1_3.xls. 2013.

See ya later, refrigerator®

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	215,749	
Program Incentives		11,430	I
Total Utility Cost	**$**	**227,179**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	–	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	274,073	$	227,179	1.21
Total Resource Cost Test		348,456		227,179	1.53
Ratepayer Impact Measure Test		274,073		559,929	0.49
Participant Cost Test		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	720,208			
NPV Cumulative Energy (kWh)	4,154,550	$	249,157	
10% Credit (Northwest Power Act)			24,916	
Total Electric Savings		**$**	**274,073**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	332,750	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	74,382	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	83%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Notes: No participant costs.
Program modified in 2015 to remove the participant incentive and to provide light-emitting diode (LED) bulbs to increase cost-effectiveness.

Year: 2015 **Program**: See ya later, refrigerator **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Freezer Recycling	Freezer removal and decommissioning		Freezer	ENRes_SF_Freezer	5	570.00	$185.95	$50.46	$–	$–	$0.300	1.09	1.38	(1)
Refrigerator Recycling	Refrigerator removal and decommissioning		Refrigerator	ENRes_SF_SecRef	6	356.00	$135.46	$41.09	$–	$–	$0.300	1.27	1.65	(1)
General Purpose LED Give away	Efficient Technology: LED Lamp Type: General Purpose and Dimmable Lumen Category: 665 to 1439 lumens Space Type: ANY		Lamp	ENRes_SF_Lighting	13	9.00	$6.72	$3.92	$–	$–	$0.300	2.49	3.94	(2)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] No participant cost.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResFridgeFreezeDecommissioning_v3_1.xlsm. 2014.
[2] RTF. ResLightingCFLandLEDLamps_v3_3.xlsm. 2014.

Simple Steps, Smart Savings™/Home Products Program

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	66,528	
Program Incentives		72,568	I
Total Utility Cost	**$**	**139,096**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	268,936	M

Summary of Cost-Effectiveness Results			
Test	**Benefit**	**Cost**	**Ratio**
Utility Cost Test	$ 468,399	$ 139,096	3.37
Total Resource Cost Test	1,621,352	335,464	4.83
Ratepayer Impact Measure Test	468,399	693,381	0.68
Participant Cost Test	1,779,807	268,936	6.62

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	770,822			
NPV Cumulative Energy (kWh)	6,588,709	$	425,817	
10% Credit (Northwest Power Act)			42,582	
Total Electric Savings		**$**	**468,399**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	554,286	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	1,152,953	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + ((M-I) * NTG)
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	30%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Notes: NEBs include the NPV of water savings from low-flow showerheads.

Year: 2015 **Program**: Simple Steps, Smart Savings/Home Products Program **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Refrigerator	ENERGY STAR Refrigerator - Any	Baseline refrigerator	Refrigerator	ENRes_SF_Refrigerator	17	29.00	$29.04	$–	$14.51	$30.00	$0.086	0.89	1.71	(1) (2)
Freezer	ENERGY STAR freezer No tiers. Any freezer	Baseline freezer	Freezer	ENRes_SF_Freezer	22	40.00	$51.71	$–	$4.26	$20.00	$0.086	2.21	6.71	(3) (4)
Clothes Washer	ENERGY STAR Clothes Washer - Any	Baseline clothes washers	Clothes washer	ENRes_SF_WtrHtr	14	121.00	$96.79		$80.43	$30.00	$0.086	2.40	1.07	(5)
Low-flow showerhead	Low-flow showerhead 2.0 gpm Any Shower Any Water Heating Retail	Showerhead 2.2 gpm or higher	Showerhead	ENRes_SF_WtrHtr	10	66.78	$39.49	$104.09	$27.29	$7.00	$0.086	3.10	4.35	(6)
Low-flow showerhead	Low-flow showerhead 1.75 gpm Any Shower Any Water Heating Retail	Showerhead 2.2 gpm or higher	Showerhead	ENRes_SF_WtrHtr	10	99.77	$58.99	$152.70	$27.29	$7.00	$0.086	3.79	5.90	(6)
Low-flow showerhead	Low-flow showerhead 1.5 gpm Any Shower Any Water Heating Retail	Showerhead 2.2 gpm or higher	Showerhead	ENRes_SF_WtrHtr	10	129.12	$76.35	$194.11	$27.29	$7.00	$0.086	4.22	7.04	(6)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResRefrigerator_v3_1.xls. 2013.
[2] Measure not cost-effective. Removed from the program in early 2015.
[3] RTF. ResFreezer_v2_2.xlsm. 2012.
[4] Measure expected to not be cost-effective with new savings. Removed from the program in early 2015.
[5] BPA. UES_Measure_List_4_1_20151021.xlsx. 2015.
[6] RTF. ResShowerheads_v2_1.xlsm. 2011. Adjusted savings by changing Electric Water Heating saturation from 64% to 52% to match Idaho Power mix.

Weatherization Assistance for Qualified Customers

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	114,229	
Community Action Partnership (CAP) Agency Payments		1,200,803	
Total Program Expenses	$	**1,315,032**	
Add: 2013 Evaluations Expenses (Amortized Year 3)		24,044	
Total Utility Cost	**$**	**1,339,076**	P
Idaho Power Indirect Overhead Expense Allocation—4.84%	$	64,811	OH
Additional State Funding		804,769	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	762,738	$	1,403,888	0.54
Total Resource Cost Test		945,162		2,208,657	0.43
Ratepayer Impact Measure Test		762,738		2,180,476	0.35
Participant Cost Test		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	550,021			
NPV Cumulative Energy (kWh)	7,894,048	$	693,398	
10% Credit (Northwest Power Act)			69,340	
Total Electric Savings		**$**	**762,738**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	776,588	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits				
Health and Safety			153,863	
Repair			28,562	
Other			–	
Non-Energy Benefits Total		**$**	**182,424**	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P + OH
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + OH + M
Ratepayer Impact Measure Test	= S * NTG	= P + OH + (B * NTG)
Participant Cost Test	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	234%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Notes: Savings from the billing analysis of the 2012 weatherization projects. Single family/multi-family/townhomes = 1,551 kWh/per home. Manufactured homes = 2,568 kWh/home. Non-profits = 1.03 kWh/heated ft^2.
Program cost-effectiveness incorporated IPUC staff recommendations from case GNR-E-12-01. Recommendations include: claimed 100% of savings; increased NTG to 100%; added a 10% conservation preference adder; health, safety, and repair NEBs; and allocation of indirect overhead expenses.
No customer participant costs. Costs shown are from the US Department of Energy (DOE) state weatherization assistance program.

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Weatherization Solutions for Eligible Customers

Segment: Residential
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	202,803	
Weatherization LLC Payments		1,040,466	
Total Program Expenses	$	**1,243,269**	
Add: 2013 Evaluations Expenses (Amortized Year 3)		24,044	
Total Utility Cost	**$**	**1,267,313**	P
Idaho Power Indirect Overhead Expense Allocation—4.84%	$	61,338	OH
Additional State Funding		–	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	600,401	$	1,328,651	0.45
Total Resource Cost Test		661,001		1,328,651	0.50
Ratepayer Impact Measure Test		600,401		1,939,955	0.31
Participant Cost Test		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	432,958			
NPV Cumulative Energy (kWh)	6,213,929	$	545,819	
10% Credit (Northwest Power Act)			54,582	
Total Electric Savings		**$**	**600,401**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	611,304	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits				
Health and Safety			52,303	
Repair			8,296	
Other			–	
Non-Energy Benefits Total		**$**	**60,599**	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P +OH
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + OH + M
Ratepayer Impact Measure Test	= S * NTG	= P + OH + (B * NTG)
Participant Cost Test	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	221%
Average Customer Segment Rate/kWh	$0.086
Line Losses	9.60%

Notes: Savings from the billing analysis of the 2012 weatherization projects. Single family/multi-family/townhomes = 2,108 kWh/per home. Manufactured homes = 3,426 kWh/home.
Program cost-effectiveness incorporated IPUC staff recommendations from Case No. GNR-E-12-01. Recommendations include: claimed 100% of savings; increased NTG to 100%; added a 10% conservation preference adder; health, safety, and repair NEBs; and allocation of indirect overhead expenses.
No customer participant costs.

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Building Efficiency

Segment: Commercial
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	332,374	
Program Incentives		1,829,626	I
Total Utility Cost	**$**	**2,162,001**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	4,131,071	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	16,504,880	$	2,162,001	7.63
Total Resource Cost Test		16,504,880		4,463,445	3.70
Ratepayer Impact Measure Test		16,504,880		15,021,411	1.10
Participant Cost Test		14,689,037		4,131,071	3.56

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	23,232,017			
NPV Cumulative Energy (kWh)	225,023,280	$	15,004,436	
10% Credit (Northwest Power Act)			1,500,444	
Total Electric Savings		**$**	**16,504,880**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	12,859,411	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	–	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + ((M-I) * NTG)
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	16%
Average Customer Segment Rate/kWh	$0.057
Line Losses	9.60%

Year: 2015 **Program**: Building Efficiency **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	**Measure Descriptions**	**Replacing**	**Measure Unit**	**End Use**	**Measure Life (yrs)[a]**	**Annual Gross Energy Savings (kWh/yr)[b]**	**NPV Avoided Costs[c]**	**Non-Energy Benefit (NEB)**	**Gross Incremental Participant Cost[d]**	**Incentive/ Unit**	**Admin Cost ($/kWh)[e]**	**UC Ratio[f]**	**TRC Ratio[g]**	**Source**
Lighting	Interior Light Load Reduction. Part A: 10-19.9% below code.	Code standards	ft^2	ENComm_InsLt	14	0.51	$0.45	$–	$0.26	$0.10	$0.014	4.23	1.70	(1)
Lighting	Interior Light Load Reduction. Part B: 20-29.9% below code.	Code standards	ft^2	ENComm_InsLt	14	1.03	$0.92	$–	$0.51	$0.20	$0.014	4.27	1.75	(1)
Lighting	Interior Light Load Reduction. Part C: Equal to or greater than 30% below code.	Code standards	ft^2	ENComm_InsLt	14	2.33	$2.07	$–	$0.89	$0.30	$0.014	6.22	2.24	(1)
Lighting	Exterior Light Load Reduction. Minimum of 15% below code.	Code standards	kW	IPC_Outdoor Lighting	15	4,059.00	$2,557.05	$–	$168.00	$160.00	$0.014	11.79	11.37	(1)
Lighting	Daylight Photo Controls	Code standards	ft^2	ENComm_InsLt	14	0.94	$0.84	$–	$0.91	$0.25	$0.014	3.17	0.90	(1) (2)
Lighting	Occupancy sensors	Code standards	sensor	ENComm_InsLt	8	366.00	$195.53	$–	$38.26	$25.00	$0.014	6.49	4.51	(1)
Lighting	High Efficiency Exit Signs	Code standards	sign	IPC_8760	16	28.00	$25.38	$–	$10.83	$7.50	$0.014	3.22	2.26	(1)
Air conditioning (AC)	6-11 ton AC unit that meets CEE Tier 1 12-19 ton AC unit that meets CEE Tier 1 20-25 ton AC unit that meets CEE Tier 1 (≥ 65,000 Btu/hr & ≤ 300,000 Btu/hr)	Code standards	tons	ENComm_Cooling	15	40.30	$48.81	$–	$36.18	$30.00	$0.014	1.60	1.33	(3)
Air conditioning	0-5 ton AC unit that meets CEE Tier 2 6-11 ton AC unit that meets CEE Tier 2 12-19 ton AC unit that meets CEE Tier 2 20-25 ton AC unit that meets CEE Tier 2 (≤ 300,000 Btu/hr)	Code standards	tons	ENComm_Cooling	15	90.16	$109.20	$–	$115.37	$75.00	$0.014	1.43	0.94	(3) (4)
Air conditioning	0-5 ton Heat Pump (HP) unit that meets CEE Tier 1 6-11 ton HP unit that meets CEE Tier 1 12-19 ton HP unit that meets CEE Tier 1 20-25 ton HP unit that meets CEE Tier 1 (≤ 300,000 Btu/hr)	Code standards	tons	ENComm_Cooling	15	27.25	$33.01	$–	$31.83	$30.00	$0.014	1.09	1.02	(3)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Air conditioning	6-11 ton AC VRF unit that meets CEE Tier 1 12-19 ton AC VRF unit that meets CEE Tier 1 20-25 ton AC VRF unit that meets CEE Tier 1 (≥ 65,000 Btu/hr & ≤ 300,000 Btu/hr)	Code standards	tons	ENComm_Cooling	15	132.60	$160.61	$–	$115.37	$75.00	$0.014	2.09	1.37	(3)
Air conditioning	6-11 ton HP VRF unit that meets CEE Tier 1 12-19 ton HP VRF unit that meets CEE Tier 1 20-25 ton HP VRF unit that meets CEE Tier 1 (≥ 65,000 Btu/hr & ≤ 300,000 Btu/hr)	Code standards	tons	ENComm_Cooling	15	332.91	$403.23	$–	$95.30	$75.00	$0.014	5.06	4.03	(3)
Air conditioning	Air-cooled chiller condenser, IPLV 14.0 EER or higher	Code standards	tons	ENComm_Cooling	20	472.44	$729.04	$–	$86.12	$80.00	$0.014	8.42	7.86	(1)
Air conditioning	Water-cooled chiller electronically operated, reciprocating and positive displacement	Code standards	tons	ENComm_Cooling	20	212.96	$328.63	$–	$38.82	$40.00	$0.014	7.65	7.86	(5)
Air conditioning	Airside economizer	Code standards	ton of cooling	ENComm_Cooling	15	344.00	$416.66	$–	$81.36	$75.00	$0.014	5.22	4.84	(1)
Air conditioning	Direct evaporative cooler	Code standards	tons	ENComm_Cooling	15	399.00	$483.28	$–	$364.00	$200.00	$0.014	2.35	1.31	(1)
Building Shell	Reflective roof treatment	Code standards	ft^2 roof area	ENComm_Cooling	15	0.12	$0.14	$–	$0.05	$0.05	$0.014	2.72	2.72	(1)
Controls	Energy Management System (EMS) controls. Part A: 2 strategies	Code standards	tons of cooling	ENComm_Cooling	15	454.00	$549.90	$–	$162.49	$70.00	$0.014	7.20	3.26	(1)
Controls	EMS controls. Part B: 3 strategies	Code standards	tons of cooling	ENComm_Cooling	15	496.00	$600.77	$–	$162.49	$80.00	$0.014	6.91	3.55	(6)
Controls	EMS controls. Part C: 4 strategies	Code standards	tons of cooling	ENComm_Cooling	15	498.95	$604.34	$–	$162.49	$90.00	$0.014	6.23	3.57	(1)
Controls	EMS controls. Part D: 5 strategies	Code standards	tons of cooling	ENComm_Cooling	15	511.75	$619.85	$–	$162.49	$100.00	$0.014	5.78	3.65	(6)
Controls	Guest room energy management system	Code standards	ton	ENComm_HVAC	11	384.00	$305.83	$–	$57.50	$50.00	$0.014	5.52	4.86	(1)
Controls	Part A. Variable speed drive on HVAC system applications: -chilled water pumps -condenser water pumps -cooling tower fans	Code standards	HP	ENComm_HVAC	15	268.00	$277.85	$–	$165.33	$60.00	$0.014	4.36	1.64	(1)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Controls	Part B. Variable speed drive on HVAC system applications: -supply -return -outside air -make-up air -hot water pumps	Code standards	HP	ENComm_HVAC	15	996.00	$1,032.61	$–	$142.05	$100.00	$0.014	9.06	6.62	(1)
Appliances with Electric Water Heating	Efficient Laundry Machines (electric)	Code standards	unit	ENComm_WtrHtr	10	756.00	$466.46	$–	$200.00	$125.00	$0.014	3.44	2.22	(1)
Appliances with Electric Water Heating	ENERGY STAR® undercounter (residential style) dishwasher	Code standards	machine	ENComm_Misc	12	2,210.00	$1,652.76	$243.80	$232.00	$200.00	$0.014	7.16	7.21	(7)
Appliances with Electric Water Heating	ENERGY STAR commercial dishwasher	Code standards	machine	ENComm_Misc	12	5,561.00	$4,158.83	$657.52	$3,978.00	$500.00	$0.014	7.20	1.19	(7)
Refrigeration	Refrigeration head pressure controls	Code standards	horsepower	ENComm_Refrigeration	16	225.00	$214.94	$–	$166.60	$40.00	$0.014	4.98	1.27	(1)
Refrigeration	Refrigeration floating suction controls	Code standards	horsepower	ENComm_Refrigeration	16	77.00	$73.56	$–	$53.75	$10.00	$0.014	6.64	1.34	(1)
Refrigeration	Efficient refrigeration condensers	Code standards	tons of refrigeration	ENComm_Refrigeration	15	114.00	$103.17	$–	$35.00	$20.00	$0.014	4.78	2.82	(1)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] Idaho Power TRM prepared by ADM Associates, Inc. 2015.
[2] Measure not cost-effective. Measure to remain in the program due to unquantifiable NEBs.
[3] Idaho Power TRM prepared by ADM Associates, Inc. 2015. Weighted average of 6–25 ton units.
[4] Measure not cost-effective. Measure to be monitored in 2016 to adjust weighted average. Measure included in the program to increase participation in a cost-effective program and to encourage the adoption of higher-efficiency equipment.
[5] Idaho Power TRM prepared by ADM Associates, Inc. 2015. Averaged water cooled chillers.
[6] Idaho Power TRM prepared by ADM Associates, Inc. 2015. Calculated from TRM spreadsheets.
[7] Idaho Power TRM prepared by ADM Associates, Inc. 2015. NEBs from water savings from RTF. ComDishwasher_v1_2.xlsm. 2012.

Custom Efficiency

Segment: Industrial
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	1,642,466	
Program Incentives		7,388,162	I
Total Utility Cost	**$**	**9,012,628**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	18,909,276	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	36,315,759	$	$9,012,628	4.03
Total Resource Cost Test		36,315,759		20,533,742	1.77
Ratepayer Impact Measure Test		36,315,759		27,450,603	1.32
Participant Cost Test		25,826,137		18,909,276	1.37

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	55,247,192			
NPV Cumulative Energy (kWh)	504,683,660	$	33,014,326	
10% Credit (Northwest Power Act)			3,301,433	
Total Electric Savings		**$**	**36,315,759**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	18,437,975	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	–	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + ((M-I) * NTG)
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	37%
Average Customer Segment Rate/kWh	$0.037
Line Losses	9.60%

Notes: Energy savings are unique by project and are reviewed by Idaho Power engineering staff or third-party consultants. Each project must complete a certification inspection.
Green Rewind initiative is available to agricultural, commercial, and industrial customers. Commercial and industrial motor rewinds are paid under Custom Efficiency.

Year: 2015 **Program**: Custom Efficiency—Green Motors **Market Segment**: Industrial **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Green Motors Program Rewind: Motor size 15HP	Green Motors Program Rewind: Motor size 15HP	Standard rewind practice	Motor	MF_Motors	8	601.00	$309.46	$–	$152.56	$30.00	$0.050	5.15	1.69	(1)
Green Motors Program Rewind: Motor size 20HP	Green Motors Program Rewind: Motor size 20HP	Standard rewind practice	Motor	MF_Motors	8	804.00	$413.98	$–	$170.21	$40.00	$0.050	5.16	1.97	(1)
Green Motors Program Rewind: Motor size 25HP	Green Motors Program Rewind: Motor size 25HP	Standard rewind practice	Motor	MF_Motors	8	1,052.00	$541.68	$–	$194.47	$50.00	$0.050	5.28	2.19	(1)
Green Motors Program Rewind: Motor size 30HP	Green Motors Program Rewind: Motor size 30HP	Standard rewind practice	Motor	MF_Motors	8	1,133.00	$583.39	$–	$213.60	$60.00	$0.050	5.00	2.16	(1)
Green Motors Program Rewind: Motor size 40HP	Green Motors Program Rewind: Motor size 40HP	Standard rewind practice	Motor	MF_Motors	8	1,319.00	$679.16	$–	$261.02	$80.00	$0.050	4.65	2.08	(1)
Green Motors Program Rewind: Motor size 50HP	Green Motors Program Rewind: Motor size 50HP	Standard rewind practice	Motor	MF_Motors	8	1,418.00	$730.14	$–	$288.96	$100.00	$0.050	4.27	2.03	(1)
Green Motors Program Rewind: Motor size 60HP	Green Motors Program Rewind: Motor size 60HP	Standard rewind practice	Motor	MF_Motors	9	1,476.00	$851.27	$–	$340.79	$120.00	$0.050	4.39	2.05	(1)
Green Motors Program Rewind: Motor size 75HP	Green Motors Program Rewind: Motor size 75HP	Standard rewind practice	Motor	MF_Motors	9	1,519.00	$876.07	$–	$368.37	$150.00	$0.050	3.88	1.97	(1)
Green Motors Program Rewind: Motor size 100HP	Green Motors Program Rewind: Motor size 100HP	Standard rewind practice	Motor	MF_Motors	9	2,005.00	$1,156.37	$–	$456.96	$200.00	$0.050	3.85	2.08	(1)
Green Motors Program Rewind: Motor size 125HP	Green Motors Program Rewind: Motor size 125HP	Standard rewind practice	Motor	MF_Motors	8	2,598.00	$1,337.73	$–	$513.21	$250.00	$0.050	3.52	2.08	(1)
Green Motors Program Rewind: Motor size 150HP	Green Motors Program Rewind: Motor size 150HP	Standard rewind practice	Motor	MF_Motors	8	3,089.00	$1,590.54	$–	$571.66	$300.00	$0.050	3.50	2.19	(1)
Green Motors Program Rewind: Motor size 200HP	Green Motors Program Rewind: Motor size 200HP	Standard rewind practice	Motor	MF_Motors	8	4,088.00	$2,104.94	$–	$688.20	$400.00	$0.050	3.48	2.36	(1)
Green Motors Program Rewind: Motor size 250HP	Green Motors Program Rewind: Motor size 250HP	Standard rewind practice	Motor	MF_Motors	9	4,972.00	$2,867.56	$–	$884.52	$500.00	$0.050	3.83	2.53	(1)
Green Motors Program Rewind: Motor size 300HP	Green Motors Program Rewind: Motor size 300HP	Standard rewind practice	Motor	MF_Motors	9	5,935.00	$3,422.96	$–	$894.08	$600.00	$0.050	3.82	2.87	(1)
Green Motors Program Rewind: Motor size 350HP	Green Motors Program Rewind: Motor size 350HP	Standard rewind practice	Motor	MF_Motors	9	6,919.00	$3,990.47	$–	$937.09	$700.00	$0.050	3.82	3.11	(1)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Green Motors Program Rewind: Motor size 400HP	Green Motors Program Rewind: Motor size 400HP	Standard rewind practice	Motor	MF_Motors	9	7,848.00	$4,526.27	$–	$1,046.64	$800.00	$0.050	3.80	3.15	(1)
Green Motors Program Rewind: Motor size 450HP	Green Motors Program Rewind: Motor size 450HP	Standard rewind practice	Motor	MF_Motors	9	8,811.00	$5,081.67	$–	$1,144.06	$900.00	$0.050	3.79	3.21	(1)
Green Motors Program Rewind: Motor size 500HP	Green Motors Program Rewind: Motor size 500HP	Standard rewind practice	Motor	MF_Motors	9	9,804.00	$5,654.37	$–	$1,235.98	$1,000.00	$0.050	3.79	3.28	(1)
Green Motors Program Rewind: Motor size 600HP	Green Motors Program Rewind: Motor size 600HP	Standard rewind practice	Motor	MF_Motors	7	14,689.00	$6,629.91	$–	$1,821.36	$1,200.00	$0.050	3.43	2.59	(1)
Green Motors Program Rewind: Motor size 700HP	Green Motors Program Rewind: Motor size 700HP	Standard rewind practice	Motor	MF_Motors	7	17,065.00	$7,702.32	$–	$1,987.11	$1,400.00	$0.050	3.42	2.71	(1)
Green Motors Program Rewind: Motor size 800HP	Green Motors Program Rewind: Motor size 800HP	Standard rewind practice	Motor	MF_Motors	7	19,461.00	$8,783.76	$–	$2,204.75	$1,600.00	$0.050	3.41	2.76	(1)
Green Motors Program Rewind: Motor size 900HP	Green Motors Program Rewind: Motor size 900HP	Standard rewind practice	Motor	MF_Motors	7	21,847.00	$9,860.69	$–	$2,430.63	$1,800.00	$0.050	3.41	2.80	(1)
Green Motors Program Rewind: Motor size 1500HP	Green Motors Program Rewind: Motor size 1500HP	Standard rewind practice	Motor	MF_Motors	7	35,891.00	$16,199.48	$–	$3,584.53	$3,000.00	$0.050	2.33	2.15	(1)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. IndGreenMotorsRewind_v2_0.xlsm. 2013.

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Easy Upgrades

Segment: Commercial
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	1,116,786	
Program Incentives		3,234,079	I
Total Utility Cost	**$**	**4,350,865**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	6,487,414	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	16,762,544	$	4,350,865	3.85
Total Resource Cost Test		16,762,544		7,604,200	2.20
Ratepayer Impact Measure Test		16,762,544		17,411,028	0.96
Participant Cost Test		16,294,243		6,487,414	2.51

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	23,594,701			
NPV Cumulative Energy (kWh)	228,536,205	$	15,238,677	
10% Credit (Northwest Power Act)			1,523,868	
Total Electric Savings		**$**	**16,762,544**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	13,060,164	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	–	NEB

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + ((M-I) * NTG)
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	33%
Average Customer Segment Rate/kWh	$0.057
Line Losses	9.60%

Notes: Measure inputs from Evergreen Consulting Group or the *Technical Reference Manual* prepared by ADM Associates, Inc., unless otherwise noted.

Year: 2015 **Program**: Easy Upgrades **Market Segment**: Commercial **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	**Measure Descriptions**	**Replacing**	**Measure unit**	**End Use**	**Measure Life (yrs)[a]**	**Annual Gross Energy Savings (kWh/yr)[b]**	**NPV Avoided Costs[c]**	**Non-Energy Benefit (NEB)**	**Gross Incremental Participant Cost[d]**	**Incentive/ Unit**	**Admin Cost ($/kWh)[e]**	**UC Ratio[f]**	**TRC Ratio[g]**	**Source**
Standard/High Performance T8 Fluorescents	4-foot T8	4-foot T12	Fixture	ENComm_InsLt	11	180.28	$129.78	$–	$61.15	$33.21	$0.052	3.05	1.84	(1)
Standard T8 Fluorescents	6-foot T8	6-foot T12	Fixture	ENComm_InsLt	11	332.20	$239.15	$–	$76.03	$16.00	$0.052	7.19	2.56	(1)
Standard T8 Fluorescents	8-foot T8	8-foot T12	Fixture	ENComm_InsLt	11	262.06	$188.66	$–	$80.56	$22.75	$0.052	5.19	2.00	(1)
Standard/High Performance T8 Fluorescents	4-foot & 8-foot T8	8-foot T12HO	Fixture	ENComm_InsLt	11	564.84	$406.63	$–	$75.36	$46.18	$0.052	5.38	3.88	(1)
T5 (Non-HO) Fluorescents	4-foot T5	4-foot T12	Fixture	ENComm_InsLt	11	156.85	$112.92	$–	$76.21	$36.18	$0.052	2.55	1.34	(1)
T5/T8 High Bay - New Fixture	4-foot T8/T5	Fixture using > 200 input watts	Fixture	ENComm_InsLt	11	1,194.00	$859.57	$–	$216.24	$137.72	$0.052	4.30	3.09	(1)
Relamp T8/ T5HO to Reduced Wattage T8/ T5HO	Reduced wattage T8/T5 re-lamp		Fixture	ENComm_InsLt	8	130.58	$69.76	$–	$23.07	$1.00	$0.052	8.96	2.34	(1)
Permanent Fixture Removal	Permanent Fixture Removal		Fixture	ENComm_InsLt	8	878.14	$469.14	$–	$35.78	$22.73	$0.052	6.86	5.76	(1)
Screw-in CFLs/ cold-cathode	Screw-in CFLs/cold-cathode	Fixture using > 40 input watts	Fixture	ENComm_InsLt	6	164.23	$66.03	$–	$33.23	$5.08	$0.052	4.85	1.58	(1)
Hardwired CFLs	Hardwired CFLs	Fixture using > 90 input watts	Fixture	ENComm_InsLt	6	366.94	$147.52	$–	$94.75	$50.00	$0.052	2.14	1.30	(1)
LED Replacement Lamps	LED Replacement Lamps	Fixture using > 20 input watts	Fixture	ENComm_InsLt	12	154.10	$119.85	$–	$48.66	$24.25	$0.052	3.71	2.11	(1)
Pulse Start/ Electronic Metal Halide	Pulse Start/Electronic Metal Halide	Fixture using > 170 input watts	Fixture	ENComm_InsLt	11	1,091.70	$785.92	$–	$153.66	$105.55	$0.052	4.84	3.73	(1)
LED Exit Sign	LED Exit Sign	Exit sign using ≥ 18 watts	Fixture	IPC_8760	12	230.68	$163.16	$–	$68.69	$40.00	$0.052	3.14	2.02	(1)
Lighting Controls	Lighting Controls	Manual controls	Fixture	ENComm_InsLt	10	280.14	$184.93	$–	$111.74	$49.02	$0.052	2.91	1.46	(1)
Standard/High Performance T8 Fluorescents	4-foot T8	4-foot T12	Fixture	IPC_Outdoor Lighting	11	166.42	$78.94	$–	$61.15	$13.80	$0.052	3.52	1.13	(1)
Standard T8 Fluorescents	6-foot T8	6-foot T12	Fixture	IPC_Outdoor Lighting	11	386.42	$183.29	$–	$76.03	$14.00	$0.052	5.38	1.91	(1)
Standard T8 Fluorescents	8-foot T8	8-foot T12	Fixture	IPC_Outdoor Lighting	11	303.92	$144.16	$–	$80.56	$19.50	$0.052	4.08	1.50	(1)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Standard/High Performance T8 Fluorescents	4-foot & 8-foot T8	8-foot T12HO	Fixture	IPC_Outdoor Lighting	11	913.16	$433.13	$–	$75.36	$21.48	$0.052	6.28	3.53	(1)
T5 (Non-HO) Fluorescents	4-foot T5	4-foot T12	Fixture	IPC_Outdoor Lighting	11	181.22	$85.96	$–	$76.21	$20.47	$0.052	2.88	1.00	(1)
T5/T8 High Bay - New Fixture	4-foot T8/T5	Fixture using > 200 input watts	Fixture	IPC_Outdoor Lighting	11	1,643.60	$779.60	$–	$216.24	$102.71	$0.052	4.14	2.58	(1)
Permanent Fixture Removal	Permanent Fixture Removal		Fixture	IPC_Outdoor Lighting	8	1,018.40	$352.51	$–	$35.78	$14.09	$0.052	5.26	3.97	(1)
Screw-in CFLs/ cold-cathode	Screw-in CFLs/cold-cathode	Fixture using > 40 input watts	Fixture	IPC_Outdoor Lighting	6	190.46	$48.57	$–	$33.23	$5.08	$0.052	3.24	1.13	(1)
Hardwired CFLs	Hardwired CFLs	Fixture using > 90 input watts	Fixture	IPC_Outdoor Lighting	6	425.55	$108.52	$–	$94.75	$35.00	$0.052	1.90	0.93	(1) (2)
LED Replacement Lamps	LED Replacement Lamps	Fixture using > 20 input watts	Fixture	IPC_Outdoor Lighting	12	178.71	$91.95	$–	$48.66	$19.25	$0.052	3.22	1.59	(1)
Pulse Start/ Electronic Metal Halide	Pulse Start/Electronic Metal Halide	Fixture using > 170 input watts	Fixture	IPC_Outdoor Lighting	11	1,265.40	$600.21	$–	$153.66	$45.68	$0.052	5.38	2.73	(1)
Lighting Controls	Lighting Controls	Manual controls	Fixture	IPC_Outdoor Lighting	10	255.65	$110.71	$–	$111.74	$45.50	$0.052	1.88	0.89	(1) (2)
Refrigeration Case Lighting	Case # 1 - T8 fluorescent lighting and electronic ballast (per lamp)	Case # 1 - T12 fluorescent lighting	Lamp	ENComm_Refrigeration	6	309.31	$119.17	$–	$44.70	$15.00	$0.052	3.83	1.96	(3)
Refrigeration Case Lighting	Case # 2 - LED display case lighting (per linear foot)	Case # 2 - T12 fluorescent lighting	Linear foot	ENComm_Refrigeration	8	111.25	$57.04	$17.07	$42.22	$15.00	$0.052	2.74	1.54	(4)
Refrigeration Case Lighting	Case # 3 - LED display case lighting (per linear foot)	Case #3 - T8 fluorescent lighting	Linear foot	ENComm_Refrigeration	8	77.75	$39.86	$15.83	$43.86	$10.00	$0.052	2.84	1.16	(5)
Air Conditioning (AC) Units	6-11 ton AC unit that meets CEE Tier 1 12-19 ton AC unit that meets CEE Tier 1 20-25 ton AC unit that meets CEE Tier 1	Standard 6-11 ton AC unit Standard 12-19 ton AC unit Standard 20-25 ton AC unit	Tons	ENComm_Cooling	15	40.30	$48.81	$–	$36.18	$30.00	$0.052	1.52	1.28	(6)
AC Units	1-5 ton AC unit that meets CEE Tier 2 6-11 ton AC unit that meets CEE Tier 2 12-19 ton AC unit that meets CEE Tier 2 20-25 ton AC unit that meets CEE Tier 2	Standard 1-5 ton AC unit Standard 6-11 ton AC unit Standard 12-19 ton AC unit Standard 20-25 ton AC unit	Tons	ENComm_Cooling	15	90.16	$109.20	$–	$115.37	$75.00	$0.052	1.37	0.91	(2) (6)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
AC Units	6-11 ton AC VRF unit that meets CEE Tier 1 12-19 ton AC VRF unit that meets CEE Tier 1 20-25 ton AC VRF unit that meets CEE Tier 1	Standard 6-11 ton AC VRF unit Standard 12-19 ton AC VRF unit Standard 20-25 ton AC VRF unit	Tons	ENComm_Cooling	15	132.60	$160.61	$–	$115.37	$75.00	$0.052	1.96	1.31	(6)
Heat Pump (HP) units	1-5 ton HP unit that meets CEE Tier 1 6-11 ton HP unit that meets CEE Tier 1 12-19 ton HP unit that meets CEE Tier 1 20-25 ton HP unit that meets CEE Tier 1	Standard 1-5 ton HP unit Standard 6-11 ton HP unit Standard 12-19 ton HP unit Standard 20-25 ton HP unit	Tons	ENComm_Cooling	15	27.25	$33.01	$–	$31.83	$30.00	$0.052	1.05	0.99	(2) (6)
HP Units	6-11 ton HP VRF unit that meets CEE Tier 1 12-19 ton HP VRF unit that meets CEE Tier 1 20-25 ton HP VRF unit that meets CEE Tier 1	Standard 6-11 ton HP VRF unit Standard 12-19 ton HP VRF unit Standard 20-25 ton HP VRF unit	Tons	ENComm_Cooling	15	332.91	$403.23	$–	$95.30	$75.00	$0.052	4.37	3.58	(6)
Chillers	Air-cooled chiller condenser, IPLV 14.0 EER or higher	Standard air-cooled chiller	Tons	ENComm_Cooling	20	472.44	$729.04	$–	$86.12	$80.00	$0.052	6.97	6.59	(7)
Chillers	Water-cooled chiller electronically operated, reciprocating and positive displacement	Standard water-cooled chiller	Tons	ENComm_Cooling	20	212.96	$328.63	$–	$38.82	$40.00	$0.052	6.43	6.59	(8)
Economizers	Airside economizer control addition	No prior control	Ton of cooling	ENComm_Cooling	15	634.00	$767.92	$–	$155.01	$100.00	$0.052	5.78	4.09	(7)
Economizers	Airside economizer control repair	Non-functional economizer	Ton of cooling	ENComm_Cooling	15	634.00	$767.92	$–	$73.65	$50.00	$0.052	9.26	7.20	(7)
Evaporative coolers/Pre-coolers	Direct evaporative cooler	Replacing standard AC unit	Tons	ENComm_Cooling	15	399.00	$483.28	$–	$364.00	$200.00	$0.052	2.19	1.26	(7)
Automated Controls	EMS controls with 2 strategies	Proposed strategy not existing (retrofit system)	Tons of cooling	ENComm_Cooling	15	918.00	$1,111.91	$–	$197.98	$125.00	$0.052	6.44	4.53	(7)
Automated Controls	EMS controls with 3 strategies	Proposed strategy not existing (retrofit system)	Tons of cooling	ENComm_Cooling	15	1,243.00	$1,505.56	$–	$197.98	$150.00	$0.052	7.01	5.73	(9)
Automated Controls	EMS controls with 4 strategies	Proposed strategy not existing (retrofit system)	Tons of cooling	ENComm_Cooling	15	1,251.00	$1,515.25	$–	$197.98	$175.00	$0.052	6.31	5.76	(7)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Automated Controls	EMS controls with 5 strategies	Proposed strategy not existing (retrofit system)	Tons of cooling	ENComm_Cooling	15	1,268.00	$1,535.84	$–	$197.98	$200.00	$0.052	5.78	5.82	(9)
Automated Controls	EMS controls with 2 strategies	Proposed strategy not existing (new system)	Tons of cooling	ENComm_Cooling	15	454.00	$549.90	$–	$162.49	$70.00	$0.052	5.87	2.95	(7)
Automated Controls	EMS controls with 3 strategies	Proposed strategy not existing (new system)	Tons of cooling	ENComm_Cooling	15	496.00	$600.77	$–	$162.49	$80.00	$0.052	5.68	3.19	(9)
Automated Controls	EMS controls with 4 strategies	Proposed strategy not existing (new system)	Tons of cooling	ENComm_Cooling	15	498.95	$604.34	$–	$162.49	$90.00	$0.052	5.21	3.21	(7)
Automated Controls	EMS controls with 5 strategies	Proposed strategy not existing (new system)	Tons of cooling	ENComm_Cooling	15	511.75	$619.85	$–	$162.49	$100.00	$0.052	4.90	3.28	(9)
Automated Controls	Lodging room occupancy controls	Manual controls	Ton	ENComm_HVAC	11	430.00	$342.46	$–	$150.61	$75.00	$0.052	3.52	1.98	(7)
Premium Windows	Low U-value, U-factor of .30 or less	Standard windows	ft^2 window area	ENComm_HVAC	25	5.89	$9.35	$–	$5.92	$2.50	$0.052	3.33	1.50	(7)
Reflective Roofing	Adding reflective roof treatment	Non-reflective low pitch roof	ft^2 roof area	ENComm_Cooling	15	0.12	$0.14	$–	$0.05	$0.05	$0.052	2.51	2.51	(7)
Wall Insulation	Increase to R11 min. insulation	Insulation level, R2.5 or less	ft^2 wall area	ENComm_HVAC	25	0.41	$0.66	$–	$0.66	$0.40	$0.052	1.56	0.96	(7) (14)
Wall Insulation	Increase to R19 min. insulation	Insulation level, R2.5 or less	ft^2 wall area	ENComm_HVAC	25	0.47	$0.74	$–	$0.66	$0.55	$0.052	1.29	1.08	(7)
Computers	PC network power management	No central control software in place	Unit	ENComm_Office	4	135.00	$33.35	$–	$12.00	$10.00	$0.052	1.96	1.75	(7)
Laundry Machines	High efficiency washer	Standard washer, electric HW	Unit	ENComm_WtrHtr	10	756.00	$466.46	$–	$200.00	$125.00	$0.052	2.84	1.95	(7)
Stock Tank/ Fountain	Energy free freeze resistant stock tank	Thermostatically controlled electric resistance element freeze protection	Unit	Comm_Agriculture	10	1,176.00	$1,024.88	$–	$428.36	$100.00	$0.052	6.36	2.09	(10)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Residential-type electric water heater	EF 0.94 or higher, 25-54 gallon EF 0.95 or higher, 45-54 gallon EF 0.93 or higher, 55-74 gallon EF 0.92 or higher, 75-99 gallon EF 0.85 or higher, 100-119 gallon	Standard electric water heater	Unit	ENComm_WtrHtr	13	154.14	$120.39	$–	$65.70	$50.00	$0.052	2.08	1.63	(11)
Commercial-type electric water heater	25-34 gallon, standby loss 157 or lower 35-44 gallon, standby loss 185 or lower 45-54 gallon, standby loss 201 or lower 55-74 gallon, standby loss 238 or lower 75-99 gallon, standby by loss 249 or lower 100-119 gallon, standby loss 287 or lower	Standard electric water heater	Unit	ENComm_WtrHtr	13	68.17	$53.24	$–	$28.78	$20.00	$0.052	2.26	1.65	(12)
Commercial showerhead, electric water heat	2.0 gpm or less installed in health club/fitness business	Showerhead using 2.2 gpm or greater	Unit	ENComm_WtrHtr	10	2,431.00	$1,499.97	$–	$12.89	$15.00	$0.052	10.61	10.77	(13)
Commercial showerhead, electric water heat	2.0 gpm or less installed in commercial business (non health club/fitness business)	Showerhead using 2.2 gpm or greater	Unit	ENComm_WtrHtr	10	129.00	$79.60	$–	$12.89	$9.00	$0.052	5.07	4.06	(13)
Refrigeration	Add refrigeration line insulation	No insulation present	Linear ft	ENComm_Refrigeration	11	9.75	$6.74	$–	$4.46	$2.00	$0.052	2.69	1.36	(7)
Refrigeration	Install auto-closer - walk-in	No/damaged auto-closer, low temp	Door	ENComm_Refrigeration	8	2,547.00	$1,305.80	$–	$139.32	$125.00	$0.052	5.07	4.80	(7)
Refrigeration	Install auto-closer - reach-in	Damaged auto-closer, low temp	Door	ENComm_Refrigeration	8	560.00	$287.10	$–	$139.32	$100.00	$0.052	2.22	1.70	(7)
Refrigeration	Install auto-closer - walk-in	No/damaged auto-closer, med. Temp	Door	ENComm_Refrigeration	8	575.00	$294.79	$–	$139.32	$100.00	$0.052	2.27	1.74	(7)
Refrigeration	Install auto-closer - reach-in	Damaged auto-closer, med. Temp	Door	ENComm_Refrigeration	8	373.00	$191.23	$–	$139.32	$70.00	$0.052	2.14	1.20	(7)
Refrigeration	Add anti-sweat heat controls	Low/med. Temp case w/out controls	Linear ft	ENComm_Refrigeration	8	208.00	$106.64	$–	$40.00	$40.00	$0.052	2.10	2.10	(7)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Evaporative fans	Add evaporative fan controls	Low or med. temp. walk-in or reach-in with no controls	Fan	ENComm_Refrigeration	15	408.00	$369.23	$–	$161.74	$75.00	$0.052	3.84	2.02	(7)
Evaporative fans	Install ECM/PSC evap fan motor	Med. or low temp. walk-in	Motor	ENComm_Refrigeration	15	593.00	$536.65	$–	$296.78	$100.00	$0.052	4.10	1.64	(7)
Evaporative fans	Install ECM/PSC evap fan motor	Med. or low temp. reach-in	Motor	ENComm_Refrigeration	15	318.00	$287.78	$–	$84.45	$60.00	$0.052	3.76	2.85	(7)
Floating head/suction pressures	Head pressure controller	Standard head pressure control	Horsepower	ENComm_Refrigeration	16	440.00	$420.33	$–	$272.60	$80.00	$0.052	4.09	1.42	(7)
Floating head/suction pressures	Suction pressure controller	Standard suction pressure control	Horsepower	ENComm_Refrigeration	16	104.00	$99.35	$–	$86.91	$20.00	$0.052	3.91	1.08	(7)
Vending machines	Non-cooled snack control	Vending machine with no sensor	Sensor	ENComm_Misc	5	387.00	$123.73	$–	$75.00	$50.00	$0.052	1.76	1.30	(7)
Commercial kitchen equipment	ENERGY STAR® undercounter (residential style) dishwasher	Standard dishwasher	Machine	ENComm_Misc	12	2,210.00	$1,652.76	$243.80	$232.00	$200.00	$0.052	5.25	5.47	(15)
Commercial kitchen equipment	ENERGY STAR commercial dishwasher	Standard commercial dishwasher	Machine	ENComm_Misc	12	5,561.00	$4,158.83	$657.52	$3,978.00	$500.00	$0.052	5.27	1.13	(15)
Commercial kitchen equipment	ENERGY STAR listed electric combination oven (6-14 pans)	Standard electric oven	Oven	ENComm_Cooking	10	12,999.00	$8,554.50	$–	$1,620.00	$1,100.00	$0.052	4.82	3.73	(16)
Commercial kitchen equipment	ENERGY STAR listed electric combination oven (15-20 pans)	Standard electric oven	Oven	ENComm_Cooking	10	17,877.00	$11,764.66	$–	$442.61	$300.00	$0.052	9.57	8.57	(16)
Commercial kitchen equipment	ENERGY STAR listed electric convection oven	Standard electric oven	Oven	ENComm_Cooking	10	1,672.00	$1,100.33	$–	$915.79	$300.00	$0.052	2.84	1.10	(17)
Commercial kitchen equipment	ENERGY STAR listed electric fryer	Standard fryer	Fryer	ENComm_Cooking	8	2,671.00	$1,422.28	$–	$782.10	$400.00	$0.052	2.64	1.54	(18)
Commercial kitchen equipment	ENERGY STAR listed electric steamer - 3 pan	Standard steamer	Steamer	ENComm_Cooking	9	21,470.00	$12,803.61	$–	$358.34	$80.00	$0.052	10.70	8.68	(19)
Commercial kitchen equipment	ENERGY STAR listed electric steamer - 4 pan	Standard steamer	Steamer	ENComm_Cooking	9	28,564.00	$17,034.10	$–	$136.78	$100.00	$0.052	10.74	10.50	(19)
Commercial kitchen equipment	ENERGY STAR listed electric steamer - 5 pan	Standard steamer	Steamer	ENComm_Cooking	9	35,659.00	$21,265.20	$–	$(267.95)	$150.00	$0.052	10.61	13.41	(19)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Commercial kitchen equipment	ENERGY STAR listed electric steamer - 6 pan	Standard steamer	Steamer	ENComm_Cooking	9	42,754.00	$25,496.29	$–	$59.32	$175.00	$0.052	10.63	11.17	(19)
Commercial kitchen equipment	ENERGY STAR listed electric steamer -10 pan or larger	Standard steamer	Steamer	ENComm_Cooking	9	71,133.00	$42,420.07	$–	$4,062.08	$200.00	$0.052	10.88	5.47	(19)
Variable speed controls	Variable speed drive on HVAC system applications: -chilled water pumps -condenser water pumps -cooling tower fans	Single speed HVAC system fan/pump	hp	ENComm_HVAC	15	268.00	$277.85	$–	$165.33	$60.00	$0.052	3.76	1.55	(7)
Variable speed controls	Variable speed drive on HVAC system applications: -supply -return -outside air -make-up air -hot water pumps	Single speed HVAC system fan/pump	hp	ENComm_HVAC	15	996.00	$1,032.61	$–	$142.05	$100.00	$0.052	6.80	5.33	(7)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] Evergreen Consulting Group, LLC. Idaho Power Lighting Tool. 2014.
[2] Measure not cost-effective. Measure to be monitored to adjust weighted average. Measure included in the program to increase participation in a cost-effective program and to encourage adoption of higher-efficiency equipment.
[3] Idaho Power *Demand-Side Management Potential Study* by Nexant, Inc. IPC DSM Potential—Commercial Model 081209.xlsm. 2009.
[4] RTF. ComGroceryDisplayCaseLEDs_v2_2 and ComGroceryCaseLEDs_v1.1.xls. 2013. T12 to LED. Averaged the measures for less than 4 W/ln ft and 4–8.5 W/ln ft.
[5] RTF. ComGroceryDisplayCaseLEDs_v2_2 and ComGroceryCaseLEDs_v1.1.xls. 2013. T8 to LED. Averaged the measures for less than 4 W/ln ft and 4–8.5 W/ln ft.
[6] Idaho Power TRM prepared by ADM Associates, Inc. 2015. Weighted average of 6–25 ton units.
[7] Idaho Power TRM prepared by ADM Associates, Inc. 2015.
[8] Idaho Power TRM prepared by ADM Associates, Inc. 2015. Averaged water cooled chillers.
[9] Idaho Power TRM prepared by ADM Associates, Inc. 2015. Calculated from TRM spreadsheets.
[10] RTF. AgStockWateringTank_v2_0.xlsm. 2013. Simple average of HZ 1, 2, & 3.
[11] RTF. ComDHWEfficientTank_v3_0.xlsm. 2014. Simple average of residential style water heaters.
[12] RTF. ComDHWEfficientTank_v3_0.xlsm. 2014. Simple average of commercial style water heaters.
[13] RTF. ComDHWShowerhead_v3_0.xlsm. 2013.
[14] Measure not cost-effective. Measure to remain in the program due to unquantifiable NEBs.
[15] Idaho Power TRM prepared by ADM Associates, Inc. 2015. NEBs from water savings from RTF. ComDishwasher_v1_2.xlsm. 2012.
[16] RTF. ComCookingCombinationOven_v2_0.xlsm. 2013.
[17] RTF. ComCookingConvectionOven_v2_0.xlsm. Simple average of half and full-size ovens. 2013.
[18] RTF. ComCookingFryer_v2_0.xlsm. 2013.
[19] RTF. ComCookingSteamer_v2_0.xlsm. 2013.

Irrigation Efficiency Rewards

Segment: Irrigation
2015 Program Results

Cost Inputs (NPV)			Ref
Program Administration	$	338,029	
Program Incentives		1,497,682	I
Total Utility Cost	**$**	**1,835,711**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	9,601,814	M

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2015 Annual Gross Energy (kWh)	14,027,411			
NPV Cumulative Energy (kWh)	101,698,208	$	10,013,012	
10% Credit (Northwest Power Act)			1,001,301	
Total Electric Savings		**$**	**11,014,313**	S
Participant Bill Savings				
NPV Cumulative Participant Savings		$	5,759,801	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
Non-Energy Benefits		$	27,166,177	NEB

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
Utility Cost Test	$	11,014,313	$	1,835,711	6.00
Total Resource Cost Test		38,180,490		9,939,842	3.84
Ratepayer Impact Measure Test		11,014,313		7,595,512	1.45
Participant Cost Test		34,423,660		9,601,814	3.59

Benefits and Costs Included in Each Test		
Utility Cost Test	= S * NTG	= P
Total Resource Cost Test	= (S + NUI + NEB) * NTG	= P + ((M-I) * NTG)
Ratepayer Impact Measure Test	= S * NTG	= P + (B * NTG)
Participant Cost Test	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.77%
Real ((1 + WACC) / (1 + Escalation)) – 1	3.66%
Escalation Rate	3.00%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	17%
Average Customer Segment Rate/kWh	$0.059
Line Losses	9.60%

Notes: Energy savings are combined for projects under the Custom and Menu program. Savings under each Custom project is unique and individually calculated and assessed.
Green Rewind initiative is available to agricultural, commercial, and industrial customers. Agricultural motor rewinds are paid under Irrigation Efficiency.
NEBs including yield, labor, and other benefits reported by the customer.

Year: 2015 **Program**: Irrigation Efficiency Rewards **Market Segment**: Irrigation **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name[a]	**Measure Descriptions**	**Replacing**	**Measure Unit**	**End Use**	**Measure Life (yrs)[b]**	**Annual Gross Energy Savings (kWh/yr)[c]**	**NPV Avoided Costs[d]**	**Non-Energy Benefit (NEB)**	**Gross Incremental Participant Cost[e]**	**Incentive/ Unit**	**Admin Cost ($/kWh)[f]**	**UC Ratio[g]**	**TRC Ratio[h]**	**Sources**
Nozzle Replacement	New flow-control-type nozzles replacing existing brass nozzles or worn out flow control nozzles of same flow rate or less.	Brass nozzles or worn out flow control nozzles of same flow rate or less	Unit	IPC_Irrigation	4	40.60	$16.34	$–	$6.45	$1.50	$0.024	6.60	2.20	(1)
Nozzle Replacement	New nozzles replacing existing worn nozzles of same flow rate or less	Worn nozzle of same flow rate or less	Unit	IPC_Irrigation	4	40.60	$16.34	$–	$2.41	$0.25	$0.024	13.35	4.83	(1)
Sprinklers	Rebuilt or new brass impact sprinklers		Unit	IPC_Irrigation	5	28.26	$14.22	$–	$14.02	$2.75	$0.024	4.15	0.97	(1) (2)
Levelers	Rebuilt or new wheel line levelers		Unit	IPC_Irrigation	5	41.76	$21.01	$–	$3.70	$0.75	$0.024	11.99	4.47	(1)
Sprinklers	Center pivot/linear move: Install new sprinkler package on an existing system		Unit	IPC_Irrigation	5	100.19	$50.41	$–	$29.03	$8.00	$0.024	4.84	1.60	(1)
Gasket Replacement	New gaskets for hand lines, wheel lines or portable mainline		Unit	IPC_Irrigation	5	170.00	$85.53	$–	$4.46	$1.00	$0.024	16.84	10.02	(1)
Drain Replacement	New drains hand lines, wheel lines or portable mainline		Unit	IPC_Irrigation	5	176.25	$88.68	$–	$15.54	$3.00	$0.024	12.27	4.48	(1)
Hub Replacement	New wheel line hubs		Unit	IPC_Irrigation	10	73.06	$70.13	$–	$56.85	$12.00	$0.024	5.10	1.20	(1)
New Goose Necks	New goose neck with drop tube or boomback		Outlet	IPC_Irrigation	15	14.50	$19.50	$–	$4.74	$1.00	$0.024	14.46	3.83	(1)
Pipe Repair	Cut and pipe press or weld repair of leaking hand lines, wheel lines, and portable mainline		Joint	IPC_Irrigation	8	84.48	$66.34	$–	$20.47	$8.00	$0.024	6.62	2.95	(1)
Gasket Replacement	New center pivot base boot gasket		Unit	IPC_Irrigation	8	1,456.40	$1,143.62	$–	$284.25	$125.00	$0.024	7.15	3.58	(1)

[a] Available measures in the Irrigation Efficiency Menu Incentive Option. For the Custom Incentive Option, projects are thoroughly reviewed by Idaho Power staff.
[b] Average measure life.
[c] Estimated peak demand reduction measured at the customer's meter, excluding line losses.
[d] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[e] Incremental participant cost prior to customer incentives.
[f] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[g] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[h] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. AgIrrigationHardware_v3.xlsm. 2013. Three-year weighted average of western Idaho (13%), eastern Washington and Oregon (4%), and eastern and southern Idaho (83%).
[2] Measure not cost-effective. Measure to remain in the program due to unquantifiable NEBs.

Year: 2015 **Program**: Irrigation Efficiency Rewards—Green Motors **Market Segment**: Irrigation **Program Type**: Energy Efficiency

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Green Motors Program Rewind: Motor size 15HP	Green Motors Program Rewind: Motor size 15HP	Standard rewind practice	Motor	IPC_Irrigation	18	317.00	$495.22	$–	$152.56	$30.00	$0.050	10.80	2.94	(1)
Green Motors Program Rewind: Motor size 20HP	Green Motors Program Rewind: Motor size 20HP	Standard rewind practice	Motor	IPC_Irrigation	18	425.00	$663.94	$–	$170.21	$40.00	$0.050	10.84	3.47	(1)
Green Motors Program Rewind: Motor size 25HP	Green Motors Program Rewind: Motor size 25HP	Standard rewind practice	Motor	IPC_Irrigation	17	595.00	$886.32	$–	$194.47	$50.00	$0.050	11.11	3.95	(1)
Green Motors Program Rewind: Motor size 30HP	Green Motors Program Rewind: Motor size 30HP	Standard rewind practice	Motor	IPC_Irrigation	17	640.00	$953.35	$–	$213.60	$60.00	$0.050	10.36	3.88	(1)
Green Motors Program Rewind: Motor size 40HP	Green Motors Program Rewind: Motor size 40HP	Standard rewind practice	Motor	IPC_Irrigation	17	746.00	$1,111.25	$–	$261.02	$80.00	$0.050	9.47	3.73	(1)
Green Motors Program Rewind: Motor size 50HP	Green Motors Program Rewind: Motor size 50HP	Standard rewind practice	Motor	IPC_Irrigation	17	802.00	$1,194.67	$–	$288.96	$100.00	$0.050	8.53	3.63	(1)
Green Motors Program Rewind: Motor size 60HP	Green Motors Program Rewind: Motor size 60HP	Standard rewind practice	Motor	IPC_Irrigation	20	765.00	$1,299.67	$–	$340.79	$120.00	$0.050	8.21	3.43	(1)
Green Motors Program Rewind: Motor size 75HP	Green Motors Program Rewind: Motor size 75HP	Standard rewind practice	Motor	IPC_Irrigation	20	788.00	$1,338.75	$–	$368.37	$150.00	$0.050	7.07	3.28	(1)
Green Motors Program Rewind: Motor size 100HP	Green Motors Program Rewind: Motor size 100HP	Standard rewind practice	Motor	IPC_Irrigation	20	1,040.00	$1,766.88	$–	$456.96	$200.00	$0.050	7.01	3.47	(1)
Green Motors Program Rewind: Motor size 125HP	Green Motors Program Rewind: Motor size 125HP	Standard rewind practice	Motor	IPC_Irrigation	20	1,157.00	$1,965.65	$–	$513.21	$250.00	$0.050	6.39	3.44	(1)
Green Motors Program Rewind: Motor size 150HP	Green Motors Program Rewind: Motor size 150HP	Standard rewind practice	Motor	IPC_Irrigation	20	1,376.00	$2,337.72	$–	$571.66	$300.00	$0.050	6.34	3.65	(1)
Green Motors Program Rewind: Motor size 200HP	Green Motors Program Rewind: Motor size 200HP	Standard rewind practice	Motor	IPC_Irrigation	20	1,821.00	$3,093.74	$–	$688.20	$400.00	$0.050	6.30	3.97	(1)
Green Motors Program Rewind: Motor size 250HP	Green Motors Program Rewind: Motor size 250HP	Standard rewind practice	Motor	IPC_Irrigation	20	2,823.00	$4,796.05	$–	$884.52	$500.00	$0.050	7.48	4.68	(1)
Green Motors Program Rewind: Motor size 300HP	Green Motors Program Rewind: Motor size 300HP	Standard rewind practice	Motor	IPC_Irrigation	20	3,370.00	$5,725.36	$–	$894.08	$600.00	$0.050	7.45	5.39	(1)
Green Motors Program Rewind: Motor size 350HP	Green Motors Program Rewind: Motor size 350HP	Standard rewind practice	Motor	IPC_Irrigation	20	3,929.00	$6,675.06	$–	$937.09	$700.00	$0.050	7.45	5.89	(1)

						Benefit			Cost			Benefit/Cost Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV Avoided Costs[c]	Non-Energy Benefit (NEB)	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UC Ratio[f]	TRC Ratio[g]	Source
Green Motors Program Rewind: Motor size 400HP	Green Motors Program Rewind: Motor size 400HP	Standard rewind practice	Motor	IPC_Irrigation	20	4,456.00	$7,570.39	$–	$1,046.64	$800.00	$0.050	7.40	5.96	(1)
Green Motors Program Rewind: Motor size 450HP	Green Motors Program Rewind: Motor size 450HP	Standard rewind practice	Motor	IPC_Irrigation	20	5,003.00	$8,499.70	$–	$1,144.06	$900.00	$0.050	7.39	6.10	(1)
Green Motors Program Rewind: Motor size 500HP	Green Motors Program Rewind: Motor size 500HP	Standard rewind practice	Motor	IPC_Irrigation	20	5,567.00	$9,457.89	$–	$1,235.98	$1,000.00	$0.050	7.40	6.25	(1)
Green Motors Program Rewind: Motor size 600HP	Green Motors Program Rewind: Motor size 600HP	Standard rewind practice	Motor	IPC_Irrigation	20	6,193.00	$10,521.42	$–	$1,821.36	$1,200.00	$0.050	6.97	4.94	(1)
Green Motors Program Rewind: Motor size 700HP	Green Motors Program Rewind: Motor size 700HP	Standard rewind practice	Motor	IPC_Irrigation	20	7,195.00	$12,223.74	$–	$1,987.11	$1,400.00	$0.050	6.95	5.21	(1)
Green Motors Program Rewind: Motor size 800HP	Green Motors Program Rewind: Motor size 800HP	Standard rewind practice	Motor	IPC_Irrigation	20	8,205.00	$13,939.65	$–	$2,204.75	$1,600.00	$0.050	6.93	5.33	(1)
Green Motors Program Rewind: Motor size 900HP	Green Motors Program Rewind: Motor size 900HP	Standard rewind practice	Motor	IPC_Irrigation	20	9,211.00	$15,648.76	$–	$2,430.63	$1,800.00	$0.050	6.92	5.41	(1)
Green Motors Program Rewind: Motor size 1500HP	Green Motors Program Rewind: Motor size 1500HP	Standard rewind practice	Motor	IPC_Irrigation	20	12,681.00	$21,544.02	$–	$3,584.53	$3,000.00	$0.050	4.74	4.20	(1)

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of avoided cost. Based on end-use load shape, measure life, savings including line losses, and alternative costs by pricing period as provided in the 2013 IRP. Includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2015 actuals.
[f] Utility Cost Ratio = (NPV Avoided Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] Total Resource Cost Ratio = (NPV Avoided Costs + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. AgMotorsRewind_v2_0.xlsm. 2013.

March 15, 2016

IDAHO POWER®
An IDACORP Company

Supplement 2: Evaluation

Demand-Side Management

2015 ANNUAL REPORT

Printed on recycled paper

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EVALUATION AND RESEARCH SUMMARY

Idaho Power considers program evaluation and research an essential part of its demand-side management (DSM) operational activities. The company contracts with third-party contractors to conduct impact, process, and other evaluations on a scheduled and as-required basis.

Third-party contracts are generally awarded using a competitive bid process and are managed by Idaho Power's Strategic Sourcing department. In some cases, research and analysis is conducted internally and administered by Idaho Power's Customer Relations and Analysis team. Third-party evaluations are specifically managed by the company's Energy Efficiency Evaluator.

Idaho Power uses industry-standard protocols for its internal and external evaluation efforts, including the *National Action Plan for Energy Efficiency—Model Energy Efficiency Program Impact Evaluation Guide*, the *California Evaluation Framework*, the *International Performance Measurement and Verification Protocol*, the *Database for Energy Efficiency Resources*, *National Renewable Energy Laboratory* report[1], and the *Regional Technical Forum's (RTF) evaluation protocols*.

The company also supports regional and national studies to promote ongoing cost-effectiveness of programs, validation of energy savings and demand reduction, and the efficient management of its programs. Idaho Power considers primary and secondary research, cost-effectiveness analyses, potential assessments, impact and process evaluations, and customer surveys important resources in providing accurate and transparent program savings estimates. Recommendations and findings from evaluations and research are used to continuously refine its DSM programs.

In 2015, Idaho Power completed program impact and process evaluations of the Home Improvement, See ya later, refrigerator® and Ductless Heat Pump programs using third-party contractor Applied Energy Group. CLEAResult was chosen to provide impact evaluations for the A/C Cool Credit, Flex Peak, and Irrigation Peak Rewards programs.

Idaho Power administered surveys on several programs in 2015 to measure program satisfaction. Participant surveys were conducted for Easy Upgrades, Home Energy Audit, Shade Tree Project, Weatherization Assistance for Qualified Customers (WAQC), and Weatherization Solutions for Eligible Customers.

In addition to these program satisfaction surveys, Idaho Power sent energy efficiency-related surveys to its online community of residential customers. Energy efficiency-related survey topics in 2015 included residential laundry habits, recall of the spring 2015 energy efficiency marketing campaign, and holiday lighting.

Throughout 2015, ADM Associates, Inc. (ADM) made several small revisions to the technical reference manual (TRM) for Building Efficiency and Easy Upgrades. These revisions include additional system types to the heating, ventilation, and air conditioning (HVAC) controls section and expanding the description of eligible equipment for air conditioning and heat pump systems.

[1] "Whole Building Retrofit with Consumption Data Analysis Evaluation Protocol" published in April 2013 by the U.S. Department of Energy (energy.gov/eere/about-us/ump-protocols).

Additionally, ADM updated the savings for measures impacted by the International Energy Conservation (IECC) 2012 code.

Final reports from all evaluations, research, and surveys completed in 2015 and an evaluation schedule are provided in this supplement. The evaluation schedule is intended to be used as a guide and may be changed periodically based on need, timing, or other relevant factors.

Evaluation Plan

Evaluation Plan

Customer Relations and Energy Efficiency 2012–2016 Program Evaluation Plan

	2012			2013			2014			2015			2016		
Residential Programs	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other
Ductless Heat Pump Pilot[a]										✓	✓				
Educational Distributions[b]															
Energy Efficient Lighting					✓		✓								
Energy House Calls															
ENERGY STAR® Homes Northwest					✓		✓								
Heating & Cooling Efficiency Program	✓				✓										
Home Energy Audit								✓							
Home Improvement Program										✓	✓				
Rebate Advantage													✓	✓	
Residential Energy Efficiency Education Initiative														✓	
See ya later, refrigerator®	✓									✓	✓				
Shade Tree Project								✓							
Simple Steps, Smart Savings™[c]															
Weatherization Solutions for Eligible Customers	✓				✓				✓						
Weatherization Assistance for Qualified Customers	✓				✓				✓						
Commercial/Industrial Programs															
Building Efficiency	✓												✓		
Custom Efficiency							✓	✓							
Easy Upgrades	✓				✓								✓		
Irrigation Programs															
Irrigation Efficiency Rewards			✓	✓					✓				✓	✓	
Demand Response Programs															
A/C Cool Credit		✓	✓			✓	✓			✓					
Flex Peak Program[d]			✓		✓	✓				✓			✓		
Irrigation Peak Rewards			✓			✓	✓			✓					

[a] Became part of Heating and Cooling Efficiency Program in 2015.

[b] Designated as a specific program in 2015, the Educational Distributions effort is administered through the Residential Energy Efficiency Education Initiative.

[c] Simple Steps, Smart Savings™ includes promotional based appliances, showerheads, and Home Products Program 2015 savings.

[d] The program originated in 2009 as the FlexPeak Management program. In 2015, the program became fully implemented by Idaho Power. The program name was changed to Flex Peak Program.

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Energy Efficiency Advisory Group Minutes

The following pages include minutes from EEAG meetings held on February 19, May 6, August 26, and November 5, 2015.

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Energy Efficiency Advisory Group (EEAG)
Meeting Notes February 19th, 2015

Present:

Catherine Chertudi–City of Boise, Public Works Dept.
Ken Robinette–South Central Comm. Action Partnership
Stacey Donohue–Idaho Public Utilities Commission
Diego Rivas–Northwest Energy Coalition
Tami White–Idaho Power
Ben Otto-Idaho Conservation League
Don Strickler–Simplot
Lynn Young–AARP
John Chatburn–Office of Energy Resources
Sid Erwin–Idaho Irrigation Pumpers Association
Kent Hanway-CSHQA
Quentin Nesbitt*–Idaho Power

Not Present:

Tom Eckman–Northwest Power & Conservation Council
Michael Breish-Public Utility Commission of Oregon

Guests and Presenters*:

Pete Pengilly*–Idaho Power
Gary Grayson–Idaho Power
Shelley Martin–Idaho Power
Zeke VanHooser–Idaho Power
Robert Everett–Idaho Power
Jay Jeffries-Resource Action Programs
Mindi Shodeen-Idaho Power
Darlene Nemnich*-Idaho Power
Julie Stutts-Baker-Idaho Power
Susan Klein-Idaho Power
Krista West-Idaho Power
Denise Humphreys-Idaho Power
Roberta Rene-Idaho Power
Ty Hardin- Idaho Public Utilities Commission
Todd Greenwell–Idaho Power
Theresa Drake–Idaho Power
Andrea Simmonsen–Idaho Power
Ken Miller-Snake River Alliance
Cheryl Paoli-Idaho Power
Patti Best-Idaho Power
Andy Healy-CLEAResults
Becky Arte-Howell-Idaho Power
Kevin Winslow-Idaho Power
Anne Alenskis-Idaho Power
Donn English-Idaho Public Utilities Commission
Sheree Willhite-Idaho Power
Bill Shawver*-Idaho Power
Randy Thorn-Idaho Power

Meeting Facilitator:

Rosemary Curtin (RBCI)

Recording Secretary:

Shawn Lovewell (Idaho Power) with Kathy Yi* (Idaho Power)

Meeting Convened at 9:30am

Quentin introduced Rosemary Curtin, who is the new EEAG Facilitator, to the group. She gave an overview of her professional background and then asked each EEAG member to introduce themselves and state the reason(s) why they participate in this group. Quentin then introduced Diego Rivas of Northwest Energy Coalition as a new EEAG member replacing Nancy Hirsh. The notes from the November EEAG meeting were reviewed and there was one clarification requested regarding the bullet point on the top of page 4. There was agreement that the November meeting notes will be updated to reflect the clarification. A few members commented that the new format and summarization of the meeting notes makes them easier and quicker to review.

9:45am-2014 Portfolio Financial/Savings Picture (Preliminary)—Pete Pengilly

Pete reviewed the 2014 preliminary DSM expenses to be included in Appendix 1& 2 of the Demand-Side-Management 2014 Annual Report. He also presented charts from the report showing portfolio saving and expense categories.

Key points presented:

- Appendix 1 highlights the Idaho and Oregon Rider balances and the Northwest Energy Efficiency Alliance (NEEA) payment amounts for 2014. Appendix 2 highlights 2014 DSM expenses by funding source (dollars).
- As of January, there was a \$1.8 million positive balance in the Idaho Rider. There was a \$3.9 million negative balance in the Oregon Rider.
- The presentation highlighted how the DSM funds were spent and the energy savings for the year in comparison to the Integrated Resource Planning (IRP) targets from a portfolio perspective.

There were questions and discussion about:

- What is the comparison of funding allocation to geographic area in regards to the NEEA savings? Idaho Power answered that it is a close comparison.
- Do any NEEA savings carry over from the previous year or does it start at zero each time? Idaho Power responded that NEEA provides an annual and cumulative look at savings. NEEA is still counting savings from the first funding cycle if it believes that the savings are still applicable.
- In regards to Demand Response, how much of the difference in cost savings from 2012 to 2014 is due to reduced participation or improved metrics? Idaho Power responded that the difference is primarily due to lower incentives and a drop in participation for irrigation customers.

10:08am-Commercial/Industrial/Irrigation Programs—Quentin Nesbitt

Quentin highlighted savings and participation for the commercial, industrial, and irrigation programs. He presented a comparison of 2013 and 2014 participation and savings.

Key points presented:

- The Easy Upgrades Program shows overall energy savings are about the same even though participation is lower for 2014.
- Irrigation Efficiency had higher participation in 2014 with about the same energy savings.

- Building Efficiency participation increased in 2014 and Custom Efficiency has had a large increase in participation as well as energy savings.

There were questions and discussion about:

- Whether participation numbers were by participant or by measure. Idaho Power stated that it is by project.

- If the big jump in participation for Custom Efficiency was because some of the larger projects were finally completed. Idaho Power answered that is part of the reason, but that a lot of those increases have to do with the new Custom Efficiency Streamlined offering. These are smaller in savings but there are a lot of them. Idaho Power then explained what the streamlined offering is and how the company works with Cascade Energy to identify these projects. Cascade Energy provides the measurement and verification along with project management and then submits them to Idaho Power. It would be interesting to see a trend over numerous years instead of just a year to year. There are some great lessons to be learned here, especially with this streamlined offering. Maybe this could be applied to the other programs by having a dedicated person to drive projects to Idaho Power, reaching out to the trade allies. This would allow Idaho Power employees to focus on doing what they do best. One EEAG member noted that he has received feedback from clients that the Building Efficiency process can be cumbersome. If the process was streamlined it could be helpful for customers.

- What the level of participation was for the Waste Water Energy Efficiency Cohort (WWEEC)? Idaho Power stated that for the cohort it was limited to the larger cities. One EEAG member mentioned that the feedback she has received was that initially there was some skepticism around whether or not they would learn anything. After the operators had gone through the cohort training they realized there was much to learn and it has been very helpful. She stated that something like this could be really impactful for the smaller cities as well.

Quentin asked the group for feedback in combining the commercial & industrial programs. The idea is to have a single application to make it easier for customers to participate in these programs. This has already been done for lighting and customers seem to like it.

- Three EEAG members stated that they like the idea of one application. Having multiple applications can be confusing for participants, so having one application to market internally would be nice. Additionally, more assistance that can be provided to the small business the better.

- One EEAG member suggested having applications that target the different commercial customer segments.

- Idaho Power noted that from a reporting perspective it might look a little different. It would be bundled for savings and goal setting so the numbers wouldn't be broken out by program.

10:40am-Residential Programs—Billie McWinn

Before the presentation, Billie recognized the effort and hard work her staff put in to these programs. She then highlighted the energy savings and participation by program for 2013-2014.

Key points presented:

- Idaho Power is looking to add new measures to the Energy House Calls (EHC) program. These ideas came from the New Ideas Team. These items would be LED's, showerheads, faucet aerators, and water heater pipe wrap for the first three feet.

- The new tool has been launched for Weatherization Solutions and recommendations from previous meetings and evaluations have been incorporated. There will be a 10% cost share with landlords and they have agreed to not raise tenant rent for a year. Marketing efforts are being increased with emphasis on publications targeting senior citizens.

- Billie went over the Simple Steps (Appliances) options that are being evaluated. The upstream and midstream incentive model look the most promising.

There were questions and discussion about:

- If Idaho Power has received feedback from the EHC contractors on installing or implementing these new measures. The concern is the showerheads and water pipe wrap. The plumbing in some of the older and low income homes is not the greatest and you could see a decline in those items being installed because of the liability of the leaky pipe. Also, Idaho Power should continue to buy showerheads from Niagara because they are high quality and customers seem to like them. One EEAG member asked why Idaho Power isn't wrapping the water heater. Another EEAG member answered that most tanks are already insulated and wrapping them can damage the newer ones.

- What about CFL disposal and how are the contractors handling that? Idaho Power explained that contractors are targeting incandescent bulbs, but that contractors are responsible for proper disposal if they change out a CFL.

- When will this program become obsolete because it is at about 50% market penetration? Idaho Power stated that it will watch trends and as long as it is cost-effective it will continue to offer the program.

- Discussion around the Weatherization Solutions program and the landlord cost-sharing. It will be interesting to see how this works out. One EEAG member stated that the landlord cannot raise tenants rent because of the weatherization work, but they can raise rents for other reasons like taxes.

- The feedback on the Simple Steps Appliance options is that filling the marketplace with high quality products is great, but getting the customer to purchase these items will be the challenge. Upstream manufacturer option just fills the pipeline but doesn't incent the customer to purchase. The direct customer incentive is probably better. One EEAG member stated that in her experience with working for a water utility, if an incentive was given to the customer it forced the retailer to stock that item. The retailer would put the savings sticker on the appliance then they would sell more of that appliance. It changed what the retailer emphasized and drove customers to the more efficient machines. Another EEAG member added that in Montana the manufacturer option failed.

11:17am- Break

11:24am-Bill Shawver & Roberta Rene—Marketing presentation

Bill started off by introducing the support staff in the Corporate Communication Department and thanked them for the hard work they do on a daily basis. He then passed around a binder that contained marketing collateral sent out to customers during the period of November 19th 2014 thru February 19th, 2015. He stated that in previous EEAG meetings the company heard from members that it wasn't doing a great job at marketing. The company wants to look forward and wants feedback from EEAG in this area.

Key points presented:

- Idaho Power opted out of some of the NEEA marketing initiatives which will save around $794,000 over the 5 year contract term. NEEA's 2015 marketing plan for the Ductless Heat Pump will be out later this month

- The marketing tactics and 2014 integrated campaign results were shared with the group along with the integrated campaign plan for 2015.

- Bill will come back to EEAG and share marketing strategies by program. The recent video's and the KTVB earned media spots were shown to the group.

There were questions and discussion about:

- How dates for marketing the programs are chosen along with questions around the print ads in the major daily newspapers. Idaho Power explained that it is a coordinated effort between the Program Specialists and the Marketing Specialists. Marketing all the programs at once is avoided, but rather look at what makes the most sense for each program taking into consideration the potential high bill months. Having a presence throughout the year for a program such as DHP is important. Customer's usually purchase these items when they breakdown, not before. Each program has its own marketing plan and each plan has its own target audience. Idaho Power addressed the newspaper ads and explained that in the last few years, the company has reduced the number of ads run in the rural areas. However, the company has since realized that these areas rely more on these papers instead of digital, it is their version of social media.

- Clarification on the video shown for the Home Improvement Program. The impression was that it was for new construction. Idaho Power explained that in the video they were just using a cleaner space to make it more obvious what was being done.

- One EEAG member stated that she doesn't disagree with general marketing as it can be very useful and effective. Her concern is around behavioral change and how marketing needs to be more targeted and focused in order to achieve that. Idaho Power stated that the trick to marketing is having it be present when the motivation to purchase an item occurs.

- There was discussion about the recent JD Power Small Business survey and the Residential survey that is currently being conducted. A question was asked about how that information would look on a trend line and if it is improving if you go back 5 years. Idaho Power answered that they would provide that information to the group later.

12:18pm Lunch

1:00pm Meeting Reconvened

1:00pm-New Program Ideas Update—Billie McWinn/Quentin Nesbitt

Billie and Quentin provided an update on the new ideas that have been discussed at prior meetings and the status of each.

Key points presented:

- Heating & Cooling Efficiency-Idaho Power took the feedback from EEAG and the whole house fan, prescriptive duct sealing, and the ECM residential blower motor will be under the Heating & Cooling Efficiency program. These will be launched in quarter 2 so that there is just one change to forms, the website and regulatory filings.

- LED's as Promotional Giveaways-Originally the issue for this was cost-effectiveness. The feedback from EEAG was positive and to move forward. Some of the issues being worked through are the regulatory considerations, fairness and perception. The company is trying to determine how to file this in Oregon.

- Energy Efficiency Kits-CLEAResult came to Idaho Power to discuss the mail by request kits. Customers would go to Idaho Power's website, fill out a form, and a kit would be mailed to them. The contents of the kit are predetermined but other options are being explored. Idaho Power is soliciting feedback and ideas from EEAG as to what other ala carte options could be included in those kits.

- The drying rack was displayed. This came out of the New Ideas team and is similar to the LED's as a giveaway. The idea is that there is an opportunity to give these out and educate people about energy savings. The agreement would be that customers would provide Idaho Power with an email address and take a short survey. This would probably remain as an event type giveaway to promote behavioral changes.

- Smart Thermostat technology, installation options, and eligibility options were discussed.

- Some of the small business options that Idaho Power is looking into were presented and Idaho Power asked for feedback on how best to reach these customers.

There were questions and discussion about:

- Provide kits to low income residents that have electrically heated homes. These customers will come in for high bill and heating assistance, go through some education and receive their kit. A crew will go into their homes 6-8 months later and the kit will still be sitting on their table. This EEAG member likes the ala carte option because if a customer is ordering something they want, then they will be more likely to use those items.

- A suggestion to have some sort of post card in the kit for the customer to mail back to Idaho Power once the items have been installed. It would be a sort of accountability to Idaho Power.

- Will there be any follow-up with customers if they received the kit or have any questions or issues with installation? That might be something to consider doing.

- Would Idaho Power be measuring the energy savings received from the kits? Idaho Power answered that there would be energy savings assumptions attached to the kits, but that a QA follow up could be done.

- If a teacher advisory group has been formed for the high school kits. One EEAG member stated that educator's would know the best way to deliver these in a way that causes the most behavioral changes. Idaho Power answered that this will happen in the spring. Another EEAG member suggested Idaho Power not limit these kits just high schools, but could also look at College of Western Idaho.

- Use social media as way to get customers engaged. Have them take a picture of the installations and tag Idaho Power. Another EEAG member added that City of Boise does that with the Curb It Program and there is a theme associated with it: "I Make a Difference by…."and then post to Facebook.

- Consider having a YouTube video on how to install a showerhead or some other item in the kit.

- One EEAG member likes the idea of the drying racks. It brings to mind that we do in fact use a dryer and that uses electricity, it gets people thinking. Another EEAG member followed-up and stated that this is a very powerful message of not just using less energy, but using no energy.

- The City of Boise distributes compost bins which are even bulkier than the drying rack. They use the "fire sale" approach. People have to sign up and come down during a specified day and time to pick them up.

- There was some discussion around a follow-up survey after the drying racks are distributed and how that could be structured.

- The company was encouraged to look at the thermostats that make programming easy for the customers.

- A few of the EEAG members suggested looking at both models; DIY and using a contractor. There are a few issues such as wiring or mercury in the older thermostats that could require a contractor. If the company required that a contractor install it might alienate those folks that like the "do-it-yourself" option. Idaho Power was commended for looking into this program.

- It was noted that time is a factor in reaching the small business customers. The initial engagement is very important. Getting incentives to these customers faster is important since many of them rely on month to month cash flow. One EEAG member stated that as a small business owner himself, he likes the idea of Idaho Power showing up at a business to talk about options for energy efficiency improvements.

- Finding ways to dispel the barriers that it is complicated to receive an incentive is something that could be looked at. Another EEAG member added that she is glad Idaho Power is looking at ways to target the small businesses. Streamlining these processes with other programs might free up some head room on the cost effectiveness.

2:05pm Shade Tree/Home Energy Audit Process Evaluation—Dr Katherine Johnson

Dr. Katherine Johnson of Johnson Consulting Group presented the results of process evaluations that were performed on the Shade Tree project and Home Energy Audit program. Dr. Johnson noted that process evaluations are most helpful when transitioning from a pilot to a full program. Idaho Power is in line with best practices. Both of these programs are doing very well.

Key points presented:

- Dr Johnson gave examples of marketing materials, customer messaging, and the online process for the Shade Tree project.

- Overall program operations are smooth and effective. Customers liked the project and love the education.

- Key recommendations would be to streamline the database, standardize the program evaluation questionnaires, develop a pre-screening tool for maximum energy savings potential, and implement a QA process to provide ongoing tracking of the trees. The Idaho Power Program Specialist commented on some of the things that are being done to address these recommendations.

- The Home Energy Audit program is a gateway program to help customers move on to larger energy efficient measures and improvements. An overview of program processes, marketing materials and key findings were presented.

- Key recommendations were to reconsider the program term “audit”, review current measure mix to make sure it is still cost-effective, conduct formal customer survey’s to assess satisfaction, develop a protocol for reaching out to customers and encouraging them to follow up on recommendations, review the CAKE software, reevaluate the role of the auditors. The Idaho Power Program Specialist commented on some of the things that are being done to address these recommendations.

3:15 pm-Time of Day—Darlene Nemnich

Darlene presented the final results of the Time of Day (TOD) impact study. She provided an overview of the basic structure of the TOD pricing plan. The primary goal of the study was to evaluate how the TOD pilot pricing plan impacted energy consumption.

There were questions and discussion about:

- If the customers that participated in the program were given any type of coaching or strategies. Idaho Power answered that in the original pilot solicitation, information was provided to direct customers to Idaho Power’s website. Every year before the summer season a postcard or packet of information is provided reminding them that their TOD rates will change on June 1st. Clings and tip cards have also been provided

- If this will now be an opt-in plan for customers. Idaho Power answered that yes, it is an open plan and customers can choose to participate.

3:43 pm-Online Residential Community—Kathy Yi

Kathy explained that Idaho Power is launching an online community called Empowered Community.

Key points presented:

- The target is to have around 1500 Idaho Power customers made up of a representative sample from across the company’s service area that will participate in monthly surveys.

- The goal is to have easily accessible and reliable respondents that can quickly provide feedback for smaller research projects.

- This community was launched this month and as of today there are around 340 participants.

- Primary recruitment is via bill insert. This method was chosen because it is the lowest cost option. Small subsets of customers do not receive a paper bill, so a postcard was sent.

- The web portal landing page that explains how customers can join was presented. This also serves as verification to customers that this is a legitimate web page and not a scam.

- This is funded by rider and base rates. The surveys will not just be energy efficiency related. There will be two $100 incentives awarded to randomly selected community members that participated in monthly research projects.

At the conclusion of the presentation, the meeting facilitator asked for EEAG member feedback on today’s meeting and if there were any final thoughts, questions or concerns. EEAG member feedback was as follows:

- The opening remarks were appreciated and Idaho Power has heard the interest in looking forward on new programs.

- This is probably the best EEAG meeting one EEAG member has attended. Another EEAG member also stated that this was the best meeting he has been to.

- It was a great meeting with a lot of information. However, having a couple less agenda items would be helpful because the agenda was very full.

- One EEAG member commented that she is impressed and it appears that the company is moving in the right direction.

- Another EEAG member enjoyed hearing the evaluation results.

Kent McCarthy then introduced himself and his role in the company. He will be providing information on the company's newest fleet of Electric Vehicles.

4:06 Meeting Adjourned

Energy Efficiency Advisory Group (EEAG)
Meeting Notes dated May 6th, 2015

Present:

Quentin Nesbitt*-Idaho Power
Ken Robinette–South Central Comm. Action Partnership
Stacey Donohue–Idaho Public Utilities Commission
Diego Rivas–Northwest Energy Coalition
Tami White–Idaho Power
Ben Otto-Idaho Conservation League
Michael Breish-Public Utility Commission of Oregon
Don Sturtevant–Simplot
Lynn Young–AARP
John Chatburn–Office of Energy Resources
Sid Erwin–Idaho Irrigation Pumpers Association
Kent Hanway-CSHQA

Not Present:

Tom Eckman–Northwest Power & Conservation Council
Catherine Chertudi–City of Boise, Public Works Dept

Guests and Presenters*:

Pete Pengilly*–Idaho Power
Chellie Jensen–Idaho Power
Shelley Martin–Idaho Power
Sheree Willhite–Idaho Power
Gary Grayson–Idaho Power
Darlene Nemnich–Idaho Power
Cheryl Paoli–Idaho Power
Billie McWinn*-Idaho Power
Mindi Shodeen-Idaho Power
Nick Bengston*-CLEAResult
Jeff Brooks-Tetra Tech
Todd Greenwell-Idaho Power
Bill Shawver*-Idaho Power
Cory Read–Idaho Power
Theresa Drake–Idaho Power
Diana Echeverria*–Idaho Power
Ken Miller–Snake River Alliance
Zeke VanHooser–Idaho Power
Patti Best–Idaho Power
Becky Arte-Howell–Idaho Power
Chris Pollow-Idaho Power
Roberta Rene*-Idaho Power
Peter Richardson-Richardson Adams, PLLC
Kevin Lauckner-Franklin Energy
Jay Jeffries-Resource Action Programs
Denise Humphreys-Idaho Power

Meeting Facilitator:

Rosemary Curtin (RBCI)

Recording Secretary:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Convened at 9:30am

Rosemary and Quentin started the meeting with introductions of guests and members. The February EEAG meeting notes had been provided to members in advance of the meeting for their review. There were no comments or concerns regarding the February meeting notes.

9:36am-Regulatory Update—Tami White

Tami reviewed the current regulatory filings that have a DSM touch-point. There were no questions or comments from members.

9:42-2015 Financials/2014 DSM Annual Report—Pete Pengilly

Pete presented Appendix 1: Idaho Rider, Oregon Rider, and NEEA payment amounts (Jan-Mar 2015), 2015 DSM Actual Expenses by Program (Jan-Mar 2015), and highlights from other areas of the 2014 DSM Annual Report

Key points presented:

- Noted that overall on a portfolio level, energy savings are up approximately 21% through April of 2015.

- Brought attention to other items highlighted in the DSM Annual Report such as: Energy Efficiency Guides, Student Energy Efficiency Kits, Integrated Design Lab, and the Local Energy Efficiency Funds.

- Pointed out that for the first time the DSM cost-effectiveness ratios were also added into the introduction of the main report.

- Highlighted that the majority of Idaho Power's buildings have been upgraded to be more energy efficient. The corporate headquarters building also participates in the Flex Peak Program (without the incentive component).

There were questions and discussion about:

- What is the projected Idaho rider balance at the end of 2015? The forecast for the Idaho rider is about $16 million dollars balance by the end of 2015.

- What are the company's plans for moving the Oregon rider balance back to a collected status? In Oregon, Idaho Power knows that the rider percentage needs adjusting, but there aren't any definitive plans on when a filing will be made to request an adjustment to the rate of collection.

- There was much discussion about the projected Idaho Rider balance and what the approach should be to reduce the amount projected to be in the account at year-end 2015. There were suggestions for looking at a long term projection to determine what the appropriate percentage should be, not reducing the percentage but figuring out ways to spend it, and looking into what other utilities are doing to manage their rider balances. Overall, the general consensus was that frequent rider percentage changes can have negative impacts on customers.
- EEAG members would like to see Idaho Power bring more attention to its corporate responsibility by talking about what is being done in the energy efficiency arena. The Just Drive campaign is a good example of that.

- Is there a way to gauge customer feedback on the distribution of the Energy Efficiency guides and through what channels were they distributed? Both the Energy Efficiency guide and 30 Simple Things are available for customers to request online. When a new customer signs up for service, this guide could be sent to them. This guide could be provided to the stores that sell energy efficient lights. The company has checked with the box store retailers about leaving the Energy Efficiency guides at the stores. There are some challenges with that concept. Some stores don't allow the leaving of materials and some will, but won't keep track of fulfillment.

- Tami stated that she would follow up on whether there is a new customer packet provided to customers when they first request service from Idaho Power and, if so, what is in the packet.

- Simplot encourages their employees to practice energy efficiency in the home as well as at work. They are interested in obtaining the Energy Efficiency kits for their employees. Pete stated that the company might be able to put them in touch with the supplier of those kits or Simplot's employees could individually contact Idaho Power to obtain them.

10:36-Commercial/Industrial/Irrigation Update—Quentin Nesbitt

Quentin presented information highlighting the commercial and irrigation programs.

Key points presented:

- Building Efficiency program will far exceed its goals this year because of one very large project that was completed.

- Easy Upgrades program is tracking closely to last year. The company is developing a customer follow up survey in order to improve customer satisfaction. The company is also looking at potential measure additions and changes.

- Custom Efficiency program projects are up, but savings are down. The company is not overly concerned about this because there are many projects in the pipeline. The Water Supply Cohort workshop will be started. Industrial trainings are now being done internally at a lower cost than what NEEA was able to provide.

- Irrigation Efficiency projects and savings are down slightly. This could be due to farm commodity prices being lower.

- Irrigation Peak Rewards enrollment is 102% compared to last year.

- Idaho Power filed to administer the Flex Peak program internally. This has been approved in Oregon and we are waiting for an order from Idaho. The company will not officially enroll participants until approval has been received from the IPUC.

11:00-Break

11:10-Residential Program Update—Billie McWinn

Billie presented a brief overview of the residential programs performance through the first trimester of 2015 compared to the first trimester of 2014. She highlighted the Shade Tree program and Energy Efficient Lighting (Simple Steps-Lighting and Showerheads). She solicited feedback and suggestions from the group regarding Weatherization Solutions (WX Sol), See ya later, refrigerator® (SYLR) and Home Products-Simple Steps.

Key points presented:

- The challenge with WX Sol is finding income eligible customers in two of the four regions; Capital and Eastern.

- Qualifying income levels for this program are 175-200% of the federal poverty level. The number of people living in the home influences the calculation of the income levels to qualify for the program.

- The program manager works closely with outside agencies and contractors to make this program available to eligible customers.

- The challenge with the SYLR® is the removal of the financial incentive and low participation. Idaho Power is researching low or no cost outreach ideas.

- Simple Steps appliances is a BPA promotion based program that includes clothes washers, refrigerators, and freezers. It will be aligned with major buying timeframes and the incentive structure will vary. Some of the models may or may not be cost-effective.

There were questions and discussion about:

Weatherization Solutions

- South Central Community Action Partnership (SCCAP) has a pipeline of applications that takes them into late summer, early fall. They will be doing marketing mid to late summer. Maybe Idaho Power's Education Reps could provide flyers at the schools that students could take home to their parents?

- Senior citizens tend to worry about taking advantage of programs that might prevent someone else from being able to participate. They may rather see someone else get help then take it themselves. If there is a cost to participate, it will be a barrier for them. If they understand that saving energy helps everyone they may be more likely to participate so that could be a way to market this program more effectively to them.

- The faith based community might be an area to market to, as a point of contact for seniors. Seniors might go to a pastor for help. If a pastor in a church makes the statement that WX Sol is a good program, it might make an impact to those who are listening. The pastor could be a very powerful spokesman in the communities.

- Parrish nurses could be another trusted source that seniors would listen to. Having a multifaceted approach to reaching seniors is good. This segment of our population is very cautious about being scammed.

- In regards to an incentive. The company could enter everyone who participates into a drawing to win a gift card. This could be a low cost way to encourage people to participate. This is another program where marketing is challenging due to cost-effectiveness concerns. Over arching energy efficiency is good. Maybe shift some of the marketing costs from the program level to the portfolio level.

See Ya Later, Refrigerator®

- Work with the BLM offices. When they do their television and radio spots they could mention that Idaho Power will come pickup their units for free.

Simple Steps

- Joint messaging with the water companies could be beneficial for the Simple Steps program.

- Since it is up to the retailer to determine how the incentive rolls out once the contract is signed, will Idaho Power know what that will be? Yes, the company will know what it will be.

- The general consensus of the group is that it sounds like a good program and the company should move forward. Might be worthwhile to look at this as a pilot program for one year to determine how much this moved the market and drove sales.

12:20 Lunch

Due to a full agenda and time constraints, the Program Planning presentation was given during lunch. Billie updated the group on Heating & Cooling Efficiency (H&CE), drying racks, Energy Efficiency Kits for High Schools, and LED's as promotional giveaways. Two new residential ideas that are being explored are Smart thermostats and residential demand education.

Key points presented:

- The New Ideas name was changed to Program Planning. The initial task was to come up with "ideas" but the intent of this group is to gather new ideas and turn them into program offerings.

- The measures for the H&CE program are on track to launch June 30th. The filing for Oregon is being finalized and should be filed in the next few weeks.

- Highlighted the offering structure, eligible systems, qualifying products, installation and incentive of the Smart Thermostat pilot. Would like feedback from EEAG.

- Discussed that if Idaho Power were to propose modified rate design to introduce demand charges for residential and small general service customers, that could relate to DSM activities in terms of helping customers to manage/reduce their demand. Idaho Power would like input from the EEAG about how best to educate residential customers regarding their demand and ways to help them manage their demand.

There were questions and discussion about:

Smart Thermostats

- Are these thermostats being looked at for demand response or just energy efficiency? Billie answered that even though they have the capability for demand response, the area of focus is energy efficiency.

- Since they have the capability of demand response, the company might want to consider designing the program up front so it has that ability for demand response growth down the road.

- Will this be a stand-alone program or a measure? Billie answered that hasn't been decided yet. It could be its own program, or could be a pilot offering with the H&CE program.

- There was discussion about the qualifying installation options; direct install and the DIY install. Idaho Power spoke with many other utilities and those utilities recommend having contractors install these thermostats.

- The general consensus of the group is to start this out as a pilot. A few members would like to see the DIY option down the road. A few members like the idea of packaging this with other programs. There were a couple of suggestions regarding incenting the contractor to install and have them market these thermostats to customers. The contractor who does the install could give a free tune up as part of the package.

Residential Demand Education

- The subject of demand is huge and it is a large part of what drives costs. Educating residential customers will have to be made from a very broad perspective, the big picture. Maybe focus on what customers can do at home to reduce their demand.

- The company could do a focus group with customers who participate in A/C Cool Credit. They might already have an understanding of demand.

- Irrigation customers pay demand charges, so they understand demand, but the average residential customer probably won't. The company will have to start small and keep it simple in order for customers to understand this concept. Put a line item on the bill called Demand with no number so people will start asking questions. You have to think about the people who pay their bill online and never see a paper copy, how will the company communicate this to them?

- When designing rates, there needs to be workshops.

- Customers require context when talking about numbers in order to understand the impact.

- The whole context of future rate design was initiated by concerns about the Fixed Cost Adjustment (FCA). The Company should start small and have analogies that resonate with customers.

1:30 -2014 Impact Evaluation Results for A/C Cool Credit & Peak Rewards—Nick Bengston- CLEAResult

Nick gave an overview of CLEAResult and his role in the company.

Key Points presented:

- Highlighted the Irrigation Peak Rewards program, reviewed the methodology in determining counterfactual realization rate (what would have happened if an event was called), and the goals and findings of this evaluation.

- The counterfactual realization rate is some of the best information from this evaluation.

- Highlighted the A/C Cool Credit program, the evaluation goals, and using these results to update the predictive calculator that was built in 2012.

2:30 -Marketing Presentation—Bill Shawver, Diana Echeverria, Roberta Rene, and Anne Alenskis

Bill thanked members for calling out the Just Drive Campaign and for recognizing how challenging it is to inform and educate customers. He gave an overview of marketing and provided his email address to everyone. If anyone hears, see's, or has any ideas about ways to market Idaho Power's programs, please feel free to contact him. Bill also gave the members a homework assignment to be thinking about any marketing tactics that they hear or see that they think are particularly effective (or in-effective) and he would like to go around the room at the next meeting to get input and ideas.

Key points presented:

- Idaho Power and NEEA meet via conference call once a month to share what campaigns they are working on.
- Highlighted the current marketing tactics; Boise airport signage in concourse B and the baggage carousel, Boise city bus signage, and Energy Efficiency radio spots.
- Highlighted social media's role in marketing efforts.
- A new television commercial along with an E-News video was shown to the group.
- Idaho Power and KTVB have put together news segments that highlight energy efficiency.

3:30 -C&I Program Combination Discussion—Quentin Nesbitt

Quentin reviewed the current commercial and industrial program processes. He described each program and how they are administered and their respective applications.

Key points presented:

- The pros and cons of having a combined program for all three commercial/industrial programs.
- The three different options proposed for combining these programs:
    1. Have one program for retrofits & new construction with one application, three supplemental applications
    2. Two programs: one for retrofit with prescriptive measures and custom options and one for new construction with prescriptive and custom options
    3. Keep three programs but have the application and processes the same for all three.

There was feedback from EEAG members about:

- From our past discussions about this a potential issue was customer confusion, not knowing which program they are applying for.
- Has the company conducted surveys to see what customers would like? Not formally, it is more anecdotal information. Customers commenting about how much paperwork there is or why do they have to submit this. Idaho Power has to be able to verify that the work was done.
- Maybe applications could be designed for different customer segments; large and small businesses.
- Marketing should be segmented but the program would be just one. The customer shouldn't have to be aware of the mechanics piece.

Rosemary asked the group for parting comments:

- It is clear that the company is trying to change program delivery and the way these meetings are run. It has been a good discussion today.

- Appreciate the company's attention to detail.

- Appreciate the company asking for specific feedback on the options presented. It allows members to give more useful and helpful ideas.

- This group is spending more time in honest discussion on programs and how they work.

4:00 Meeting Adjourned

Energy Efficiency Advisory Group (EEAG)
Notes dated August 26th, 2015

Present:

Catherine Chertudi–City of Boise, Public Works Dept.
Ken Robinette–South Central Comm. Action Partnership
Stacey Donohue–Idaho Public Utilities Commission
Diego Rivas–Northwest Energy Coalition
Quentin Nesbitt–Idaho Power
Tina Jayaweera–Northwest Power & Conservation Council
Ben Otto-Idaho Conservation League
Don Strickler–Simplot
Lynn Young–AARP
John Chatburn–Office of Energy Resources
Sid Erwin–Idaho Irrigation Pumpers Association
Kent Hanway-CHSQA
Tami White–Idaho Power
Michael Breish-Public Utility Commission of Oregon (via phone)

Guests and Presenters*:

Pete Pengilly*–Idaho Power
Bill Shawver*–Idaho Power
Shelley Martin–Idaho Power
Mary Hacking–Idaho Power
Darlene Nemnich–Idaho Power
Gary Grayson–Idaho Power
Amanda Richards–Honeywell
Mike Youngblood-Idaho Power
Shirley Lindstrom- Northwest Power & Conservation Council
Kevin Winslow*-Idaho Power
Mark Rogers-Idaho Public Utilities Commission
Becky Arte-Howell-Idaho Power
Denise Humphreys-Idaho Power
Chellie Jensen-Idaho Power
Dennis Merrick-Idaho Power
Patti Best-Idaho Power
Don Reading-ICIP
Anne Alenskis-Idaho Power
Cory Read–Idaho Power
Theresa Drake–Idaho Power
Andrea Simmonsen–Idaho Power
Todd Greenwell–Idaho Power
Jenny Fraser–Evergreen Economics
Ken Miller–Snake River Alliance
Donn English–Idaho Public Utilities Commission
Rick Haener-Idaho Power
Billie McWinn*-Idaho Power
Krista West-Idaho Power
Roberta Rene*-Idaho Power
Robert Everett-Idaho Power
Cheryl Paoli-Idaho Power
Randy Thorn-Idaho Power
Sheree Willhite-Idaho Power
Mindi Shodeen-Idaho Power
Brenda Tominaga-Idaho Pumpers Association
Jennifer Pope-Office of Energy Resources
Mark Stokes*-Idaho Power

Meeting Facilitator:

Rosemary Curtin-RSCI

Recording Secretary:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Convened at 9:30am

Rosemary and Quentin started the meeting with introductions of guests and members. Two new members have joined the group. Tina Jayaweera from the NW Power & Conservation Council will be replacing Tom Eckman and Don Strickler of J.R. Simplot will be replacing Don Sturtevant. Rosemary asked members to review the Summary of EEAG Member Interviews. Several of the recommendations from the interviews will be implemented at the November EEAG meeting. Rosemary stated that she is discussing additional recommendations with Idaho Power. The May EEAG meeting notes had been provided to members in advance of the meeting for review. There were no comments or concerns regarding the notes.

9:40 -2015 Financials—Pete Pengilly

Pete presented Appendix 1: The overall status of the Idaho Rider, Oregon Rider, and NEEA payment amounts (January-July 2015) and 2015 DSM Actual Expenses and Preliminary Energy Savings by Program (Jan-July).

There were questions and discussions about:

- In regards to the NEEA payments, do they provide a report regarding their activities? Pete answered that Idaho Power receives an annual report from NEEA. Idaho Power has a representative on the NEEA Board of Directors. Additionally many people in the Customer Relations and Energy Efficiency department are part of NEEA advisory committees and are actively involved with them.

- Is there a snapshot of what the Rider funding is now vs. a year ago at this time? Pete answered that he didn't have an exact number but that he thinks expenses seem to be on track, and he can find out.

9:51- DSM Preliminary Energy Savings by Program—Billie McWinn & Quentin Nesbitt

Billie reviewed the 2015 Year-to-Date Preliminary Savings Residential spreadsheet and Quentin reviewed the 2015 Year-to-Date Preliminary Savings Commercial/Industrial/Irrigation spreadsheet. Billie explained that she would only be discussing the programs that fell below 90% of year-to-date savings of the same time last year.

Key points presented for the residential portion:

- The Heating & Cooling Efficiency (H&CE) numbers won't match the financial information by program that Pete had presented earlier because Ductless Heat Pump has been combined with H&CE.

- EE Lighting is at 89% when compared to savings at the same time last year, but that is due to timing issues around invoice reconciliation.

- Home Improvement savings were only at 34% of last year at our May meeting. Since that time Idaho Power has increased marketing efforts; both online and direct mail, the Program Specialist visited with trade allies in the regions and met with Customer Reps on ways to help market the program.

- In order to keep the See ya later, refrigerator® (SYLR) program cost effective, the incentive was removed. Participation has gone down, but later Billie discussed what is being done to address that.

- The savings numbers for the Student EE Kits can vary due to timing because of the way school year semesters work. Teachers have a choice of which semester to participate in. Typically fall semester participation is higher so the 2015 savings numbers aren't reflected in this spreadsheet.

- Billie is looking at a better way to show savings numbers for the Home Products program in the future. 2014 savings included refrigerators & freezers, but those have since been removed. 2015 savings include residual savings from those two items, but now also include showerheads. It isn't an apple to apples comparison right now, but moving forward it should be more comparable.

There were questions and discussion about:

- On EE Lighting, does Idaho Power know the breakdown comparison between the CFL vs. LED incentives? Billie answered that final sales numbers are not available yet, but Idaho Power can provide those to the group at a later time.

- Last year we heard that there were problems in locating eligible homes for the low income program, but the savings numbers show that isn't the case now. Billie explained that it is a timing issue and how the contractors have allocated their work so the savings is still low.

- In regards to the Home Improvement program, has the company seen that the extra marketing has been effective compared to prior years? Billie stated that the final numbers are still being evaluated.

- There are quite a few programs that are doing really well; the company shouldn't only focus on the negative. Billie stated that she wanted to make sure the company addressed any concerns that the group might have.

- Are the 2015 IRP Energy Efficiency goals similar to2014? Pete answered that they are pretty close.

Key points presented for commercial/industrial/irrigation portion:

- Building Efficiency looks very good on a per project basis. The energy savings reflect how just one large project can affect those numbers.

- Easy Upgrades savings are on track. The company is looking to add new measures to the current prescriptive list. Streamlining the customer process for the commercial and industrial programs is still in development. The company is also continually looking for ways to engage the small businesses.

- The Custom Efficiency program savings are lower than last year right now, but with this program it is a timing issue. There are some large projects that are expected to come in by the end of the year.

- Irrigation Efficiency is on track. There is some lag with the Custom projects but there aren't any issues with the program. BPA is doing a large research study and looking at irrigation scheduling. Idaho Power hasn't seen details or costs but is very engaged and ready to participate.

- A workshop for the Municipal Water Supply Cohort will be held late September. It will give prospective participants detailed information about the program. There will be 4-5 workshops for participants after that. Quentin explained that one of the biggest ways for this type of customer to save energy is through pressure zones. Through this cohort each municipal water system will be analyzed with software developed by our consultant to identify energy saving potential.

10:13-Break

10:23 -2015 Demand Response Update—Quentin Nesbitt

Quentin updated the group on the three Demand Response (DR) programs.

Key points presented for Irrigation Peak Rewards:

- Participants are split into 4 groups so as not to create large divots in the system load.

- The company is moving away from the cell phone devices and going to the AMI system.

- Reductions are lower later in the year as grain comes off irrigation and lower reductions are expected.

There were questions and discussion about:

- Regarding the 62MW of manual irrigation demand response, is that customer preferred and is there any way to encourage them to move to dispatchable? Quentin explained that manual is allowed if that service point has 1000 hp of connected load. Those customers will nominate an amount that they will shut off. There is no encouragement from Idaho Power to move towards dispatchable. Customers are resistant to have that type of device on those pumps. These pump stations cannot be turned all the way off.

- Does Idaho Power have data on the average total of manual MW that is participating? Quentin answered that interval data is available on each customer and they are paid according to their actual reduction. They receive a monthly payment.

- What was the overall realization rate? Quentin stated that it is still being calculated, but it is looking to be around 70%.

Key Points presented for Flex Peak:

- Preliminary results show a 25 MW reduction for 2 events and 15 MW reduction for the 3rd event.

- Most of the same Flex Peak customers from 2014 enrolled in the program for 2015. Idaho Power would like feedback and suggestions from EEAG on ideas to increase participation in Flex Peak; especially for the smaller commercial customers.

There were questions and discussion about:

- There was quite a bit of discussion and questions around the type of messaging that is currently being used to market Flex Peak. There were suggestions on changing the messaging so that it is more specific for the smaller customer vs. the larger customer.

- What type of smaller customer is Idaho Power targeting for this program? Would customers with large refrigeration be a potential candidate? Quentin answered that the tariff states that the customer would need to provide 20 kW so it has to be realistic for the customer. Customers who have large refrigeration systems typically won't participate on the hottest day due to the nature of their business.

- It was suggested that having a "town hall" type meeting or workshop for the small business customer might help with enrollment. Is it possible for the smaller customers to group together to nominate the 20kw? Quentin answered that it is possible for a single customer to combine service locations to do that.

- It was emphasized that someone from Idaho Power should have a peer to peer visit with the state agencies to explain how Flex Peak has worked for Idaho Power here at the Corporate Building. Explain to the agencies that it has not been an imposition on employees. He explained that a plaque will be presented to the Parks and Recreation on their recent energy efficiency work at Bruneau State Park. He offered to help Idaho Power identify the contacts at these state agencies and help with any messaging that might be needed.

- It was suggested that adding testimonials within the marketing mailers could help promote enrollment. Having a dollar amount savings associated with the amount of kW nominated could also help.

Key points presented for A/C Cool Credit:

- Participation is down since 2013. As directed by the Demand Response Settlement Agreement, Idaho Power markets to participants who move and customers who have moved into a home that has a switch already installed.

- Idaho Power would like suggestions and feedback from EEAG about marketing to additional groups. Per the Demand Response Settlement Agreement, the company stated that it would meet with EEAG to talk about participation and marketing of this program.

There were questions and discussion about:

- Are customers who have dropped out of the program being asked why they leave? Quentin answered yes along with trying to convince them to remain enrolled in the program. Customers usually answer that they are too hot.

- How many customers have dropped out because they have purchased a higher efficiency a/c unit? The Program Specialist answered that there aren't very many customers that cite that as a reason.

- Looks like it might be time to increase marketing to maintain previous participation levels.

- Marketing to new customers or first time homebuyers could be a good opportunity.

11:30 Program Planning—Billie McWinn

Billie explained the updates to existing programs and the new offerings. The topics listed in red on the slides are where she would like specific feedback from EEAG.

Key points presented:

- There are three new measures that have been incorporated into the Heating & Cooling Efficiency (H&CE) program. There is a participating contractor list and there are currently four contractors signed up. A bill insert will be mailed out in September. At the next EEAG meeting more information on participation should be available.

- The company is now using LED's as a giveaway when picking up refrigerators for the SYLR program. This started in June and since then a bill insert along with a television ad have run. There isn't any measurable data yet, but by the next EEAG meeting there should be something to report.

- At a previous meeting EEAG members provided feedback on whether or not Idaho Power should participate in the promotion based activity, Simple Steps. One of the target dates was July 4th, but Sears opted out due to internal changes. Sears will participate in the Labor Day promotion and they are the only participant for that date. Best Buy is no longer participating in the Black Friday event and Lowe's is hesitant. They want to see how it works before they commit. Idaho Power is providing point of purchase material and CLEAResult is doing the majority of the marketing.

- The new offerings and new opportunities; Energy Savings Kits, Smart Thermostats, Home Improvement, and Home Energy Audit were discussed and EEAG members were asked for feedback.

There were questions and discussion about:

- **Energy Savings Kits**

    - Is cost effectiveness of each measure or the whole kit being looked at? Billie answered that both are being evaluated.

    - Will there be a way to follow up with customers after the kit is delivered to see if the contents were actually installed? Billie stated that it she is looking into that but nothing is in place yet.

    - When will these kits be ready for customers? Billie stated that the company is looking at the end of quarter one, 2016.

- **Smart Thermostats**

    - How much would the installation for this measure be? The installation could range between $100-$300 for product and labor.

    - When a smart thermostat is purchased, customers can buy them with or without a contract for ongoing data sharing service. Customer would provide their data to the provider and the provider would then provide prompts. Idaho Power would like feedback from EEAG on the concept of the service provider data sharing.

    - Would Idaho Power require this of customers who participate? Billie answered that right now, the inclination of the company is to not require this.

    - Someone suggested that the company could offer a higher incentive for the customers who choose to sign up with the service provider vs. those who don't.

    - Since this is a pilot, it might be good to have the two groups to evaluate what the savings differences are.

    - Could Idaho Power be the third party provider for customers? Pete answered that it would be hard to obtain the data since it is proprietary to the manufacturer. The Program Specialist added that the function the third party performs would require a separate business unit.

    - Under a pilot designation, the company would have more flexibility in a two tiered approach.

    - The option of choice is important for customers.

    - Would the pilot have participation limits? Billie answered that it will be available throughout the company's service territory with no limitations on the number of customers.

    - Does the company have a goal for participation or amounts? Billie stated that those haven't been determined.

12:05 Lunch

12:52-Meeting Reconvened. Program planning presentation continued.

- **Home Improvement Program**

- Billie asked the group for feedback on whether or not Idaho Power should actively market to multifamily especially with the uncertainty around the Regional Technical Forum (RTF) savings numbers in the future.

- What is the definition of a multifamily building? The Program Specialist answered that it is four stories or higher.

- Most of the tenants in a multifamily building are renters so the building owner would need to be targeted, not the tenant. It was emphasized to not put this out as a marketing piece but rather just go directly to building owners.

- One member stated that she didn't think the RTF multifamily savings applies to high rises but that it's for the garden style buildings. Another member stated that this should be followed up with RTF to confirm the right application.

- **Home Energy Audit**

    - Billie asked for feedback if Idaho Power should offer this to gas-heated customers and not just the all-electric customer.

    - Even though it might not be cost-effective, it can increase awareness and participation in all programs. This is one of the best ways to reach customers. Has reached out to the local gas company to see if they want to partner in this? Billie stated that the company hasn't yet reached out.

    - This would be an excellent service to provide. This could be a great opportunity to get people to change their behavior and I commend Idaho Power for considering this.

    - Idaho Power will need to educate the auditors about which customers can and cannot participate in incentive programs.

    - This is a great idea. There is electric savings in gas homes that hasn't been obtained and this could be a great way to get it.

Tami gave a brief update on the residential demand education. Since the last EEAG meeting, this has continued to be evaluated. There hasn't been any decisions made on this, but Idaho Power plans on gauging customer reaction and acceptance to a three part rate design. This will include stakeholder discussion and customer focus groups. This would happen before any decision by Idaho Power is made. One member asked if the demand charge would replace the Fixed Cost Adjustment (FCA). Tami answered that as more of the collection of fixed costs is moved out of the energy charge and into the demand charge the FCA would reduced accordingly.

1:18-C&I Custom Efficiency Evaluation—Jenny Fraser/Evergreen Economics

Evergreen Economics performed a process and impact evaluation on the Custom Efficiency program. Today's presentation will focus on the impact evaluation.

Key points presented:

- The evaluation was for the 2013 program year and the incentive values are from 2013 as well.

- 73 total projects were looked at. No lighting projects were selected for site visits because Idaho Power already had documented inspections on a large portion of projects

- The process evaluation focused on the streamlined offering, the wastewater cohort, and the refrigerator operator cohort. The high level conclusion is that participants have a high level of satisfaction. The networking aspect for participants of the cohorts was a side benefit that wasn't initially expected but they are happy with those results.

There were questions and discussion about:

- Were the original savings estimates based on preliminary or final applications? Jenny answered that the energy savings is based on final applications.

- Did Idaho Power already include the HVAC interactions in their calculations? Jenny stated that the calculator Idaho Power was using did not include those.

- During the site visits, how was baseline data collected? Jenny answered that there was some baseline information in the documentation but most of it was confirmed with the facility through discussions with site personnel in order to verify savings.

- How does this evaluation for Idaho Power compare to other utilities' evaluations? Jenny stated that you want to see as close to 100% realization rate as possible. With Idaho power there was great documentation and overall in relation to other utilities the results are very good.

1:55-Program Marketing—Bill Shawver

Bill highlighted what would be covered during his presentation. He emphasized to the group again about emailing him with ideas on marketing throughout the year and not just during the EEAG meetings.

Key points presented:

- Idaho Power is in the early stages of revamping its website.

- Looking into sub-branding the energy efficiency portfolio. Idaho Power doesn't want the sub brand to become the brand but rather enhance it. Would like feedback from EEAG on the concept of sub branding.

- Social media and marketing efforts were presented along with some radio and television ads.

There were questions and discussion about:

- The idea of a sub brand is a good idea, but caution was given in choosing its name. The name is one of the most important aspects of drawing people to the brand and takes a lot of planning and research.

- With the Curb It sub brand, the City of Boise has learned that the program is the same in its' gut whether or not you are at home, work, school, or play. What you can do at home for recycling you can do anywhere. That brand brings everyone to the program and it can be touched in different ways.

- Has research been done on what types of wording and images people respond to for the marketing pieces and if so, where does that information come from? The Marketing Specialist answered that people respond to the words; "saving money" and "comfort." That information has come from E Source, JD Power, Burke, using the empowered community, and in talking with other utilities.

- A suggestion was made that people respond better to a dollar sign than a percentage sign. Telling people that they would save 2-3% on their energy bill might not resonate strongly with customers since the cost of energy is inexpensive here in Idaho. Finding a different way to get that message across might have more impact.

3:07 -IRP Discussion—Mark Stokes

Mark thanked those that participated in the Integrated Resource Plan (IRP) process and appreciates everyone sticking around for this presentation.

Key points presented:

- The IRP is a regulatory requirement and it is updated every 2 years.

- The purpose of the IRP is so that utilities can plan how they expect to provide service to customers for the next 20 years.

There were questions and discussion about:

- There has been a lot of talk about demand response at today's meeting. The discussions we have in these meetings play out in the IRP process. The current portfolio counts on the company getting a certain level of energy efficiency and demand response.

3:42-Wrap up—Rosemary Curtin

Rosemary asked EEAG members for parting comments.

- It was a good meeting, but it was pretty full so please provide more time in the agenda for discussion. Appreciated the red highlighted questions in the presentations. Really enjoyed the IRP discussion.

- Liked the tie to the IRP discussion

- Maybe mic the presenter so the person on the phone could hear the presentation.

- It was a great meeting. I learned a lot.

- Appreciated Quentin's presentation. It's nice to see the longer picture and broader trends. It was nice to see affirmation that realization rates for the Custom Efficiency program were so good.

- Would like to see follow-up on the MOU and where it is in the timeline. Maybe at the next meeting we can get an update.

- Appreciate that 44% of advertising is focused on energy efficiency.

- Excited to see the new programs/offerings roll out.

- This meeting was improved from the last one I attended remotely, I could hear well. Quentin's presentation was good, but we only had 10 minutes to discuss program participation. Felt like we should have had more time on that for productive discussion.

Rosemary thanked everyone for their comments and stated that the next EEAG Meeting would be held on November 5th.

3:47 Meeting Adjourned

Energy Efficiency Advisory Group (EEAG)
Notes dated November 5th, 2015

Present:

Catherine Chertudi–City of Boise, Public Works Dept.
Ken Robinette–South Central Comm. Action Partnership
Stacey Donohue–Idaho Public Utilities Commission
Diego Rivas–Northwest Energy Coalition
Tami White–Idaho Power
Michael Breish-Public Utility Commission of Oregon
Kent Hanway-CSHQA
Don Strickler–Simplot
Ben Otto-Idaho Conservation League
John Chatburn–Office of Energy Resources
Sid Erwin–Idaho Irrigation Pumpers Association
Tina Jayaweera (via phone)–Northwest Power & Conservation Council
Quentin Nesbitt*–Idaho Power

Not Present:

Lynn Young–AARP

Guests and Presenters*:

Pete Pengilly*–Idaho Power
Lisa Nordstrom–Idaho Power
Shelley Martin–Idaho Power
Phil Devol–Idaho Power
Bill Shawver*–Idaho Power
Shirley Lindstrom–Northwest Power & Conservation Council
Don Reading–ICIP
Peter Richardson-ICIP
Susan Klein-Idaho Power
Mary Hacking-Idaho Power
Tracey Burtch-Idaho Power
Cheryl Paoli-Idaho Power
Connie Aschenbrenner-Idaho Power
Matt Larkin-Idaho Power
Barb Ryan*-Applied Energy Group Inc (via phone)
Cory Read–Idaho Power
Theresa Drake–Idaho Power
Roberta Rene*–Idaho Power
Lynn Tominaga-Idaho Irrigation Pumpers Association
Brenda Tominaga–Idaho Irrigation Pumpers Assoc.
Aaron Jarr–Franklin Energy
Denise Humphreys-Idaho Power
Donn English–Idaho Public Utilities Commission
Darlene Nemnich-Idaho Power
Anne Alenskis-Idaho Power
Zeke VanHooser-Idaho Power
Billie McWinn*-Idaho Power
Robert Everett-Idaho Power
Mindi Shodeen-Idaho Power
Craig Williamson*-Applied Energy Group Inc
Chad Worth-Energy Solutions

Meeting Facilitator:

Rosemary Curtin (RBCI)

Recording Secretary:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Convened at 9:32am

Rosemary and Quentin started the meeting with introductions of guests and members. There were no comments or questions on the notes from the August meeting. Rosemary passed out a comment sheet to members. If there was something that didn't get addressed during the meeting, she asked that they add it to the comment sheet and it would get picked up after the meeting.

Tami addressed the group regarding a follow up item from the August meeting. There had been a question about what was included in a new customer information packet. She passed out a copy of the letter that Idaho Power sends to new and existing customers that move to a new address. A copy of this letter was sent to Tina Jayaweera because she participated in the meeting by phone. Tami also followed up the topic of rate design. Idaho Power is continuing to evaluate, looking at system capabilities and engaging with stakeholders. No final decisions have been made on this. The last follow up item is regarding the status of the Memorandum of Understanding (MOU). Idaho Power met with staff at the Idaho Public Utilities Commission (IPUC), Avista, and Rocky Mountain Power in July. It was concluded that rather than update the current MOU, the IPUC staff would prepare a memo to the utilities on how prudency would be evaluated and determined. Stacey added that this memo is circulating at the commission.

Theresa updated the group regarding reply comments that Idaho Power filed on the Integrated Resource Plan. The comments did not include a citation which led to stakeholder confusion on Idaho Power's commitment to pursuing all cost effective energy efficiency. Theresa wanted to clarify and reaffirm that the company's commitment to pursue all cost effective energy efficiency has not changed. Ben indicated that what concerned him was the statement that there was no potential beyond the achievable. He felt that was incorrect and stated that Idaho Power has gotten above achievable and remained cost effective. Theresa thanked him for calling attention to what was missing in the comments. Ben encouraged the group to look at the ACEEE document that was cited.

9:44 a.m.-2015 Financials—Pete Pengilly

Pete presented Appendix 1: The overall status of the Idaho Rider, Oregon Rider, and NEEA payment amounts (Jan-Sept 2015), Appendix 2: 2015 DSM Actual Expenses and Preliminary Energy Savings by program (Jan-Sept), and DSM Expenses by Program.

There were questions and discussions about:

- In regards to Appendix 2, what part of Flex Peak is in base rates? Pete answered that it is the Idaho incentives. In Oregon the incentives come out of the rider. In Idaho demand response program incentives are included in base rates and tracked through the annual Power Cost Adjustment (PCA).

- In regards to the DSM Expenses by Program slide, the group would like to see the energy savings included on this sheet but realizes there's a lot on the sheet.

9:58 a.m.-Commercial Program Performance YTD—Quentin Nesbitt

Quentin updated the group on the commercial, industrial and irrigation programs.

Key points presented for the commercial and industrial portion:

- The commercial and industrial programs are at 155% YTD savings compared to last year. There aren't as many big projects in the pipeline so November and December will not be as big as last year.

- The current lighting tool will be updated once Easy Upgrades, Building Efficiency & Custom Efficiency are combined into one program.

- Quentin asked the group for input and feedback in coming up with a new name for the Commercial/Industrial Program Combination. Idaho Power has not decided on a name yet. He showed slide 11 which had some word concepts that the company has brainstormed.

There were questions and discussions about:

- If there is variability in these programs and they are hard predict, does it make sense to do a 2 year trend line so you capture some of that variability? It might help with planning and rollout. Quentin answered that in the last few years it has been consistent in the Custom Efficiency program whereas Building Efficiency has had more variability. There is a lot of overlap so maybe looking at each program individually isn't the best. It is one of the reasons the company is looking at combining these programs.

- In regards to the Easy Upgrades program and the new measures being looked at for the combined program, are the deemed savings based on Idaho Power doing its own calculations and then making the decision? Quentin answered yes and in addition to that, the company reviews the Technical Resource Manual that a third party developed for Idaho Power and asks for measures to be evaluated and added but does not necessarily always wait on the addition in order to make a decision.

- There was discussion about extra effort required by contractors in the current lighting tool when LED options are chosen. Quentin stated that proposed program modifications will fix this issue. LED project savings will be easier to calculate and review once these changes take place. In the past, there have not been all the options for LED's that we are seeing now.

- It was suggested, on the Custom Efficiency slide (9), that it would be more helpful to show a percentage of the year instead of a year to date comparison.

- In regards to coming up with a new program name, one member suggested Energy Strategies @work. The name might imply more than just incentives and include an educational component. Another member stated that for commercial/industrial customers, "energy efficiency" is a big term. He also liked the term "@work" because it was all encompassing. He didn't like the term "Institutional." Quentin stated that if any of the members had other ideas or suggestions to email him.

Key points presented for the irrigation portion:

- Irrigation Efficiency is at 81% of YTD 2014 savings. Commodity prices could be a factor. There are a number of crops that irrigators grow that aren't worth what they were in the past. Idaho Power still conducts workshops, marketing, and customer knowledge seems to be high. There will be more workshops and the company will continue to do newsletters.

- Quentin asked for input and feedback from the group on a potential tariff change for Irrigation Peak Rewards program to move customers to a one-way option. The one way option is more cost efficient as the annual fees for cell devices exceeds new AMI device cost. The manual option would be allowed when communication is not available.

There were questions and discussion about:

- Commodity prices could have something to do with the lack of participation in Irrigation Efficiency, but some of the non-participants are waiting to see if the program actually works before they sign up.

- Do you think that focusing on the success stories would help those that don't participate to see that it does work? Quentin stated that the company uses that strategy, especially in the workshops.

- In regards to the different options in Irrigation Peak, one member said the two way option should be eliminated. These pumps can be accessed remotely and irrigators can drive out and access them directly. He is also in favor of moving to the AMI devices.

- With the one-way option, would Idaho Power get information on the pumps that it turns off? Quentin answered that the AMI data shows that the pump is shut down. With the cell phone system, it logs that the pump was shut off. The company has to request a query from the third party and then sift through that data.

- It would seem that the two-way option offers benefits to the irrigator. Maybe they should pay some incremental costs if they want to keep the cell phone system.

- Does Idaho Power know what the cost savings is? Quentin stated that it would depend on how many devices would need to stay on cell service. The contract has a base amount so there is not a flat per device savings.

11:02 a.m-Residential Planning Update/Discussion—Billie McWinn

Billie provided information on year-to-date savings and participation for all residential programs and a detailed look at the Home Improvement program, A/C Cool Credit, and See ya later, refrigerator® (SYLR).

Key points presented:

- Billie reported that the residential programs are doing well this year; overall year-to-date savings at 107% of 2014.

- SYLR has experienced a decline in participation despite an increased effort in marketing and a concentrated digital campaign. The Regional Technical Forum (RTF) updated savings numbers that have lowered even further. Idaho Power has reached out to another recycling company for competitive pricing information.

- At the end of 2014 the federal tax credit expired which could be one of the reasons why the Home Improvement program has experienced a decrease in participation in 2015. The marketing for this program has increased substantially in 2015 and will continue. Members of EEAG provided feedback at the last meeting to include multifamily in the marketing materials.

- Current participation in the A/C Cool Credit program is down to less than 30,000 customers. At the August EEAG meeting, the company solicited members for feedback on marketing and program participation. Although the settlement agreement precludes us from actively marketing to new customers, there is a group of customers that dropped out of the program between suspension and settlement that we are now marketing to. Billie passed around examples of a postcard campaign.

There were questions and discussion about:

- Make sure that the multifamily buildings that are being marketed to in Home Improvement haven't already been weatherized in either WAQC or Weatherization Solutions. Billie stated that while there could be potential for overlap, the Program Specialists for Home Improvement and Weatherization are working together to ensure there is no duplication.

- Is there a way for Idaho Power to include in the new customer letter, a pamphlet about the A/C Cool Credit program? Could those customers be isolated according to the guidelines and restrictions of the settlement? Billie answered that Idaho Power knows which customers fall within the settlement restrictions and they have been sent marketing information. Revisiting the settlement boundaries and marketing to new customers is encouraged, at least from the Oregon side. Quentin stated that in regards to the 390 MW of DR included in the Integrated Resource Plan (IRP), it is really causing surpluses for multiple years in the future. The primary purpose of the settlement was to include a minimum amount of DR even when there isn't a need identified in the IRP.

11:30 a.m.-Program Planning Update/Discussion—Billie McWinn

Billie presented an update on the new offerings for the Heating & Cooling Efficiency program (H&CE) and the drying racks. The areas in blue on the slides are where she would like discussion and feedback from the group.

Key points presented:

- The new offerings for H&CE were incorporated in June of this year. The contractor network list for Single Family Home Duct Sealing has six contractors enrolled. Once the contractor network is more fully developed the marketing push will start.

- The implementation of smart thermostats will be first quarter of 2016. There will be a qualifying products list and will require contractor installation.

- The drying racks have arrived, fifteen pallets in Boise and ten pallets in Pocatello. Interested customers have signed up to be notified when the racks will be available. Idaho Power will send out a notification of the time and place and it will be on a first-come-first-served basis. Billie asked for feedback on whether the company should follow up with customers in six months or one year. She explained the pros and cons of both.

- The company is looking into an "opt-out" option for the Energy Savings Kits (ESK) for a small number of customers. A postcard would be sent to them and if it was returned then they wouldn't get the kit. Billie is asking for feedback from the group.

- Billie explained the Multi-family offering that is being considered and asked the group for feedback on contractor install vs. facilities install.

There were questions and discussion about:

- Because the company is asking people to change behavior by using a drying rack, sending out frequent prompts would be helpful. It might be better to wait longer on the survey in order to collect better data.

- Waiting six months to do a survey should be adequate. Having prompts would be a good idea.

- The key with the ESK's is getting customers to install the items that that they receive, so focus on the best way to make that happen.

- The opt-out option programmatically has higher savings while the opt-in provides better per unit savings. One member stated that they favored the "opt- out" approach.

- Avista had something similar a few years ago where customers could opt-out. It was pretty successful with a lot of savings associated with it.

- Just sending it to customers hoping they install isn't a good idea. The company should do either opt-in or opt-out to help insure installation.

- Including a postcard that has messaging about potential money savings if installed might be helpful. Even something on the outside of the box to grab their attention.

- The opt-out option gets these items into the hands of customers who might not try this on their own.

- There have been other utilities that have these types of programs that are successful. It might be a good idea to look at those to make informed decisions.

- There was discussion concerning the multi-family direct install and whether the measures should be installed by building facility personnel or a contractor. Tenants might be more willing to participate in the facility install approach as they trust the building owners and landlords who already have a key to the unit.

- There might be a better success rate if the property manager is involved instead of a facility manager. They typically have more than one facility to manage, so coordination could be an issue.

- Both options could be available. If the property doesn't have someone on-site to do the installs, a contractor could be used instead.

- QA could be done by a third party to ensure that the items have been installed.

12:00- Lunch

1:00 Meeting Reconvened

1:00 p.m.-Residential Program Evaluations—Craig Williamson and Barb Ryan (via phone), Applied Energy Group (AEG)

Craig presented the results of the Residential Programs Evaluation. The programs that were evaluated were the Ductless Heat Pump (DHP) Pilot, Home Improvement Program (HIP), and See Ya Later, Refrigerator® (SYLR). This is a historical look at what the savings were and how the programs operated in 2014.

Key Points Presented for DHP:

- Both an Impact and Process evaluations were performed on all three programs.

- Results for both evaluations of the DHP Pilot were favorable. A few adjustments were needed on the Non-Electric Benefits (NEBs). The cost of money calculations were done differently than specified by the RTF. Also, savings depends on different climate zones. Because some zip codes have more than one climate zone, a few customers were assigned to an incorrect climate zone which resulted in a reduction of savings.

- Customers were not surveyed for these evaluations.

- Idaho Power is already doing the majority of the standard best practices and has implemented some of the recommendations since the evaluation was completed.

There were questions and discussion about:

- What are examples of NEBs? Craig answered that NEBs are what the RTF says they are. They are usually things not related directly to energy savings but rather health and comfort.

- Does AEG get any more granular to find out if certain low income customers are not pursuing incentives? Craig stated that they didn't go to that level of detail. That would require intensive surveying and it wasn't part of the scope of this evaluation.

- How common are DHP's in new construction? Craig stated that they are not a huge part of the energy efficiency portfolio across the country. They are more common in the Northwest due to the RTF. Barb added that a utility in Maine and Connecticut offer DHPs for new construction.

- DHP's could be extremely beneficial in multi-family development. Most of these housing types use baseboard heat because it is the cheapest to install.

Key points presented for HIP:

- This program more than doubled its savings goal. Most utilities have a goal; they meet this goal and then stop which translates to missed opportunities. Idaho Power didn't do this, they doubled their goal.

- In the past, the RTF did not quantify NEB's but Idaho Power will use them if available.

Key points presented for SYLR:

- This program surpassed its goals and achieved a 100% realization rate. It is a very well run program and complies with most of the best practices in the industry.

- It is easy to come up with recommendations for a poorly run program, but can be a challenge for exceptionally well run programs such as this. One recommendation is to decrease the time it takes to pick up a unit. This could be done by looking at different promotional ideas.

There were questions and discussion about:

- Are NEBs included in the cost analysis? Yes, if available. The information used for this evaluation was from 2014 which didn't have NEBs included in some RTF workbook.

- Marketing material could demonstrate how a customer could save money by not dumping their refrigerator at the landfill.

- A neighborhood blitz could be organized. Customers could be informed that Jaco will be in their neighborhood on a certain date to pick up old units. Barb stated that could be worth considering, but there are specific requirements on having someone home when Jaco comes to pick up.

2:04 –Program Marketing—Bill Shawver

Bill introduced the new Marketing Specialist, Tracey Burtch. Bill thanked one of the EEAG members for his ongoing communications with him and referenced a comment made by another EEAG member earlier about the increase in dollars spent for the residential programs. This was due to an increase in marketing activities.

Key points presented:

- In early 2016 the company will take a deeper dive into behavioral motivators and campaign messaging.

- Utilities are moving away from “apps” and moving toward adaptive and responsive web presence so the web can adapt to the device a customer is using.
- An exchange of ideas and information is encouraged so please contact Corporate Communications if you have something to share.
- The marketing for energy efficiency awareness campaigns, online panel findings and 2016 planning were reviewed. The EEAG members were asked for campaign ideas.

There were questions and discussion about:

- Has Idaho Power done movie theater ads? Roberta answered that the company did some about two years ago for HIP.
- In the past there has been advertising in stores, such as a cling, directing people to look at the more energy efficient products. Roberta stated that is something the company is looking at. It can be a challenge to work with the big box stores to allow outside marketing.
- There could be a positive spillover by utilizing the smaller stores even if you aren’t able to get into the larger box stores.
- Look at church or community groups.
- The key to behavioral motivators isn’t what customers say, but what is actually motivating them to action. Usually the revealed preference is completely different that what really motivated them to act. Bill stated that the company would be looking at the best practices and what is happening on a national level.
- In response to slide 11 (Consistent Look and Feel), for residential customers, the company should find a core message and value that it wants them to focus on instead of targeting each program.
- For example, for recycling we say, “We want you to know that you can do the same thing at home, work, and play.”

2:45-Break.

3:00-Future EE Measure Savings, IRP Avoided Costs & Cost Effectiveness—Kathy Yi

Kathy presented program and measure cost effectiveness assumptions, cost effectiveness tests, changes to the savings assumptions for measures in the current programs, and anticipated savings changes impacting 2017. This presentation is to get these issues on the radar.

Key points presented:

- For the current 2015 program year, 2013 IRP DSM Alternative costs are being used.
- A Technical Reference Manual (TRM) was developed by a third party for use by the commercial programs on items that the RTF doesn’t look at.
- Version 1.7 of the TRM will have different savings for new construction and major renovation projects that fall under the 2009 International Energy Conservation Code (IECC) and 2012 IECC.

- Idaho Power freezes savings and cost assumptions during budgets. The 2016 budgets were set in August. The RTF has met twice since August and has approved changes on a few measures which will impact planning for 2017

There were questions and discussion about:

- I found this presentation very useful to look out in the future as to what to expect for programs.

- This was very helpful in allowing stakeholders to see what utilities have to deal with when planning programs.

3:25-Open Discussion—Quentin Nesbitt

- At the last EEAG meeting, the company asked for input and ideas from members on how to increase participation in the Flex Peak program. Could Idaho Power offer coaching opportunities to the facilities that participate? Quentin stated that Idaho Power does provide some coaching to facilities after an event.

- One EEAG member shared that the coaching that EnerNOC provided was not well received within certain facilities. Receiving multiple emails and calls wasn't working and facility staff stated that if they kept getting that type of "coaching" they would no longer participate in the program. Prior to the demand response season, the different facilities receive an email discussing the Flex Peak program and a review of the prior season.

- Having other companies that currently participate in Flex Peak, share their lessons learned could be a valuable coaching opportunity.

- It would be interesting to learn about Idaho Power's budget setting process. Quentin gave a high level summary of how the Customer Relations & Energy Efficiency department plans its budget.

Rosemary asked for parting comments:

- I like the open discussion portion of the meeting. I like that we stayed with the agenda and like that the lunch was brought in. Kudos to the marketing department on Weatherization Solutions. One suggestion for the marketing material, if there is a way to make it clearer that this program is for electrically heated homes that would save on some unnecessary phone calls.

- Appreciate having the open discussion, enjoyed Kathy's presentation on what is happening in savings going forward. I liked the clarification on a few items. Programs look good and exceeding goals, company is doing a good job.

- Congratulations to Quentin and Zeke in successfully implementing and managing the Flex Peak program.

- It was a great meeting. The topics that Billie and Quentin cover should have more time and flexibility built in for more discussion.

- Liked the number of topics. It was a full agenda but not over filled. The company does a good job at soliciting feedback from members, but there needs to be a more concise way to hear what is done with that feedback.

- Like the meeting format change and will continue to stress the multi family issue. Earlier in the year the company did a good job presenting on new ideas and next steps. Would like to continue seeing that.

- I liked all the comments and open discussion. Maybe focus less on trying to fit everything in on the agenda.

- I enjoyed the program evaluations. It's a reality check of how the programs are doing and if they are running as they are supposed to.

- Would like to hear more about the evaluation plan in the future.

Rosemary stated that dates for the 2016 EEAG Meetings will be sent out in the next few weeks.

4:02 Meeting Adjourned

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NEEA Market Effects Evaluations

Table 1. 2015 NEEA Market Effects Evaluations

Report Title	Sector	Analysis Performed by	Study Manager	Study/Evaluation Type
2013–2014 Northwest Residential Lighting Long-Term Tracking Study	Residential	DNV GL-Energy	NEEA	Assessment
2014 Energy Savings for the Commercial Real Estate Strategic Energy Management Cohorts	Commercial	Cadmus	NEEA	Impact
2014–2015 Northwest Residential Lighting Long-Term Market Tracking Study	Residential	DNV GL-Energy	NEEA	Market Assessment
Agricultural Irrigation Initiative: Data Exchange Standards	Irrigation	Next Chapter Marketing	NEEA	Assessment
Agricultural Irrigation Initiative: Grower Experience	Irrigation	Next Chapter Marketing	NEEA	Assessment
Agricultural Irrigation Initiative: Instrumentation and Hardware Best Practices in Precision Agriculture	Irrigation	Western AgTech Solutions	NEEA	Assessment
Agricultural Irrigation Initiative: Overview	Irrigation	Next Chapter Marketing	NEEA	Assessment
Agricultural Irrigation Initiative: Overview of Center Pivot Irrigation Systems	Irrigation	New Chapter Marketing	NEEA	Overview
Agricultural Irrigation Initiative: Pivot Evaluation Best Practices	Irrigation	Western AgTech Solutions	NEEA	Assessment
Agricultural Irrigation Initiative: Precision Water Application Test	Irrigation	Oregon State University	NEEA	Assessment
Agricultural Irrigation Initiative: Soil Science and the Basics of Irrigation Management	Irrigation	Western AgTech Solutions	NEEA	Assessment
Agricultural Irrigation Initiative: The Future of Agricultural Irrigation	Irrigation	Irrigation for the Future	NEEA	Assessment
Agricultural Irrigation Initiative: Using Soil Electrical Conductivity Mapping for Precision Irrigation in the Columbia Basin	Irrigation	Oregon State University	NEEA	Assessment
BOC—Expansion Initiative Market Progress Evaluation Report #2	Commercial	Research Into Action	NEEA	Market Assessment
BOC—Expansion Initiative Market Progress Evaluation Report #3	Commercial	Research Into Action	NEEA	Market Assessment
Business Case, Economic Modeling, and Market Channel Improvements	Irrigation	Next Chapter Marketing	NEEA	Assessment
Commercial Real Estate (CRE) Market Test Assessment: Understanding Delivery, Partnership Strategies and Program Channels	Commercial	New Buildings Institute	NEEA	Market Assessment
Commercial Real Estate Participant Cohorts Market Progress Report	Commercial	Cadmus Group	NEEA	Market Assessment
Consumer Messaging for Ductless Heat Pumps and Heat Pump Water Heaters	Residential	ILLUME Advising, LLC	NEEA	Assessment
CRES Initiative Market Test Assessment Final Report	Commercial	Research Into Action	NEEA	Impact
Establishing the Market Baseline for Super-Efficient Dryers	Residential	Cadmus Group	NEEA	Market Baseline
Evaluation of Key Alliance Cost Effectiveness Model Assumptions for Commissioning	Commercial	Cadmus Group	NEEA	Model Assessment
Evaluation of Key Alliance Cost Effectiveness Model Assumptions for Motor Rewinds	Industrial	Cadmus Group	NEEA	Model Assessment
Existing Building Renewal Montana and Idaho Savings Validation 2014 Results	Commercial	Navigant	NEEA	Impact
Heat Pump Water Heater Model Validation Study	Residential	Ecotope, Inc.	NEEA	Assessment
Hospitals and Healthcare Initiative Market Progress Evaluation Report #7	Commercial	Evergreen Economics	NEEA	Market Assessment

Influence Assessment: Establishing Data Exchange Standards Among Irrigation Manufacturers	Irrigation	Cadmus Group	NEEA	Influence Assessment
Laboratory Assessment of GE GEH50DFEJSRA Heat Pump Water Heater	Residential	Ecotope, Inc.	NEEA	Lab Assessment
Next Step Home Builder Focus Groups	Residential	Curtis Research Associates	NEEA	Assessment
Northwest Ductless Heat Pump Initiative: Market Progress Evaluation Report #4	Residential	ILLUME Advising, LLC	NEEA	Market Assessment
Northwest Food Processors Association Energy Savings Model Review	Commercial	Energy 350	NEEA	Impact
Northwest Heat Pump Water Heater Initiative Market Progress Evaluation Report #1	Residential	Evergreen Economics	NEEA	Market Assessment
Reduced Watt Lamp Replacement Market Characterization and Baseline	Commercial	Cadeo Group	NEEA	Baseline Assessment
Reduced Wattage Lamp Replacement Market Test Assessment Report	Commercial	Opinion Dynamics	NEEA	Market Assessment
Television Initiative MPER #4	Residential	Research Into Action	NEEA	Market Assessment

For NEEA reports, see the CD included at the back of this supplement.

INTEGRATED DESIGN LAB

Table 2. 2015 Integrated Design Lab

Report Title	Sector	Analysis Performed by	Study Manager	Type
2015 Task 1: Foundational Services Summary of Projects	Commercial	Integrated Design Lab	Idaho Power	Summary
2015 Task 1.8: Heat Pump Calculator Summary of Progress	Residential/Commercial	Integrated Design Lab	Idaho Power	Summary
2015 Task 2: Lunch and Learn Summary of Effort and Outcomes	Commercial/Industrial	Integrated Design Lab	Idaho Power	Summary
2015 Task 3: Commercial Real Estate Support Summary of Efforts and Outcomes	Commercial	Integrated Design Lab	Idaho Power	Summary
2015 Task 4: BSUG Summary of Effort and Outcomes	Commercial	Integrated Design Lab	Idaho Power	Summary
2015 Task 5: Building Efficiency Verifications Summary of Projects	Commercial/Industrial	Integrated Design Lab	Idaho Power	Summary
2015 Task 6: Tool Loan Library Summary of Effort and Outcomes	Commercial	Integrated Design Lab	Idaho Power	Summary
2015 Task 7: Building Metrics Labeling Summary of Effort and Outcomes	Commercial	Integrated Design Lab	Idaho Power	Summary
2015 Task 9: Technical Assistance Whole House Fan	Residential	Integrated Design Lab	Idaho Power	Analysis
2015 Task 10: IBOA/IFMA Support Summary of Effort and Outcomes	Commercial/Industrial	Integrated Design Lab	Idaho Power	Summary

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2015 Task 1: Foundational Services

Summary of Projects

Idaho Power Company External Year-End Report

December 31, 2015

Prepared for:
Idaho Power Company

Author:
Elizabeth Cooper

Report Number: 1501_001-01

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Contract Number:
5277

Please cite this report as follows: Cooper, E. (2015). *2015 TASK 1: Foundational Services – Summary of Projects* (1501_001-01). University of Idaho Integrated Design Lab, Boise, ID.

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Table of Contents

Acronyms and Abbreviations

AIA	American Institute of Architects
ASHRAE	American Society of Heating, Refrigeration, and Air-conditioning Engineers
BEQ	Building Energy Quotient
BOMA	Building Owners and Managers Association
EMS	Energy Management System
HID	High Intensity Discharge
IDL	Integrated Design Lab
IPC	Idaho Power Company
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
Op-Ed	Opinion Editorial
TI	Tenant Improvement
UI	University of Idaho

1. Introduction

The University of Idaho Integrated Design Lab (UI-IDL) provided technical assistance in 2015 for energy efficiency building projects through the Foundational Services task. This program, supported by Idaho Power Company (IPC), offered three phases of assistance for customers to choose from. A marketing flyer outlining the three phases is shown below. In 2015, the budget limits of the phases was changed such that Phase I includes projects with budgets less than $2,000, Phase II is limited to projects from $2,000 to $4,000, and Phase III is any project with a budget greater than $4,000.

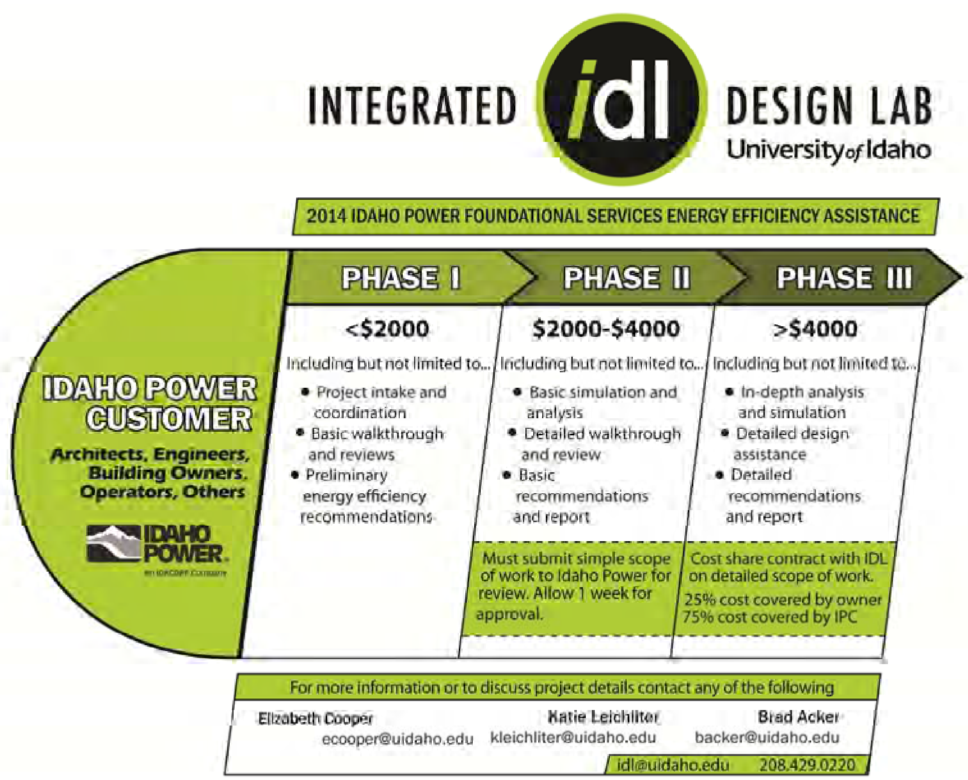

Figure 1: Foundational Services Flyer Outlining Phases

The Foundational Services program was marketed at numerous events and to multiple organizations in 2015, which included all IDL Lunch and Learn series presentations, local architect and engineering firms, ASHRAE, AIA, BOMA, and local government.

2. Project Summary

Fifty-five projects received technical assistance through the Foundational Services program in 2015. Projects ranged from short phone call consultations to detailed building simulations. Building owners, property managers, building operators, architects, design engineers, utility customer representatives, government staff, energy management staff, program administrators, and contractors contacted the IDL. In total, there were forty-seven Phase I projects, two Phase II projects and one Phase III project. The full list of projects is shown in the appendix below. Details on Phase 2 and Phase 3 projects are included in the individual project reports submitted to IPC. Five projects are in early stages and the full scope of work has yet to be determined. Seventeen of the projects were for work to be completed in existing buildings, and twenty were for new construction projects. The remaining projects are not building specific, or the scope has yet to be defined.

Table 1: 2015 Foundational Services Project Summary

	Project	Approximate Area (ft2) (if applicable and known)	New or Existing	Location
	Phase 1			
1	School building scoping study		Existing	Boise
2	EEM communications	--	--	--
3	Multi-family central plant cost analysis	--	--	--
4	Analysis of commonly available modeling tools	--	--	--

5	Facility lighting design assistance	>100,000	Existing	Boise
6	Energy modeling of chiller system	--	New	Boise
7	Daylighting design assistance	±5,000	New	Boise
8	Daylighting design assistance	±5,000	New	Boise
9	Office energy efficiency upgrades inquiry	19,000	Existing	Boise
10	Energy modeling technical assistance		Existing	Boise
11	State of technology in LED	--	--	--
12	Non energy benefit review for hotels	--	--	--
13	Specialty facility energy analysis	±20,000	Existing	Boise
14	Church energy efficiency measures inquiry		Existing	Boise
15	Prospective net-zero government building support	±45,000	New	Ketchum
16	Net zero facility design support		New	Boise
17	Energy efficiency goals and communications	--	--	Boise
18	Energy conference planning meetings/support	--	--	--
19	District scale energy benchmarking analysis	--	--	Boise
20	Municipal building energy efficiency design support	--	Existing	Boise
21	Green building code stakeholders meetings	--	--	--
22	Prospective net zero facility inquiry	16,000	New	Boise
23	Daylighting inquiry			
24	Lighting upgrades inquiry		Existing	Boise
25	Guest presentation by EE expert	--	--	--
26	Specialty facility energy analysis	±10,000	New	Garden City
27	School building energy performance	6 schools	Existing	Boise
28	LED lighting analysis		--	--
29	Office facility lighting analysis			
30	School building energy efficiency support		Existing	Boise
31	Mixed use energy efficiency design support		New	Boise
32	Office facility lighting analysis			Boise
33	Lighting incentives inquiry	5,000	New	Twin Falls
34	Energy modeling technical support		Existing	Boise
35	Office TI daylighting analysis		Existing	Boise
36	Hotel energy efficiency design assistance inquiry		New	Mt. Home
37	Hotel energy efficiency design assistance inquiry		New	
38	Facility daylighting analysis			Ketchum
39	Specialty facility technical assistance			Hailey
40	Hotel energy efficiency design assistance inquiry		New	Garden City
41	Specialty facility energy analysis			Boise
42	Specialty facility assistance inquiry		New	Twin Falls
43	Office facility technical assistance inquiry		New	Boise
44	Campus benchmarking and technical assistance		--	
45	Retail design assistance inquiry		Existing	Boise
46	Recreation facility daylight inquiry			
47	Mixed-use technical assistance inquiry		Existing	Boise
	Phase 2			

48	Religious building facility daylighting study	6,000	Existing	Boise
49	Specialty facility technical and planning support		Existing	Boise
	Phase 3			
50	Office building energy management and lighting design assistance	268,000	New	Boise
	Phase to be determined			
51	Education facility		New	Boise
52	Healthcare/Education facility		New	Boise
53	School buildings	46,000	New	Meridian
54	Healthcare facility		New	Boise
55	Healthcare facility	>500,000	New/Ex	Boise
	TOTAL:	**>1,045,000**		

3. Appendices

Appendix A: Project Identification

	Project	Contact	Approx. Area (ft2) (if known)	New or Existing	Location
	Phase 1				
1	Boise Schools	Chris Wendrowski		Existing	Boise
2	Dashboard Template	Haley Falconer	--	--	--
3	LCA on Central Plant for multi-family	Mike Brown	--	--	--
4	Revit energy tools review	IDL	--	--	--
5	Boise Main Library	Steve Trout & Denise McNealy	>100,000	Existing	Boise
6	Chiller curve EnergyPlus	Josh Norhbryn	--	New	Boise
7	Fire Station #4	Stan Cole & Rob Bousfield	±5,000	New	Boise
8	Fire Station #8	Stan Cole & Rob Bousfield	±5,000	New	Boise
9	Happy Family Brands		19,000	Existing	Boise
10	Idaho Water Center	Stephanie Fox & Coby Barlow		Existing	Boise
11	LED vs. Fluorescent Comparison	IDL/IPC	--	--	--
12	Non Energy Benefit Lit Review	Haley Falconer	--	--	--
13	Payette Brewing	Mike Francis	±20,000	Existing	Boise
14	Red Rock Christian Church	Everald Penzel		Existing	Boise
15	Ketchum City Hall	Mike Simmonds & Lance Fish	±45,000	New	Ketchum
16	Boise TMFS			New	Boise
17	City of Boise (General)	Steve Burgos	--	--	Boise
18	Energy Conference Planning	Leon Duce	--	--	Boise
19	LIV District	City/USGBC	--	--	Boise
20	Boise City Hall bEQ	Beth Baird	--	Existing	Boise
21	Boise Green Building Code	IPC	--	--	--
22	Bown Library Branch	Ian Gelbrich & Rob Bousfield	16,000	New	Boise
23	Greenhouse solar				

24	IHFA			Existing	Boise
25	Molly McCabe Visit	--	--	--	--
26	Powder Haus Brewing	Lisa Schmidt	±10,000	New	Garden City
27	School Building Performance	Pete Pearson	6 schools	Existing	Boise
28	Simply LED				
29	SOVRN	Joe Rice			
30	St. Mary's			Existing	Boise
31	The Roost Mixed Use			New	Boise
32	TigerProp	Max Coursey			Boise
33	Twin Fall Chamber of Commerce		5,000	New	Twin Falls
34	Wells Fargo Musgrove Support			Existing	Boise
35	Erstad office TI	Andy Erstad		Existing	Boise
36	Capitol and Broad Hotel	Jared Smith		New	Boise
37	Inn at 500 Capitol	Obie Development (Brian Obie)		New	Boise
38	Mountain Home AFB	Joseph Armstrong			Mt Home
39	Lost Grove Brewing				
40	Limelight Hotel	Jeff Hanle		New	Ketchum
41	Sawtooth Brewing	Paul			Hailey
42	Telaya Winery	Earl Sullivan		New	Garden City
43	Ada County Dispatch	Selena O'Neal		New	Boise
44	CSI master planning	CTA		--	Twin Falls
45	George's Cycles			Existing	Boise
46	Tennis courts			-	
47	Water Cooler	David Ruby and Local Construct		Existing	Boise
	Phase 2				
48	Islamic Center of Boise	Matt Rhees	6,000	Existing	Boise
49	YMCA				
	Phase 3				
50	Simplot HQ	The Dons, Tiffany Curtis	268,000	New	Boise
	Phase to be determined				

51	BSU (Multiple)	Tony Roark (BSU) Scott Henson (LCA)		New	Boise
52	Project Pocatello	Gunnar Gladics		New	Boise
53	Holy Apostles School	Pete Rockwell	46,000	New	Meridian
54	St. Luke's orthopedic clinic	Gunnar Gladics/Brandon Taylor		New	Boise
55	St. Luke's Addition and Renovation	Gunnar Gladics	>500,000	New/Ex	Boise

2015 Task 1.8: Heat Pump Calculator

Summary of Progress

Idaho Power Company External Year-End Report

December 31, 2015

Prepared for:
Idaho Power Company

Authors:
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Report Number: 1501_010-08

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Contract Number:

5277

Please cite this report as follows: Leichliter, K., Woods, D., Cooper, E. (2015). *2015 TASK 8: Heat Pump Calculator– Summary of Projects* (1501_010-08). University of Idaho Integrated Design Lab, Boise, ID.

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Acronyms and Abbreviations

GSHP	Ground-Source Heat Pump
HP	Heat Pump
IDL	Integrated Design Lab
IPC	Idaho Power Company
UI	University of Idaho
VRF	Variable Refrigerant Flow
WSHP	Water-Source Heat Pump

1. Introduction

The 2015 Heat Pump (HP) Calculator task was a continuation of work done by the University of Idaho Integrated Design Lab (UI-IDL) for Idaho Power Company (IPC) that was begun in 2013 and continued through 2014. A Heat Pump Energy Savings Calculator (HePESC) spreadsheet was developed in 2013, which was capable of hourly load calculations, energy consumption estimates using regression curves from simulation, and simple cost calculations. Details on 2013 effort, progress, and methods can be found in the IDL technical report number 1301_010-01, "*2013 Heat Pump Calculator – Development and Methodology*." The scope in 2014 focused on improving the tool by means of verification and user feedback. The 2015 work included further revisions, outreach, the completion of adding a residential space-type, and the incorporation of several climate design tools. Details of this and the tool improvements are outlined in this report.

2. Beta Version Revisions and Support

The IDL team did some reformatting of the tool for the sake of simplicity and ease of use. During this process, many of the comments and instructions throughout the tool were edited for grammar and clarity. Different types of information are represented by different formats in the tool. These classifications are described in the color legend of the introduction sheet. This legend initially included eight formats for eight different types of information. During beta testing, this was found to be somewhat confusing, and so the color legend was reduced from eight types to four. The four remaining classifications of cells are: user input (gold background), default value (blue background), hyperlinks (orange text), and instructional (flagged).

The IDL also offered user support and outreach through a presentation open to both Idaho Power and the public. Katie Leichliter delivered the lecture on July 22nd to the Building Simulators User Group (BSUG). The presentation, which was also available as a webcast focused on use of the tool and how it compared to other detailed simulation tools. The audience included IPC representatives, several architects and engineers in Boise as well as 17 viewers online. The audience found the tool's ability to explain load calculations line by line to be very helpful, as was the comparison offered between eQuest and EnergyPlus.

3. Residential Use

One of the major additions from 2014-2015, was the inclusion of a residential space-type in the tool. Initially, the tool was set up to analyze large commercial buildings of nine different usage types including offices, warehouses, and retail. Now, appearing in the "Building Use" dropdown menu is a tenth type: "Residence." One of the difficulties of adding a residential usage is that residences have very different, and smaller, types of equipment than large commercial buildings. They also have schedules and lighting loads that are quite unlike those typically associated with commercial buildings. In order to add residential equipment into the tool, the IDL added new schedules, equipment curves, pricing, and plug load information to the tool.

Once the residential space-type is selected in the tool, a new entry appears under the general building info section: number of bedrooms. The number of bedrooms is used to approximate plug loads, lighting, and occupancy. The residential loads were selected based on the NREL 2014 Building America House Simulation Protocols, which was developed from residential survey data (Wilson). In addition to using the standard plug loads associated with residences, the user has the option to add large, uncommon loads, such as an extra refrigerator or gas fireplace.

In order to include residential HVAC equipment, new performance curves had to be developed. During 2014, the IDL ran over 1,500 simulations in BEopt for residential HVAC systems including DX units, gas and electric furnaces, and heat pumps all of various efficiencies. The staff at IDL compiled this data and added the resulting performance curves into the tool just as the commercial systems had been. A complete list of the residential systems and regression curves added to the tool can be found in Appendix A. The staff also compiled cost data for each of these systems by requesting quotes from different manufacturers. This data has been incorporated into the latest version of the HP Calculator tool, nearly doubling the system selection that had been available when the tool was used only for commercial buildings

4. Climate Design Tools

The IDL has developed several different climate design tools that existed as separate spreadsheets in the past. These tools included passive cooling with thermal mass and natural ventilation, cross ventilation, stack ventilation, and night flush strategies. These tools are now compiled within the HP Calculator tool under the “Advanced Design” tab. One of the climate design tools, the balance point calculator, was not added, because this already exists within the normal “Loads Results” tab of the HP Calculator within the more detailed energy signature analysis. These tools are now much faster to use than when they had existed as standalone spreadsheets, because many of the inputs needed for these separate calculations are already entered into the first sheet of the HP calculator. These features are shown in Appendix B: Climate Design Tools.

5. Feedback and Next Steps

Since the tool has become much more than a simple estimator of heat pump savings, a new name for the tool is under consideration: HVAC Analysis and Loads Tool (or "HAL" if an acronym is required). The earth tube and passive solar climate design tools still need to be incorporated into the Advanced Design portion of the HP Calculator. Further development of the tool could be to include other building types, such as multifamily. Given the pace of innovation, there are many new products on the market now that were not available during the creation of the tool. In order to include these additional HVAC systems, the IDL would need to increase the data simulation set. It would also be beneficial to the integrity of the tool to include more iterations of current and baseline conditions to allow for better interpolation between efficiencies for the performance curves in the tool. The IDL could also hold a training program either specific to IPC or open to the public on the use of this tool as well as the climate design tools that are included in the calculator.

6. References

ASHRAE. (2013). Chapter 18: Nonresidential cooling and heating load calculations. In Ashrae handbook: Fundamentals. Atlanta, GA: ASHRAE.

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Wilson, E., Metzger, D., Hrowitz, S., and Hendron, R. (2014). 2014 Building America House Simulation Protocols. National Renewable Energy Laboratory, Technical Reprot NREL/TP-5500-60988

2015 Task 2: Lunch and Learn

Summary of Effort and Outcomes

Idaho Power Company Internal Year-End Report

December 31, 2015

Prepared for:
Idaho Power Company

Authors:
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Katie Leichliter

Report Number: 1501_002-01

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Please cite this report as follows: Agnes, D., Leichliter, K. (2015). *2015 TASK 2: Lunch and Learn – Summary of Effort and Outcomes* (1501_002-01). University of Idaho Integrated Design Lab, Boise, ID.

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Acronyms and Abbreviations

AIA	American Institute of Architects
Arch	Architect(ure)
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BCGCC	Boise Green Building Code
BESF	Building Energy Simulation Forum (Energy Trust of Oregon)

Bldg.	Building
BOMA	Building Owners and Managers Association
CSI	Construction Specifications Institute
Cx	Customer Experience
Elec.	Electrical
EUI	Energy Use Intensity
GSHP	Ground Source Heat Pump
HVAC	Heating, Ventilation, and Air Conditioning
IBOA	Intermountain Building Operators Association
IBPSA	International Building Performance Simulation Association
IDL	Integrated Design Lab
IECC	International Energy Conservation Code
IPC	Idaho Power Company
LEED	Leadership in Energy & Environmental Design
LED	Light Emitting Diode
M&V	Measurement and Verification
Mech.	Mechanical
Mgmt.	Management
NCARB	National Council of Architectural Registration Boards
TBD	To Be Determined
UI	University of Idaho
USGBC	U.S. Green Building Council
WBS	WELL Building Standard

1. 2015 Summary and Cumulative Analysis

Table 1: 2015 Lunch and Learn Summary

	Date	Title	Presenter	Group / Location	Attendees
1	3/12	Deep Retrofits on Historic Projects	Energy Trust of Oregon	Commercial Real Estate Firm- Boise	7
2	3/19	Daylight in Buildings - Getting the Details Right	Kevin Van Den Wymelenberg	Architecture Organization 1 - Pocatello	5
3	6/4	Adding to Zero: Chemeketa Community College's Path to Net Zero	Energy Trust of Oregon	Commercial Real Estate Firm- Boise	13
4	7/20	IECC 2012 for Industrial Building	Ken Baker / Kevin Van Den Wymelenberg	Industry Organization 2 - Boise	17
5	7/22	Daylight in Buildings - Schematic Design	Kevin Van Den Wymelenberg	Architecture Firm 2 - Boise	6
6	8/6	Occupant Cx	Energy Trust of Oregon (Julia Day)	Commercial Real Estate Firm- Boise	11
7	8/17	Daylight in Buildings - Getting the Details Right	Kevin Van Den Wymelenberg	Engineering Firm 2 - Boise	17
8	8/18	Daylight Sensing Electric Light Controls	Kevin Van Den Wymelenberg	Architectural Organization 2 – Ketchum	12
9	8/18	Architectural HVAC Integration Strategies	Kevin Van Den Wymelenberg	Architectural Organization 2 – Ketchum	7
10	8/19	Architectural HVAC Integration Strategies	Kevin Van Den Wymelenberg	Engineering Firm 1 - Boise	11
11	8/26	Daylight in Buildings - Getting the Details Right	Kevin Van Den Wymelenberg	Architecture Firm 2 - Boise	4
12	8/27	Daylight Sensing Electric Light Controls	Kevin Van Den Wymelenberg	Engineering Firm 1 - Boise	5
13	9/8	Operations and Maintenance Strategies	Brad Acker	Engineering Firm 2 - Boise	12
14	9/15	Radiant Design Considerations	Damon Woods	Architecture Firm 1 - Boise	9
15	9/17	Benchmarking and Energy Goal Setting	Elizabeth Cooper	Architecture Organization 1 – Idaho Falls	5
16	9/29	Boise Green Building Code & Idaho Power Efficiency Programs	Jason Blais, Katie Leichliter, Sheree Willhite	Industry Organization 3 - Boise	55
17	10/13	Integrated Design Case Principles	Katie Leichliter	Architecture Organization 3 - Boise	-
18	10/13	Benchmarking and Energy Goal Setting	Elizabeth Cooper	Architecture Firm 1 - Boise	20
19	11/11	Integrated Design Case Principles	Elizabeth Cooper	Architecture Firm 3 – Boise	4
20	12/08	The Importance of Building Performance Modeling for Architects	Elizabeth Cooper	Architecture Firm 3 - Boise	3

Table 1 above summarizes all Lunch and Learn presentations given in 2015. Eighteen presentations were slated to specific organizations or companies during the project planning phase of the task. Two additional sessions were left open to be filled by request. Twenty sessions were held in 2015. The statistics in this section are cumulative for the first 20 presentations. At each presentation participants were asked to sign in and fill out an evaluation form. Presentations were judged on a scale of 1 to 5, please see table 2, however, participants were given the opportunity to provide hand written responses.

Table 2: Evaluation Form Scale

Evaluation	1	2	3	4	5
In general, today's presentation was:	Not Useful		Somewhat Useful		Very Useful
The content of the presentation was:	Too Basic		About Right		Too Advanced
Please rate the following parts of the presentation: Organization, Clarity, Opportunity for Questions, Instructor's Knowledge of Subject Matter, and Delivery of Presentation	Needs Improvement		Good		Excellent

Table 3: Overall Attendance Breakdown

Architect:	176	Electrician:	
Engineer:	9	Contractor:	
Mech. Engineer:	16	Other:	80
Elec. Engineer:	5	None Specified:	35
Total (In-Person):	**321**		

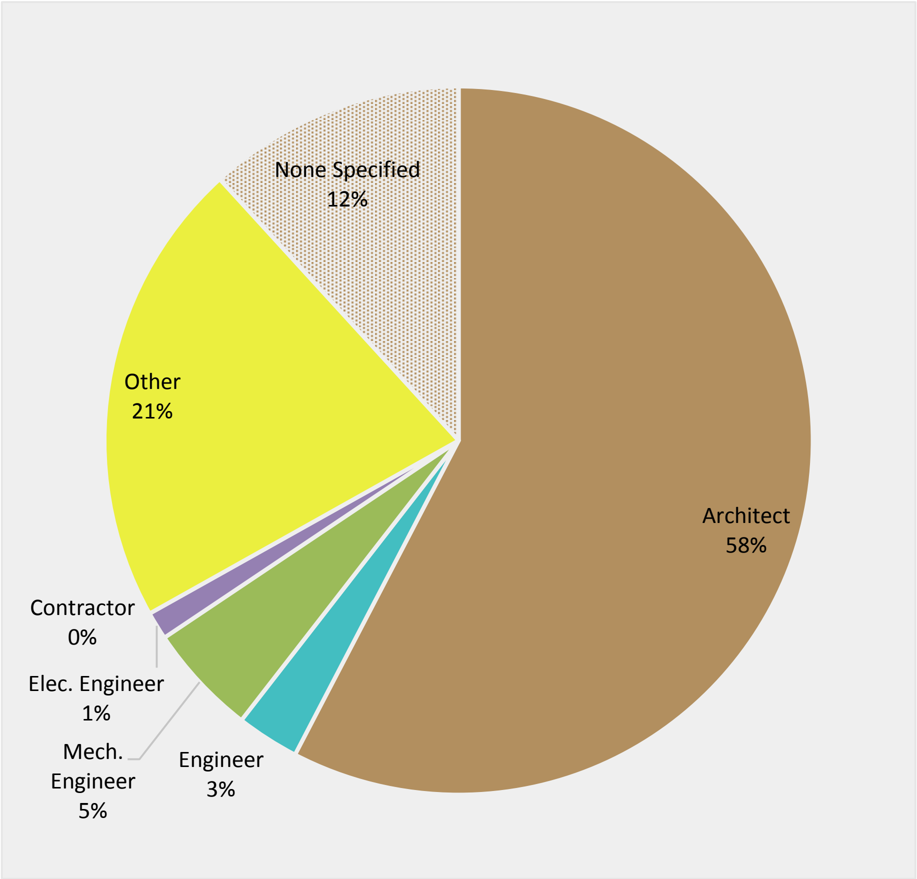

Figure 1: Attendee Profession

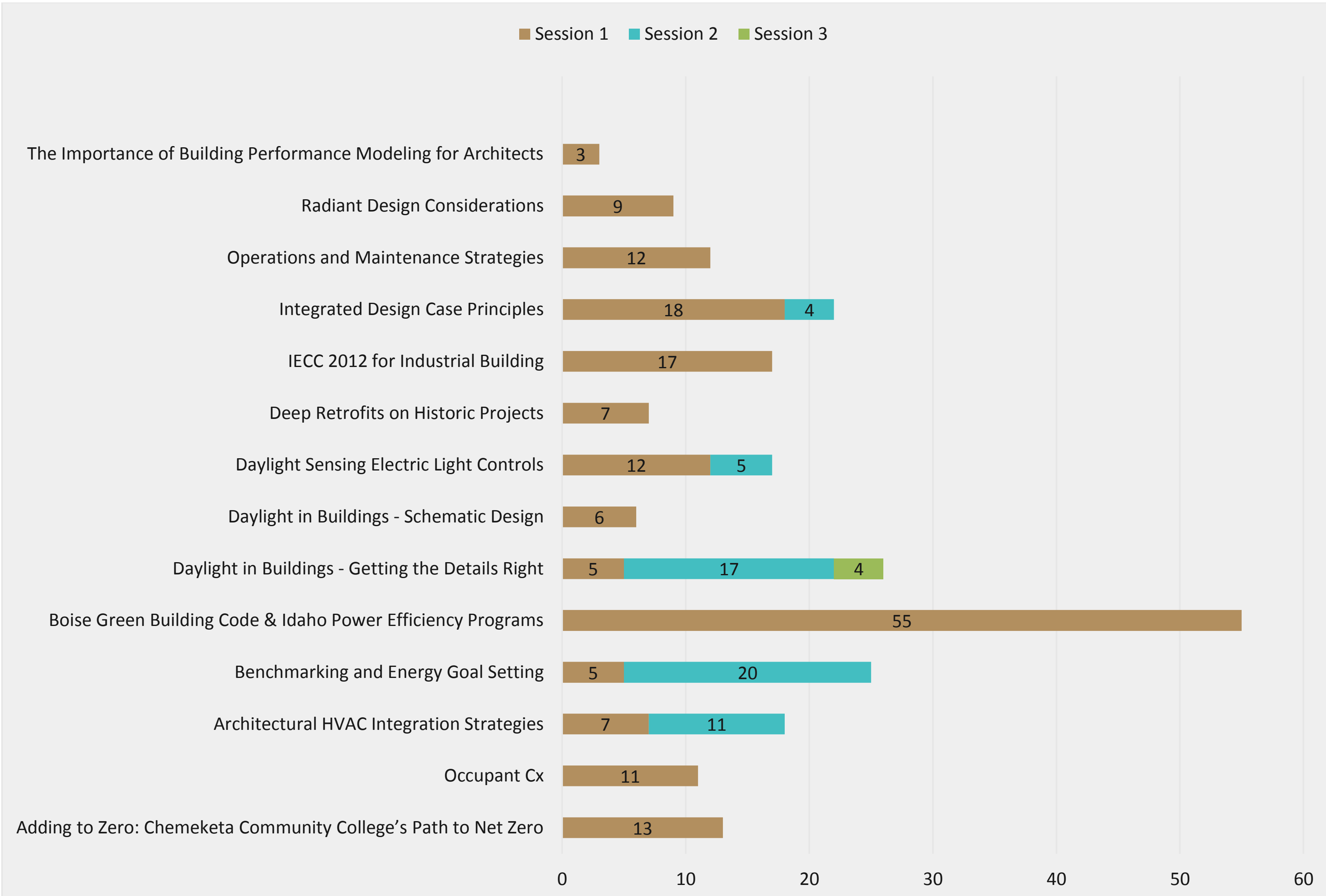

Figure 2: Attendee Count by Title and Session

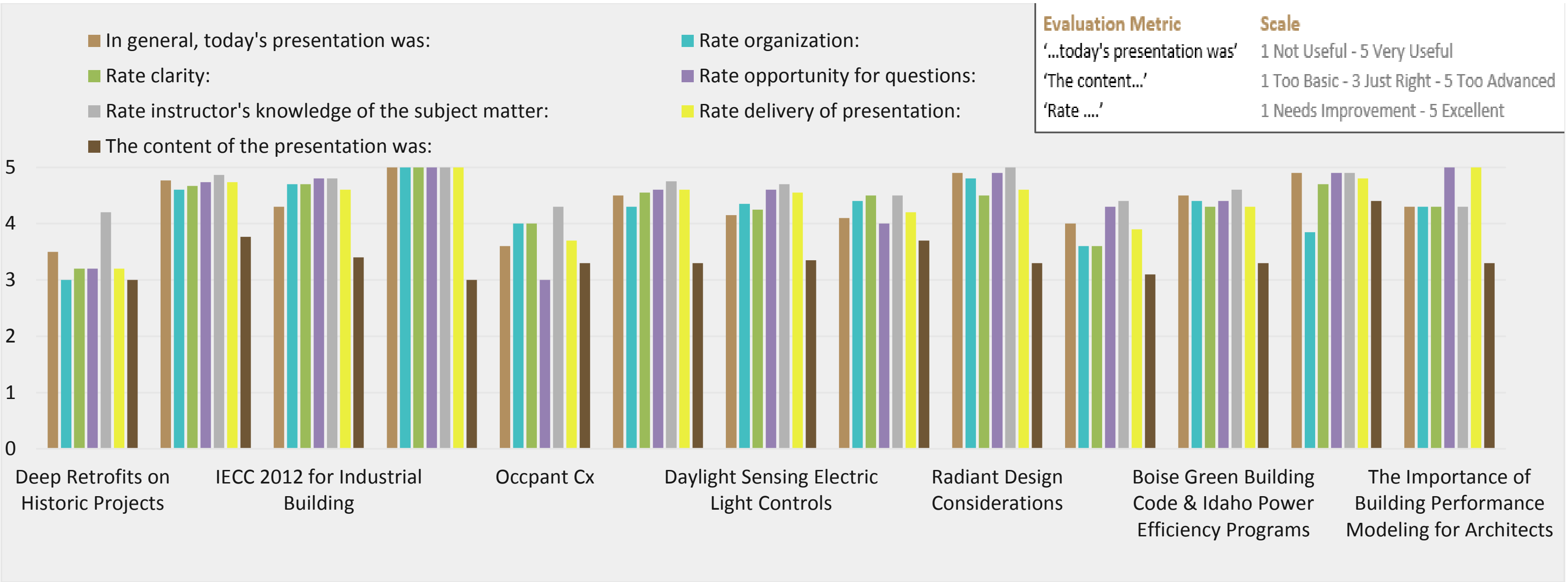

Figure 3: Average Evaluations by Session Title

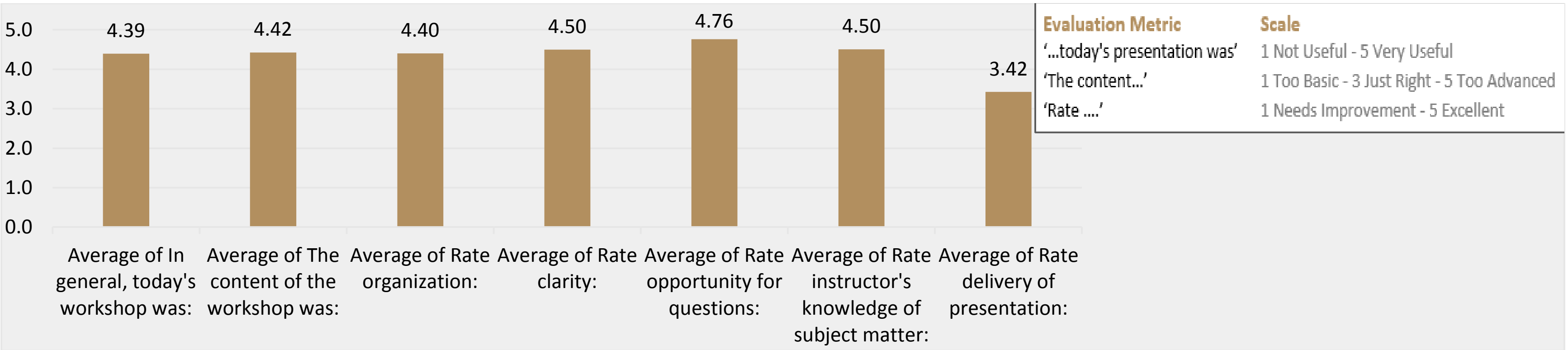

Figure 4: Overall Averages of Evaluations for all Sessions

2. Session Summaries

At the conclusion of each lunch and learn session, an evaluation form was requested from each participant. The feedback was used to improve future sessions. The feedback received from participants is generally constructive criticism used to keep sessions updated but also to propose other potential topics and questions to the Integrated Design Lab.

2.1 Session 1: Deep Retrofits on Historic Projects (3/12/15)

Title: Deep Retrofits on Historic Projects

Description: Deep retrofits go well beyond a system-by-system approach to existing building equipment upgrades. They require a holistic building redesign that incorporates infrastructure, mechanical and electrical systems, building skin, renewable energy, and energy analysis and management. Unlike new construction projects, deep retrofits have the added complexity of working through constraints inherent in the existing structure that designers and contractors must resolve.

This course will present how the owner, developer, design teams, and general contractor approached the conversion and deep retrofit of the former Meier & Frank warehouse into a high-performance office building that serves as the North American headquarters for Vestas. The project is LEED® Platinum certified and has achieved an Energy Star score of 99 through post occupancy energy analysis verification.

Presentation Info:

Date:	3/12/2015
Location:	Commercial Real Estate Firm-Boise
Presenter:	Energy Trust of Oregon – Multiple

Attendance:

Architect:	4	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:	1	Other:	2
Elec. Engineer:		None Specified:	
Total (In-Person):	**7**		

2.2 Session 2: Daylight in Buildings – Getting the Details Right (3/19/15)

Title: Daylight in Buildings: Getting the Details Rights

Description: The second talk in a sequence intended to instruct on the process of creating high quality and comfortable daylit spaces focuses on getting the details right. After the schematic design is formed to appropriately deliver daylight to the important surfaces within a space, there are several details that can make or break the overall success of the project. This presentation discussed several details ranging from interior surface colors and reflectances, to interior space layouts, furniture design, window details including glazing specifications and shading strategies. The presentation introduces concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight.

Presentation Info:

Date:	3/19/2015
Location:	Architectural Organization 1 - Pocatello
Presenter:	Kevin Van Den Wymelenberg

Attendance:

Architect:	5	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**5**		

2.3 Session 3: Adding to Zero: Chemeketa Community College's Path to Net Zero (6/4/15)

Title: Adding to Zero: Chemeketa Community College's Path to Net Zero

Description: The Chemeketa Community College Health Science Complex (HSC) in Salem, Oregon was one of thirteen projects that participated in Energy Trust of Oregon's Path to Net Zero (PTNZ) pilot. This pilot allowed the project team to analyze and utilize energy-reducing features including natural ventilation, dedicated heat recovery with demand control ventilation, hydronic heating, passive cooling, photovoltaics, and a control system for integrated mechanical and electrical system operation. The HSC also has an exceptionally integrated lighting design. The Owner was committed to designing a passive building that would operate within a limited extended range of comfort, and providing detailed room-level metering.

Through this training, we will explore the project's design concept, development and construction. The building has been operating for nearly three years, and the project team will be able to share room-level data that is available to demonstrate building performance. In addition, Energy Trust's team will introduce to the new PTNZ program, which is available starting 2015.

Presentation Info:

Date:	6/4/2015		
Location:	Industry Organization 1 – Webinar		
Presenter:	Energy Trust of Oregon – Multiple People		

Attendance:

Architect:	5	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	8
Total (In-Person):	**13**		

2.4 Session 4: IECC 2012 for Industrial Building (7/20/15)

Title: IECC 2012 for Industrial Building

Description: Come see how the IDL can benefit your buildings and your business! The IDL is dedicated to the development of high performance, energy efficient buildings. It is a collaboration of architecture and engineering staff and students working with building owners, managers, and operators, as well as professional design and construction teams to transform practice for reduced energy use. The resources available through the IDL help design buildings that are more comfortable, require less energy to maintain and operate, and enhance the health and productivity of occupants. At this talk, we will be discussing the resources available through the IDL and how they can benefit your bottom line. These resources include energy audits, energy benchmarking, tool loan library, technical assistance, deep energy retrofits, simulation capabilities, daylighting potential, available funding for low-cost or no-cost analysis, and more.

Presentation Info:

Date:	7/20/2015
Location:	Industry Organization 2 - Boise
Presenter:	Keven Van Den Wymelenberg & Ken Baker

Attendance:

Architect:		Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	15
Elec. Engineer:		None Specified:	
Total (In-Person):	**15**		
*Other included:	Broker, Property Mgmt, and Real estate		

2.5 Session 5: Daylight in Buildings – Schematic Design Methods (7/22/15)

Title: Daylight in Buildings – Schematic Design Methods

Description: High quality daylighting design is a lost art. Several generations of designers and engineers have been trained to rely on electrically illuminated spaces in order to meet minimum lighting criteria for functional environments occupied by humans. This presentation is the first in a sequence intended to revive the lost art of daylighting design. It teaches concepts of designing in the overcast sky as well as under sunny skies. The concept of providing useable work plane illumination is delivered while the importance of creating visually comfortable and balanced daylit spaces is stressed. This presentation highlights the architectural form generators as well concepts of interior surface brightness to produce high quality and comfortable daylit spaces.

Presentation Info:

Date:	7/22/2015
Location:	Architecture Firm 2 - Boise
Presenter:	Kevin Van Den Wymelenberg

Attendance:

Architect:	4	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	2
Total (In-Person):	**6**		

2.6 Session 6: Occupant Cx: Learning from Occupants to Improve Building Design (8/06/15)

Title: Occupant Cx: Learning from Occupants to Improve Building Design

Description: Both passive design and high performance building strategies offer a wealth of potential benefits to both occupants and owners, such as increased satisfaction, employee productivity, and building energy and cost savings. However, negative occupation patterns often compromise these benefits, especially if end users do not have the knowledge to properly manage and take advantage of these efficient building systems. Understanding how occupants interact with high-performance buildings can help inform designers to implement better strategies that foster positive energy outcomes as well as an improved occupant experience. Research from case studies showing insights gained from existing high performance and net-zero buildings will be presented. This course will also offer common design and construction issues to avoid with their lessons learned and suggestions for better educating occupants to take advantage of energy-savings design strategies such as daylighting and natural ventilation.

Presentation Info:

Date:	8/06/2015
Location:	Commercial Real Estate Firm- Boise
Presenter:	Julia Day

Attendance:

Architect:	4	Electrician:	
Engineer:		Contractor:	

Mech. Engineer:		Other:	4
Elec. Engineer:		None Specified:	
Total (In-Person):	**8**		

2.7 Session 7: Daylight in Buildings Getting the Details Right (8/17/15)

Title: Daylight in Buildings Getting the Details Right

Description: The second talk in a sequence intended to instruct on the process of creating high quality and comfortable daylit spaces focuses on getting the details right. After the schematic design is formed to appropriately deliver daylight to the important surfaces within a space, there are several details that can make or break the overall success of the project. This presentation discussed several details ranging from interior surface colors and reflectances, to interior space layouts, furniture design, window details including glazing specifications and shading strategies. The presentation introduces concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight.

Presentation Info:

Date:	8/17/2015
Location:	Engineering Firm 2 - Boise
Presenter:	Kevin Van Den Wymelenberg

Attendance:

Architect:	6	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	5
Total (In-Person):	**11**		

2.8 Session 8: Daylight Sensing Electric Light Controls (8/18/15)

Title: Daylight Sensing Electric Light Controls

Description: Daylighting alone does not necessarily save energy. While a good daylighting design will optimize the envelope to minimize unnecessary heat gain and heat loss, the bulk of the energy savings from spaces with the significant inclusion of daylight comes from dimming or switching off electric lighting systems. There have been several examples of successful daylighting-sensing lighting controls systems and even more tough lessons learned from systems that did not perform adequately. The general concepts of various daylight harvesting strategies will be presented. Then, the seven most common challenges to creating functional daylight-sensing lighting control systems will be reviewed in detail. Finally, several successful examples will be highlighted to promote more successful applications in future projects.

Presentation Info:

Date:	8/18/2015

Location:	Architectural Organization 2 – Ketchum		
Presenter:	Elizabeth Cooper		

Attendance:

Architect:	12	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**12**		

2.9 Session 9: Architectural HVAC Integration Strategies (8/18/15)

Title: Architectural HVAC Integration Strategies

Description: The relationship between architecture and mechanical systems design is often one of neglect, dysfunction, and sometimes even abuse. It has not always been like this, nor does it have to be moving forward. Aesthetic meaning and design concept can be derived from the interdependent relationship between architecture and mechanical engineering, distribution system and interior design, or even equipment and facade expression. Sometimes the most profound architectural moments are deeply informed by their integration with how the building delivers comfort to its occupants. A successful marriage of these concepts can even lead to reduced energy bills, lower capital costs, and, most importantly of all, occupants who love the building. This presentation will focus on breaking down exemplary case studies of architecture's courtship of both passive and active systems.

Presentation Info:

Date:	8/18/2015
Location:	Architectural Organization 2 - Ketchum
Presenter:	Kevin Van Den Wymelenberg

Attendance:

Architect:	7	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**7**		

2.10 Session 10: Architectural HVAC Integration Strategies (8/19/15)

Title: Architectural HVAC Integration Strategies

Description: The relationship between architecture and mechanical systems design is often one of neglect, dysfunction, and sometimes even abuse. It has not always been like this, nor does it have to be moving forward. Aesthetic meaning and design concept can be derived from the interdependent relationship between architecture and mechanical engineering, distribution system and interior design, or even equipment and facade expression. Sometimes the most profound architectural moments are deeply informed by their integration with how the building delivers comfort to its occupants. A successful marriage of these concepts can even lead to reduced energy bills, lower capital costs, and, most importantly of all, occupants who love the building. This presentation will focus on breaking down exemplary case studies of architecture's courtship of both passive and active systems.

Presentation Info:

Date:	8/9/2015
Location:	Engineering Firm 1 - Boise
Presenter:	Kevin Van Den Wymelenberg

Attendance:

Architect:		Electrician:	
Engineer:		Contractor:	
Mech. Engineer:	3	Other:	8
Elec. Engineer:		None Specified:	
Total (In-Person):	**11**		

2.11 Session 11: Daylight in Buildings Getting the Details Right (8/26/15)

Title: Daylight in Buildings Getting the Details Right

Description: The second talk in a sequence intended to instruct on the process of creating high quality and comfortable daylit spaces focuses on getting the details right. After the schematic design is formed to appropriately deliver daylight to the important surfaces within a space, there are several details that can make or break the overall success of the project. This presentation discussed several details ranging from interior surface colors and reflectances, to interior space layouts, furniture design, window details including glazing specifications and shading strategies. The presentation introduces concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight.

Presentation Info:

Date:	8/26/2015
Location:	Architecture Firm 2 – Boise
Presenter:	Kevin Van Den Wymelenberg

Attendance:

Architect:	4	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**4**		

2.12 Session 12: Daylight Sensing Electric Light Controls (8/27/15)

Title: Daylight Sensing Electric Lighting Controls

Description: Daylighting alone does not necessarily save energy. While a good daylighting design will optimize the envelope to minimize unnecessary heat gain and heat loss, the bulk of the energy savings from spaces with the significant inclusion of daylight comes from dimming or switching off electric lighting systems. There have been several examples of successful daylighting-sensing lighting controls systems and even more tough lessons learned from systems that did not perform adequately. The general concepts of various daylight harvesting strategies will be presented. Then, the seven most common challenges to creating functional daylight-sensing lighting control systems will be reviewed in detail. Finally, several successful examples will be highlighted to promote more successful applications in future projects.

Presentation Info:

Date:	8/27/2015
Location:	Engineering Firm 1 – Boise
Presenter:	Kevin Van Den Wymelenberg

Attendance:

Architect:		Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	5
Elec. Engineer:		None Specified:	
Total (In-Person):	**5**		
*Other included:	Structural Engineer, Elec. Designer		

2.13 Session 13: Operations and Maintenance Strategies (9/5/15)

Title: Operations and Maintenance Strategies

Description: An often overlooked step of the integrated design process, operations and maintenance strategies, can make or break the efficiency of a high performance project. Through our existing building research and consulting, the UI-IDL has experienced first-hand how important operations can be on the energy efficiency of all buildings. This lunch and learn topic revolves around presenting the impact of operations on multiple building types and the effect on energy consumption, simulation calibration, and occupant comfort. Local examples from the recent Kilowatt Crackdown competition will be presented. The talk also touches on some free resources developed by Betterbricks to aid building operators in understanding, diagnosing, and maintaining their projects.

Presentation Info:

Date:	9/5/2015
Location:	Engineering Firm 2 – Boise

Presenter: Brad Acker

Attendance:

Architect:		Electrician:	
Engineer:	2	Contractor:	
Mech. Engineer:	1	Other:	9
Elec. Engineer:		None Specified:	1
Total (In-Person):	**13**		

2.14 Session 14: Radiant Design Considerations (9/15/15)

Title: Radiant Design Considerations

Description: Designing for radiant systems and thermally active surfaces represents a key opportunity for integrated design and high performance buildings. While radiant systems can be inherently more energy efficient than air-based systems, their success requires close collaboration between architects and engineers to ensure that the building facade reduces loads to levels achievable by radiant systems. This integration between the disciplines has a direct relationship to the performance of the system and comfort of the building, which is not always so closely related in more typical forced-air systems. Key design decisions must be made early in the design process to ensure the feasibility and performance of radiant systems down the road. A wide spectrum of configurations and types of radiant systems are available for designers, with each having different strengths, capacities, and complexities according to their setup. This presentation will cover some general rules of thumb to consider for radiant systems, as well as provide an overview of the key architectural and engineering design decisions associated with each system configuration.

Presentation Info:

Date: 9/15/2015
Location: Architecture Firm 1 – Boise
Presenter: Damon Woods

Attendance:

Architect:	9	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**9**		

2.15 Sessions 15 : Benchmarking and Energy Goal Setting (9/17/15)

Title: Benchmarking and Energy Goal Setting

Description: Learning the language and tools of the energy engineering field is critical to reaching real energy reductions in buildings. This presentation discusses several methods for establishing energy goals and targets in the pre-design phase and what the implications are for generating ideas to approach serious reductions in usage. Local examples will be highlighted. Measuring the performance of existing and new projects is critical to long term success because, you can't improve what you don't measure.

Presentation Info:

Date:	9/17/2015
Location:	Architecture Organization 3 – Ketchum
Presenter:	Elizabeth Cooper

Attendance:

Architect:	5	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**5**		

2.16 Session 16: Boise Green Building Code & Idaho Power Efficiency Programs (9/29/15)

Title: Boise Green Building Code & Idaho Power Efficiency Programs

Description:
Jason Blais, City of Boise, Building Division - highlights about the City of Boise's new voluntary Green Building Code. This code serves as another option for sustainable building design that focuses on site development and land us, material resource conservation, water conservation, energy conservation, indoor environmental quality, and building commissioning. Sheree Willhite, Building Efficiency Program - will review cash incentives for energy efficient design on new construction projects and major remodels. Katie Leichliter of the UI - Integrated Design Lab will be available to discuss technical assistance and other resources the IDL can provide to advance your projects.

Presentation Info:

Date:	9/29/2015
Location:	Industry Organization 3 – Boise
Presenter:	Katie Leichliter, Jason Blais, Sheree Willhite

Attendance:

Architect:	22	Electrician:	
Engineer:	3	Contractor:	
Mech. Engineer:	5	Other*:	14
Elec. Engineer:	1	None Specified:	8
Total (In-Person):	**53**		
*Other included:	IPC Customer Rep., Elec Designer, Mechanical, Interior Designer, Engr, Project Manager,		

2.17 Session 17: Benchmarking and Energy Goal Setting (10/13/15)

Title: Benchmarking and Energy Goal Setting

Description: Learning the language and tools of the energy engineering field is critical to reaching real energy reductions in buildings. This presentation discusses several methods for establishing energy goals and targets in the pre-design phase and what the implications are for generating ideas to approach serious reductions in usage. Local examples will be highlighted. Measuring the performance of existing and new projects is critical to long term success because, you can't improve what you don't measure.

Presentation Info:

Date:	10/13/2015
Location:	Architecture Organization 3 - Boise
Presenter:	Katie Leichliter

Attendance:

Architect:	14	Electrician:	
Engineer:	1	Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	5
Total (In-Person):	**20**		

2.18 Session 18: Integrated Design Principles (10/13/15)

Title: Integrated Design Principles

Description: The discussion will include a brief overview of the 2030 challenge, the status of current building stock, and its relationship to code. Most of the discussion will be centered on the process of design and the associated inputs of climate, building use, site design, and building design. The creation of loads by the necessary inputs will be addressed as an element to be reduced in order to mitigate system size and energy use. The aim is to provide an example of what can happen when we reduce energy loads through climate and use responsive design. Additionally, the presentation will cover some of the tools and techniques used to help guide decisions in the integrated design process.

Presentation Info:

Date:	10/13/2015
Location:	Architecture Firm 1 – Boise
Presenter:	Elizabeth Cooper

Attendance:

Architect:	4	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	

Total (In-Person):	**4**		

2.19 Session 19: Integrated Design Principles (11/11/15)

Title: Integrated Design Principles

Description: The discussion will include a brief overview of the 2030 challenge, the status of current building stock, and its relationship to code. Most of the discussion will be centered on the process of design and the associated inputs of climate, building use, site design, and building design. The creation of loads by the necessary inputs will be addressed as an element to be reduced in order to mitigate system size and energy use. The aim is to provide an example of what can happen when we reduce energy loads through climate and use responsive design. Additionally, the presentation will cover some of the tools and techniques used to help guide decisions in the integrated design process.

Presentation Info:

Date:	11/11/2015
Location:	Industry Organization 4 – Boise
Presenter:	Elizabeth Cooper

Attendance:

Architect:	4	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**4**		

2.20 Session 20: The Importance of Building Performance Modeling for Architects (12/08/15)

Title: The Importance of Building Performance Modeling for Architects

Description: The process of integrated design can blur the traditional line between the various design trades. People often talk about borrowing budget from the mechanical systems to improve architectural elements that will, in turn, lessen the mechanical needs due to small energy loads. What are the step and strategies involved in putting real numbers to the value of these smaller loads? The session will cover the use of energy modeling and life cycle cost valuing to provide quantifiable data to various strategies in order to understand the feasibility of energy improvements to projects.

Presentation Info:

Date:	12/08/2015
Location:	Architecture Firm 3 – Boise
Presenter:	Elizabeth Cooper

Attendance:

Architect:	1	Electrician:	

Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	2
Total (In-Person):	**3**		

3. Future Work

Feedback was gathered from the 224 Lunch and Learn evaluations received throughout 2015. The comments from these were valuable in defining possible future Lunch and Learn topics and informed the list of suggestions below.

Potential Future Topics:

- Building management (integrated)
    - Benchmarking
    - Training on M&V tools
    - Real-time performance measurements
- Mechanical systems
    - Building HVAC System
    - HVAC controls and programming
    - Passive heating/cooling/ventilation
- Codes
    - Advances in insulation systems
    - Energy Efficient Envelopes (Think this fits here)
- Modeling/Simulation
    - Details about models programs use (heat transfer models)
    - EnergyPlus, OpenStudio, Revit
- Lighting/Daylighting
    - Daylight calculations process and refresher course
    - Revit Daylighting and export
    - Energy consumption
    - Human Comfort

With the Lunch and Learn task, attendance at each session is determined mainly by the size of the firm or organization that is hosting. However, there may still be opportunities for increasing attendance. One suggestion would be to encourage the hosting entity to invite others who would find the information relevant such as, consultants or owners they work with.

INTEGRATED DESIGN LAB
University of Idaho

2015 TASK 3: COMMERCIAL REAL ESTATE SUPPORT

SUMMARY OF EFFORT AND OUTCOMES

IDAHO POWER COMPANY EXTERNAL YEAR-END REPORT

December 31, 2015

Prepared for:
Idaho Power Company

Author:
Elizabeth Cooper

Report Number: 1501_03-01

IDAHO POWER
An IDACORP Company

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Prepared by:
University of Idaho Integrated Design Lab | Boise
306 S 6th St. Boise, ID 83702 USA
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IDL Director:
Elizabeth Cooper

Author:
Elizabeth Cooper

Prepared for:
Idaho Power Company

Contract Number:
5277

Please cite this report as follows: Cooper, E. (2015). *2015 TASK 3: Commercial Real Estate Support – Summary of Effort and Outcomes* (1501_03-01). University of Idaho Integrated Design Lab, Boise, ID.

DISCLAIMER

While the recommendations in this report have been reviewed for technical accuracy and are believed to be reasonably accurate, the findings are estimates and actual results may vary. All energy savings and cost estimates included in the report are for informational purposes only and are not to be construed as design documents or as guarantees of energy or cost savings. The user of this report, or any information contained in this report, should independently evaluate any information, advice, or direction provided in this report.

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TABLE OF CONTENTS

Acronyms and Abbreviations

ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BCA	Building Contractors Association
BOC	Boise Operations Center (Idaho Power Company)
BOMA	Building Owners and Managers Association
CDD	Cooling Degree Day
COC	Canyon Operations Center (Idaho Power Company)
Com	Commercial
CR(s)	Customer Representative(s) (Idaho Power Company)
DDC	Direct Digital Controls
EE	Energy Efficiency
EMS	Energy Management System
EUI	Energy Use Intensity
HDD	Heating Degree Day
HVAC	Heating, Ventilation, and Air Conditioning
IBOA	Intermountain Building Operators Association
IT	Information Technology
PE	Professional Engineer
POC	Pocatello Operations Center (Idaho Power Company)
Res	Residential
RTU(s)	Rooftop Unit(s)
TFOC	Twin Falls Operations Center (Idaho Power Company)
USGBC	U.S. Green Building Council
VAV	Variable Air Volume
WSHP(s)	Water-Source Heat Pump(s)

1. Introduction

The Commercial Real Estate task was new within the University of Idaho Integrated Design Lab (UI-IDL) scope of work in 2015. Idaho Power Company requested that the UI-IDL support and collaborate with GreenSteps to implement energy efficiency measures in select commercial properties in the Idaho Power Company territory. The support and planning was based on common energy efficiency opportunities seen during the UI-IDL's involvement with energy efficiency scoping audits for the Boise Kilowatt Crackdown Program held in 2013. The UI-IDL's role included: building audits, providing audit reports, providing technical support at follow up meetings, working with building staff to properly specify energy efficiency projects to vendors, and ENERGY STAR certification to eligible buildings. The scope of work aimed to continue the support of the GreenSteps team or other tasks as directed by Idaho Power in the area of commercial real estate. The GreenSteps team remained the direct contact with the building owners and managers; UI-IDL assisted GreenSteps as requested.

2. Task Summary

The IDL worked with GreenSteps on several projects in 2015 providing a variety of technical assistance in the support of commercial energy efficiency projects. The following is a summary of activities associated with this task:

- Meetings were held on a quarterly basis with GreenSteps and building owners or representatives to discuss energy efficiency opportunities and strategies

- GreenSteps asked the IDL to provide technical assistance for six buildings
- UI-IDL staff performed multiple site visits and building audits as requested by GreenSteps
- Two buildings attained, or are in the process of attaining, first time ENERGY STAR® certification
- One building achieved ENERGY STAR renewal
- A natural ventilation plan for one building was provided to the building owner for distribution to the building tenants and occupants
- UI-IDL has scheduled to place CO_2 loggers and measure air flow in one building in 2016
- One owners plans a major mechanical system upgrade as a result of technical design assistance from UI-IDL
- One owner plans to pursue exterior lighting efficiency upgrades in 2016
- Multiple contacts were made with building owners and operators who indicated an interest in pursuing ENERGY STAR certification or energy efficiency upgrades

2015 Task 4: BSUG

Summary of Effort and Outcomes

Idaho Power Company External Year-End Report

December 31, 2015

Prepared for:

Idaho Power Company

Author:

Katie Leichliter

Dylan Agnes

Report Number: 1501_004-01

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Author:
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Dylan Agnes

Prepared for:
Idaho Power Company

Contract Number:
5277

Please cite this report as follows: Leichliter, K. (2015). *2015 TASK 4: BSUG – Summary of Effort and Outcomes* (1501_004-01). University of Idaho Integrated Design Lab, Boise, ID.

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Acronyms and Abbreviations

AIA	American Institute of Architects
App	Application
ARUP	London based multi-discipline firm
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BCVTP	Building Controls Virtual Test-Bed
BEMP	Building Energy Modeling Professional
BESF	Building Energy Simulation Forum (Energy Trust of Oregon)

BIM	Building Information Modeling
BOMA	Building Owners and Managers Association
BSME	Bachelor of Science in Mechanical Engineering
BSUG	Building Simulation Users' Group
CBECS	Commercial Building Energy Consumption Survey
Comm	Commercial
CTA	CTA Architects Engineers
EDR	Eskew+Dumez+Ripple
Elec.	Electrical
eQUEST	Quick Energy Simulation Tool
GBXML	Green Building Extensible Markup Language
HePESC	Heat Pump Energy Savings Calculator
HVAC	Heating, Ventilation, and Air Conditioning
IBPSA	International Building Performance Simulation Association
IDL	Integrated Design Lab
IPC	Idaho Power Company
LBNL	Lawrence Berkeley National Laboratory
LEED	Leadership in Energy & Environmental Design
M. Arch	Masters of Architecture
ME	Mechanical Engineer(ing)
Mech.	Mechanical
MEP	Mechanical, Electrical, and Plumbing
MS Arch	Masters of Science Architecture
NCARB	National Council of Architectural Registration Boards
RDA	Revit Daylighting Analysis
TMY	Typical Meteorological Year
THERM	
UDC	Urban Design Center
UI	University of Idaho
USGBC	U.S. Green Building Council

1. Introduction

The 2015 Idaho Power scope of work for the Building Simulation Users' Group (BSUG) task included planning, organization hosting six monthly meetings, recording attendance and evaluations, archiving video of the presentations, and maintaining the BSUG 2.0 website.

2. 2015 Summary and Cumulative Analysis

In 2015, six sessions were coordinated and hosted. Sessions are summarized below with details in the following sections.

Table 1: Overall Summary of Sessions

Date	Title	Presenter	Presenter Company	RSVPs		Attendees	
				In-person	Online	In-person	Online
1/28	Performance – Based Wall Design using THERM	Gunnar Gladics	Hummel	24	131	27	66
2/25	Annual Energy and Daylight Impacts of Blind Control Patterns through Simulation	Amir Nezamdoost & Alen Mahic	IDL	11	60	11	35
7/22	Simulation Engine Loads Comparison and Heat Pump Calculator Preview	Katie Leichliter	IDL	9	33	7	17
9/3	Using Post Occupancy evaluation to Develop Data Driven Design Process	Corey Squire	Lake Flato Architects	12	27	12	14
10/7	Integrating Building Performance Simulation at a Design Firm	Jacob Dunn	EDR + APO	31	100	17	61
10/28	High Density, Low Cost: The Development of Accessible Building Monitoring	Roderick Bates	Kieran Timberlake	12	43	5	22
11/18	Using Energy Models for Commission Controls	Damon Woods	IDL	7	50	9	28
			Total:	**106**	**444**	**86**	**230**
				550		**316**	

2.1 2015 Attendance

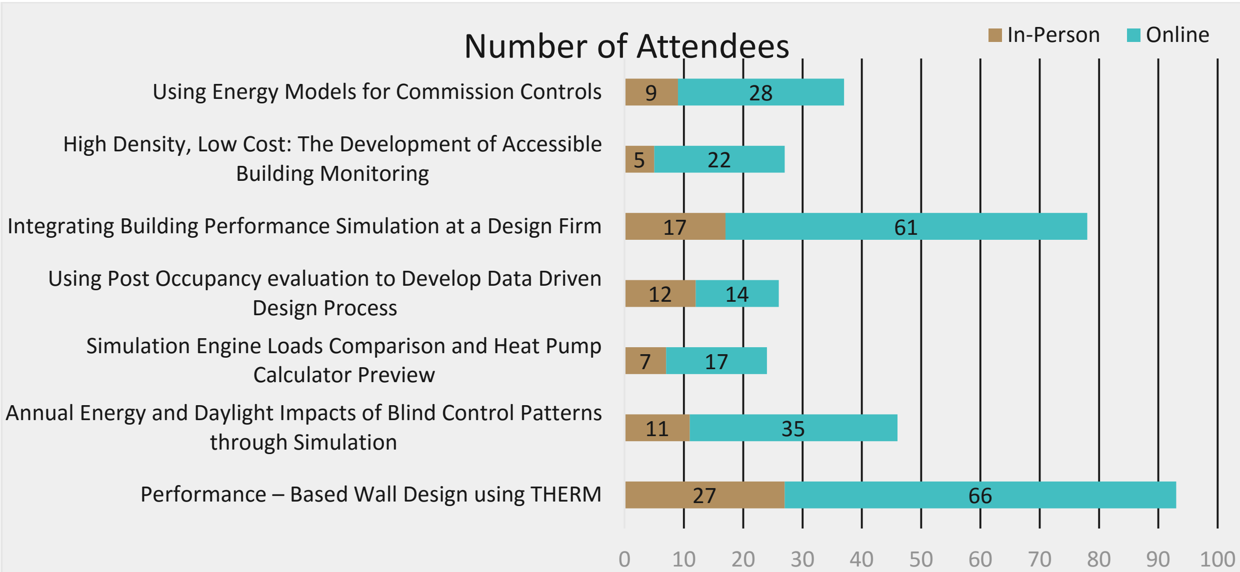


Figure 1: Attendee Count by Session and Type

Table 2: Overall Attendance Breakdown

Architect:	37	Electrician:	
Engineer:	13	Contractor:	2
Mech. Engineer:	19	Other:	23
Elec. Engineer:	3	None Specified:	219
Total (In-Person):	**86**		
Total (Online):	**230**		
Total (Combined):	**316**		

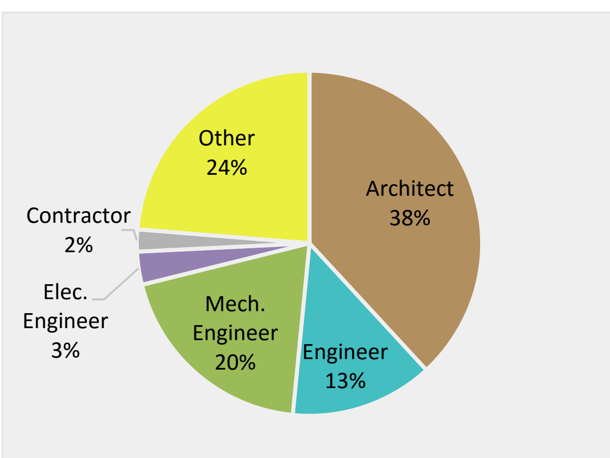


Figure 2: Attendee Profession Breakdown

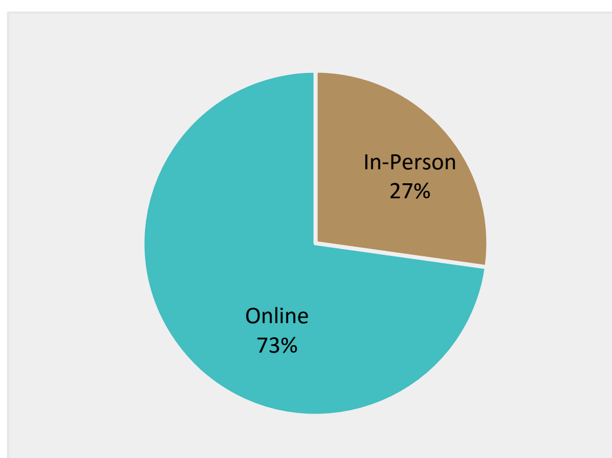


Figure 3: Attendee Type Breakdown

2.2 2015 Evaluations

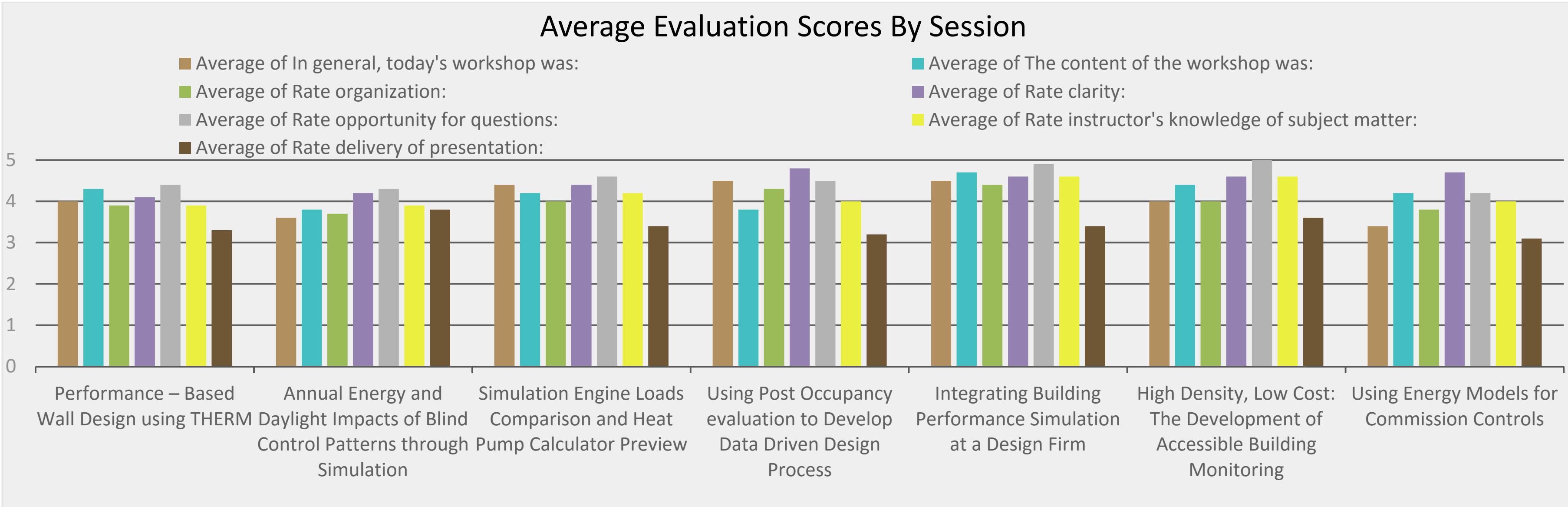
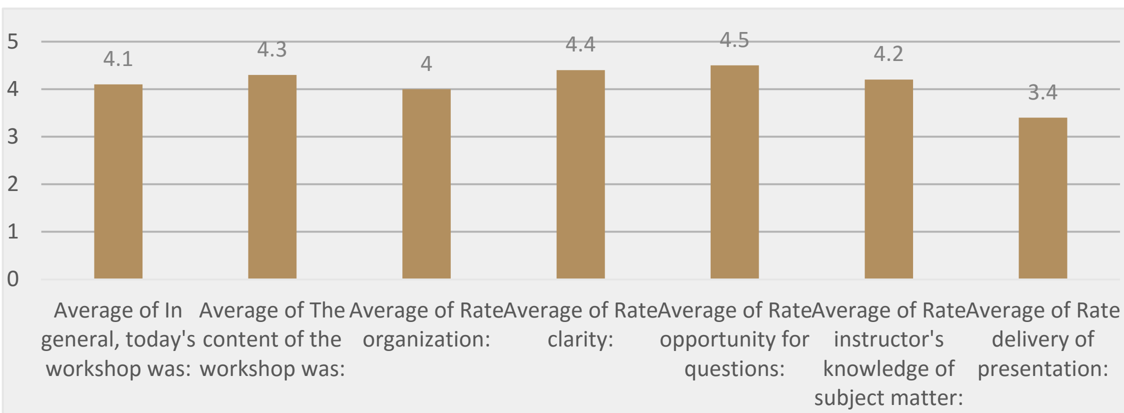


Figure 4: Average Evaluations by Session



Evaluation Metric	Scale
'...today's presentation was'	1 Not Useful - 5 Very Useful
'The content...'	1 Too Basic - 3 Just Right - 5 Too Advanced
'Rate ....'	1 Needs Improvement - 5 Excellent

Figure 5: Average Evaluation Scores for All Sessions

3. Session Summaries

3.1 Session 1: Performance – Based Wall Design using THERM

Title: Performance – Based Wall Design using THERM

Date: 1/28/15

Description: Gunnar Gladics will be sharing the process of using THERM for performance-based wall design. Specifically, he will discuss how the program can be used to determine thermal bridging within a wall, how it might affect energy use and comfort, and strategies to minimize it. He will also discuss the program's capabilities assisting with moisture mitigation and code compliance.

From the THERM website: "THERM is a state-of-the-art, Microsoft Windows™-based computer program developed at Lawrence Berkeley National Laboratory (LBNL) for use by building component manufacturers, engineers, educators, students, architects, and others interested in heat transfer. Using THERM, you can model two-dimensional heat-transfer effects in building components such as windows, walls, foundations, roofs, and doors; appliances; and other products where thermal bridges are of concern. THERM's heat-transfer analysis allows you to evaluate a product's energy efficiency and local temperature patterns, which may relate directly to problems with condensation, moisture damage, and structural integrity."

Presenter: Gunnar Gladics has recently joined the Hummel team to bring additional experience in building performance and sustainable design. He has a strong background in building science, working at the University of Idaho's Integrated Design Lab as an architectural research scientist for five years prior to joining Hummel. Gunnar has consulted on energy and sustainability issues on hundreds of projects in the Northwest and across the country.

Attendance:

Architect:	13	Electrician:	0
Engineer:	1	Contractor:	1
Mech. Engineer:	4	Other*:	6
Elec. Engineer:	2	None Specified:	66
Total (In-Person):	**27**		
Total (Online):	**66**		
*If 'Other' was noted:	Designer, IPC Programs, Consultant, IPC Customer Rep.		

Evaluation Highlights (What attendees found most valuable):

- Already understood benefit of thermal de-coupling but concerned about water vapor.
- Good overview. Not too basic or advanced.
- Difference between design R value & actual achieved R-value.
- Directed to resources applicable to everyday work.

3.2 Session 2: Annual Energy & Daylight Impacts of Blind Control Patterns through Simulation

Title: Annual Energy and Daylight Impacts of Blind Control Patterns through Simulation

Date: 2/25/15

Description: Manual blind controls are typically not included in energy modelling and often are not considered in daylight modelling. This is in part because there is no consensus in the research or practice community about the way users operate manual blinds. However, researchers have recently proposed multiple algorithms for this purpose. Blind control patterns affect the energy consumption (interior lighting loads and space heating and cooling loads) of buildings but a deeper understanding of the range of effects is needed before widespread adoption of manual blind control algorithms in daylighting and energy simulation will occur or consensus about appropriate algorithms reached. Preliminary results show annual lighting end-use variances up to more than 6% and other end-uses up to more than 20% depending on the blind control algorithm. This presentation will briefly discuss and compare the proposed algorithms, and describe the process for inclusion of blind control within the simulation programs EnergyPlus and Radiance.

Presenters: Alen Mahic joined the University of Idaho Integrated Design Lab in Boise three years ago and has been heavily focused on daylighting technical assistance and education. With a strong understanding of the Radiance daylighting tool, he has helped the Lab expand on its digital simulation capabilities through scripted automation of advanced simulation techniques. Alen is an M.Arch graduate from the University of Idaho.

Amir Nezamdoost is currently a research assistant at the IDL and is pursuing his M.S.Arch through the U of I, focusing on performance of manual blind control patterns in daylighting and energy simulation. He received his B.Arch with concentration on energy efficient buildings from Azad University (Mashhad, Iran) in 2010 and worked in professional architecture studios there for two years. To continue his professional experience in the U.S., Amir joined the IDL in 2013. His work at the IDL has included daylighting design and simulation on multiple projects as well as developing building simulations in EnergyPlus, OpenStudio, and Radiance.

Attendance:

Architect:	3	Contractor:	1
Mech. Engineer:	3	Other*:	3
Elec. Engineer:	1	None Specified:	35
Total (In-Person):	**11**		
Total (Online):	**35**		
*If 'Other' was noted:	IPC Programs (3)		

Evaluation Highlights (What attendees found most valuable):

- That cooling load was not greatly affected by blind use. The combination of programs used to do simulation.
- Learning about how the workflow was handled between the EnergyPlus and Radiance.
- Discussion of influencing factors on blinds

3.3 Session 3: Simulation Engine Loads Comparison and Heat Pump Calculator Preview

Title: Simulation Engine Loads Comparison and Heat Pump Calculator Preview

Date: 7/22/15

Description: A macro-free, single zone Heat Pump Energy Savings Calculator (HePESC) workbook is currently under development by the Integrated Design Lab in Boise, Idaho. As part of the calculator vetting process, an in-depth loads analysis was done comparing the heat gain results with those from EnergyPlus and eQuest. Comparisons were made for lighting, plug loads, infiltration, glazing solar heat gain, zone temperature, and overall building loads. Through these comparisons, it is obvious the simulations use differing calculation methods which result in varying final outputs. This presentation will give a brief overview of the heat pump calculator project and progress, then further discuss the loads results from the simulation studies and possible next steps.

Presenter: Katie Leichliter is a Research Scientist at the University of Idaho – Integrated Design Lab in Boise. She conducts energy efficiency field work, measurement and verification, and operational and investment grade audits. Katie also conducts simulation research for energy efficiency in existing building renewal projects, and has developed stand-alone energy analysis tools. She has given multiple presentations on building efficiency opportunities to building design and operation professionals. Katie graduated with a Bachelors and Masters of Science in Mechanical Engineering from the University of Idaho and spent three years in a private mechanical design practice specializing in BIM, building simulation, and HVAC design. Katie serves on the board of governors of the Idaho ASHRAE Chapter.

Attendance:

Architect:	2	Electrician:	
Engineer:	5	Contractor:	
Mech. Engineer:	5	Other*:	1
Elec. Engineer:		None Specified:	10
Total (In-Person):	**7**		
Total (Online):	**16**		
*If 'Other' was noted:	Post IPE		

Evaluation Highlights (What attendees found most valuable):

- Interesting to see this tool…looking forward to trying it out myself
- Cool tool, will be helpful
- About the simulation energy tools

- The comparison with eQuest & e+ and the central ventilation
- Explaining the load calcs, line by line

3.4 Session 4: Using Post-Occupancy evaluation to Develop Data Driven Design Process (9/3/15)

Title: Using Post Occupancy evaluation to Develop Data Driven Design Process

Date: 9/3/15

Description: Established in 1984, Lake|Flato believes in architecture that is rooted to its place, responds to the natural environment and merges with the landscape. With a palette of regional materials, we create buildings that are tactile and modern, environmentally responsible and well-crafted. The firm has been honored with over 200 design awards, including the American Institute of Architects Firm of the Year Award in 2004, eight Committee on the Environment Top Ten Project Awards, and the Global Award for Sustainable Architecture in 2015.

While we have been setting sustainability goals and simulating energy performance for years, we recently revamped our process and began implementing a more thorough, methodical approach to tracking and analyzing the actual energy performance of our residential projects. By installing energy monitoring devices to collect real time, circuit by circuit energy data, we have been able to drill down and find out precisely where every kilowatt-hour is being spent. The results have surprised us and caused us to rethink the way we simulate performance and the way we design.

Presenter: Corey Squire, LEED AP O+M is the Sustainability Coordinator at Lake|Flato. Corey works with all Lake|Flato teams to establish sustainability goals, analyze designs with simulation software, and collect post-occupancy performance data. He received a Bachelor of Arts in Environmental Studies from Oberlin College and a Master of Architecture from Tulane University. In 2012, Corey was awarded the Eskew+Dumez+Ripple Research Fellowship to study building post-occupancy energy performance and sustainable design processes. Corey's research on post occupancy evaluation in custom residential projects has been an instrumental contribution to Lake|Flato's innovative approach toward analyzing energy performance.

Attendance:

Architect:	6	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:	3	Other*:	3
Elec. Engineer:		None Specified:	27
Total (In-Person):	**12**		
Total (Online):	**27**		
*If 'Other' was noted:	IPC Programs		

Evaluation Highlights (What attendees found most valuable):

- Case studies were interesting

- “Pool” load types
- The comparison and monitoring equipment
- Comparisons and experiments, as well as the honesty.

3.5 Session 5: Integrating Building Performance Simulation at a Design Firm – Trials and Tribulations

Title: Integrating Building Performance Simulation at a Design Firm – Trials and Tribulations

Date: 10/7/15

Description: In-house architecture simulation services. Is this an achievable and worthwhile prospect? Does building performance simulation add value to an architecture practice? Is it worth the time and trouble? These are examples of the questions that Jacob Dunn has been grappling with since leaving the University of Idaho Integrated Design Lab over a year ago to bring architectural simulation to Eskew+Dumez+Ripple (EDR), a New Orleans-based, design-first practice and AIA Firm of the Year recipient in 2015. Over the past year, Jacob has worked with their director of Building Performance and Sustainability, Z Smith, to integrate performance-driven design throughout their studio. This presentation will cover the trials and tribulations of this task, while proposing frameworks and initiatives firms can use that encourage performance based design and building simulation in practice. Jacob will discuss the need for the redefinition of the way firms think about design, how they structure project teams, and how they implement new technologies and tools at every stage of the design process, Finally, Jacob will present EDR implementation case studies and initiatives piloted by the firm to provide insight into the difficulty and value that simulation can provide to design and sustainability.

Presenter: Jacob Dunn grew up in the Boise, Idaho in the Pacific Northwest (ASHRAE Climate Zone 5B) before recently moving to his new home in New Orleans (ASHRAE Climate Zone 2A). He holds a Master's Degree in Architecture from the University of Idaho and his professional background has pivoted between research, sustainability consulting, education, and architecture. After working for about a year in London for ARUP's Foresight Innovation and Incubation group, Jacob finished his degree and started working at the University of Idaho's Integrated Design Lab (IDL). At the IDL, he specialized in consulting through architectural simulation, conducted research on energy efficiency, and taught various graduate-level architecture courses. Jacob used simulation on a daily basis for both architectural and engineering analysis, and across a broad spectrum of building types in both new and existing structures. After four years of being a Research Scientist, he was recruited out of Idaho to Eskew+Dumez+Ripple (EDR) and tasked with enabling evidenced-based design and simulation analysis to their award-winning design firm. At EDR, Jacob currently works with design teams to explore the link between aesthetics and performance through simulation and a scientific approach to sustainability.

Attendance:

Architect:	8	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:	1	Other*:	8
Elec. Engineer:		None Specified:	60
Total (In-Person):	**17**		
Total (Online):	**60**		
*If 'Other' was noted:	EIT, Prof, Eng, ID		

Evaluation Highlights (What attendees found most valuable):

- Evaluation of design software + use/abilities of software
- Good synopsis of Revit tools, consulting experiences
- Points along the process where it makes most sense to incorporate which tools/analysis + tips on Revit extensions
- Organization was excellent – really great to see multiple project phases and in relation to energy analysis
- Use in Practice/Real world issues

3.6 Session 6: Using Energy Models to Commission Controls

Title: Using Energy Models to Commission Controls

Date: 11/18/15

Description: Accurate, effective and thorough commissioning of building controls is often neglected or incomplete due to several factors; fear of occupant complaints, equipment damage, cost and time all contribute to a lack of proper commissioning. Building Controls Virtual Test-Bed (BCVTB), a free software available from Lawrence Berkeley National Lab, enables a user to connect their energy simulation to elements in the real world. It can be used to incorporate real-time weather, sensor outputs, or even pieces of control hardware. The research team at IDL implemented this process for a large campus building currently in operation, by physically connecting one of its controllers to an energy model developed in OpenStudio. This approach enabled identification and correction of operating parameters, including economizer control settings. By tuning just a few operational settings, this project had a potential to save up to 12% of the building's energy per year. This lecture will cover how the IDL successfully connected OpenStudio/EnergyPlus models to physical controllers.

Presenters: Damon Woods is a PhD student at the University of Idaho and has been with the Integrated Design Lab since 2012. His research focus is on increasing the energy efficiency of buildings by using modeling and predictive control of radiant systems. Damon received a BS in Mechanical Engineering from Montana State University and an MS in Mechanical Engineering from Boise State University in 2013.

Attendance:

Architect:	3	Electrician:	
Engineer:	7	Contractor:	
Mech. Engineer:	2	Other*:	3
Elec. Engineer:		None Specified:	20
Total (In-Person):	**9**		
Total (Online):	**26**		
*If 'Other' was noted:	Professor, Energy Manager, Utility Rep		

Evaluation Highlights (What attendees found most valuable):
- Inspiration on the potential of modeling
- Concept
- Details on the graphic that showed integration of EnergyPlus and the fact that commissioning should never stop.
- Economizer example

4. Website Maintenance and Statistics

The Google site "BSUG 2.0" was maintained and updated monthly. Each month, details about the upcoming presentation were posted to the 'UPCOMING EVENTS' page. These pages also included links to both webinar and in-person registration. Monthly emails linked to these pages as well as directly to the registration sites. If the monthly session included a webinar recording, the video was edited and posted to the YouTube channel with a link from the BSUG 2.0 website.

Between January 1, 2015 and November 25, 2015, total page views summed to 166 with unique page views at 147 for 313 total sessions at the site. Of the 313 sessions, 114 (36%) of the sessions were by users in Idaho. Below are charts showing a summary of website activity for the most popular pages, as well as for the site as a whole.

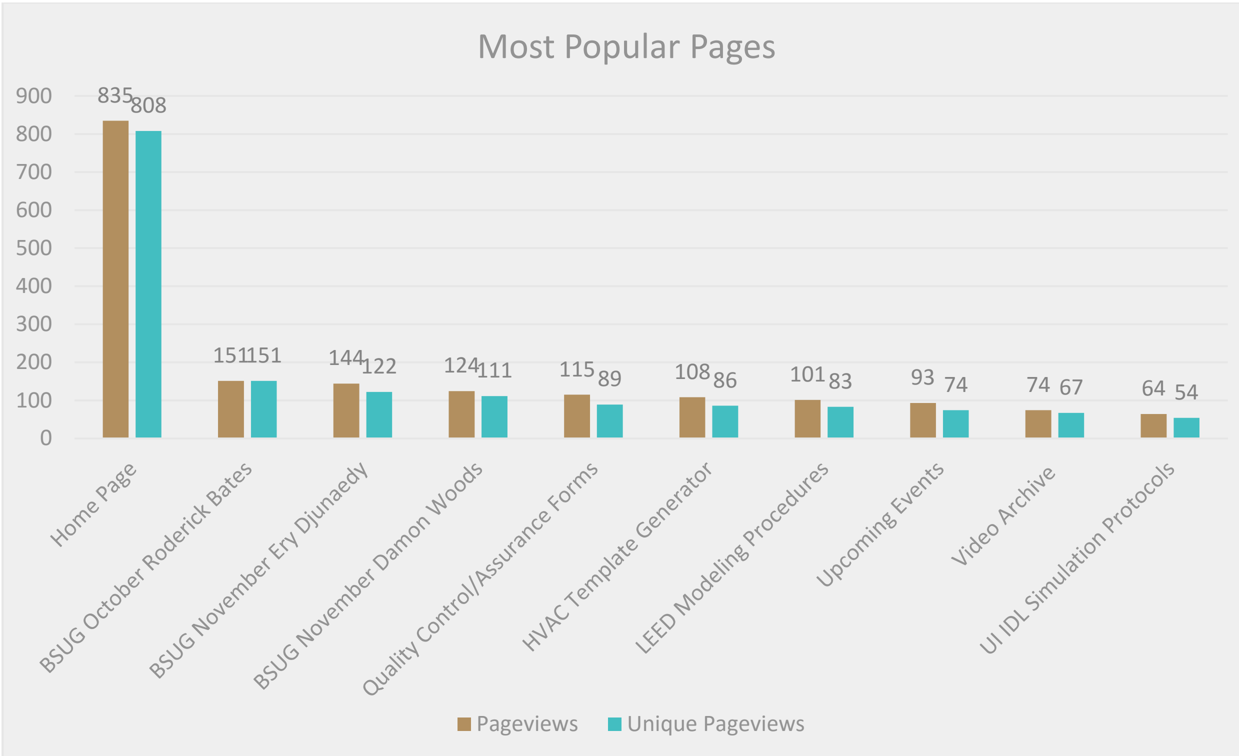


Figure 6: Number of Page Views for the Ten Most Popular Pages in 2015

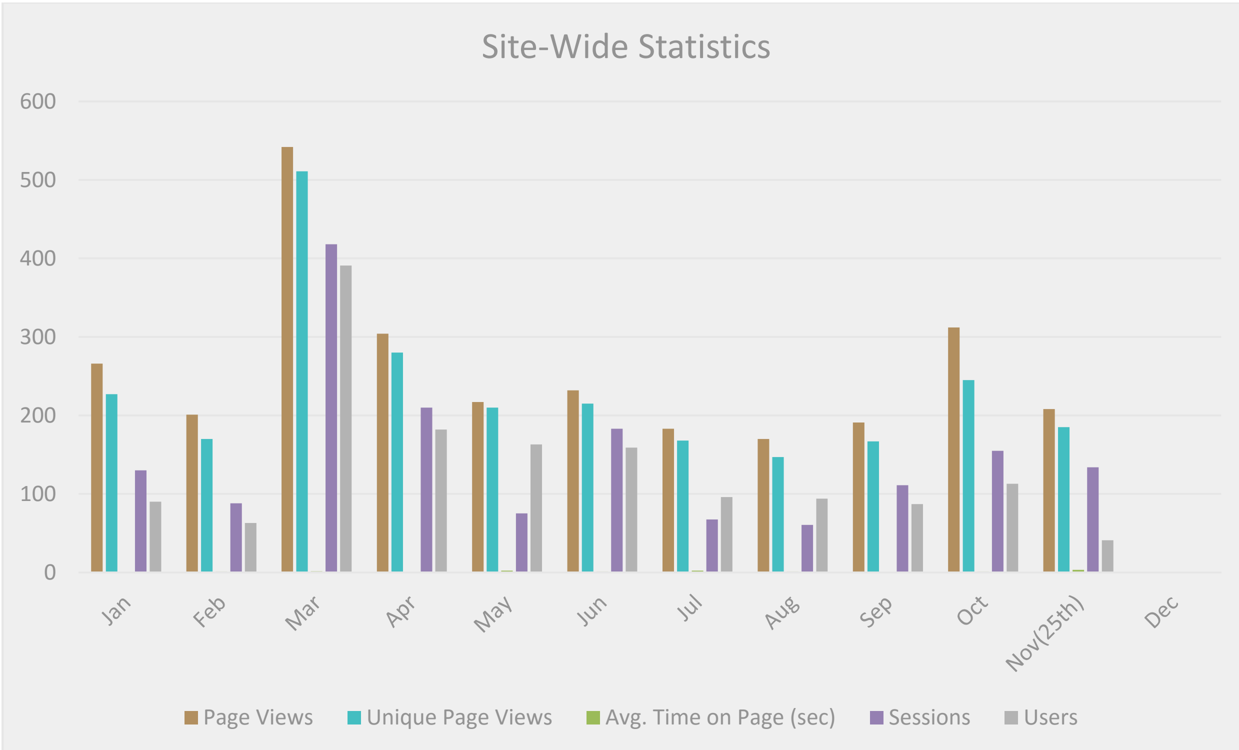


Figure 7: Monthly Site-Wide Statistics

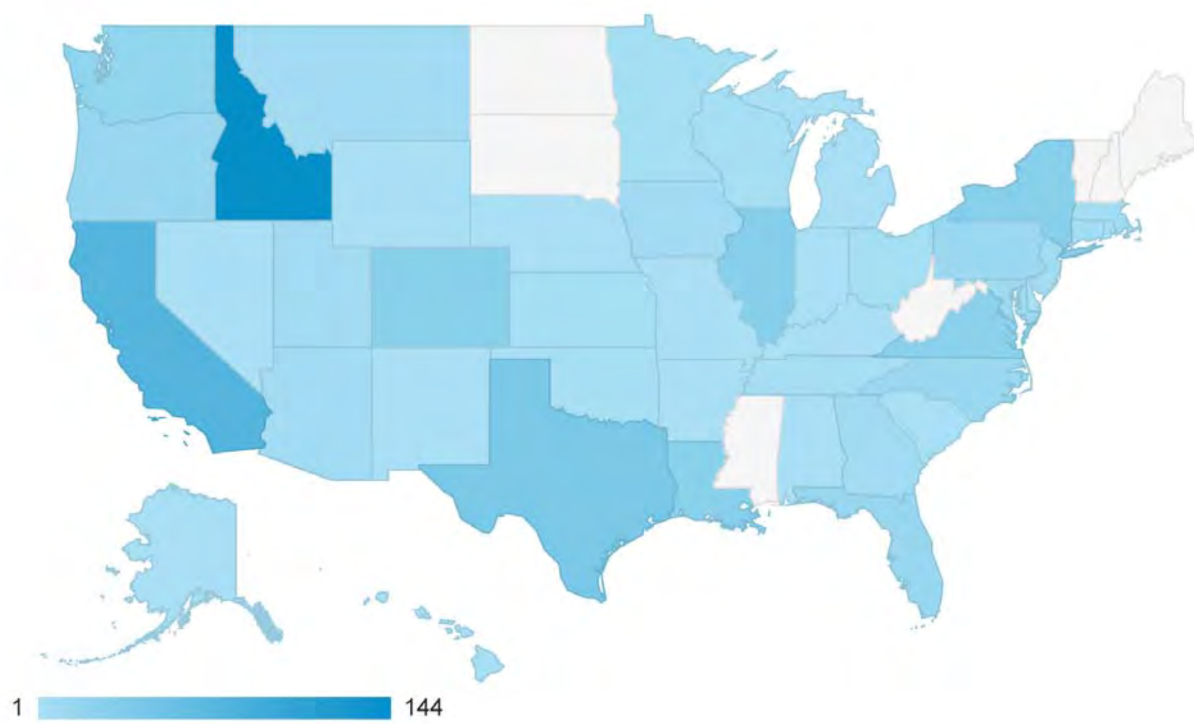


Figure 8: Heat Map of All U.S. Sessions in 2015

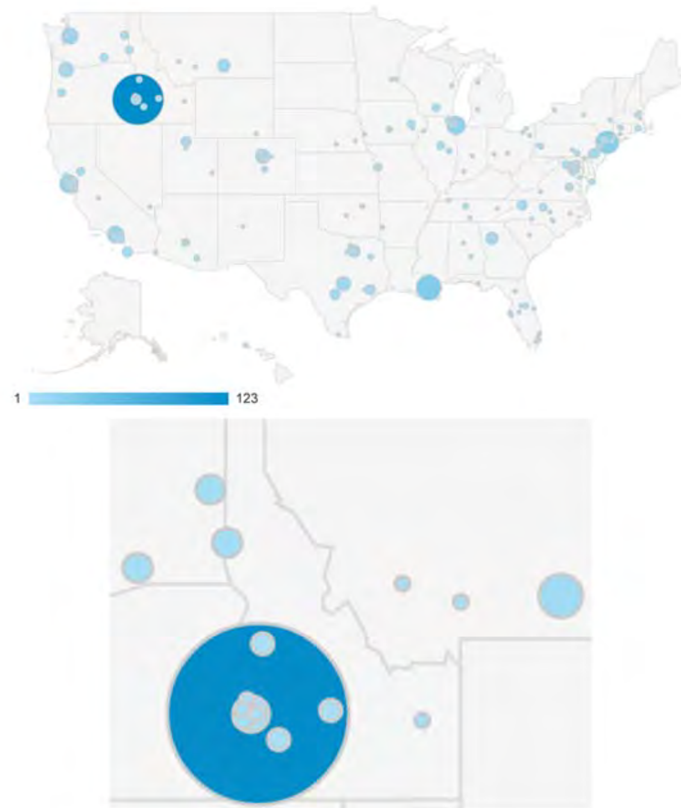


Figure 9: Bubble Maps of All Sessions and Idaho in 2015

5. Other Activities and Suggestions for Future Improvements

2015 was a successful year for the BSUG task with 6 sessions completed and 331 total attendees – 86 in-person and 230 online. Feedback was provided by attendees via the evaluation forms, 89 of which were collected. These offered a starting point for determining future improvements to the program.

A brainstorming session was held at the end of the last BSUG – Session 6. At the last session, discussion centered on potential topics for 2016 as well as general improvements and ways to increase attendance. Below is a short summary of main takeaways from the last session as well as the feedback from the evaluations.

<u>Potential Topics:</u>

- Google Flux
- Business Case for Modeling
- Modeling at different levels of accuracy/time
- CBECS LBL Calibrated Models
- Meteorologist

<u>Potential Speakers:</u>

- TBD

<u>Attendance and Marketing:</u>

- Try to hold joint meetings with other organizations (such as ASHRAE, AIA, BOMA, and others)
- Include calendar invitations on any notices or reminders
- Market toward eastern Idaho and other remote locations
- Attendance prizes

2015 Task 5: Building Efficiency Verifications

Summary of Projects

Idaho Power Company External Year-End Report

December 31, 2015

Prepared for:
Idaho Power Company

Authors:
Robert Galarza
Katie Leichliter

Report Number: 1501_005-01

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Idaho Power Company

Contract Number:
3094

Please cite this report as follows: Galarza, R., Leichliter, K. (2015). *2015 TASK 5: Building Efficiency Verifications – Summary of Projects* (1501_005-01). University of Idaho Integrated Design Lab, Boise, ID.

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Acronyms and Abbreviations

AC	Air Conditioning
BEV	Building Efficiency Verification
HVAC	Heating, Ventilation, and Air Conditioning
IDL	Integrated Design Lab
IPC	Idaho Power Company
UI	University of Idaho
VRF	Variable Refrigerant Flow

1. Introduction

The University of Idaho Integrated Design Lab (UI-IDL) had two roles for the Building Efficiency Verification (BEV) task in 2015. The primary role was to conduct on-site verification reports for approximately 10%, typically seven to eight, of projects that participated in Idaho Power Company's (IPC) Building Efficiency Program. The verified projects were randomly selected from the entire pool of projects, and at least two projects were required to be outside the Boise area. The secondary role was to review the photo controls design and function for every project whose application included incentive L3: Daylight Photo Controls within the Building Efficiency Program. Once each review was concluded, a letter of support for the incentive was submitted to Idaho Power. This review and letter were intended to increase energy savings and quality of design through the inclusion of additional design and commissioning recommendations.

2. 2015 Building Efficiency Verification Projects

The UI-IDL completed nine Building Efficiency Verification projects in 2015. A detailed report for each project was submitted to IPC, including claimed and actual installation for each specific incentive the project applied for. With the exception of one, all of the projects reviewed in 2015 were completed under the new Building Efficiency's 2014 Program which supersedes the Building Efficiency's 2011 Program. The specific incentives for these programs are outlined in Table 1 and Table 2. Notable changes included the addition of the 'Appliances with Electric Water Heating' and 'Refrigeration' sections in the 2014 program.

Table 1: 2011 Build Efficiency Program Specific Incentives

Lighting	L1	Interior Light Load Reduction
	L2	Exterior Light Load Reduction
	L3	Daylight Photo Controls
	L4	Occupancy Sensors
	L5	High Efficiency Exit Signs
Air Conditioning (HVAC)	A1	Premium Efficiency HVAC Units
	A2	Additional HVAC Efficiency Unit Efficiency Bonus
	A3	Efficient Chillers
	A4	Air Side Economizers
Building Shell	B1	Reflective Roof Treatment
	B2	High Performance Windows and Skylights
Controls	C1	Energy Management Control System
	C2	Demand Control Ventilation
	C3	Variable Speed Drives

Table 2: 2014 Build Efficiency Program Specific Incentives

Lighting	L1	Interior Light Load Reduction
	L2	Exterior Light Load Reduction
	L3	Daylight Photo Controls
	L4	Occupancy Sensors
	L5	High Efficiency Exit Signs
Air Conditioning	A1	Efficient Air-Cooled AC & Heat Pump Units
	A2	Efficient VRF Units
	A3	Efficient Chillers
	A4	Air Side Economizers
	A5	Direct Evaporative Coolers
Building Shell	B1	Reflective Roof Treatment
Controls	C1	Energy Management Control System
	C2	Guest Room Energy Management System
	C3	HVAC Variable Speed Drives
Appliances with Electric Water Heating	W1	Efficient Laundry Machines
	D1	EnergyStar Undercounter Dishwashers
	D2	EnergyStar Commercial Dishwasher
Refrigeration	R1	Head Pressure Controls
	R2	Floating Suction Controls
	R3	Efficient Condensers

To streamline writing project reports, a detailed template in spreadsheet form was created. This template is quick and easy to use allowing the user to focus on reviewing project specifics and less time on formatting and organizing. It contains all necessary incentive information neatly organized in one file. Figure 1 shows how the each incentive is separated into tabs, which are color coded for working efficiently. Figure 2 is representative of the look and feel of each tab, containing information about the project and requirements for the incentive.

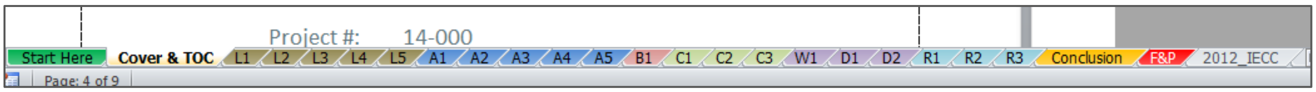
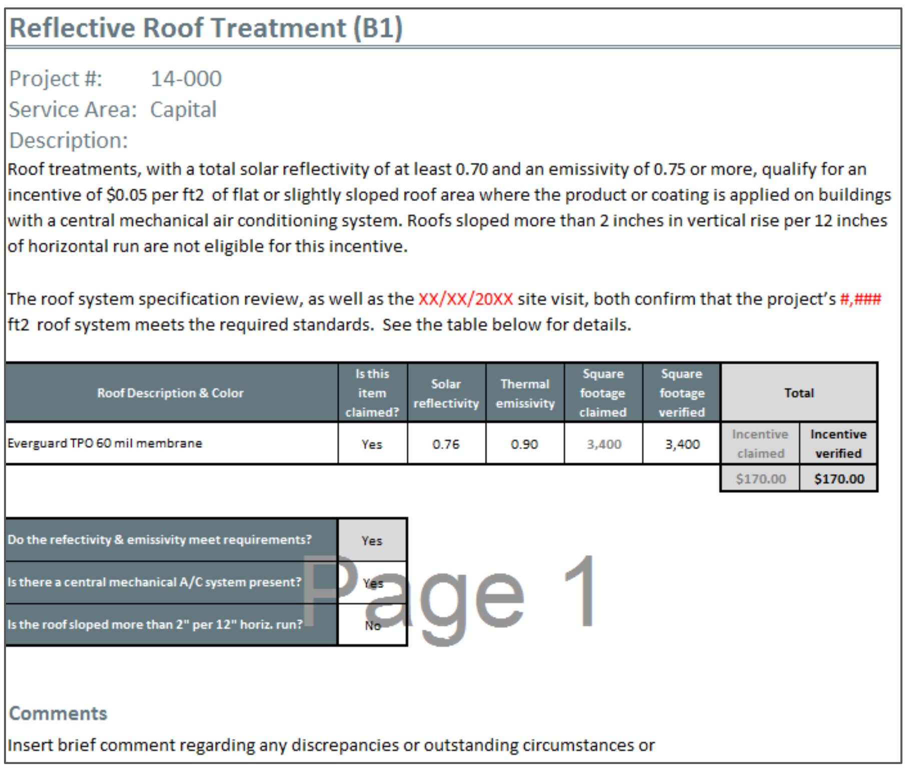


Figure 1: Workflow from left to right with tabs for each incentive.



Reflective Roof Treatment (B1)

Project #: 14-000
Service Area: Capital
Description:
Roof treatments, with a total solar reflectivity of at least 0.70 and an emissivity of 0.75 or more, qualify for an incentive of $0.05 per ft2 of flat or slightly sloped roof area where the product or coating is applied on buildings with a central mechanical air conditioning system. Roofs sloped more than 2 inches in vertical rise per 12 inches of horizontal run are not eligible for this incentive.

The roof system specification review, as well as the XX/XX/20XX site visit, both confirm that the project's #,### ft2 roof system meets the required standards. See the table below for details.

Roof Description & Color	Is this item claimed?	Solar reflectivity	Thermal emissivity	Square footage claimed	Square footage verified	Total	
						Incentive claimed	Incentive verified
Everguard TPO 60 mil membrane	Yes	0.76	0.90	3,400	3,400	$170.00	$170.00

Do the refectivity & emissivity meet requirements?	Yes
Is there a central mechanical A/C system present?	Yes
Is the roof sloped more than 2" per 12" horiz. run?	No

Page 1

Comments

Insert brief comment regarding any discrepancies or outstanding circumstances or

Figure 2: Example of the general layout of each tab with project and incentive information.

Table 3 below summarizes the nine projects and respective qualified incentive measures which were verified by UI-IDL. The new template was used to write the reports for these projects.

Table 3: BEV Project Summary

IPC Project #	Facility Description	Location	Incentive Measures	UI-IDL Site-Visit Date
11-348	Industrial - Large	Pocatello, ID	C3	10/29/15
14-006	Retail (non-food)	Twin Falls, ID	A1, C1	10/28/15
14-033	Warehouse	American Falls, ID	L1	10/28/15
14-071	Paramedic Station	Boise, ID	L1, L2, L4, L5, A1, A5, B1, W1, D1	12/08/15
14-101	Hospital	Boise, ID	L1, L4, R3	06/19/15
14-105	Retail (non-food)	Nampa, ID	A1	06/12/15
14-140	Industrial - Large	Jerome, ID	L2	10/28/15
14-143	College/University	Nampa, ID	L1, L3, L4, L5, A1, A4, B1, C1,	12/09/15
14-149	Retail (non-food)	Twin Falls, ID	L1, L4, A1,	10/28/15

3. 2015 Photo Controls Review Projects

In 2015, the UI-IDL received at least seven inquiries regarding the Building Efficiency photo controls incentive review. Documentation was received and final letters of support were submitted to IPC for photo controls incentive applications for four of these projects including a warehouse, a government facility, an office, and a manufacturing facility. Reviews were not completed for two government facilities and a university library since the requested necessary documentation was not received by the UI-IDL. Follow-up may be necessary on these projects.

2015 Task 6: Tool Loan Library

Summary of Effort and Outcomes

Idaho Power Company External Year-End Report

December 31, 2015

Prepared for:

Idaho Power Company

Authors:

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Katie Leichliter

Brad Acker

Report Number: 1501_006-05

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Contract Number:
5277

Please cite this report as follows: Noble, T., Leichliter, K., Acker, B. (2015). *2015 TASK 6: Tool Loan Library – Summary of Effort and Outcomes* (1501_006-05). University of Idaho Integrated Design Lab, Boise, ID.

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Acronyms and Abbreviations

AC	Air Conditioning
AIA	American Institute of Architects
AHU	Air Handling Unit
Amp	Ampere
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BOMA	Building Owners and Managers Association
BSU	Boise State University
CO2	Carbon Dioxide
CT	Current Transducer
Cx	Commissioning
DCV	Demand Control Ventilation
EE	Energy Efficiency
EEM(s)	Energy Efficiency Measure(s)
fc	Foot-Candle
HVAC	Heating, Ventilation, and Air Conditioning
IAC	Industrial Assessment Center
IBOA	Intermountain Building Operators Association
IDL	Integrated Design Lab
Int.	International
IPC	Idaho Power Company
kW	Kilowatt
kWh	Kilowatt-Hour
M&V	Measurement and Verification
OSA	Outside Air

PG&E	Pacific Gas and Electric Company
PPM	Parts Per Million
RPM	Rotations Per Minute
RTU	Rooftop Unit
TLL	Tool Loan Library
TPS	Third Party Service
UI	University of Idaho
USGBC	U.S. Green Building Council
Verif.	Verification
VOC	Volatile Organic Compound

1. Introduction

The Tool Loan Library (TLL) is a resource supported by Idaho Power Company (IPC) and managed by the University of Idaho Integrated Design Lab (UI-IDL). The TLL at the UI-IDL is modeled after the Lending Library at the Pacific Energy Center, which is supported by Pacific Gas and Electric (PG&E). In the past years interest in these type of libraries have grown. Recently the Smart Building Center which is a project of the Northwest Energy Efficiency Council has started a lending library and they list other lending libraries spanning a large range of tools, not just energy efficiency focused tools.

The primary goal of the TLL is to help customers with energy efficiency (EE) needs, through the use of sensors and loggers deployed in buildings of various types. Loans are provided to individuals or businesses at no charge to the customer. Over 900 individual pieces of equipment are available for loan through the TLL. The equipment is focused on measurement parameters to quantify key factors related to building and equipment energy use, and factors which can affect worker productivity.

The loan process is started when a customer fills out the tool loan proposal form, which is found on the TLL webpage (www.idlboise.com/tool-loan-library). When completing a tool loan proposal, the customer includes basic background information, project and data measurement requirements, and goals. When a proposal is submitted, UI-IDL staff members are alerted of a pending proposal via email. The customer and a staff member communicate to verify and finalize equipment needs. Tools are picked up at the UI-IDL or shipped at the customer's expense.

2. Marketing

Marketing for the TLL was done at various UI-IDL and IPC activities throughout 2015, as well as on the UI-IDL website. Five hundred tool loan flyers were printed in March of 2015 for distribution by IPC and UI-IDL staff. The flyer layout was unchanged from 2013: it is in Figure 1 and Figure 2 below. The TLL was promoted in presentations given by the UI-IDL staff, including the Lunch and Learn series and lectures to professional organizations such as American Institute of Architects (AIA), International Building Operators Association (IBOA), City of Boise, Building Owners and Operators Association (BOMA), and the Idaho Green Energy and Building Conference.

The TLL flyer and program slides point potential users to the TLL website for more information about the library. The main UI-IDL website hosts the TLL portal where customers can submit proposals and request tools, all online. In 2015, the TLL home page had 3,160 visitors.

Figure 1: TLL Flyer Front

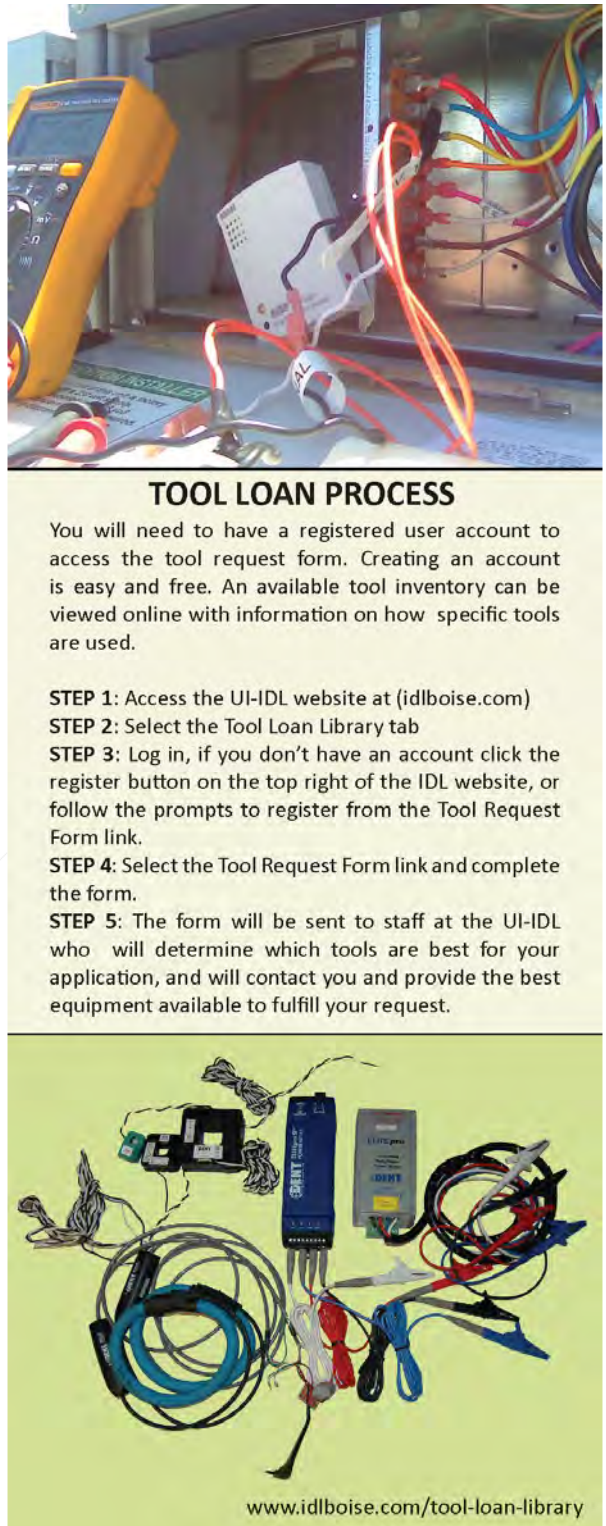

Figure 2: TLL Flyer Back

3. Tool Calibration Plan

Equipment items included in the tool loan program are typically distributed with a manufacturer guaranteed calibration period between 1 and 3 years. The vast majority of items are beyond this guaranteed period of calibration. While many items may stay within calibration for years after the guaranteed calibration period ends, re-verifying the item is within calibration and re-calibrating if necessary is highly recommended. Calibration services are available on most tools either from the manufacturer or various certified calibration services nationwide. While IDL suggests that every tool should be kept 100% up-to-date on calibration, several inquiries and other research suggests doing so is not without substantial cost.

Appendix C is a summary of calibration status of the tool loan inventory and includes the current best estimate for implementation of an annual calibration program. Calibration is a time intensive endeavor, generally requiring expensive test equipment. Ideally recalibration would be performed by the original manufacturer factory and would typically be outsourced to a third party service (TPS) when factory recalibration services are unavailable.

In lieu of certified calibration, there are occasionally measures that IDL can take to ensure items are within calibration tolerances. There are a few equipment types, for instance, that can be cross-checked against other equipment for accuracy. Some sensors, like carbon dioxide or volatile organic compound sensors, test procedures may be followed to ensure accuracy of readings.

4. 2015 Summary Of Loans

In 2015, loan requests totaled 56 with 42 loans completed. The second and third quarters equally had the highest volume of loans at 14 total. Loans were made to 24 different locations and 31 unique users. A wide range of tools was borrowed, as listed in Figure 7. The majority of tools were borrowed for principle investigations or audits, although loans were also made for determining baselines before EEMs were implemented. Tools were borrowed to verify these EEMs as well. Table 1 and the following figures outline the usage analysis for TLL in 2015.

Table 1: Project and Loan Summary

	Request Date	Location		Project	Type of Loan	# of Tools Loaned
1	1/7/2015	Boise	ID	OB1	Audit	7
2	1/14/2015	Twin Falls	ID	OB2	Audit	12
3	1/20/2015	Garden City	ID	OB3	Audit	3
4	2/2/2015	Boise	ID	MB1	Audit	12
5	2/3/2015	Shoshone	ID	Dairy1	Verification of EEMs	15
6	2/12/2015	Nampa	ID	Home1	Audit	1
7	2/13/2015	Boise	ID	WWTP1	Verification of EEMs	1
8	2/17/2015	Burley	ID	Plant1	Verification of EEMs	1
9	2/17/2015	Twin Falls	ID	OB4	Verification of EEMs	7
10	2/18/2015	Boise	ID	School	Audit	1
11	3/11/2015	Boise	ID	Plant2	Audit	7
12	3/30/2015	Boise	ID	Plant3	Audit	1
13	4/6/2015	Weiser	ID	WWTP2	Verification of EEMs	1
14	4/10/2015	Nampa	ID	OB5	Audit	11
15	4/16/2015	Boise	ID	WWTP3	Audit	15
16	4/17/2015	Boise	ID	Plant4	Audit	1

17	4/27/2015	Shoshone	ID	Dairy2	Verification of EEMs	37
18	5/5/2015	Boise	ID	Theater	Verification of EEMs	4
19	5/5/2015	Meridian	ID	OB6	Audit	7
20	5/6/2015	Caldwell	ID	Plant5	Verification of EEMs	1
21	5/6/2015	Burley	ID	Plant6	Verification of EEMs	9
22	5/8/2015	Sun Valley	ID	Lodge1	Verification of EEMs	1
23	5/11/2015	Boise	ID	OB7	Audit	2
24	5/21/2015	Boise	ID	Bank1	Verification of EEMs	5
25	5/29/2015	Boise	ID	Home2	Audit	1
26	6/30/2015	Boise	ID	Lab1	Audit	23
27	7/6/2015	Ontario	OR	Medical1	Verification of EEMs	4
28	7/15/2015	Boise	ID	OB8	Verification of EEMs	5
29	7/21/2015	Boise	ID	Dairy3	Audit	1
30	7/23/2015	Burley	ID	Plant7	Verification of EEMs	16
31	7/24/2015	Spokane	WA	Audit1	Audit	7
32	7/30/2015	Boise	ID	Freezers	Audit	1
33	7/31/2015	Nampa	ID	OB9	Audit	21
34	8/4/2015	Twin Falls	ID	OB10	Audit	5
35	8/5/2015	Nampa	ID	OB11	Audit	7
36	8/6/2015	Boise	ID	OB12	Audit	3
37	8/19/2015	Boise	ID	Plant9	Audit	38
38	9/4/2015	Twin Falls	ID	OB12	Verification of EEMs	9
39	9/19/2015	Boise	ID	Library1	Verification of EEMs	1
40	9/23/2015	Meridian	ID	OB13	Audit	2
41	10/1/2015	Boise	ID	Home3	Audit	6
42	10/2/2015	Boise	ID	OB14	Verification of EEMs	2
43	10/12/2015	Boise	ID	OB15	Verification of EEMs	1
44	10/14/2015	Nampa	ID	OB16	Audit	1
45	11/6/2015	Boise	ID	OB17	Verification of EEMs	1
46	11/16/2015	Boise	ID	WWTP4	Audit	8
47	11/18/2015	Pocatello	ID	OB18	Audit	7

48	11/18/2015	Boise	ID	OB19	Audit	1
49	11/20/2015	Burley	ID	Plant10	Audit	3
50	11/25/2015	Boise	ID	Plant11	Audit	1
51	12/7/2015	Kuna	ID	OB20	Audit	1
52	12/15/2015	Durkee	OR	Plant12	Verification of EEMs	1
53	12/17/2015	Meridian	ID	Plant13	Audit	1
54	12/18/2015	Twin Falls	ID	Plant14	Verification of EEMs	1
55	12/22/2015	Boise	ID	OB21	Verification of EEMs	1
56	12/29/2015	Boise	ID	Home4	Verification of EEMs	1

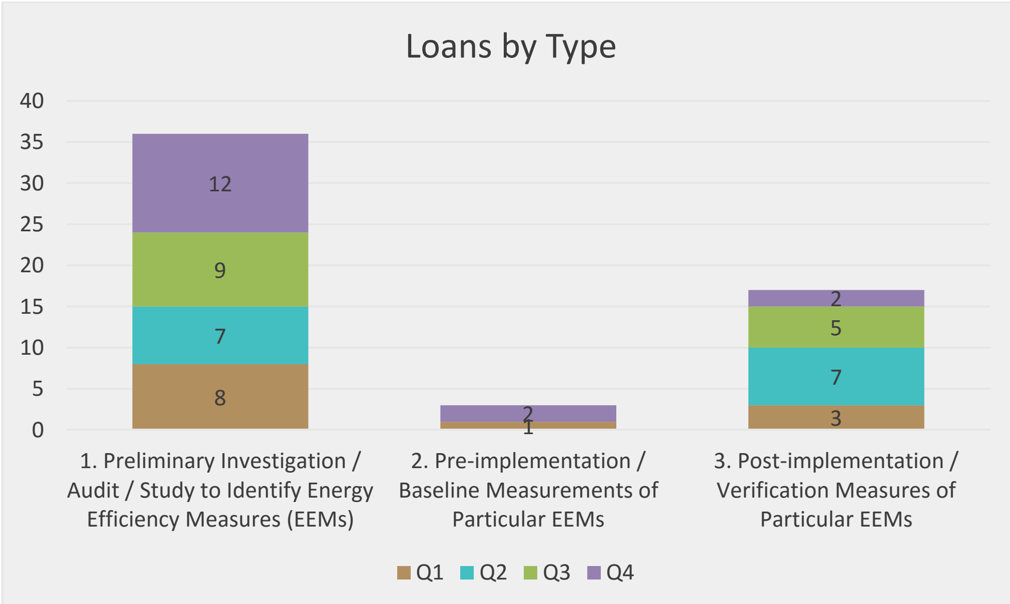

Figure 3: Loans by Type

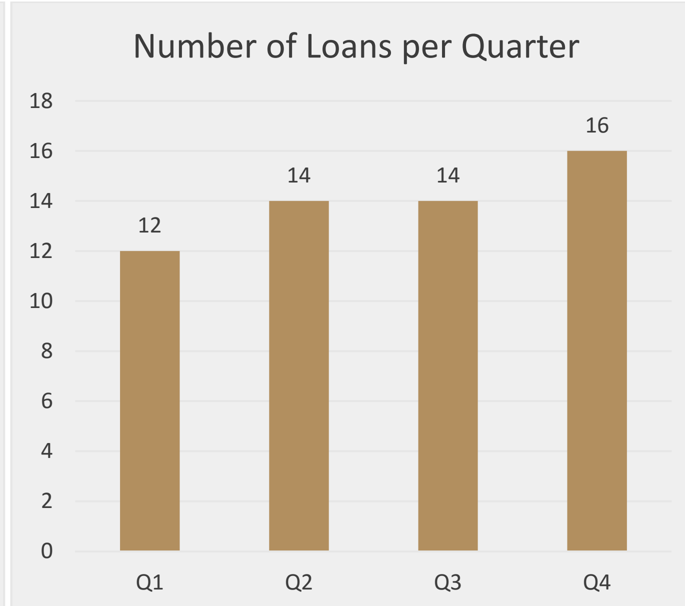

Figure 4: Number of Loans per Quarter

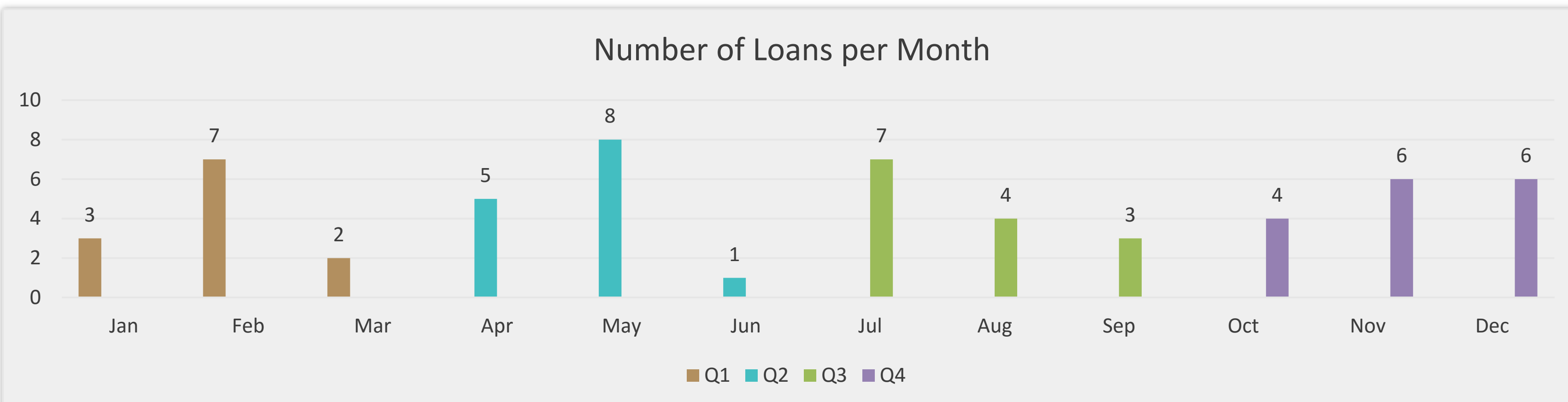

Figure 5: Number of Loans per Month

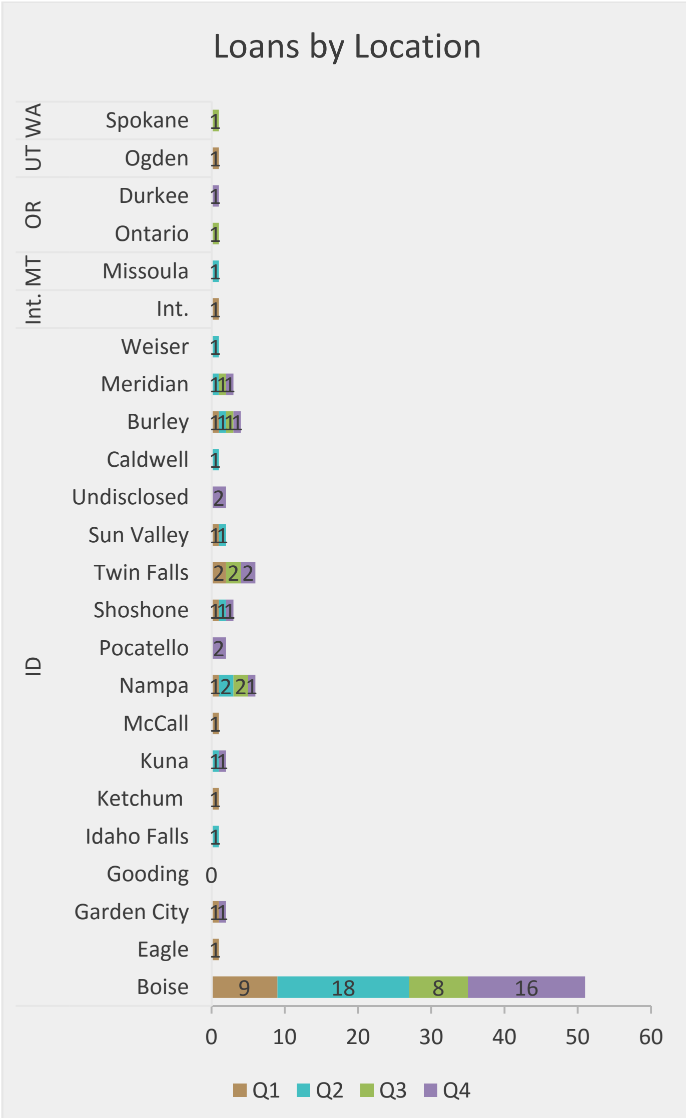

Figure 6: Number of Loans by Location

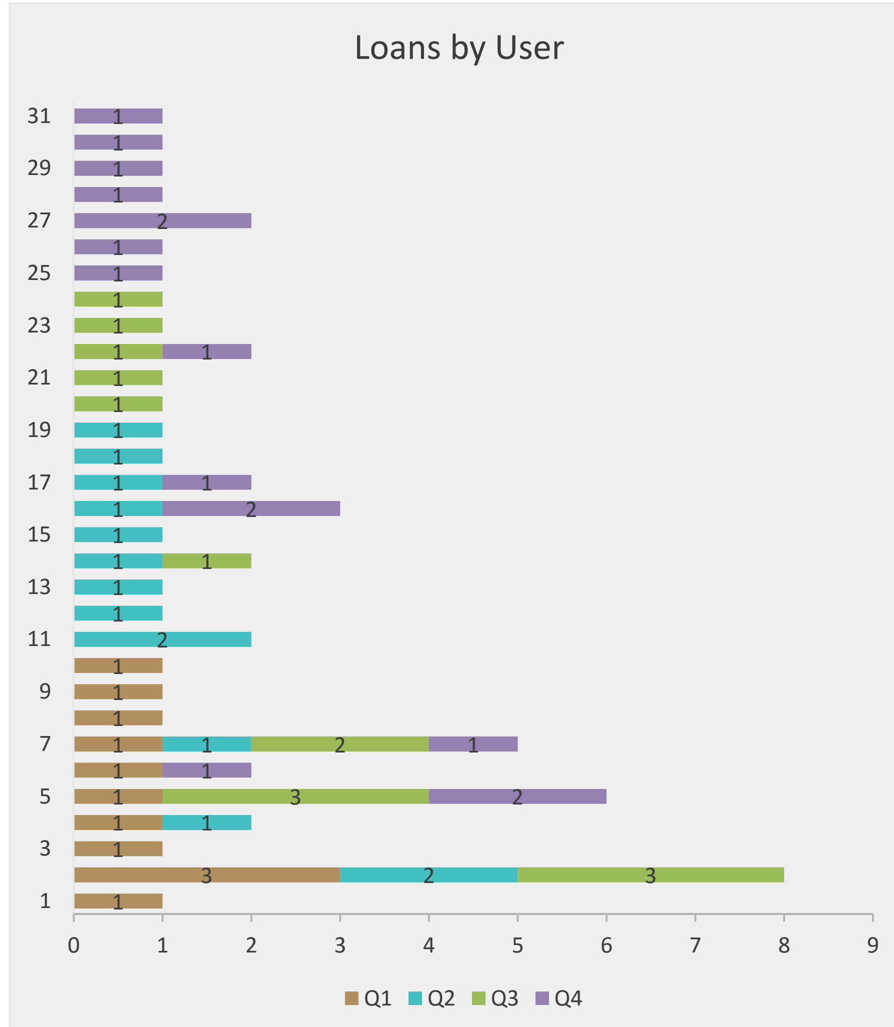

Figure 7: Number of Loans by User

TOTAL TOOLS LOANED: **317**	Q1=**66**	Q2=**111**	Q3=**113**	Q4= **27**

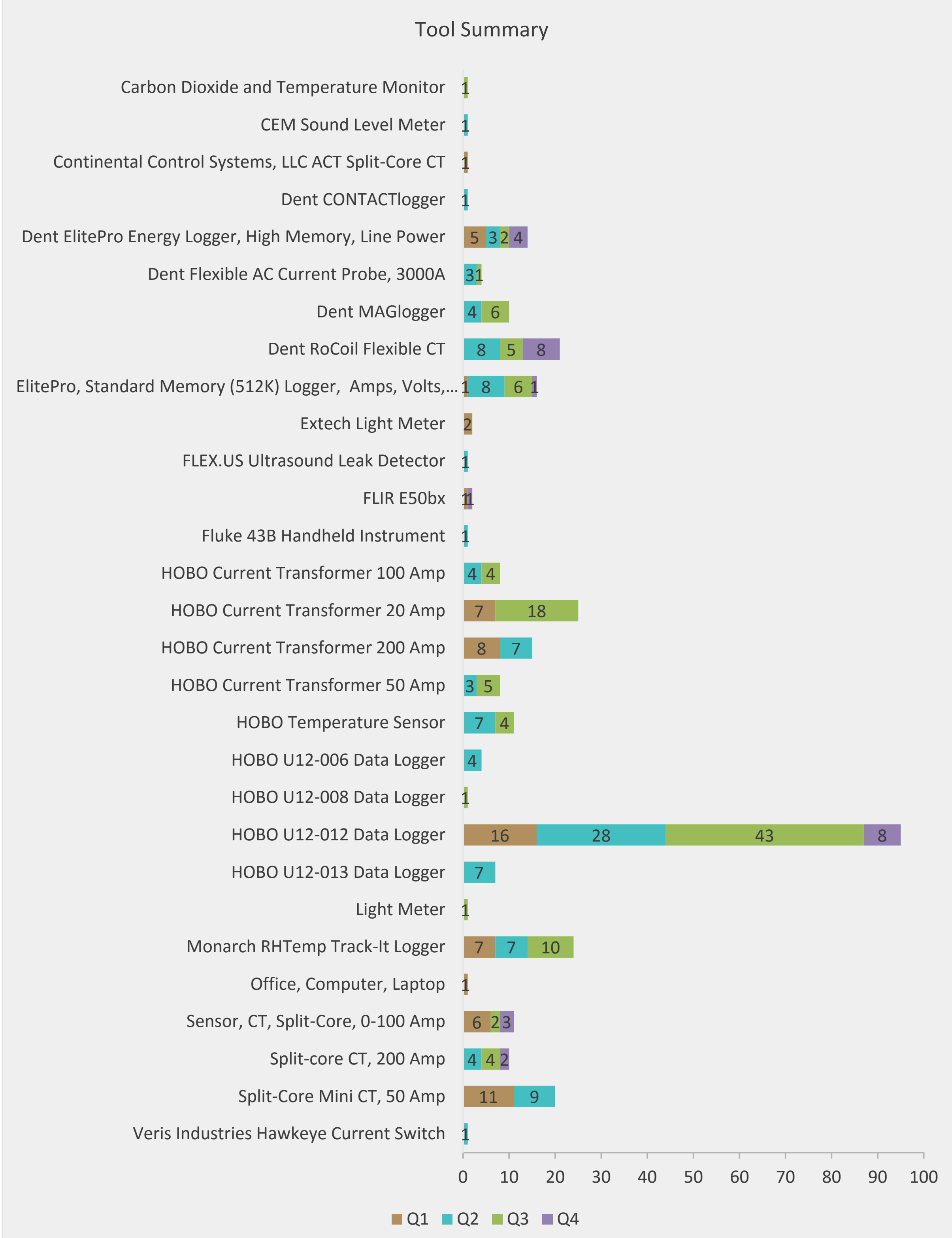

Figure 7: Summary of Tools Loaned

INTEGRATED DESIGN LAB
University of Idaho

2015 Task 7: Building Metrics Labeling

Summary of Effort and Outcomes

Idaho Power Company Year-End Report

December 31, 2015

Prepared for:
Idaho Power Company

Author:
Elizabeth Cooper

Report Number: 1501_007-01

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Contract Number:
5277

Please cite this report as follows: Cooper, E. (2015). *2015 TASK 7: Building Metrics Labeling – Summary of Efforts and Outcomes* (1501_007-01). University of Idaho Integrated Design Lab, Boise, ID.

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Acronyms and Abbreviations

App	Application
BOMA	Building Owners and Operators Association
BSUG	Building Simulation Users' Group
CREW	Commercial Real Estate Women (Network)
EUI	Energy Use Intensity
IDL	Integrated Design Lab
IMG	Intermountain Gas
IPC	Idaho Power Company
KWCD	Kilowatt Crackdown
UI	University of Idaho
USGBC	United States Green Building Council

1. Introduction

The Building Metrics Labeling (BML) task was a continuation of work done by the University of Idaho Integrated Design Lab (UI-IDL) for Idaho Power Company (IPC) beginning in 2012. A stand-alone energy specific label was developed in 2012 and a web-portal was created in 2013 so the label could be automatically generated once information was submitted by users. In 2014 the work focused on providing user support, general promotion of the tool, and tool debugging with minor functionality improvements. The task in 2015 was a continuation of the support, promotion and improvement of the tool that was started in 2014.

2. Summary of Progress

2.1 Website Progress

The majority of the progress made in 2015 was maintenance and support. No additional content was added.

2.2 Marketing

The UI-IDL created a two-sided flyer that was used as the main method for marketing in 2014, this flyer was distributed widely in 2015 and a second printing was made. The flyer can be seen in the figures on the following pages.

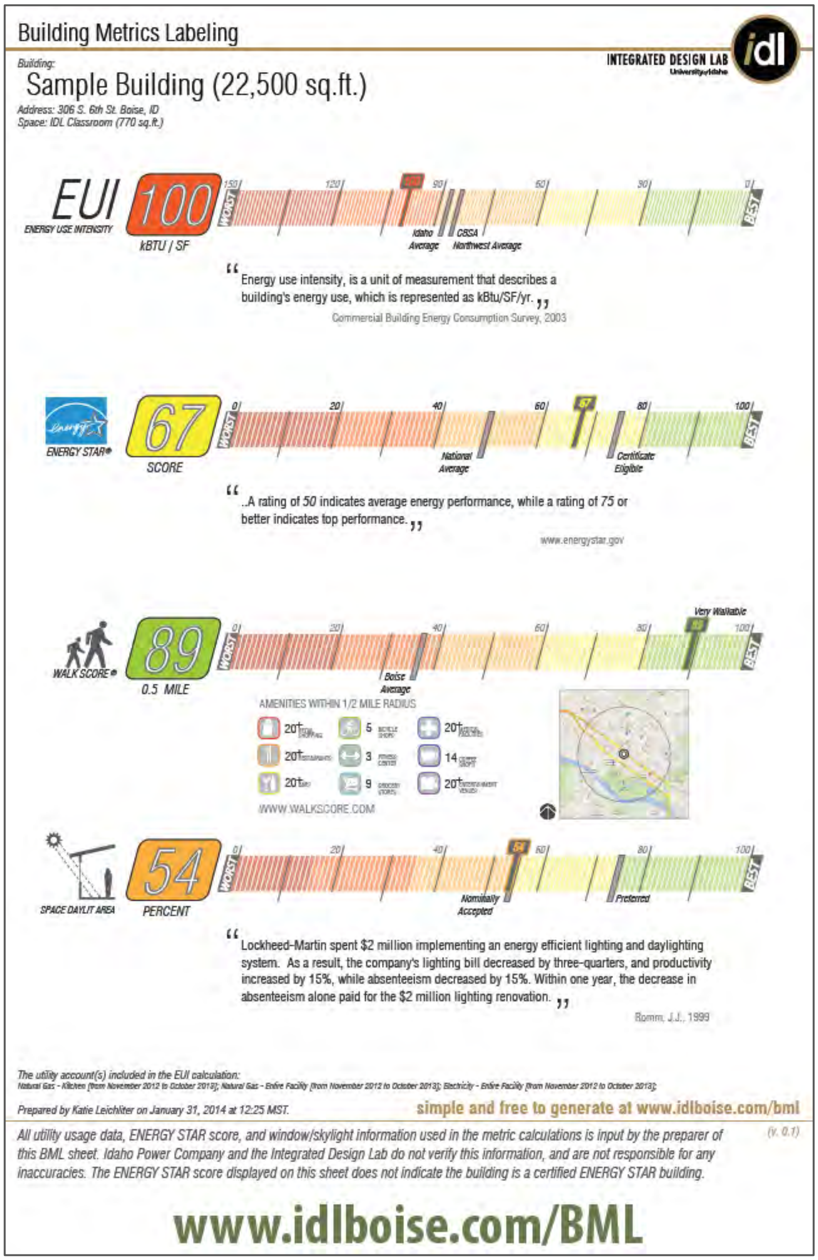

Figure 1: BML Flyer Front

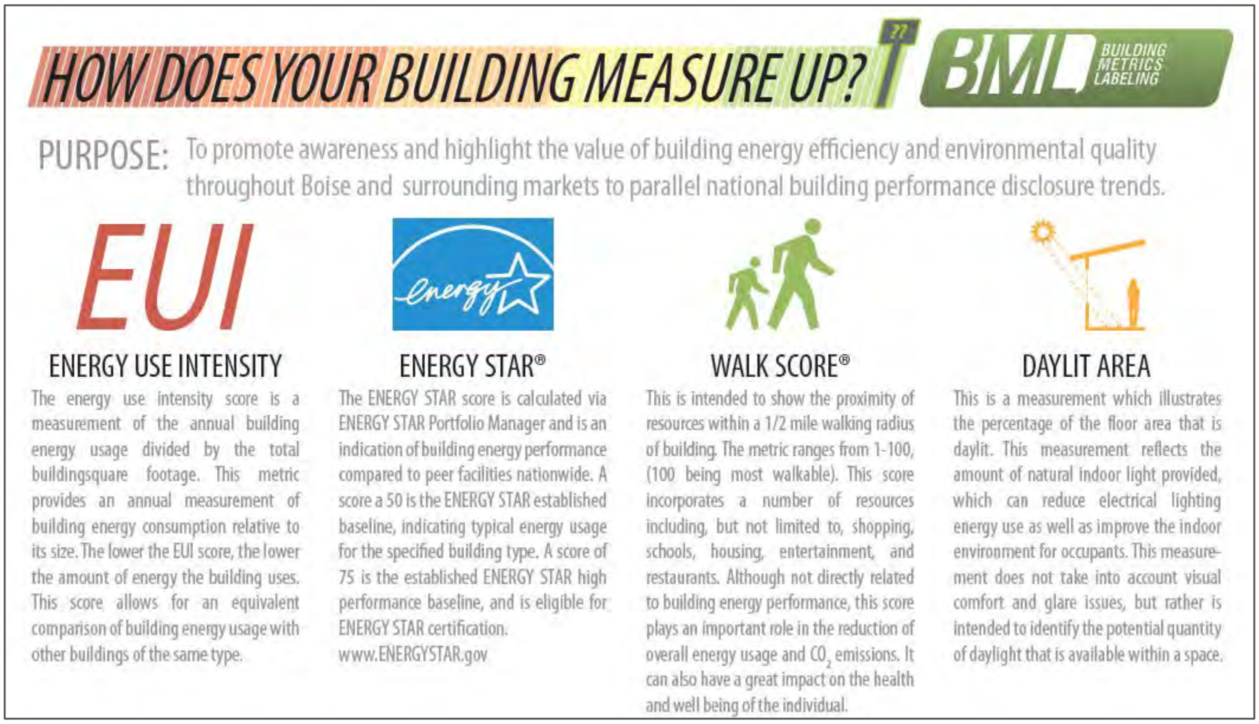

Figure 2: BML Flyer Back

During 2015, the tool was discussed and/or the flyer was distributed at multiple events, listed below.

- 20 Lunch and Learn presentations to architecture or engineering firms and organizations (flyers and a slide before the main presentation)
- Multiple Central Addition planning meetings hosted by USGBC
- Six BSUG events
- A presentation to the Mayor and Planning and Development Services staff at the City of Boise (4/30/2015)
- A presentation to a, including brokers and managers
- A presentation to a commercial real estate management company, and building owners, followed up with a link emailed to property managers
- Multiple emails to commercial real estate management companies, including a link, marketing materials and follow up

One-on-one marketing and support was also available when requested. In 2015, three requests for information were made; two by local development firms, one by an architectural firm.

3. Next Steps

In preparation for additional marketing and community engagement in 2016, the UI-IDL will create a list of potential users and stakeholders. The list will be comprised of approximately 12 individuals, organizations, and businesses to contact in 2016.

To improve the tools usability and promote its wider use, other potential future work was identified and is listed below. The feasibility and value of each of these items will need to be determined before implementation.

- Develop additional website functionality
  - Progress bar to option ”goal” markers
  - Dynamic average walkability for areas outside Boise
  - Dynamic EUI averages for other areas and building-type specifics
- Add automation from ENERGYSTAR® if capabilities become available
- Develop a new database of comparable building utility usages
- Solicit targeted users for feedback
- Coordinate with IPC and IMG to pursue increased automation of data flow directly to building owners and real estate agents

2015 Task #9: Technical Assistance

Whole House Fan

Report

October 14, 2015

Prepared for:

Idaho Power Company

Author:

Brad Acker, Robert Galarza

Report Number: 1408-031-01

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Prepared for:
Idaho Power Company

Please cite this report as follows: Brad A., Robert G. (2015) 2015 Task 9*: Whole House Fan* (1408-031-01). University of Idaho Integrated Design Lab, Boise, ID.

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Acronyms and Abbreviations

A/C	Air Conditioning
CFM	Cubic Feet per Minute
CLG	Cooling
COP	Coefficient of Performance
DX	Direct Expansion
ECM	Energy Conservation Measure
EER	Energy-Efficiency Ratio
IAT	Outdoor Air Temperature
IDL	Integrated Design Lab
IPC	Idaho Power Company
M&V	Measurement and Verification
OAT	Outdoor Air Temperature
SHR	Sensible Heat Ratio
TMY	Typical Meteorological Year
UI	University of Idaho
WHF	Whole House Fan

1. INTRODUCTION

The following work has been conducted to analyze the energy impact of installing a whole house fan (WHF) for cooling. EnergyPlus simulation software was utilized to perform this analysis. A WHF is one which draws air from the home's living space and exhausts it typically to an attic space. These fans are best installed in a central location in the home so as to provide air exchange from all locations of the home. Exterior windows need to be open by the residents to draw in cool air to provide the home with cooling. These fans are typically not automated to turn on or off on their own due to the fact that windows need to be manually opened. Running a WHF with windows closed can have the potential to cause safety concerns with back drafting combustion appliances. Due to the behavioral control aspect of this technology a wide range of energy models were developed to inform program designers. The energy model is based on a DOE prototype model house (US DOE, 2013). Two baseline single-family home models were developed, one single story and one two-story home comprised of typical 2006 residential construction (Mendon & Taylor, 2014) with a single zone and net conditioned area of 1,200 ft^2 and 2,400 ft^2 respectively. Further details on equipment sizing and model characteristics are provided below. Using typical meteorological year (TMY) weather for Boise Idaho for an annual simulation, all models were simulated without a WHF and with a WHF having two fan design flow rates. This report summarizes the major differences in cooling energy between the different conditions.

2. METHODS

In this study, energy use was determined for a baseline model compared to the same home with a WHF. In this study home size and WHF flow rate parameters were variable so a range of energy use characters could be explored. This resulted in a total of six EnergyPlus models: two baseline models and two WHF models for each baseline. Three of the models were 1200 ft^2, one story homes, which will be referred to as One Story, and three of the models were 2400 ft^2, two story homes, which will be referred to as Two Story. Each model contains one conditioned zone (main living area), an attic, and a basement as well as similar physical construction and geometry, a typical DX split fan coil cooling system, and no heating system. Two flow rates of the WHF were investigated for each home size, 1 CFM/ ft^2 and 2 CFM/ ft^2. The home cooling set point was set to 78°F. If the outdoor air was at 78°F or below, the WHF was allowed to cool the space. If the outdoor air was above 78°F the DX cooling cooled the space. Space sub-cooling effects or impacts of thermal storage were not investigated. Table 1 gives an overview of the simulations discussed in the following sections.

Table 1 Summary of six models showing house type, size, and WHF model flow rates

Model	House Type	House Size	WHF Flow Rate
Baseline	One Story	1200 ft^2	N/A
Baseline	Two Story	2400 ft^2	N/A
WHF	One Story	1200 ft^2	1 CFM/ ft^2
WHF	One Story	1200 ft^2	2 CFM/ ft^2
WHF	Two Story	2400 ft^2	1 CFM/ ft^2
WHF	Two Story	2400 ft^2	2 CFM/ ft^2

Baseline Models

The EnergyPlus models developed are based on the DOE prototype model homes (US DOE, 2013). Two baseline models were developed, one single story and one two story. Figure 1 shows the SketchUp physical model illustrating the features of each house, mainly the shape and levels. Table 2 describes the model's physical characteristics as well as the cooling equipment input parameters.

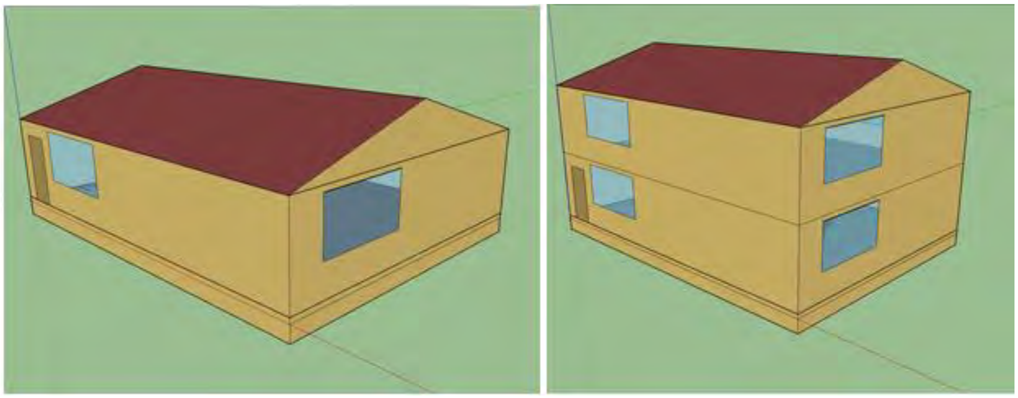

Figure 1 (left) One Story: 1200 ft^2 with 2.5 tons of cooling (right) Two Story: 2400 ft^2 with 3.5 tons of cooling

Table 2 Summary of input parameters

	One Story	Two Story
Net Conditioned Area	1200 ft^2	2400 ft^2
Levels	1	2
Gross Rated Total Cooling Capacity Tons [kW]	2.5 [8.792]	3.5 [12.309]
Gross Rated SHR (Sensible Heat Ratio)	0.72	0.71
COP	3.37	3.37
Rated Air Flow CFM [m^3/s]	1,000 [0.472]	1,375 [0.649]
Model CLG Coil Electric kW Usage	1.814	3.081
Model Blower Electric kW Usage	0.348	0.581

The house cooling set point was established at 78°F. For the cooling system, equipment characteristics typical air conditioner specifications were estimated from Rheem's Classic Series of Air Conditioners (A/Cs) using an A/C system with 2.5 nominal tons and 3.5 nominal tons of cooling capacity for One Story and Two Story, respectively. Inputs needed by EnergyPlus are 'Gross Rated Total Cooling Capacity' in wattage, 'Gross Rated Sensible Heat Ratio' (SHR), 'COP', and 'Rated Air Flow Rate' (Table 2).

Similarly rated products were referenced in order to guide model cooling equipment inputs, which are recorded in Table 3. Based on referenced system performance parameters, equivalent EnergyPlus cooling equipment values were estimated. Model inputs for the total cooling capacity were idealized, directly converting nominal tonnages to wattages. This resulted in an EnergyPlus input wattage increase of 4.7% for One Story and 1.2% for Two Story from product specifications due to products being slightly smaller than nominal sizes. The gross rated SHR was calculated from product specifications as follows:

$$SHR = \frac{Sensible\ Cooling\ Capacity}{Total\ Cooling\ Capacity}$$

The COP was calculated using the Energy-Efficiency Ratio (EER) and conversion factor:

$$COP = \frac{EER}{3.41214}$$

Indoor rated air flow rate was simply converted from CFM to m^3/s, because EnergyPlus requires metric units for its calculations.

Table 3 Rheem Classic Series A/C specifications

	2.5 Ton (One Story)	3.5 Ton (Two Story)
Total Capacity Btuh [kW]	28,600 [8.4]	41,500 [12.2]
Net Sensible Btuh [kW]	20,500 [6.0]	29,300 [8.6]
EER	11.5	11.5
Indoor CFM	1000	1375

WHF Models

The EnergyPlus run model schedule was modified to use a WHF for ventilated cooling in lieu of typical DX cooling. Fan control conditions were established based on inside and outside temperature conditions. Table 4 shows the thermostat set point and WHF control structure. The WHF operates when the IAT is between the minimum and maximum points and when the outdoor air temperature (OAT) is between its minimum and maximum points. This allows for a control to use outdoor air when it is cool and use DX when it is warm outdoors. If the IAT and OAT are outside of their operational ranges and the zone temperature is above the thermostat set point, then the WHF shuts OFF, and cooling is performed by the DX coil and blower fan.

A heating system is not active. During early energy model testing the heating system interfered with WHF operation, ultimately increasing cooling energy use. Before deactivation, the house heating set point was established at 72°F. During heating mode, the WHF introduced 50°F outside air into the zone. This caused the heating system to constantly and unnecessarily counteract the WHF, and vice versa. In a realistic situation, however, household operators would not run the WHF while requiring heat. Thus, for modeling simplicity, it was removed.

Table 4 Cooling system control structure

Cooling Setpoints	
Thermostat Set Point (DX)	Cooling: 78°F
	No Heating
WHF IAT	Max: 122°F
	Min: 78°F
WHF OAT (Supply)	Max: 78°F
	Min: 32°F

For each house size, design air flow rates of 1 CFM/ ft^2 and 2 CFM/ ft^2 were used, resulting in a 1200 CFM fan at 279 W, 2400 CFM fan at 400 W, and 4800CFM fan at 600 W. The WHF power usages were approximated from available commercial products. The less efficient belt-driven fans allowed for the desired CFM/ ft^2. Although direct drive fans are able to move more air with less electrical power input, the selection was strictly limited to belt-driven fans for fair model comparison. Other fan details are shown in Table 5.

Table 5 WHF types and characteristics

Design Flow Rate	1200 CFM ($0.566\ m^3/s$)	2400 CFM ($1.133\ m^3/s$)	4800 CFM ($2.265\ m^3/s$)
Power	279 W	400 W	600 W
Pressure Rise	320 Pa (1.28” H_2O)	230 Pa (0.92” H_2O)	172 Pa (0.69” H_2O)
Total Efficiency	65%	65%	65%

Table 6 shows the power usages for each model and their cooling components. Values for component power are EnergyPlus outputs. Based on model input parameters and equipment characteristics, calculations were made by EnergyPlus resulting in shown power usages. The compressor power and blower fan power were dependent on cooling equipment properties (Table 2) and house load (return temperature from the house). With regards to the WHF, WHF power consumptions were calculated based on simple fan characteristic relationships shown in Table 5. Note that the compressor power (DX CLG kW) is slightly different in the baseline and the WHF models. This difference is due to the difference in the return air temperatures. Cooler return temperatures are experienced for a time around switching from WHF to DX cooling, resulting in lower DX circuit power use.

Table 6 Summary of model power usages

	One Story		Two Story	
	BASELINE MODELS			
DX CLG kW	1.814		3.081	
Blower Fan kW	0.348		0.581	
	WHF MODELS			
WHF CFM	**1200**	**2400**	**2400**	**4800**
DX CLG kW	1.933	1.793	3.137	3.133
Blower Fan kW	0.432	0.401	0.689	0.689
WHF kW	0.279	0.400	0.400	0.600

3. Results

Model parameters were broken down into each cooling system component: the WHF; the blower/central supply fan; and the DX cooling coil, which includes the compressor and outside condenser fan. Typical annual hours of operation and total annual energy consumption of both the individual cooling components and the whole cooling system energy characteristics were tabulated for performance comparison and model behavior. The impact a WHF has on the usage, operational runtime and energy, of the A/C system is also summarized. Overall results in the tables are highlighted in yellow.

To gain an understanding of any potential offset a WHF could ideally provide the runtime and energy usage below 78°F OAT was quantified. Based on the control sequence, the WHF would operate when outside conditions were met, OAT below 78°F, and the house called for cooling, IAT above 78°F. Capturing this window of time, and equivalent energy use, in the baseline models provided insight to the achievable offsets in the WHF models (Table 7). The A/C system usage (runtime and energy) offset is about 30% for One Story and Two Story.

Table 7 Potential A/C system offsets from baseline models based on control conditions

	One Story	Two Story
Total Hours of Cooling	1126	1125
Cooling Hours Below 78°F OAT	343	342
% of Cooling Hours Below 78°F OAT	30.4%	30.4%
Total Cooling Energy [kWh]	1156	1956
Potential Cooling kWh Savings Below 78°F OAT	346	584
Potential % Energy Offset	29.9%	29.9%

After implementing the WHF into the baseline model and analyzing the hours of operation (Table 8), operating runtime for the A/C system (DX CLG Coil + Blower Fan) decreased by an average of 39% over all cases from the baselines to the WHF models (Table 9). This is about 9% higher than the percentage of cooling hours below 78°F OAT as realized in the baseline potential. Because WHF operation is also dependent on the IAT, it is reasonable to conclude that the WHF actually shifted the A/C system cooling load. The amount of time the system called for cooling increased during times of the day where the OAT was below 78°F, decreasing DX cooling runtime by about 9% more than the maximum potential and utilizing the WHF. Comparing the WHF types, 1 CFM/ft^2 and 2CFM/ ft^2, the 2 CFM/ft^2 fan operated an average of 150 hours less than the 1 CFM/ft^2 case. To more clearly visualize the differences, Figure 2 shows a histogram comparing annual average hours of WHF use for the 1 CFM/ft^2 and 2CFM/ ft^2 cases for each outside air temperature bin.

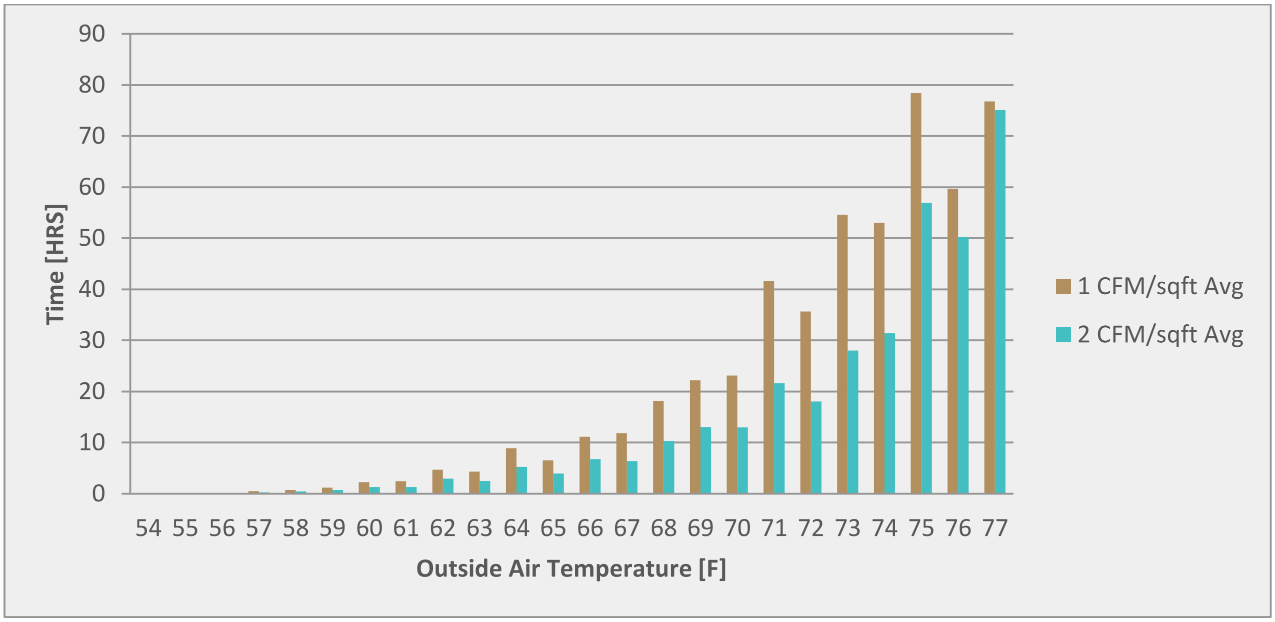

Figure 2 WHF average usages for each fan type

Considering the performance of the WHF types based on overall energy consumption (referring to Table 8 and Table 9) shows that 150 hours correlates to a 4 kWh difference, or a total WHF energy consumption difference that is slightly greater than 1%. A 39% average reduction of A/C runtime and WHF implementation resulted in an overall average of 21% energy decrease across all cases. This percent energy difference from baseline can be graphically seen in Figure 3. The data below the 78°F mark of the distribution highlights the energy offset the WHF achieves. Also note for the WHF models that there is a slight decrease in total cooling energy use above 81°F, which illustrates the 9% A/C system cooling load reduction previously discussed.

Table 8 Model outputs for each house

	House Size	1200 sqft		2400 sqft	
BASELINE	DX CLG Coil Use [hrs]	528		528	
	Blower Use [hrs]	598		597	
	TOT CLG HRS (DX+Blower)	1126		1125	
	DX CLG Coil [kWh]	950		1611	
	Blower [kWh]	206		344	
	TOT CLG Energy (DX+Blower) [kWh]	1156		1956	
	TOT CLG EUI [kWh/sqft]	0.97		0.82	
	WHF Type	**1200 CFM**	**2400 CFM**	**2400 CFM**	**4800 CFM**
WHF	DX CLG Coil Use [hrs]	339	362	355	353
	Blower Use [hrs]	319	341	335	332
	WHF Use [hrs]	543	368	493	330
	DX + Blower HRS	658	703	690	685
	TOT CLG HRS (DX+Blower+WHF)	1201	1071	1183	1015
	DX CLG Coil [kWh]	647	641	1101	1093
	Blower [kWh]	136	135	228	226
	WHF [kWh]	152	147	197	198
	DX + Blower Energy [kWh]	783	776	1329	1319
	TOT CLG Energy (DX + Blower + WHF) [kWh]	934	924	1526	1517
	TOT CLG EUI [kWh/sqft]	0.79	0.78	0.64	0.64

Table 9 Cooling energy savings and differences from baseline due to WHF

	1200 sqft		2400 sqft	
WHF Type	1200 CFM	2400 CFM	2400 CFM	4800 CFM
DX CLG Coil Savings [kWh]	303	309	510	518
Blower Savings [kWh]	70	71	116	118
DX CLG Coil + Blower Savings [kWh]	373	380	627	637
TOT CLG Energy (DX + Blower + WHF) Savings [kWh]	222	232	430	439
DX (Compressor) Energy Diff. (%)	32%	33%	32%	32%
Blower Energy Diff. (%)	34%	34%	34%	34%
DX CLG Coil + Blower Energy Diff. (%)	32%	33%	32%	33%
% Energy Diff. from Baseline	19%	20%	22%	22%
A/C System Usage Decrease (%)	42%	38%	39%	39%

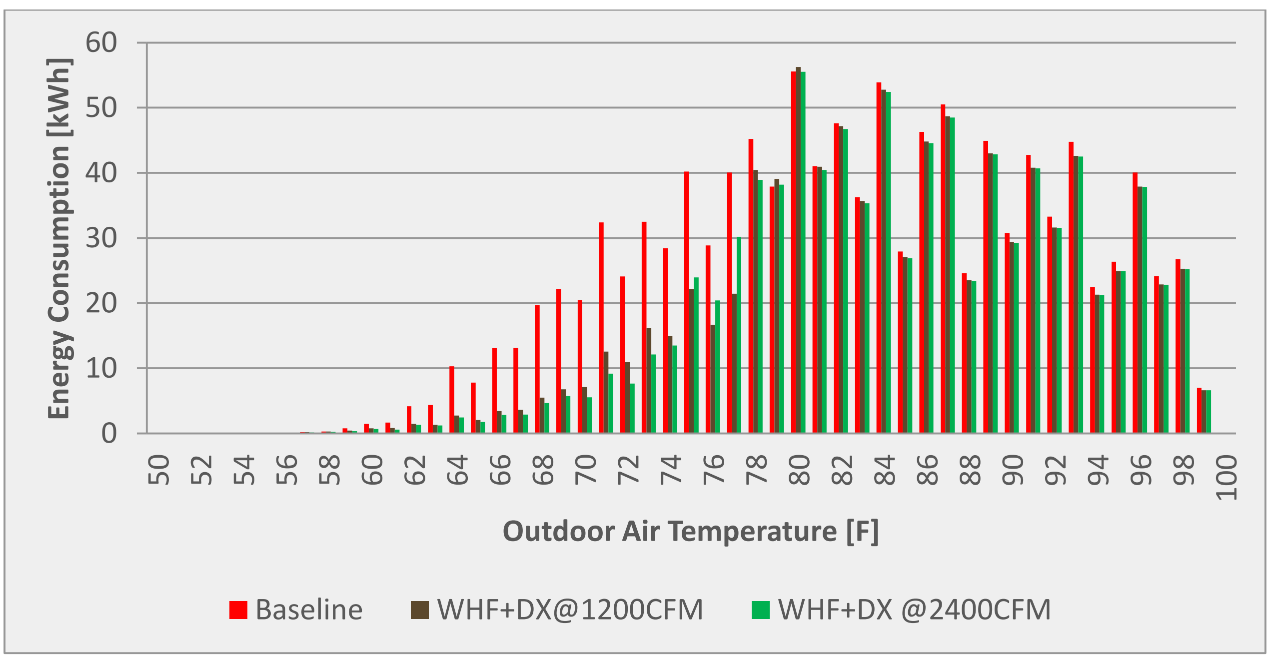

Figure 3 Total cooling energy comparisons for the One Story

4. Discussion

The applications of WHF can result in significant energy savings. Existing DX system size and the type / size of WHF installed will all play into the ultimate savings achieved. Simulation results highlight the importance of monitoring and reducing WHF hours of operation along with the importance of installing the most efficient fan possible, which is typically a direct drive ECM model. In addition the simulations show sensitivity of saving as it relates to CFM/ft^2 of home size, again relating back to the power use of the fan. These findings would best be informed by field studies or data. Such data was not reviewed as part of this study.

1. Works Cited

Mendon, V., & Taylor, T. (2014). Development of Residential Prototype Building Models and Analysis System for Large-Scale Energy Efficiency Studies Using EnergyPlus. *Building Simulation Conference* (pp. 457-464). Atlanta: ASHRAE/IBPSA-USA.

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2015 TASK 10: IBOA/IFMA SUPPORT

SUMMARY OF EFFORT AND OUTCOMES

IDAHO POWER COMPANY EXTERNAL YEAR-END REPORT

December 31, 2015

Prepared for:
Idaho Power Company

Author:
Elizabeth Cooper

Report Number: 1501_001-10

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Contract Number:
5277

Please cite this report as follows: Cooper, E. (2015). *2015 TASK 10: IBOA/IFMA Support– Summary of Efforts and Outcomes* (1501_001-10). University of Idaho Integrated Design Lab, Boise, ID.

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Acronyms and Abbreviations

ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
bEQ	(ASHRAE) Building Energy Quotient
BOC	Building Operator Certification
BOMA	Building Owners and Operators Association
EUI	Energy Use Intensity
IBOA	Intermountain Building Operators Association
IDL	Integrated Design Lab
IFMA	International Facility Management Association
IMG	Intermountain Gas
IPC	Idaho Power Company
UI	University of Idaho
USGBC	United States Green Building Council

1. Introduction

The objective of this task was to help the local IBOA organization succeed and meet their goals and to address the barriers as identified by NEEA and stakeholders. These barriers included; Lack of time to attend, Lack of funds/willingness to pay, Lack of awareness, Lack of a compelling business case, Lack of product performance (ANSI certification)

Additionally, UI-IDL worked with the leadership of IBOA to determine their needs. The barriers and needs on which the UI-IDL can have an impact are; the lack of product awareness and the development of a compelling business case for employee certification and involvement in IBOA. This was accomplished by conducting research, providing technical support and education, attending coordination meetings, and helping with marketing efforts.

2. Summary of Work

The two major deliverables for this task were to 1) provide technical support and education, and 2) Support IBOA initiatives. The following is a summary of the activities associated with these deliverable:

Provide technical support and education:

- Develop “Tech Talks” via lunch and learn format for BOC certification continuing education
    - One “Tech Talk” was developed and delivered to IBOA in January. Another talk was scheduled for IFMA on Economic Analyses of Efficiency Projects, but was canceled due to low enrollment.

Support IBOA initiatives:

- Attended quarterly conference calls:
    - January 21st- updates on BOC 1003, 1004, 212
    - May 21st- (Topic unknown)
    - November 5th- IEQ, Water Efficiency and O&M for Sustainable Buildings
- Attended coordination meetings on specific knowledge sectors:
    - May 7 – HVAC Systems – standard and high performance
    - June 4 – Lighting Equipment & Controls
    - Sept 3 – Building Controls and Preventive Maintenance
    - Oct 1 – Electrical Systems, Diagnostics and Motors
    - Nov 5 – IEQ, Water Efficiency and O&M for Sustainable Buildings
    - Dec 3 – Building Scoping and Building Commissioning
- Attended IFMA Northern Rockies Annual conference
- Marketed the BOC certification at trainings/classes in Salt Lake City, Boise, Missoula, and Idaho Falls.

Research/Surveys

Research/Surveys

Table 3. 2015 Research/Surveys

Report Title	Program or Sector	Analysis Performed by	Study Manager	Study/Evaluation Type
2015 Idaho Power Easy Upgrades Program Customer Survey	Commercial/Industrial	Idaho Power	Idaho Power	Survey
Easy Savings Program Survey Response Summary 2014–2015	Residential	Idaho Power	Idaho Power	Survey
Energy Efficiency Campaign Awareness Survey	Residential	Idaho Power	Idaho Power	Survey
Flex Peak 2015 Survey Results	Commercial/Industrial	Idaho Power	Idaho Power	Survey
Holiday Lighting	Residential	Idaho Power	Idaho Power	Survey
Home Energy Audit Program Survey	Residential	Idaho Power	Idaho Power	Survey
Idaho Power–CAPAI Survey Report 2016	Residential	Idaho Power	Idaho Power	Survey
Idaho Power Energy Wise® Program Summary Report	Residential	Research Action Programs	Idaho Power	Program Summary
Idaho Power Shade Tree Survey	Residential	Idaho Power	Idaho Power	Survey
Idaho Power Weatherization Assistance Program	Residential	Idaho Power	Idaho Power	Survey
Idaho Power Weatherization Programs	Residential	Idaho Power	Idaho Power	Survey
Residential Laundry Habits Survey	Residential	Idaho Power	Idaho Power	Survey
Technical Reference Manual 1.7	Commercial/Industrial	ADM	Idaho Power	Research

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2015 Idaho Power Easy Upgrades Program Customer Survey

Monday, February 01, 2016

92

Total Responses

Complete Responses: 88

Q1: How did you first learn about the Easy Upgrades program?

Answered: 92 Skipped: 0

Answer Choices	Responses	
Contractor, supplier or vendor	45.65%	42
Idaho Power employee	17.39%	16
Business associate	11.96%	11
Mailing from Idaho Power	7.61%	7
Participation in other Idaho Power energy efficiency program	11.96%	11
Easy Upgrades program web site	3.26%	3
Other (please specify)	2.17%	2
Total		92

Q2: Overall how satisfied are you with the Easy Upgrades program?

Answered: 92   Skipped: 0

Answer Choices	Responses	
Very satisfied	88.04%	81
Somewhat satisfied	9.78%	9
Somewhat dissatisfied	0.00%	0
Very dissatisfied	2.17%	2
Total		92

Q4: For each of the following statements indicate the level to which you agree or disagree.

Answered: 90   Skipped: 2

	Strongly Disagree 1	2	3	4	Strongly Agree 5	N/A	Total
Idaho Power staff was helpful.	**1.11%** 1	**0.00%** 0	**3.33%** 3	**12.22%** 11	**70.00%** 63	**13.33%** 12	90
Idaho Power incentive application forms were easy to follow.	**1.11%** 1	**0.00%** 0	**11.11%** 10	**24.44%** 22	**52.22%** 47	**11.11%** 10	90
Your application was processed within the time frame you expected.	**1.14%** 1	**2.27%** 2	**3.41%** 3	**26.14%** 23	**61.36%** 54	**5.68%** 5	88

Q5: Please rate the contractor you used for your Easy Upgrades project in the following areas:

Answered: 89 Skipped: 3

	Poor 1	2	3	4	Excellent 5	N/A	Total
Quality of work	1.14% 1	1.14% 1	3.41% 3	17.05% 15	71.59% 63	5.68% 5	88
Professionalism	3.41% 3	0.00% 0	2.27% 2	19.32% 17	69.32% 61	5.68% 5	88
Knowledge of energy efficiency aspects of new equipment	1.15% 1	0.00% 0	5.75% 5	17.24% 15	68.97% 60	6.90% 6	87
Knowledge of Easy Upgrades program	1.15% 1	0.00% 0	5.75% 5	19.54% 17	65.52% 57	8.05% 7	87

Q6: How likely would you be to recommend this contractor to a business associate?

Answered: 87   Skipped: 5

Answer Choices	Responses	
Definitely would	82.76%	72
Probably would	13.79%	12
Probably would not	1.15%	1
Definitely would not	2.30%	2
Total		87

Q8: Please indicate which of the following types of equipment you received an Easy Upgrades incentive for. (Check all that apply)

Answered: 88 Skipped: 4

Answer Choices	Responses	
Lighting/Controls	94.32%	83
HVAC/Controls	7.95%	7
Building Shell	1.14%	1
Food Services Equipment	0.00%	0
Variable Frequency Drive (VFD)	2.27%	2
Other	4.55%	4
Total Respondents: 88		

Q10: How would you like to receive energy efficiency information from Idaho Power in the future?(Check all that apply)

Answered: 84   Skipped: 8

Answer Choices	Responses	
Mailing from Idaho Power	38.10%	32
Idaho Power employee	10.71%	9
Email from Idaho Power	59.52%	50
Idaho Power website	15.48%	13
Other (please specify)	2.38%	2
Total Respondents: 84		

Q11: Would you like an Idaho Power program representative to follow up with you on any questions you have regarding the program?

Answered: 88   Skipped: 4

Answer Choices	Responses	
Yes	6.82%	6
No	93.18%	82
Total		88

EASY SAVINGS PROGRAM

Survey Response Summary 9/30/15

Question	% Answered	Qty Answered	Total Answered
1. How much would you like to save?			120
$30 - Install just the LED light bulb, High-efficiency showerhead, Kitchen faucet aerator, and the Limelight nightlight	18%	21	
$85 - Install the above items and unplug an unused refrigerator or freezer	9%	11	
$240 - Complete the Easy Savings® Quick Start Guide Steps	73%	88	
	100%	120	
2. Have you (or will you) lower your heat during the day?			124
Yes, I lowered it	77%	96	
Yes, I plan to lower it	17%	21	
No	6%	7	
	100%	124	
3. Have you (or will you) lower your heat at night?			122
Yes, I lowered it	77%	94	
Yes, I plan to lower it	18%	22	
No	5%	6	
	100%	122	
4. Did you place the Thermostat Temperature Sticker near your thermostat?			122
Yes, I placed it	61%	75	
Yes, I plan to place it	20%	25	
No	18%	22	
	100%	122	

5. Did you (or will you) install the 11.5-watt Light Emitting Diode (LED)? 123

Yes, I installed it	78%	96
Yes, I plan to install it	20%	24
No	2%	3
	100%	123

6. Did you (or will you) install the Limelight Night Light? 124

Yes, I installed it	81%	101
Yes, I plan to install it	15%	19
No	3%	4
	100%	124

7. Did you (or will you) install the Draft Stoppers? 124

Yes, I installed them	52%	64
Yes, I plan to install them	39%	48
No	10%	12
	100%	124

8. Did you place the Turn Off Light Sticker near a light switch that was often left on? 123

Yes, I placed it	55%	68
Yes, I plan to place it	19%	23
No	26%	32
	100%	123

9. Do you turn off lights in empty rooms more often now? 124

Yes	95%	118
No	5%	6
	100%	124

10. Did you install the High-Efficiency Showerhead? 118

Yes, I installed it	70%	83
No, it does not fit pipes	19%	22
No	11%	13
	100%	118

11. Did you install the Kitchen Faucet Aerator? 121

Yes, I installed it	69%	84
No, it does not fit pipes	18%	22
No	12%	15
	100%	121

12. Do you use cold water when you do your laundry? 123

Yes, always	60%	74
Yes, sometimes	34%	42
Never	6%	7
	100%	123

13. Did you place the Wash in Cold Water Magnet on your washing machine? 120

Yes, I placed it	51%	61
Yes, I plan to place it	13%	16
Don't have a washing machine	19%	23
No	17%	20
		120

14. Did you use the Digital Thermometer to check the temperature of your water? 117

Yes	68%	79
No	32%	38
	100%	117

15. Did you (or will you) change the temperature setting of your water heater? 120

Yes, I raised it (warmer)	14%	17
Yes, I lowered (cooler)	39%	47
No	47%	56
	100%	120

16. Did you check the temperature of your refrigerator(s) and freezer(s)? 119

Yes	87%	103	
No	13%	16	
	100%	119	

17. Did you (or will you) adjust the temperature of your refrigerator(s) and freezer(s)? 118

Yes, turned up (warmer)	34%	40	
Yes, turned down (colder)	28%	33	
No	38%	45	
	100%	118	

18. Did you unplug your old or unused refrigerator(s) and freezer(s)? 123

Yes, I unplugged 1 unit	8%	10	
Yes, I plan to unplug 1 unit	1%	1	
Yes, I unplugged 2 units	3%	4	
Yes, I plan to unplug 2 units	0%	0	
Not applicable	82%	101	
No	6%	7	
	100%	123	

19. Did you recycle your old or unused refrigerator(s) and freezer(s)? 124

Yes, I recycled 1 unit	9%	11	
Yes, I plan to recycle 1 unit	2%	3	
Yes, I recycled 2 units	3%	4	
Yes, I plan to recycle 2 units	1%	1	
Not applicable	80%	99	
No	5%	6	
	101%	124	

20. Did you place the Turn Your Computer Off Sticker on your computer? 122

Yes	38%	40	
I don't have a computer	62%	65	
No	14%	17	
		122	

21. How many items from your Easy Savings® Kit did you install? 120

All	46%	55
4	18%	22
3	23%	28
2	8%	10
1	3%	3
None	2%	2
	100%	120

22. How effective was the Easy Savings® Quick Start Guide in helping you become more energy efficient? 121

Very effective	69%	84
Somewhat effective	26%	31
Not effective at all	2%	2
Didn't use	3%	4
	100%	121

23. Now that you have completed the Easy Savings® Quick Start Guide, how much have you learned about saving energy and money in your home? 123

I learned a lot	78%	96
I learned a little	20%	24
Nothing	2%	3
	100%	123

empowered community

IDAHO POWER

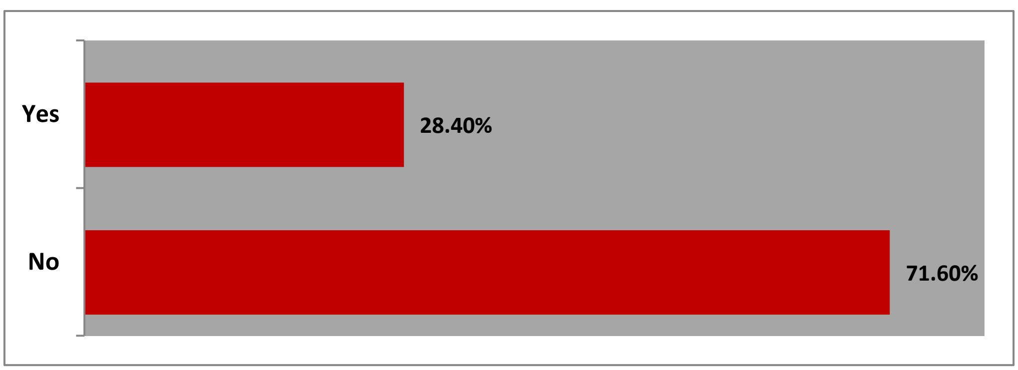
Energy Efficiency Campaign Awareness Survey Results

June 2015

Do you remember seeing or hearing one or more of these ads?

QUESTION TOTAL: 588
NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Yes	167	28.40%
O2	No	421	71.60%



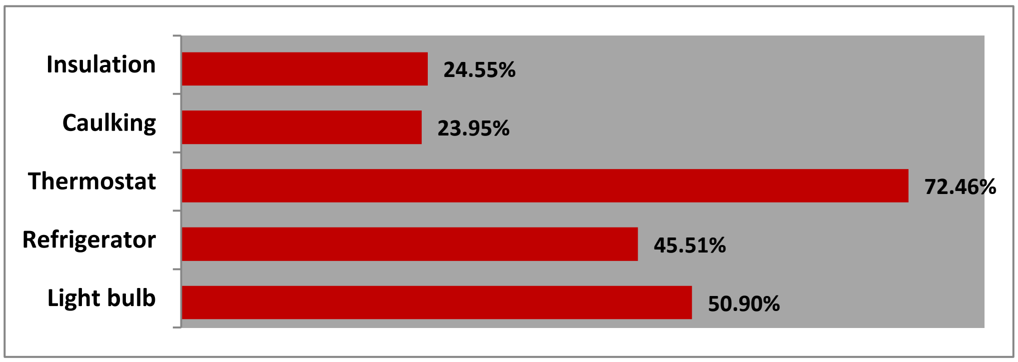
Which of the following ad themes do you recall seeing or hearing before taking this survey?

(asked only of respondents who said they recalled seeing the ads before taking the survey)

QUESTION TOTAL: 167

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Insulation	41	24.55%
O2	Caulking	40	23.95%
O3	Thermostat	121	72.46%
O4	Refrigerator	76	45.51%
O5	Light bulb	85	50.90%



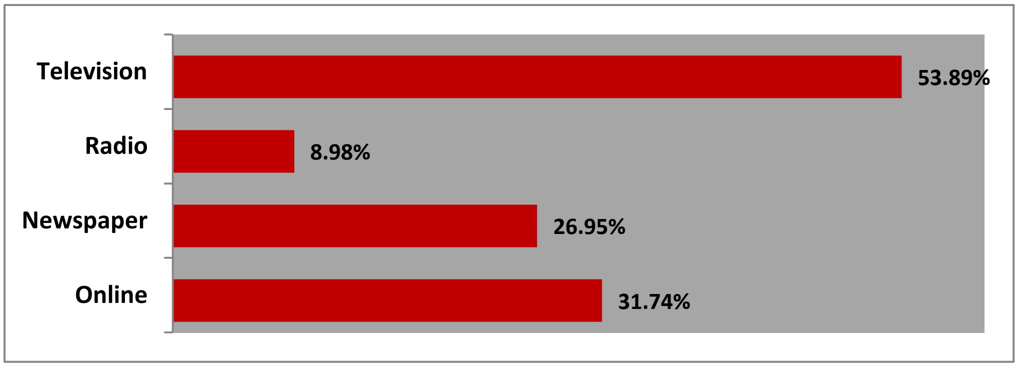
Where did you see, or hear, the ad(s) before taking this survey?

(asked only of respondents who said they recalled seeing the ads before taking the survey)

QUESTION TOTAL: 167

NO RESPONSE: 0

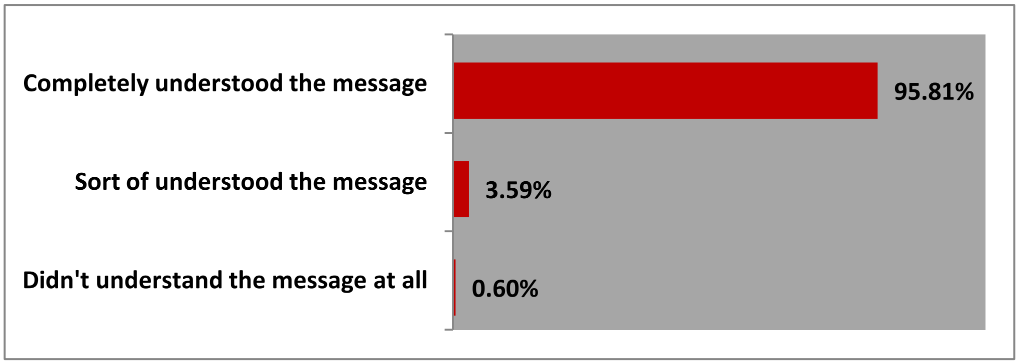
	OPTIONS	TOTAL	PERCENT
O1	Television	90	53.89%
O2	Radio	15	8.98%
O3	Newspaper	45	26.95%
O4	Online	53	31.74%



How well would you say you understood the message in the ad(s)?
(asked only of respondents who said they recalled seeing the ads before taking the survey)

QUESTION TOTAL: 167
NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Completely understood the message	160	95.81%
O2	Sort of understood the message	6	3.59%
O3	Didn't understand the message at all	1	0.60%



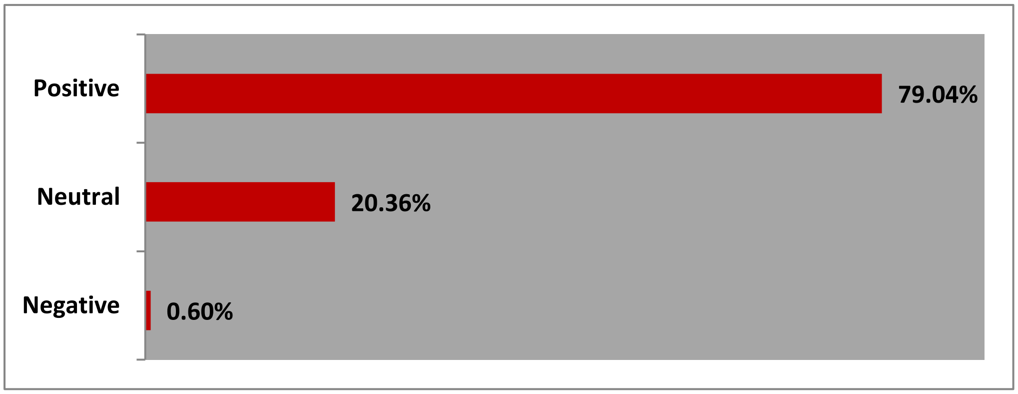
Overall, how did you feel about the ad(s) you saw or heard?

(asked only of respondents who said they recalled seeing the ads before taking the survey)

QUESTION TOTAL: 167

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Positive	132	79.04%
O2	Neutral	34	20.36%
O3	Negative	1	0.60%



What is it about the ad(s) that gave you a positive feeling?

(asked only of respondents who said they had a positive feeling about the ad(s) they recalled)

QUESTION TOTAL:	132
NO RESPONSE:	0

Verbatim Responses	Total
Simple and to the point	2
$$ Savings per degree warmer thermostat	1
a company that was showing us how to save energy in a laid back easy format	1
A demonstration on saving energy that is easy to do.	1
A good plan for most people.	1
Always want to save on energy bills.	1
An understanding of what you could save by cleaning the coils on your fridge	1
Because the message resonates with me.	1
clear consise to the point colorful eye catching	1
Common sense reminder	1
Conservation is necessary and helps keep the cost of power down	1
Conservation of energy and saving money.	1
contemporary use of illustration style, simplr/direct message	1
cut my bills, conserver	1
Cute drawings	1
cutting power usage	1
Direct to the point. Self explanatory.	1
don't know	1
Easy concept to get & easy to do!	1
Easy fix.	1
Easy to read and the graphics correlated with the written message.	1
easy to understand and direct and to the point	1
Encouraged me to follow some if not all of the suggestions.	1
encouragement of saving energy and money	1
Encouragement to save energy, and help cut costs.	1
Encourages all to try to save.	1
Engaging art work and provides a quick, easy, and free way to act.	1
felt it was a good reminder on ways to reduce energy costs.	1
felt like I understood the message and appreciated it too.	1

For the most part, all the messages are showing that anyone can save money, and help the environment.	1
Fun graphics, simple concise message heading even if I didn't read the entire text.	1
glad you are informing the public so energy can be saved for the good of the environment	1
good advise	1
Good color	1
Good for saving energy and good for environment.	1
good information	1
Good information. Easy to understand. Like the nostalgic look of the photos.	1
good message	1
good program	1
got the point across easily. liked the color	1
got your attention	1
Great reminders to pay attention.	1
Happy to see public education about energy conservation.	1
I enjoyed the color and whimsical design.	1
I feel the best way to answer this is by saying I am conscience of saving power , but to so many they just don't care.	1
I felt like I really wanted to participate in being better about conserving energy in my home. I was inspired to buy light bulbs.	1
I felt reassured that I am doing what I can to save energy	1
I keep my thermostat at that already so it reenforced behavior	1
I like any ads that promote environmental conservation.	1
I like our area doing more to stay green & make less pollution.	1
I never really thought of a second appliance in the house. It made me stop and think, do I really need that appliance.	1
I understood the old refrigerator in the garage ad, but I don't think many people received that message.	1
I was glad that Idaho Power is trying to help their customers conserve energy and save money.	1
I was wondering what would be the best temp for my ac and this is how i found out.	1
Idaho Power is working to help consumers be smarter with power use and savings	1
in that they reflect my knowledge and belief.	1
IPC is interested in me	1
It was a positive message that was implemented a wonderful way.	1
It came from Idaho Power	1
It helped me to remember to adjust my thermostat, not only in cool weather, but also in hot weather	1
It is every ones job to save energy.	1

It is something I do already it made me feel like I was making a difference.	1
It made sense.	1
It reminded me to check for leaks around windows and doors.	1
It reminds folks that wasting energy carries a price	1
It suggests a practical step to save energy and money.	1
It was a great reminder on where to set the thermostat, I like to get reminders like that	1
It was to improve my home...	1
it will help people understand how to save power	1
It's nice that Idaho Power wants to help it's customers use electricity more efficiently	1
Letting people know that something so simple can make a difference.	1
Light bulbs fascinate me. So I paid more attention to it.	1
Like the colors, thought it was funny when somebody said goodbye to their old refrigerator like it was an old friend.	1
Made me realize how I can save energy.	1
made you think and question if you have done any of those	1
maybe lowering power bill with temp contol	1
NIce to built on what I already know and to affirm that it actually does make a difference. LIghtbulbs are expensive.	1
picture	1
Positive message, easy to accomplish energy savings, message	1
POssible and easy to save energy and save money.	1
Promotion of conservation and mindfulness. Information to educate self and others	1
Recycling message, money for old fridge	1
Reminder that LED bulbs are out there	1
Saving energy is always a good idea!	1
Saving energy is always good!	1
Saving energy is important.	1
saving money	1
savings	1
Seeing the number on the thermostat gave me the idea to do better and set mine at 76....	1
short, to the point, upbeat, easy to understand the message	1
Showed a simple idea to save energy. Simple to do and relatively pain free.	1
Showed the ease of how to achieve the best for your home.	1
Showed ways to conserve energy	1
Simple	1
simple and easy to understand not too preachy	1
Simple and straight forward. Nice art work.	1
Simple easy to understand message	1

Simple graphics with a simple message, but one that we all need to be reminded of every once in a while!	1
Simple message with eye-catching simple graphics	1
Simple positive message.	1
Simple to understand and clear.	1
simple, less "noise", direct	1
That following the ads would help to keep my electric bill down.	1
that saving energy doesn't have to be expensive or complicated. that anyone can do their part	1
The ad gave specific information on how to conserve energy	1
The ads confirmed for us that we're doing our best to save energy.	1
The ads were very specific and easy to follow. I got the point. Not	1
The amount you can save by adjusting your thermostat.	1
the graphics were nice and casual, and I felt like we are not the only home with insulation issues, everyone can do well to look at	1
The message to conserve energy.	1
The rhyme in the refrigerator ad is catchy and memorable; the lightbulb ad just makes sense, changing to energy efficient bulbs.	1
the theme	1
The theme and the message.	1
There is something to be done that will save energy and have little effect on me	1
There were small things that I could do.	1
They all let me know what I can do to help.	1
They are all simple things that can be done to save energy!	1
They are clear, concise and get the point across! Plus the ideas they are conveying are easy to achieve.	1
They are simple ways to save energy	1
They make sense and are easy to understand.	1
they tell it like it is == good thinking	1
They were easy to understand with a clear message.	1
They were helpful and clear.	1
They were written in language that was understandable to most people.	1
Turning down your thermostat saves energy.	1
Very much needed with our energy situation.	1
We all can save energy	1
We are comfortable at 78-80 degrees. We're saving money!!	1
We need to conserve energy, it is good to get a reminder.	1
Would reduce expenses	1
You would have to know me to completely understand, but I could almost write a book in answer to this question. But simply put, in	1

What is it about the ad(s) that gave you a negative feeling?

(asked only of respondents who said they had a negative feeling about the ad(s) they recalled)

QUESTION TOTAL:	1
NO RESPONSE:	0

Verbatim Responses	Total
I can't stand to be too warm, especially when I'm pregnant. So the idea of turning up the thermostat to save money will not work for	1

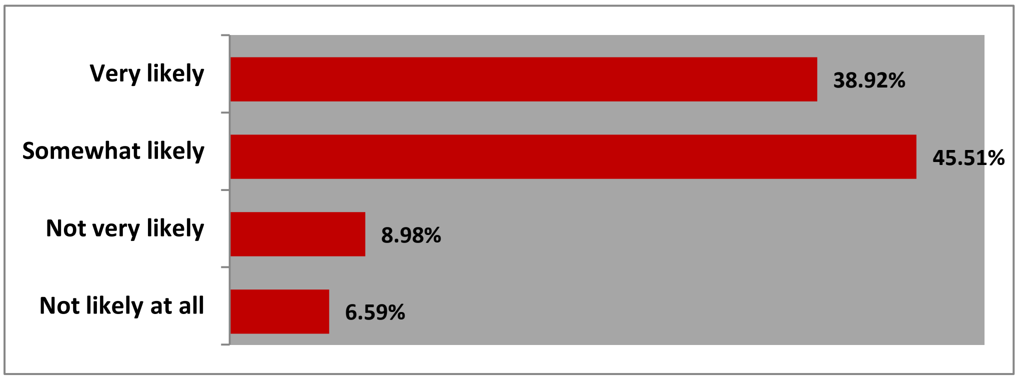
How likely are you to make any energy saving changes in your home after seeing or hearing these ads?

(asked only of respondents who said they recalled seeing the ads before taking the survey)

QUESTION TOTAL: 167

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Very likely	65	38.92%
O2	Somewhat likely	76	45.51%
O3	Not very likely	15	8.98%
O4	Not likely at all	11	6.59%



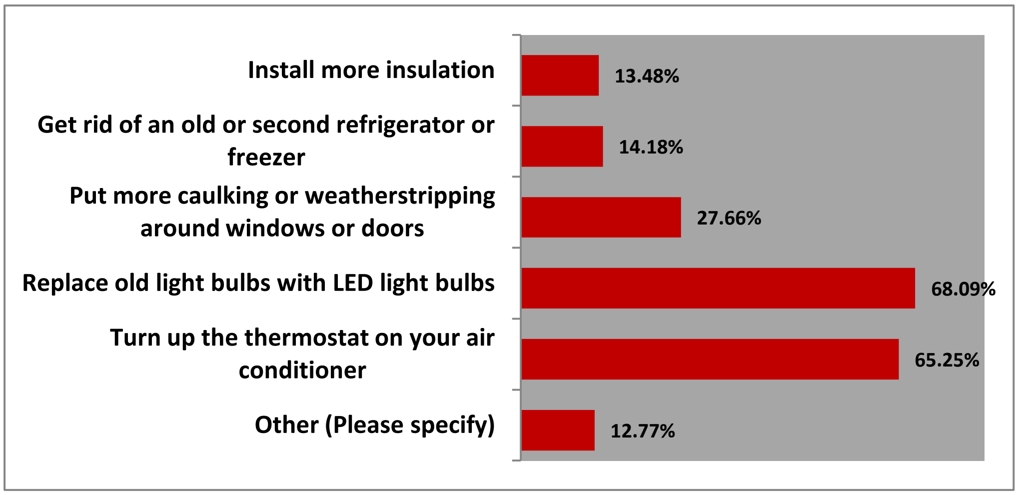
What energy saving changes are you most likely to make after seeing or hearing these ads?

(asked only of respondents who said they recalled seeing the ads before taking the survey)

QUESTION TOTAL: 141

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Install more insulation	19	13.48%
O2	Get rid of an old or second refrigerator or freezer	20	14.18%
O3	Put more caulking or weatherstripping around	39	27.66%
O4	Replace old light bulbs with LED light bulbs	96	68.09%
O5	Turn up the thermostat on your air conditioner	92	65.25%
O6	Other (Please specify)	18	12.77%



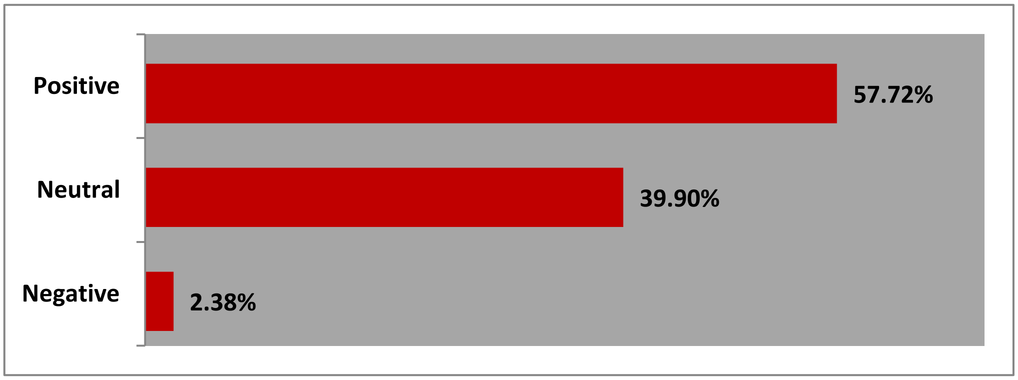
Now that you have seen them, overall, how did you feel about these ad(s) ?

(asked only of respondents who said they did not recall seeing the ads before taking the survey)

QUESTION TOTAL: 421

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Positive	243	57.72%
O2	Neutral	168	39.90%
O3	Negative	10	2.38%



What is it about the ad(s) that gave you a positive feeling?

(asked only of respondents who said they did not recall seeing the ads before taking the survey but had a positive feeling towards the ads after seeing them)

QUESTION TOTAL: 243
NO RESPONSE: 0

Verbatim Responses	Total
Colorful	2
saving money	2
A good way to remind people of saving money and resources if they can follow suggestions	1
Any attempt to spread the word about conservation is good. :)	1
artistic, easy to read, and positive messages about energy savings	1
attractive, put positive spin on RE	1
Bright and colorful, short concise captions	1
bright colors and simple graphics. concise message.	1
Bright colors, fun, contemporary graphic elements	1
Bright colors, simple illustrations of the point, positive, not pushing guilt.	1
Bright colors, simple message	1
Bright, sounded friendly, focused on both conservation and helping people lower power bills	1
Cartoonie light. Specific suggestions provided. Dialing it in was not clear.	1
catchy colors. hip. etc.	1
Catchy, quick to the message. Graphics tie in w the message.	1
Changing a light bulb is easy and saves energy. Giving up a fridge is probably not easy for a lot of people.	1
Changing a lightbulb and dial it in r the only good memorable ones	1
Clean, informative and attractive.	1
Clever sayings. Suggested actions are all easy to implement.	1
Color choice. Short statment. Picture makes it easy to understand.	1
color, graphics and catchy phrases	1
colorful and good ideas	1
Colorful!!	1
colorful, noticeable, short, to the point, common sense-able, easy to incorporate	1
Colorful, simple	1
Colors and graphics made me want to read the entire ad.	1
colors and they are friendly	1

common sense	1
common sense reminders	1
Concrete actions to take. That's always good. Any time a problem is brought up or mentioned, it is great to have attached to it, what YOU can do about it. Thanks.	1
Concrete ideas for saving energy and thus saving money (and helping the global warming environment by having less of a carbon footprint.)	1
Conservation and efficiency	1
conserving energy	1
Conveys a simple message, clearly.	1
Cute, colorful, good ideas	1
Cutting energy use	1
different ways to save electricity	1
Doing something good about your energy usage	1
easy on eyes, colorful, simple thinks to safe.	1
Easy steps to make a difference	1
Easy tips and information about programs that could be useful.	1
Easy tips, fun hip design	1
Easy to read and good graphics - also it makes this tips seem simple and positive to do.	1
Easy to read and understand the message.	1
Easy to read, not cluttered. Not preachy. They don't make me feel guilty.	1
Easy to relate to offering simple fixes that anyone can do.	1
easy to understand	1
Easy to understand and apply to dait life and they also conveyed the impact these changes would make.	1
easy to understand what to do and nice graphics	1
Easy to understand, familiar catch-phrases	1
Easy ways to conserve energy. Little things we can all do. I have heard "see you later, refrigerator " but not in this particular ad campaign.	1
Educational in nature.	1
Encouraging households to use less energy!	1
Energy conservation ideas is always helpful.	1
Energy saving	1
Energy saving tips	1
Eye catching and informative	1
eye catching designs with simple, easy to understand messages about saving energy and money	1
Friendly graphics, simple message	1
Fun, simple, bright.	1
Gave examples of how to be energy efficient in the summer.	1
Gentle reminders of simple things we can do to save energy.	1
Good advice with easy and fast information	1

Good advice.	1
Good ideas to think about on saving energy and money.	1
Good information	1
Good message to conserve energy & money	1
good pictures, simple messages, good color schemes.	1
good reminders	1
Good reminders, easy to read and understand	1
Good suggestions and colorful	1
Good, simple, messages.	1
graphics	1
Graphics and messages were catchy and didn't feel "preachy".	1
graphics are friendly, and the text emphasizes easy things to do	1
Happy graphics.	1
helpful information	1
I can be part of the change to save energy into home	1
I enjoy the conservative illustrations, catchy slogans, and to the point messages...	1
I like saving money. The ads reminded me to check into options I'd saving energy which equals saving money.	1
I like that customers and Idaho Power are learning about energy efficiency.	1
I like the colors and the font.	1
I like the content and the reminder of ways to conserve energy.	1
I like the design. Ads are straightforward and easy to understand.	1
I like the emphasis on saving energy.	1
I like the idea of people not only saving $, but of being environmentally conscious.	1
I like the message that saving energy is easy and can make one's life more comfortable.	1
I like the one about keep warm air in cold air out or vise versa. Refers to need of insulation	1
I like the ones with specific details...like 3% saved on the bill for each degree on thermostat!	1
I like the suggestions on ways to help save energy	1
I liked the fact that they were cartoons, something original and different from the norm.	1
I really like the designs.	1
Idaho power is doing something to help the environment and the community	1
Ideas for saving money are always a good thing.	1
Ideas on how to be more energy efficient. Idaho Power is a willing partner to help homeowners increase their efficiency	1
Ideas to save money	1
It is easy to make small changes.	1

It was easy to get the message of the ads because of the simplicity of the colors and drawings. The message was short and straight forward.	1
It's an educational step. :)	1
Just easy ways to save energy.	1
Just the idea of thinking about simple things we can do to save energy and $$$$.	1
Like how clear the energy savings were displayed	1
Looks of adds draw attention to energy savings which saves money.	1
message and artistic delivery was non confrontational	1
Most had some sort of assistance offered for all electric homes which I have.	1
N/A	1
New look, graphic makes the point of the ad.	1
Nice graphics, bright and colorful, positive.	1
not complicated. The average person should understand them all.	1
Options to save energy	1
Positive & good information	1
positive approach to keep control of my power bill	1
positive message about saving energy	1
Practical ideas but why not promote solar hot water heating and solar electric to reduce reliance on fossil fuels	1
Proactive efforts bring positive results.	1
Promoting conservation	1
quick message	1
Quick short things that can be done to save energy which equates to saving money, which helps the environment.	1
relative to the current situation, especially with this upcoming heat wave. Always nice to have specific ideas on how to save energy and stay comfortable.	1
reminding me to check lights, filters, windows and doors for leaks	1
Retro graphics are great.	1
Saving energy always give me a positive feeling	1
Saving energy by sealing out the hot air	1
Saving energy is a no brainer, but I feel most people don't care or just don't know how. This seems to make it easy to do.	1
Saving energy IS easy	1
Saving energy is good for everyone.	1
Saving energy is important. The illustrations were very cute.	1
Saving energy is VERY IMPORTANT	1
saving energy, education, cute images, nice vivid colors	1
Saving energy, money and addressing climate change were doable with some simple steps.	1

Saving energy=saving money Nice cartoonish ads	1
saving engergy	1
saving money and energy	1
Saving money and/or energy and it seems easy to do	1
saving money.	1
Short and informative. Good graphics-modern and illustrative of message.	1
Short, quick messaging	1
simple actions to take to save energy	1
simple and common sense	1
Simple and cute.	1
Simple and true	1
Simple attractive graphics. Conservation message	1
Simple bright colors, fun	1
Simple ideas	1
simple message, colorful graphics	1
Simple message, message fits graphic, message is action oriented.	1
Simple message. Simple drawings.	1
simple statements that hit home	1
Simple things anyone can do to conserve energy.	1
Simple, actionable steps I can take to reduce energy consumption.	1
Simple. Colorful. Easy to understand.	1
Simplicity	1
simplicity and power savings awareness	1
Simplicity of message on ways to save.	1
Some are not practical (or likely to happen) for the average homeowner... insulation/caulking, but a few are easily doable for the average homeowner. These are the ones that caught my eye. We've already replaced most of our bulbs with LED's (spendy though) and raised the thermostat setting. Also, for many, ditching the garage refer. is not an option. I know we always use ours. Just hope there's not a long term power outage.	1
Specific and friendly messages that promote conservation.	1
Specific problem to solve. Ad nice and clean.	1
Specific ways to save energy and money.	1
Straightforward language and simple actions that anyone can do.	1
Suggestions that saving energy and money is doable.	1
Supportive message. Cute pictures. Fun colors.	1
Sustainability	1
That Idaho Power is making efforts to educate folks about energy saving.	1

That there are ways to save electricity and many aren't too difficult.	1
That we could save energy	1
That we should do our best to save energy and money and that Idaho Power cares about that.	1
The are obviously designed by someone who wants to catch attention. The portray a message quickly.	1
The artwork used and the information presented.	1
The bright colors caught my eye. The message to save money is motivational.	1
The bright, fun colors and fun graphics with easy to read messages.	1
The cartoons make it easier and more fun to read.	1
The catchy phrase and fun picture we good to pull me and and the information on the bottom was simple, easy to understand, and they all seemed like doable ideas.	1
the colorful pictures	1
The coloring of the ads and the sayings tend to click more. It had a nice simple feeling to it making me feel that I can do simple things to save me some money on my utility bills.	1
The colors were bright and eye catching and the captions were encouraging about ways to save power and money.	1
the colors.	1
The indicate things you can do to cut energy use.	1
the layout.	1
The look (cartoonish)	1
The look and colors. Also the short message	1
The message	1
The phrases captured my interest and then I was able to read the details.	1
The priority of energy conservation	1
The simple design, the clear messages, the HOW TO do something to help with costs.	1
The style makes it look like it is simple to make the change	1
The suggestion that someone might not of thought of. They are bright and catch your eye	1
Their simple, and show that saving energy can be pretty simple too.	1
There are number of ways to save energy	1
These are very mild. They could have a larger impact.	1
They all encourage saving energy, reducing dependence of existing generating and delivery infrastructure and saving money.	1
They appear happy.	1
they are "upbeat" rather thn threatening or warning.	1
They are attractive and send a message	1
They are colorful, easy to read.	1
they are cute with the rhyming	1

They are encouraging people to be responsible about conserving energy.	1
they are just a reminder and we all need reminded once in a while	1
They are things that we are already doing.	1
they are upbeat, generally light and great content	1
They are visually appealing and easy to read.	1
They are visually please and have a simple, straight-forward message.	1
they are well presented and give me a lot of "food for thought"	1
They gave an action that I can choose to do and why its go to do it.	1
They gAve examples of steps to take.	1
They gave great tips on saving energy	1
They give information about specific things people can do to save energy, which is a good thing.	1
They give solutions and options to problems.	1
They give you something you can do.	1
They had a good message. I feel the "cartoon" design made them more fun and worth looking at.	1
They identify positive steps that are easy to understand.	1
They look good and gave good advise	1
They make simple suggestions and explanations on saving electrical energy.	1
They might remind some people, who weren't already thinking about it, of some simple ways to conserve energy.	1
They present easy, and practical ways to reduce energy use and costs.	1
They seem friendly and provide clear suggestions to save energy.	1
They urge people to be more proactive when it comes to energy use.	1
They were all helpful, non-intrusive tips that could be relevant to various customers.	1
They were cheerful and colorful	1
They were short and simple and applied one positive thing about electrical use.	1
They were simple, easy & quick to read, and gave great tips that would benefit me.	1
They were simple, easy to get the message	1
They were very clear about some easy options I could consider to save energy and money.	1
They're all about conserving energy costs.	1
They're bright, catchy phrases and good information	1
They're colorful	1
They're cute and easy to read and understand.	1
They're eye catching and have a good and simple message	1
To help the environment	1

Upbeat	1
Very educational and helpful ways to lower your electric bill.	1
Very straightforward and simple ways to save energy	1
Very young and kid-dish in presentation, cartoon-like = fun.	1
visual	1
Ways to save electricity as well as money.	1
ways to save energy and stay cooler	1
We all like saving money on the electric bill.	1
We all want to save energy	1
We always need reminders even if we are familiar with the messages the ads give. These ads were simple, easy to read, straight to the point, and if followed can save money.	1
we are reducing our dependence on burning fossil fuels	1
well done, helpful hints and reminders	1
You care about us customers saving energy	1

What is it about the ad(s) that gave you a negative feeling?
(asked only of respondents who said they did not recall seeing the ads before taking the survey but had a negative feeling towards the ads after seeing them)

QUESTION TOTAL: 10
NO RESPONSE: 0

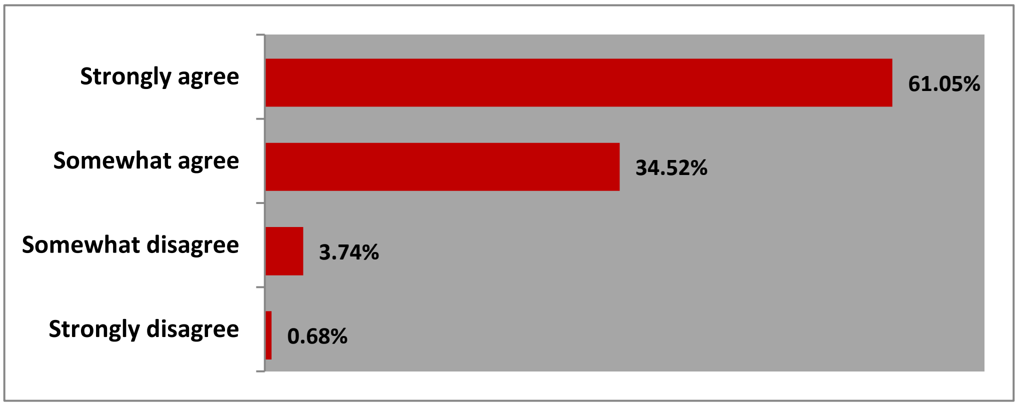
Verbatim Responses	Total
Absolute waste of money. If someone wants to save energy, they can look on a web site somewhere or do research. I'd rather the money spent on said ads be given back to customers, thus...saving us actual money!	1
Cartoons are not interesting. I see enough with my kids.	1
I don't like that they are cartoons.	1
Idaho power should be investing more resources in renewable generation rather than investing money in advertising conservation	1
The cost .	1
The font of the text is ugly. The graphics are simplistic as is the message. The ads are not specific and don't provide enough information.	1
They strike me as childish and aimed at someone who wouldn't get the point.	1
They're ugly. Hate the font.	1
To childish.	1
You are spending profit I have to pay for. Where else can I buy power, you put a boat load of PSA in with every bill. Maybe you could lower my monthly annual power adjustment cost if you weren't spending thousands or millions of bucks on ada.	1

How much would you agree, or disagree, that Idaho Power encourages energy efficiency and saving energy with its customers?

QUESTION TOTAL: 588

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Strongly agree	359	61.05%
O2	Somewhat agree	203	34.52%
O3	Somewhat disagree	22	3.74%
O4	Strongly disagree	4	0.68%



What could Idaho Power do differently to encourage customers to be more energy efficient or to save energy?

(asked only of respondents who said theysomewhat or strongly disagreed that Idaho power encourages energy efficiency)

QUESTION TOTAL: 26
NO RESPONSE: 0

Verbatim Responses	Total
Coupons, free inspections done by Idaho Power, other types of incentives.	1
Don't have any good ideas. The apathy of the consuming public is the reason for many of the world's problems.	1
Encourage renewables, stop coal generated purchases, encourage solar at both a personal and commercial level.	1
Encourage the use of renewables. Encourage the construction of renewable sources by retaining the 20 year contract provision.	1
Evolve from fossil fuels or become part of the problem	1
Fully embrace the AC Cool Credit and repeal the rollback. Incentives/penalties for utilizing power at peak times. Reward instead of discouraging roof top solar and other distributed generation.	1
Get more wind and solar energy moving in Idaho and use sustainable and renewable sources NOW!	1
Have a time of day program, help with low cost loans for windows, doors and insulation and not just for needy families but for houses that use alot of energy.	1
Help customers convert from electric heating to gas heating. Help customers install solar panels or other green power.	1
I don't see active programs anymore for doing energy audits and home retrofitting. Idaho Power also appears to be fighting alternate energy methods that it does not benefit from.	1
I saw no ads. Most effective advertising now is on the internet, and they certainly weren't there.	1
I think that you have to go out and actively recruit customers. Also the incentives/help need to not be pathetic.	1
I would focus more on the actual approximate monetary savings. 3% doesn't sound worth the trouble.	1
Improve targeting and marketing to customers	1
Incorporate the extent to which Idaho Power believes that more energy efficiency reduces the need for dirty generation. People want e-e, no question, but getting rid of fossil fuels is a motivator.	1
it's all about money, show examples of savings	1
Monetary incentives	1
More of the energy saving education. With statistics, it's compelling	1

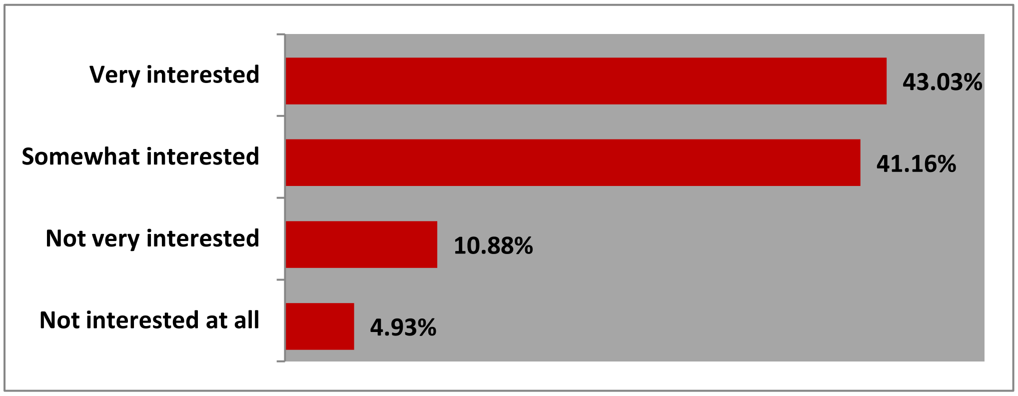
More promos with a dedicated separate websites for upgrading appliances, insulation and simple upgrades like LED bulbs and smart power strips.	1
Most energy use at this point is realistically fixed. You're not going to cook less, or lower the heat below what's comfortable, or bother to run climate control at all unless it makes you ...comfortable.	1
Offer incentives and rebates. I recently looked to see if there were any rebates for replacing old air conditioning units or furnaces and there was only a rebate for a heat pump. Our old city used to offer a lot of rebates to get people to upgrade units to more energy efficient models	1
Offer larger financial incentives for efficiency. Also, actively developing renewable sources of energy rather than putting money into coal and gas plants.	1
Promote promote promote	1
reduce rates for reduced consumption	1
reward energy efficiency with cash rewards; like washing dishes at 11 pm instead of 6 pm, recommending best times to run appliances, what to do with hot water heaters when going out of town	1
The best way to encourage efficiency is to increase the price of electricity. The second best way would be to show people their real time energy use with a monitor most likely placed in their kitchen.	1

How interested would you be in getting more information from Idaho Power about energy saving programs for your home?

QUESTION TOTAL: 588

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Very interested	253	43.03%
O2	Somewhat interested	242	41.16%
O3	Not very interested	64	10.88%
O4	Not interested at all	29	4.93%



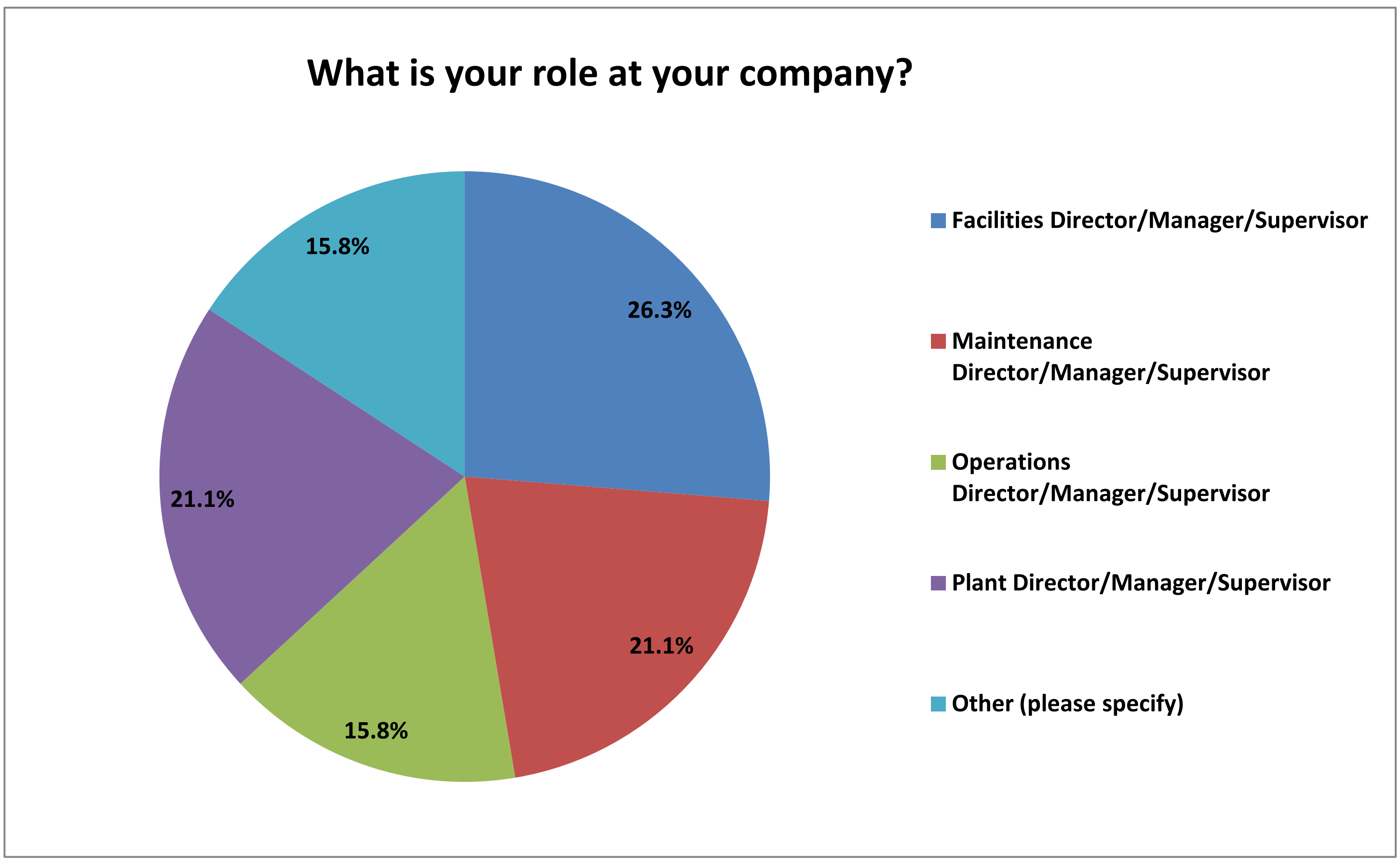
Flex Peak Program Summary

How much do you agree, or disagree, with the following statements about the application process and operation of the program:	
Mean Response	4.4
How clear were the notification messages for the Flex Peak Program events?	
Mean Response	4.9
For each of the events Idaho Power called this summer, please indicate how prepared were you for the event?	
Mean Response	*4.2*
Following each event, Idaho Power provided post event performance data for each participating facility. How useful was this information in helping you refine future nominations for the program?	
Mean Response	4.9
If you contacted Idaho Power, how helpful was Idaho Power with any questions you had regarding the Flex Peak Program?	
Mean Response	4.6
How satisfied are you with the timeliness of receiving your incentive payment?	
Mean Response	4.7
How satisfied are you with your incentive amount?	
Mean Response	4.2
How satisfied are you with your overall experience with the Flex Peak Program?	
Mean Response	4.5
How likely would you be to re-enroll in the Flex Peak Program in the future?	
Mean Response	4.9
Overall Program Average	4.6

Flex Peak Program Survey

What is your role at your company?		
Answer Options	Response Percent	Response Count
Facilities Director/Manager/Supervisor	26.3%	5
Maintenance Director/Manager/Supervisor	21.1%	4
Operations Director/Manager/Supervisor	15.8%	3
Plant Director/Manager/Supervisor	21.1%	4
Other (please specify)	15.8%	3
	answered question	19
	skipped question	0

Other (please specify)
Energy Engineer
Master Electrician
Lead Water Tech.



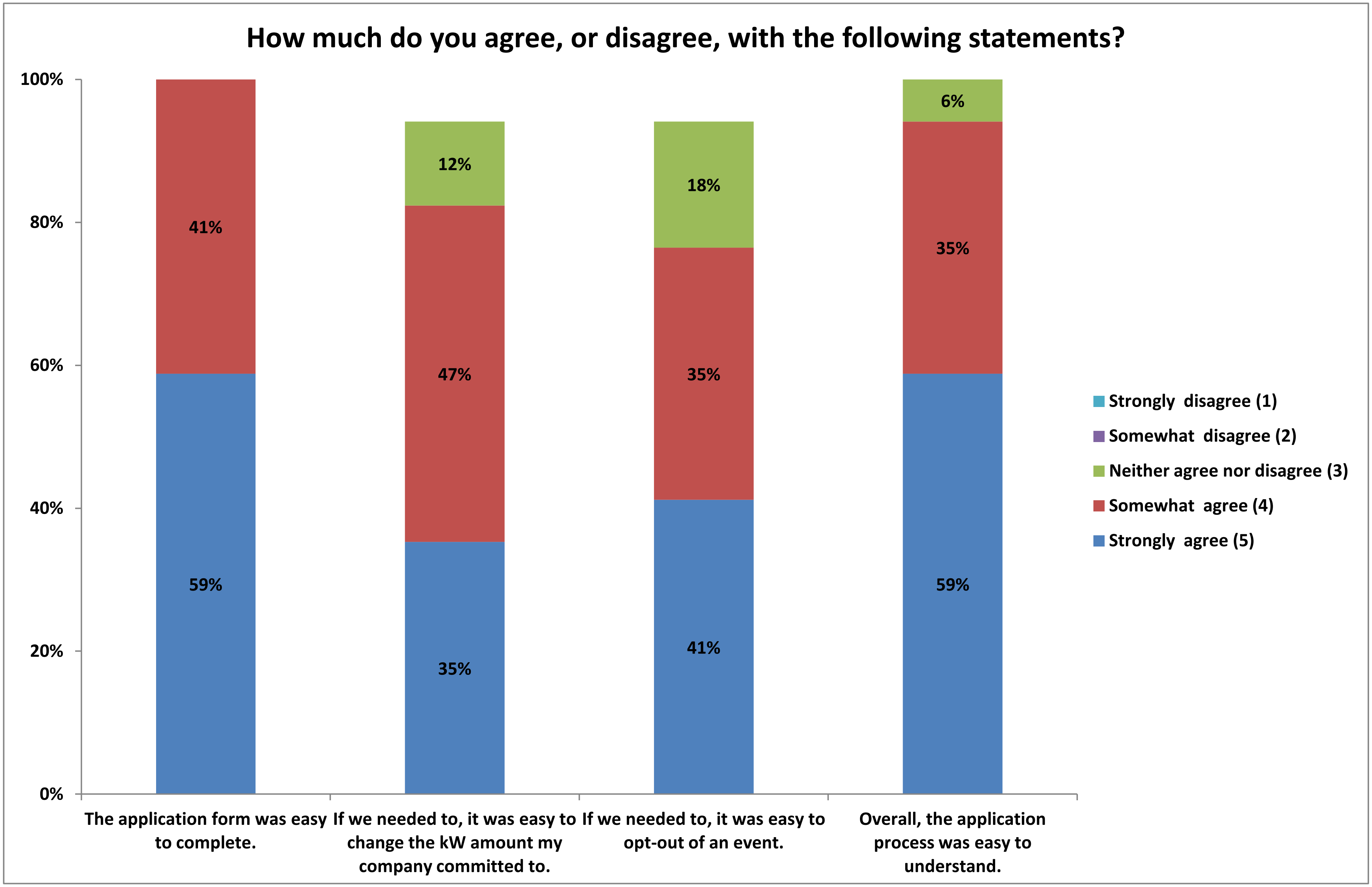
Flex Peak Program Survey

How much do you agree, or disagree, with the following statements:							
Answer Options	**Strongly agree (5)**	**Somewhat agree (4)**	**Neither agree nor disagree (3)**	**Somewhat disagree (2)**	**Strongly disagree (1)**	**Not applicable**	**Response Count**
The application form was easy to complete.	10	7	0	0	0	0	17
If we needed to, it was easy to change the kW amount my	6	8	2	0	0	1	17
If we needed to, it was easy to opt-out of an event.	7	6	3	0	0	1	17
Overall, the application process was easy to understand.	10	6	1	0	0	0	17
						answered question	17
						skipped question	2

Overall Mean

How much do you agree, or disagree, with the following statements:							
Answer Options	**Weighted Strongly agree (5)**	**Weighted Somewhat agree (4)**	**Weighted Neither agree nor disagree (3)**	**Weighted Somewhat disagree (2)**	**Weighted Strongly disagree (1)**	**Response Count**	**Mean Response**
The application form was easy to complete.	50	28	0	0	0	17	4.6
If we needed to, it was easy to change the kW amount my company committed to.	30	32	6	0	0	16	4.3
If we needed to, it was easy to opt-out of an event.	35	24	9	0	0	16	4.3
Overall, the application process was easy to understand.	50	24	3	0	0	17	4.5
						Overall Mean	4.4

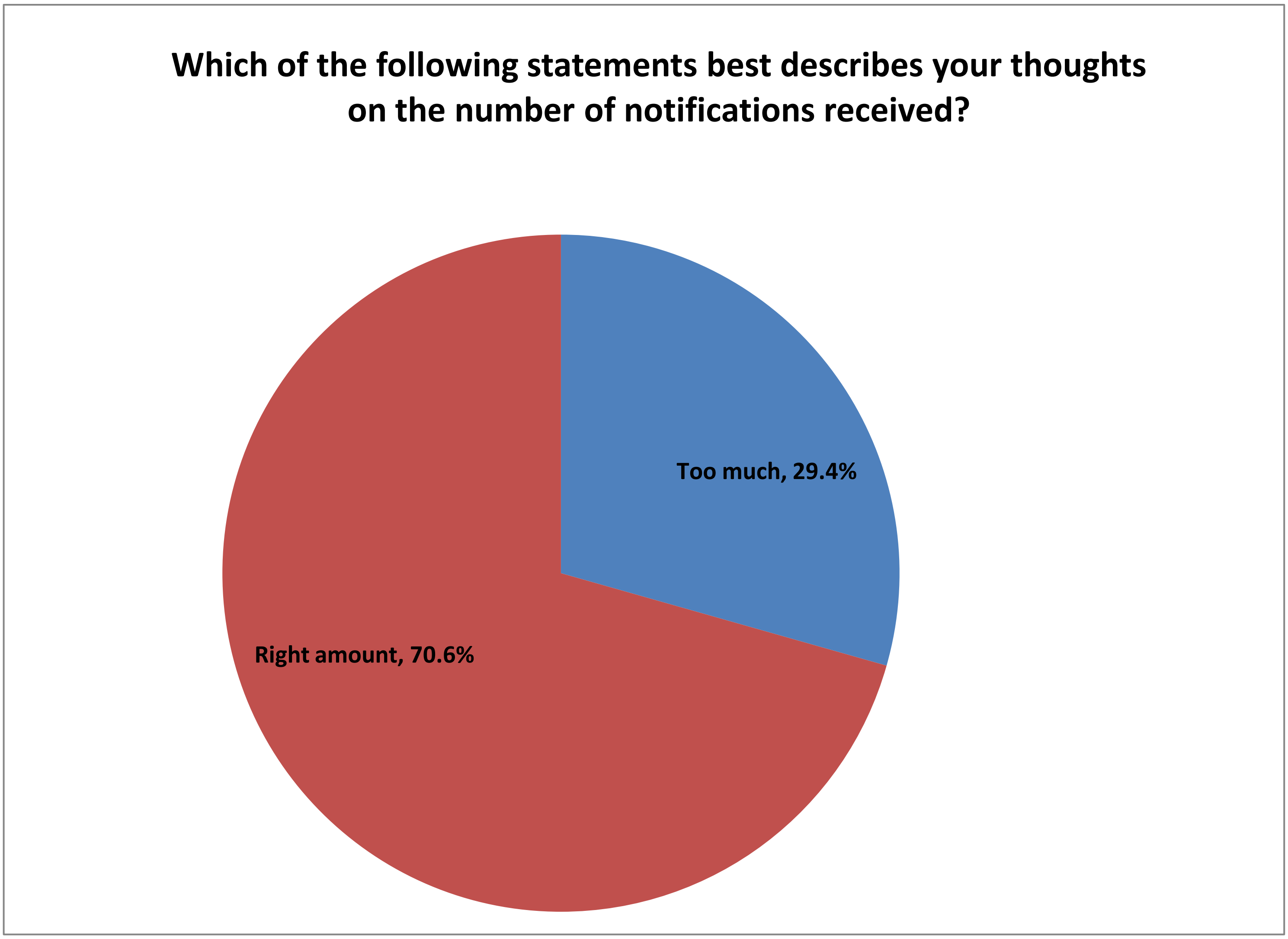
How much do you agree, or disagree, with the following statements:							
Answer Options	**Strongly agree (5)**	**Somewhat agree (4)**	**Neither agree nor disagree (3)**	**Somewhat disagree (2)**	**Strongly disagree (1)**	**Not applicable**	**Response Count**
The application form was easy to complete.	59%	41%	0%	0%	0%	0%	17
If we needed to, it was easy to change the kW amount my	35%	47%	12%	0%	0%	6%	17
If we needed to, it was easy to opt-out of an event.	41%	35%	18%	0%	0%	6%	17
Overall, the application process was easy to understand.	59%	35%	6%	0%	0%	0%	17
						answered question	17
						skipped question	2


How much do you agree, or disagree, with the following statements?
100%
80%
60%
40%
20%
0%
41%
59%
12%
47%
35%
18%
35%
41%
6%
35%
59%
Strongly disagree (1)
Somewhat disagree (2)
Neither agree nor disagree (3)
Somewhat agree (4)
Strongly agree (5)
The application form was easy to complete.
If we needed to, it was easy to change the kW amount my company committed to.
If we needed to, it was easy to opt-out of an event.
Overall, the application process was easy to understand.

Flex Peak Program Survey

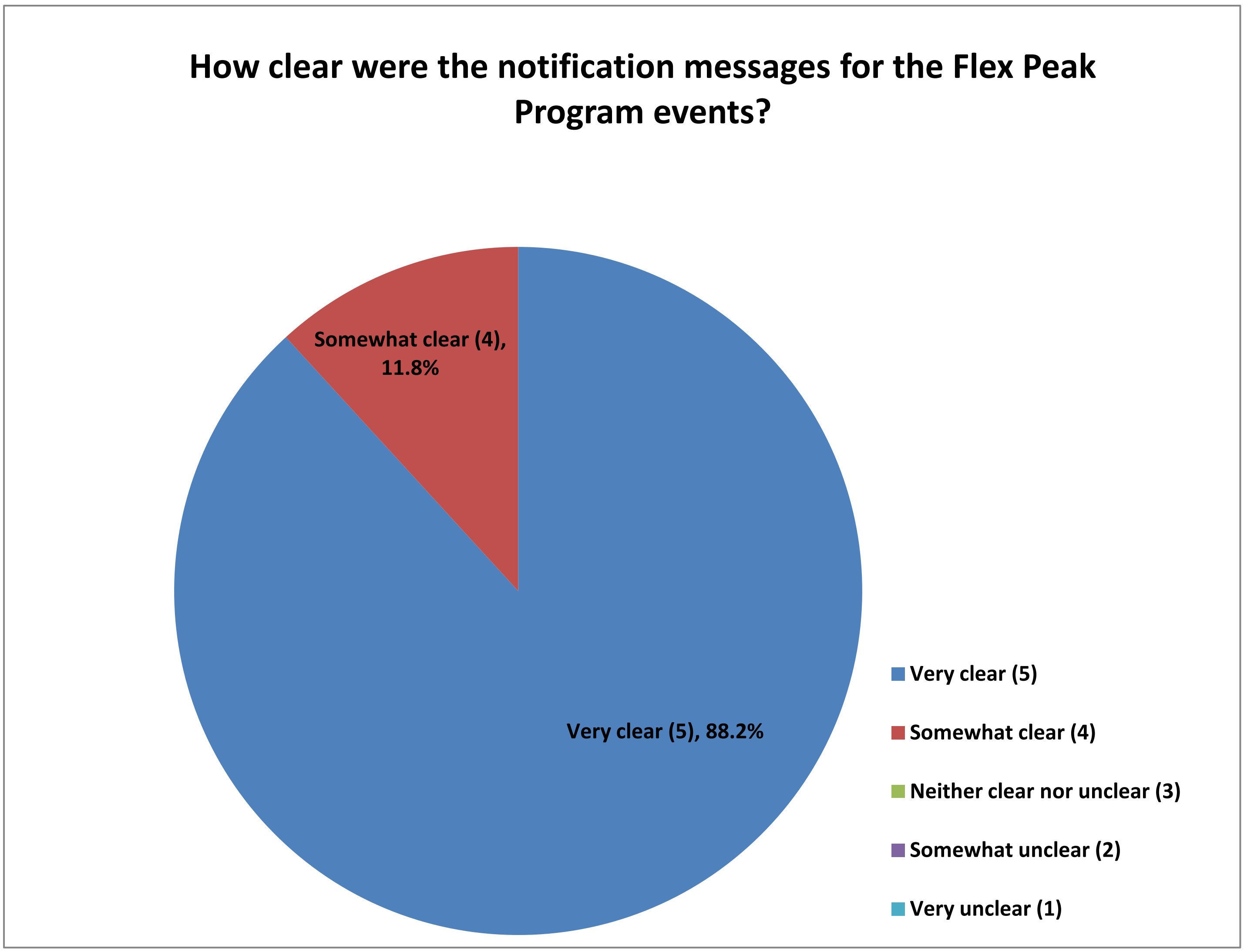
Idaho Power notified customers of an event by contacting them three times by email or by phone. Which of the following statements best describes your thoughts on the number of notifications received?		
Answer Options	Response Percent	Response Count
Too much	29.4%	5
Right amount	70.6%	12
Too little	0.0%	0
	answered question	17
	skipped question	2

Overall Mean



Flex Peak Program Survey

How clear were the notification messages for the Flex Peak Program events?			
Answer Options	Response Percent	Response Count	Weighted Response
Very clear (5)	88.2%	15	75
Somewhat clear (4)	11.8%	2	8
Neither clear nor unclear (3)	0.0%	0	0
Somewhat unclear (2)	0.0%	0	0
Very unclear (1)	0.0%	0	0
answered question		17	
skipped question		2	
		Mean Response	4.9

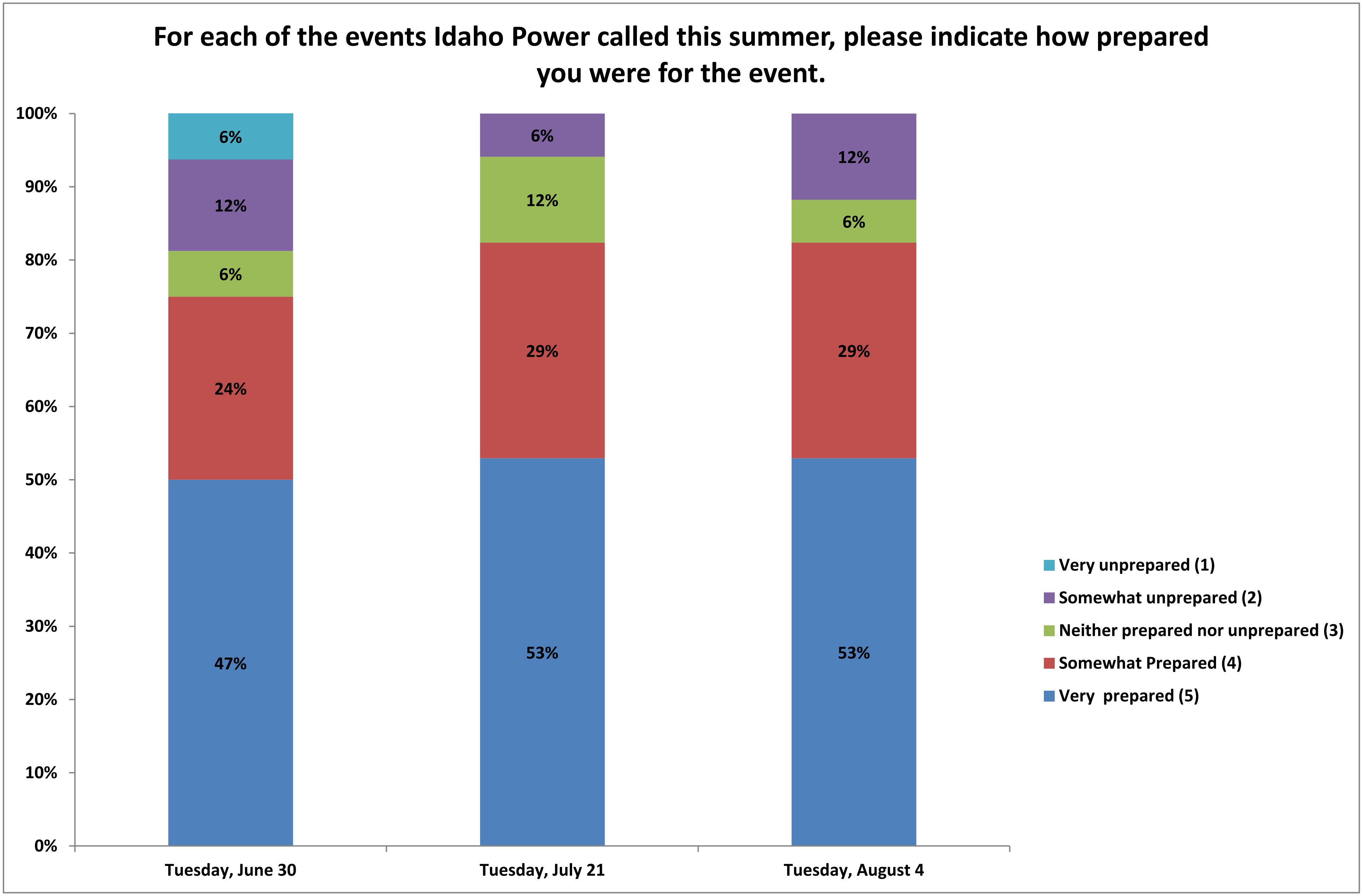


Flex Peak Program Survey

For each of the events Idaho Power called this summer, please indicate how prepared were you for the event?							
Answer Options	Very prepared (5)	Somewhat Prepared (4)	Neither prepared nor unprepared (3)	Somewhat unprepared (2)	Very unprepared (1)	Not applicable	Response Count
Tuesday, June 30	8	4	1	2	1	1	17
Tuesday, July 21	9	5	2	1	0	0	17
Tuesday, August 4	9	5	1	2	0	0	17
						answered question	17
						skipped question	2

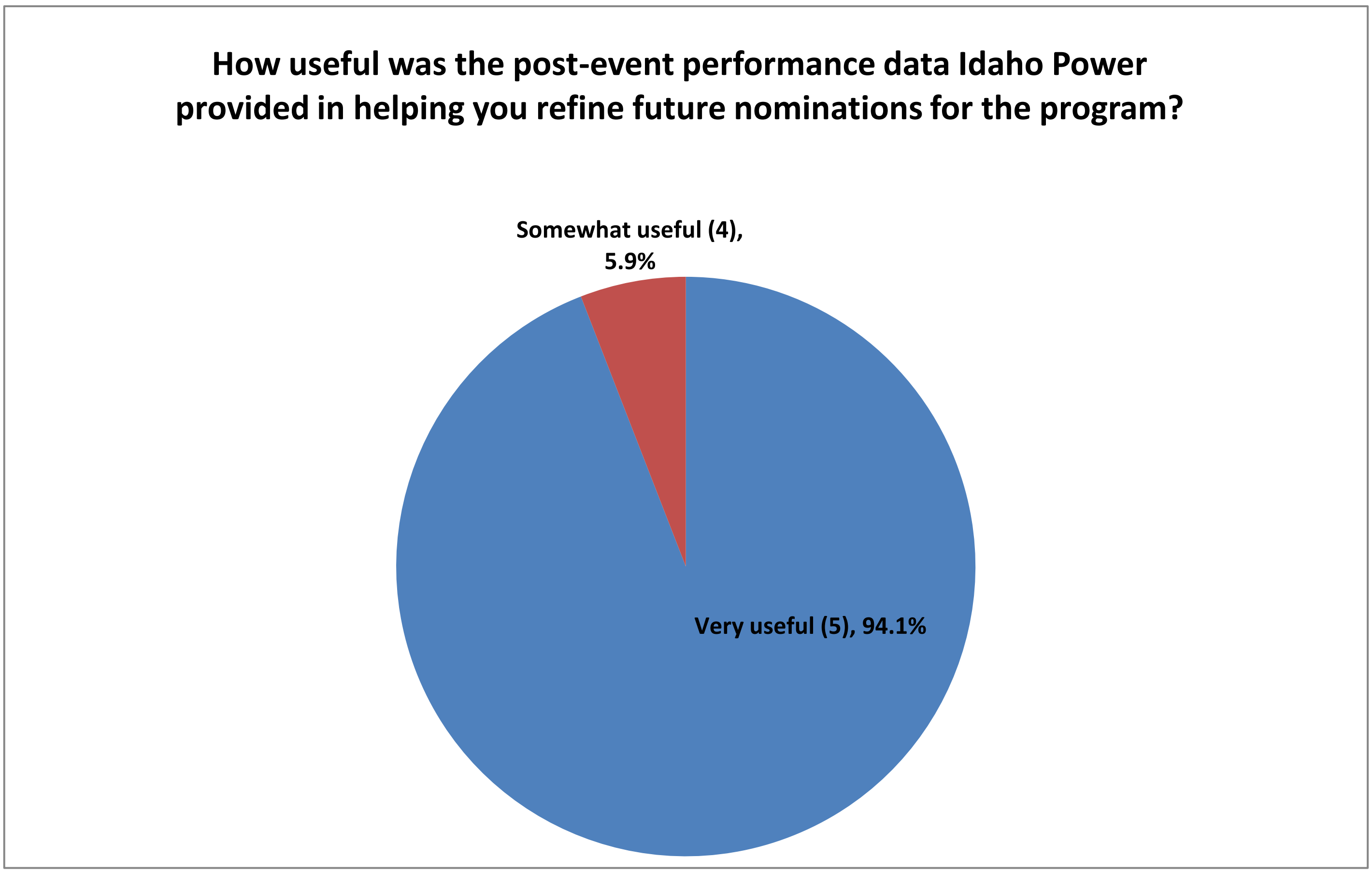
Overall Mean							
	Weighted	Weighted	Weighted	Weighted	Weighted		
Answer Options	Very prepared (5)	Somewhat Prepared (4)	Neither prepared nor unprepared (3)	Somewhat unprepared (2)	Very unprepared (1)	Response Count	Mean Response
Tuesday, June 30	40	16	3	4	1	16	4.0
Tuesday, July 21	45	20	6	2	0	17	4.3
Tuesday, August 4	45	20	3	4	0	17	4.2
						Overall Mean	*4.2*

For each of the events Idaho Power called this summer, please indicate how prepared were you for the event?							
Answer Options	Very prepared (5)	Somewhat Prepared (4)	Neither prepared nor unprepared (3)	Somewhat unprepared (2)	Very unprepared (1)	Not applicable	Response Count
Tuesday, June 30	47%	24%	6%	12%	6%	6%	17
Tuesday, July 21	53%	29%	12%	6%	0%	0%	17
Tuesday, August 4	53%	29%	6%	12%	0%	0%	17
						answered question	17
						skipped question	2


For each of the events Idaho Power called this summer, please indicate how prepared you were for the event.
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
6%
12%
6%
24%
47%
6%
12%
29%
53%
12%
6%
29%
53%
Tuesday, June 30
Tuesday, July 21
Tuesday, August 4
Very unprepared (1)
Somewhat unprepared (2)
Neither prepared nor unprepared (3)
Somewhat Prepared (4)
Very prepared (5)

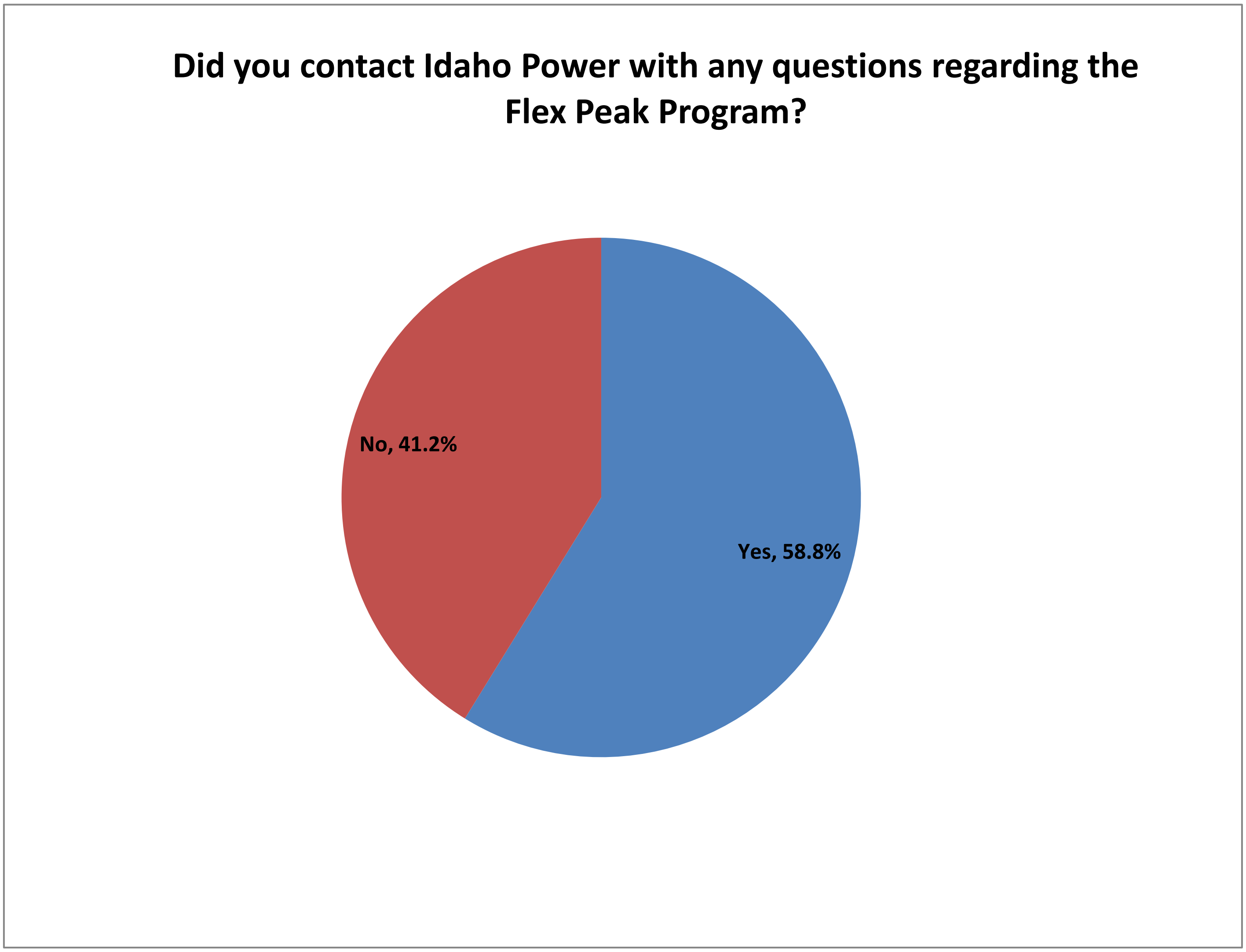
Flex Peak Program Survey

Following each event, Idaho Power provided post event performance data for each participating facility. How useful was this information in helping you refine future nominations for the program?			
Answer Options	Response Percent	Response Count	Weighted Response
Very useful (5)	94.1%	16	80
Somewhat useful (4)	5.9%	1	4
Neither useful nor useless (3)	0.0%	0	0
Somewhat useless (2)	0.0%	0	0
Very useless (1)	0.0%	0	0
answered question		17	
skipped question		2	
		Mean Response	4.9



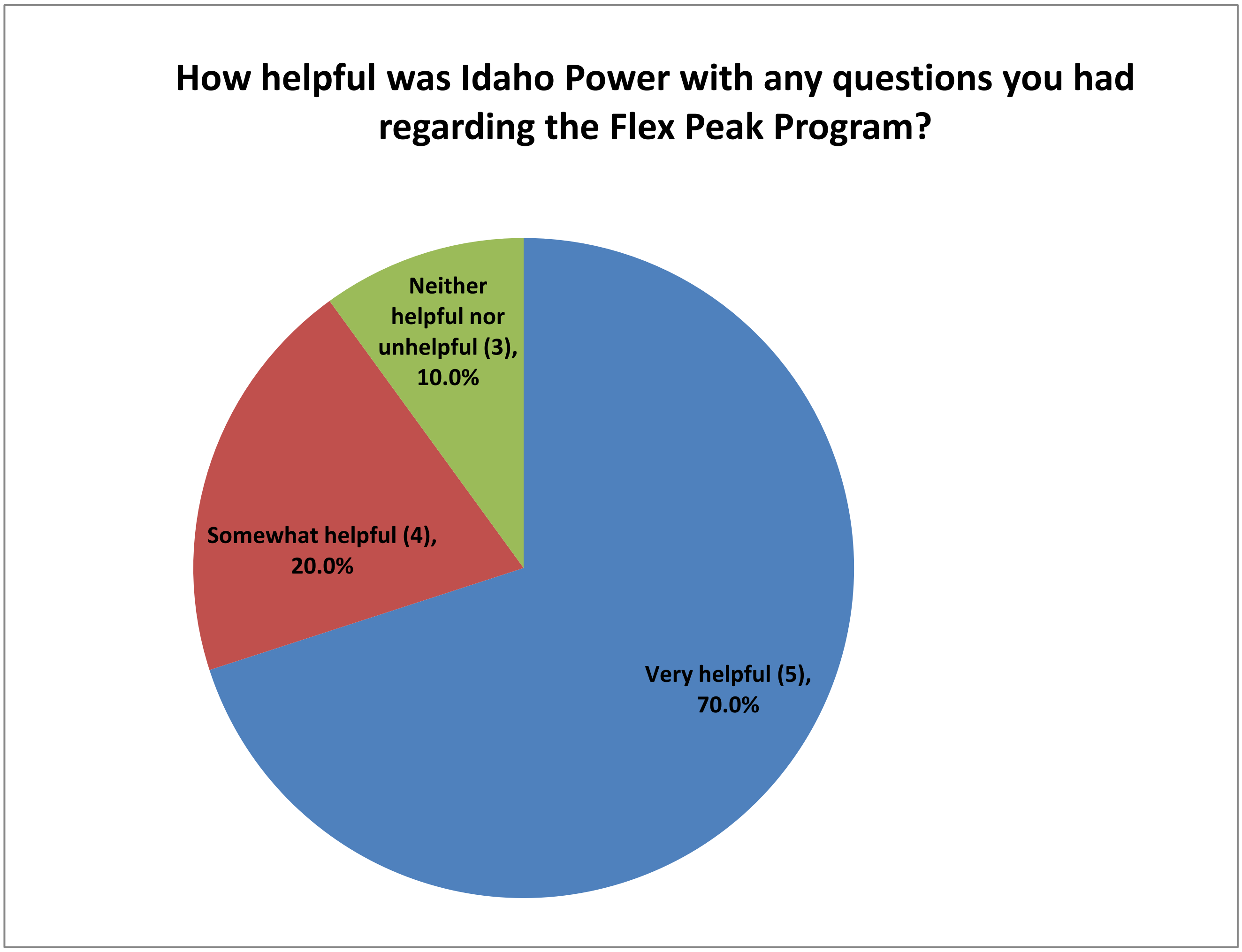
Flex Peak Program Survey

Did you contact Idaho Power with any questions regarding the Flex Peak Program?		
Answer Options	Response Percent	Response Count
Yes	58.8%	10
No	41.2%	7
	answered question	17
	skipped question	2



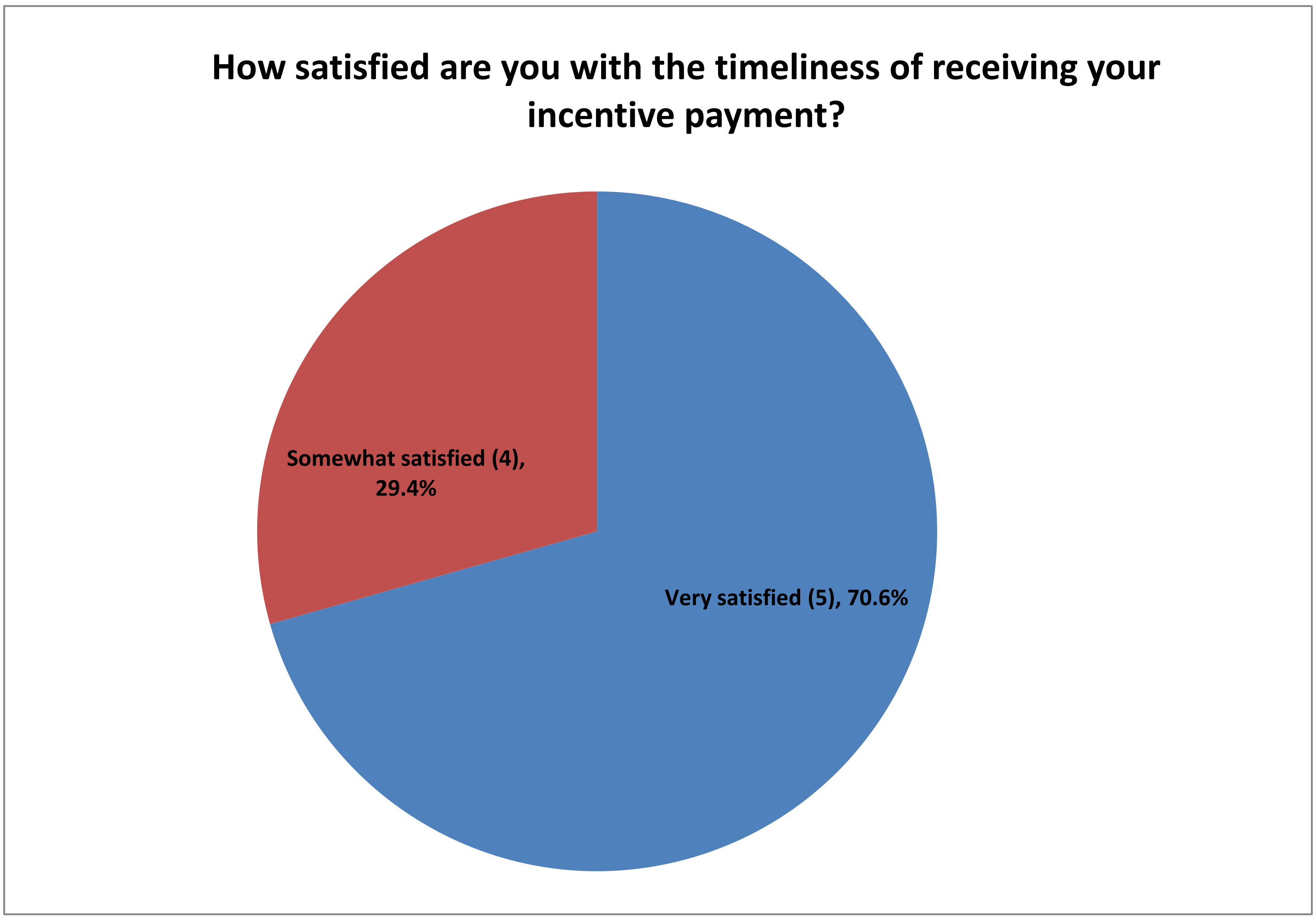
Flex Peak Program Survey

If you contacted Idaho Power, how helpful was Idaho Power with any questions you had regarding the Flex Peak Program?			
Answer Options	Response Percent	Response Count	Weighted Response
Very helpful (5)	70.0%	7	35
Somewhat helpful (4)	20.0%	2	8
Neither helpful nor unhelpful (3)	10.0%	1	3
Somewhat unhelpful (2)	0.0%	0	0
Very unhelpful (1)	0.0%	0	0
	answered question	10	
	skipped question	9	
		Mean Response	4.6



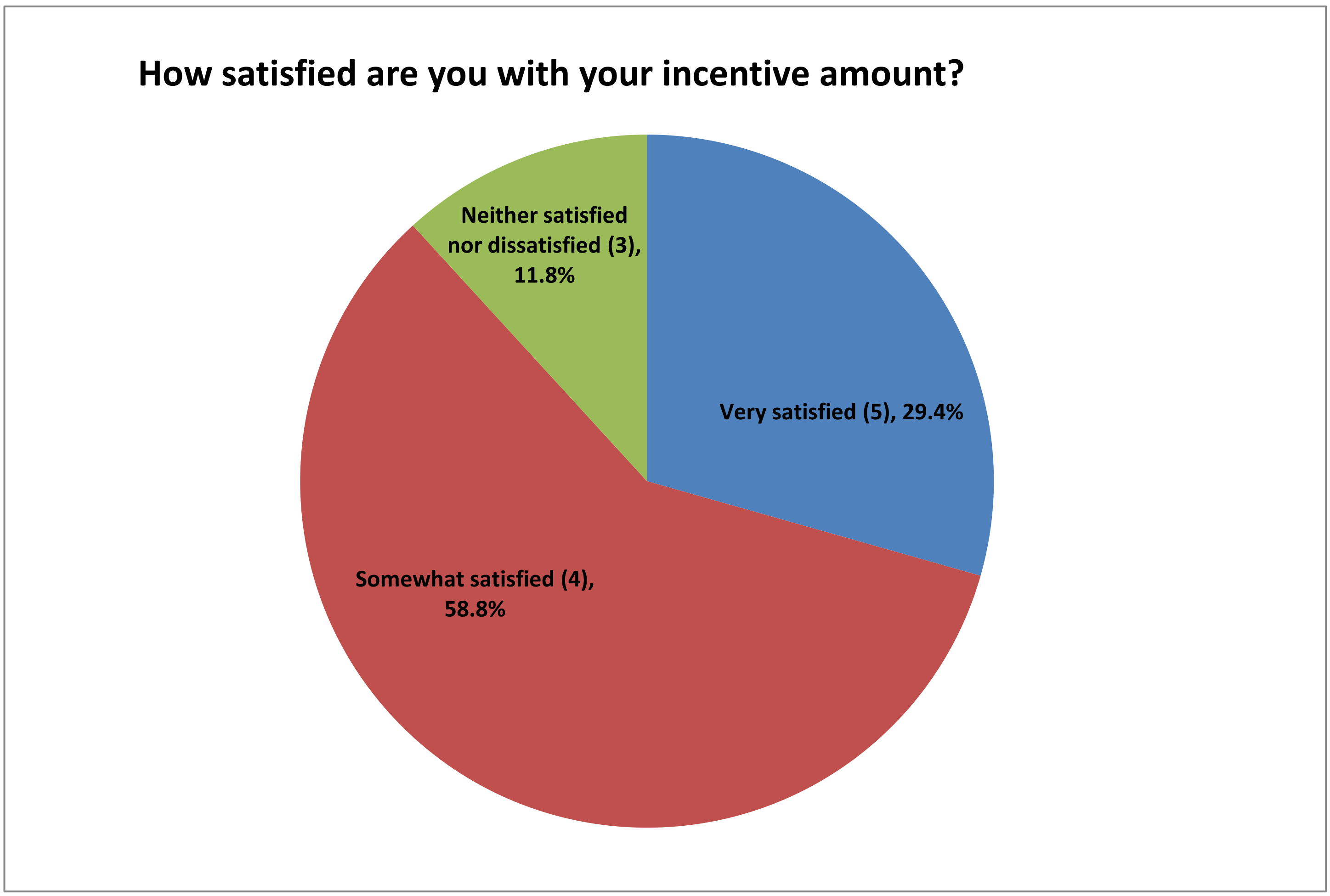
Flex Peak Program Survey

How satisfied are you with the timeliness of receiving your incentive payment?			
Answer Options	Response Percent	Response Count	Weighted Response
Very satisfied (5)	70.6%	12	60
Somewhat satisfied (4)	29.4%	5	20
Neither satisfied nor dissatisfied (3)	0.0%	0	0
Somewhat dissatisfied (2)	0.0%	0	0
Very dissatisfied (1)	0.0%	0	0
answered question		17	
skipped question		2	
		Mean Response	4.7



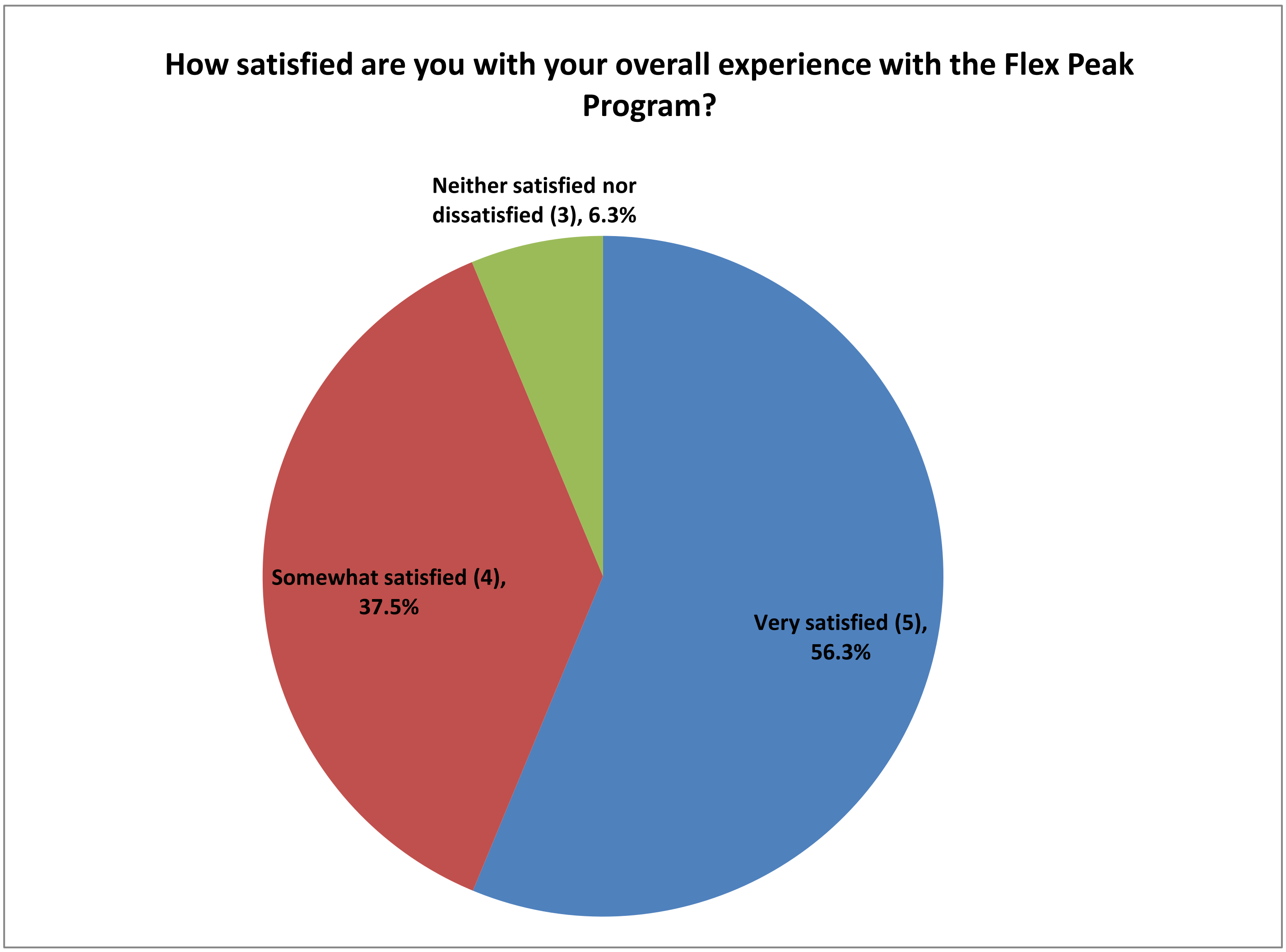
Flex Peak Program Survey

How satisfied are you with your incentive amount?			
Answer Options	Response Percent	Response Count	Weighted Response
Very satisfied (5)	29.4%	5	25
Somewhat satisfied (4)	58.8%	10	40
Neither satisfied nor dissatisfied (3)	11.8%	2	6
Somewhat dissatisfied (2)	0.0%	0	0
Very dissatisfied (1)	0.0%	0	0
answered question		17	
skipped question		2	
		Mean Response	4.2



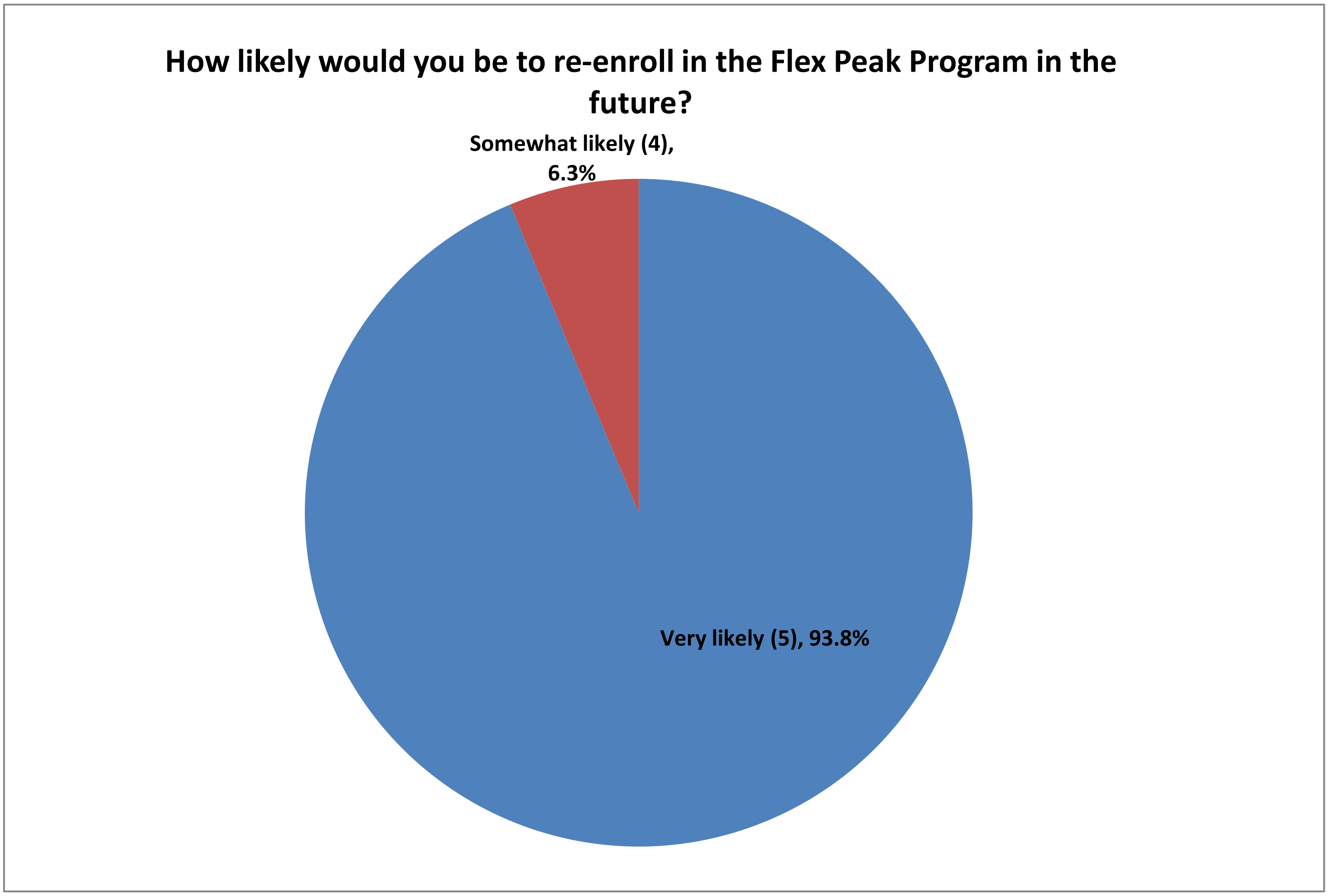
Flex Peak Program Survey

How satisfied are you with your overall experience with the Flex Peak Program?			
Answer Options	Response Percent	Response Count	Weighted Response
Very satisfied (5)	56.3%	9	45
Somewhat satisfied (4)	37.5%	6	24
Neither satisfied nor dissatisfied (3)	6.3%	1	3
Somewhat dissatisfied (2)	0.0%	0	0
Very dissatisfied (1)	0.0%	0	0
answered question		16	
skipped question		3	
		Mean Response	4.5



Flex Peak Program Survey

How likely would you be to re-enroll in the Flex Peak Program in the future?			
Answer Options	Response Percent	Response Count	Weighted Response
Very likely (5)	93.8%	15	75
Somewhat likely (4)	6.3%	1	4
Neither likely nor unlikely (3)	0.0%	0	0
Somewhat unlikely (2)	0.0%	0	0
Very unlikely (1)	0.0%	0	0
	answered question	16	
	skipped question	3	
		Mean Response	4.9



Flex Peak Program Survey

Please provide any additional comments about Idaho Power's Flex Peak Program.	
Answer Options	Response Count
	5
answered question	5
skipped question	14

Response Text
I understand that the program does not want to give more than two hours notice, but it would be very useful to have more advance notice of an impending event. The more notice the better.
Overall Mean
Zeke was very helpful and knowledgeable.
Just need to work on notification gliche.
Idaho's peak program was easy to enroll, performance reports made available timely after each event, easy to make changes to nominations in between events. The support team was outstanding in their management and communications for the program. They provide detail information needed to review with other levels of OD management. We look forward to next season.

empowered community

Holiday Lighting Survey Results

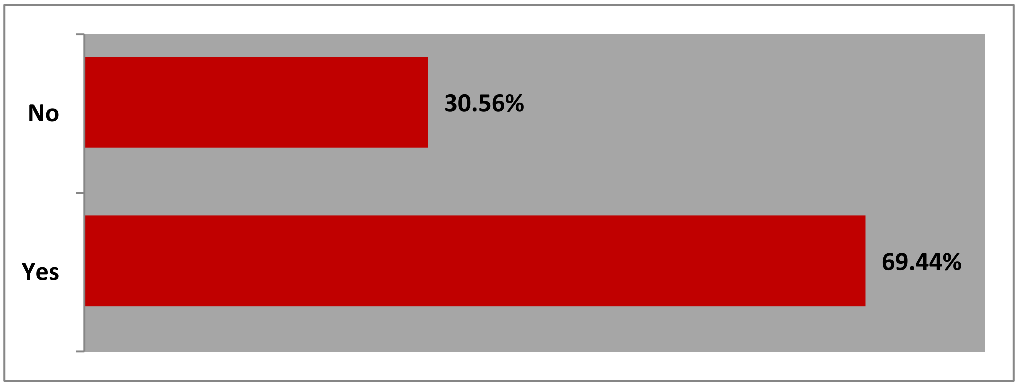
December 2015

Do you use holiday lighting at your home?

QUESTION TOTAL: 445

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Yes	309	69.44%
O2	No	136	30.56%



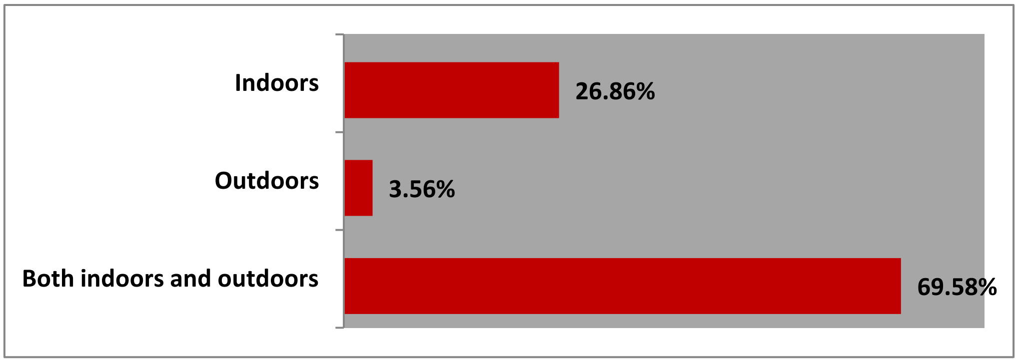
Where do you use holiday lighting?

(asked only of respondents who said they use holiday lighting)

QUESTION TOTAL: 309

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Indoors	83	26.86%
O2	Outdoors	11	3.56%
O3	Both indoors and outdoors	215	69.58%



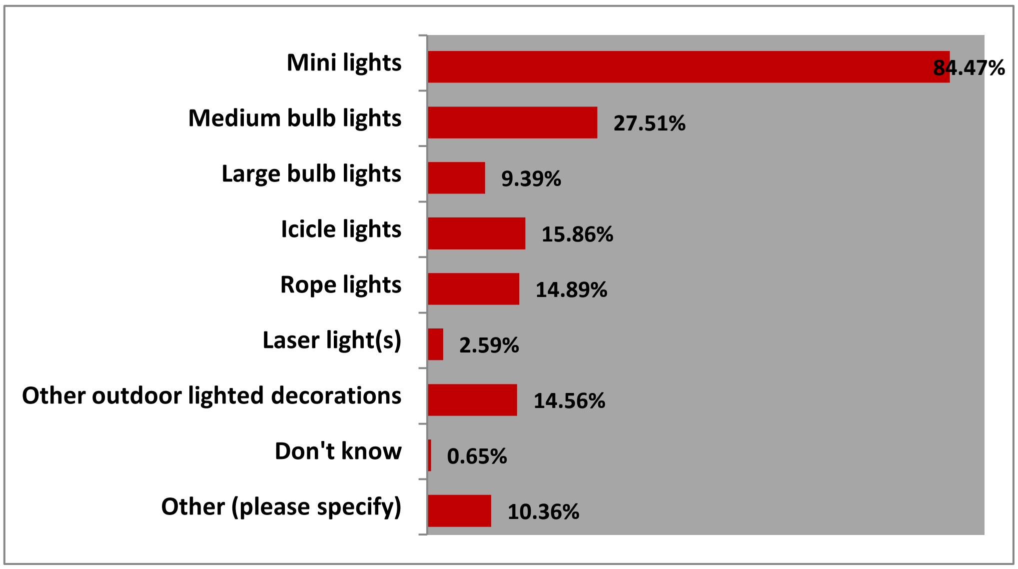
What type of holiday lights do you use?

(asked only of respondents who said they use holiday lighting)

QUESTION TOTAL: 309

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Mini lights	261	84.47%
O2	Medium bulb lights	85	27.51%
O3	Large bulb lights	29	9.39%
O4	Icicle lights	49	15.86%
O5	Rope lights	46	14.89%
O6	Laser light(s)	8	2.59%
O7	Other outdoor lighted decorations	45	14.56%
O8	Don't know	2	0.65%
O9	Other (please specify)	32	10.36%



What type of holiday lights do you use? Other (please specify).

Verbatim Responses	Total
LED	9
LEDs	2
solar lights	2
all led lights	1
All Mini or Medium LED's	1
battery candles	1
bubble lights	1
colored spots	1
Halloween lights tooo	1
led and led spotlight	1
LED candles battery	1
LED lights	1

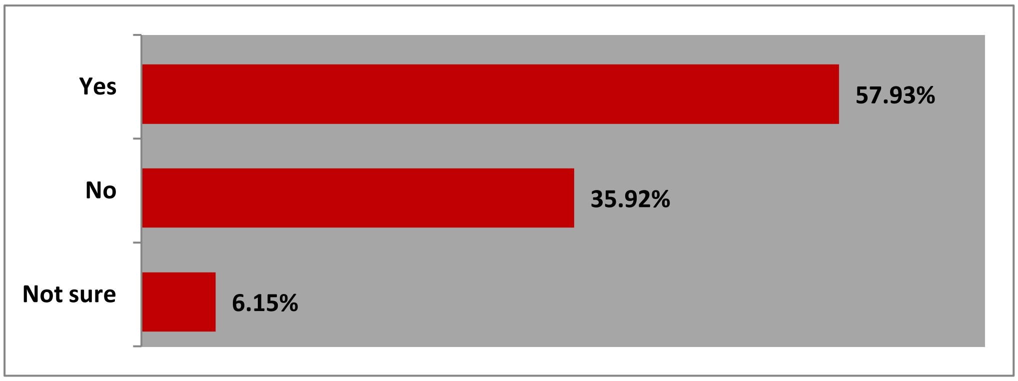
LED mini lights	1
Led outdoors	1
Led rope	1
LED Spotlights	1
nativity scene	1
Small LED lights inside of large	1
Solar string lights	1
spot light	1
Traditional incandescent lights	1
we didn't use any this year but we	1

Are any of your holiday lights LED lights?

(asked only of respondents who said they use holiday lighting)

QUESTION TOTAL: 309
NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Yes	179	57.93%
O2	No	111	35.92%
O3	Not sure	19	6.15%



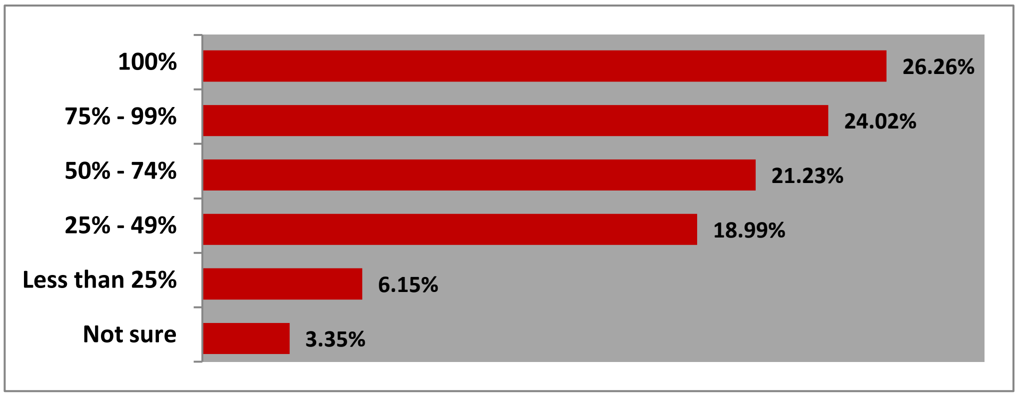
What proportion of your holiday lights are LED's?

(asked only of respondents who said they use LED lights)

QUESTION TOTAL: 179

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	100%	47	26.26%
O2	75% - 99%	43	24.02%
O3	50% - 74%	38	21.23%
O4	25% - 49%	34	18.99%
O5	Less than 25%	11	6.15%
O6	Not sure	6	3.35%



Home Energy Audit Program Survey

Monday, February 01, 2016

140

Total Responses

Complete Responses: 120

Q1: How easy was it for you to apply for the Home Energy Audit program?

Answered: 140   Skipped: 0

Answer Choices	Responses	
Very easy	77.86%	109
Somewhat easy	17.14%	24
Somewhat difficult	3.57%	5
Very difficult	1.43%	2
Total		140

Q3: Please identify the auditor that you used for your home audit.

Answered: 103 Skipped: 37

Answer Choices	Responses	
Brian Bennett, The Energy Auditor	18.45%	19
Chris Callor, Affordable Energy Improvements, LLC	29.13%	30
Dallen Ward, Home Energy Efficiency Technologies (H.E.E.T.)	5.83%	6
Jessie Lumbreras, Energy Zone, LLC	3.88%	4
Robert Johnson, Savings Around Power	1.94%	2
Rod Burk, Home Energy Management	6.80%	7
Tad Duby, On Point, LLC	33.98%	35
Total		103

Q4: Please rate your home auditor on each of the following:

Answered: 127   Skipped: 13

	Excellent	Good	Fair	Poor	Total
Courteousness	**78.57%** 99	**21.43%** 27	**0.00%** 0	**0.00%** 0	126
Professionalism	**76.19%** 96	**23.02%** 29	**0.79%** 1	**0.00%** 0	126
Explanation of work/measurements to be performed as part of the audit	**71.77%** 89	**25.81%** 32	**1.61%** 2	**0.81%** 1	124
Explanation of recommendations resulting from audit	**66.67%** 84	**25.40%** 32	**4.76%** 6	**3.17%** 4	126
Overall experience with auditor (from scheduling an appointment to follow up after the audit)	**68.25%** 86	**23.81%** 30	**6.35%** 8	**1.59%** 2	126

Q6: How did you receive your Home Energy Audit report?

Answered: 121 Skipped: 19

Answer Choices	Responses	
Accessed report online	35.54%	43
Received paper copy	43.80%	53
Both	20.66%	25
Total		121

Q7: How difficult was it for you to access the report online?

Answered: 123 Skipped: 17

Answer Choices	Responses	
Very easy	34.96%	43
Somewhat easy	20.33%	25
Somewhat difficult	2.44%	3
Very difficult	7.32%	9
N/A	34.96%	43
Total		123

Q8: How much did the audit influence you to reduce the amount of electricity you consume?

Answered: 124 Skipped: 16

Answer Choices	Responses	
Influenced me a lot	37.10%	46
Influenced me some	49.19%	61
Didn't influence me much	12.10%	15
Didn't influence me at all	1.61%	2
Total		124

Q9: As a result of the Home Energy Audit program, please indicate how strongly you agree or disagree with the following statements.

Answered: 125   Skipped: 15

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	N/A	Total
I am more informed about energy usage in my home	**57.26%** 71	**40.32%** 50	**0.81%** 1	**0.81%** 1	**0.81%** 1	124
Other members of my household are more informed about our household energy usage	**33.61%** 41	**36.89%** 45	**9.02%** 11	**0.82%** 1	**19.67%** 24	122
I am more informed about energy efficiency programs that are available to me through Idaho Power	**41.80%** 51	**45.90%** 56	**8.20%** 10	**3.28%** 4	**0.82%** 1	122
I know what no to low-cost actions I can take	**53.33%** 64	**33.33%** 40	**5.00%** 6	**1.67%** 2	**6.67%** 8	120
I know what next steps I should take	**59.84%** 73	**30.33%** 37	**4.92%** 6	**0.00%** 0	**4.92%** 6	122

Q10: After receiving your audit through the Home Energy Audit program, please indicate if you have taken any of the following actions:

Answered: 120 Skipped: 20

	Yes	No	Total
Visited the Idaho Power website	40.00% 46	60.00% 69	115
Unplugged appliances when not in use	53.51% 61	46.49% 53	114
Signed up for myAccount	39.45% 43	60.55% 66	109
Shared my energy audit experience with relatives and/or friends	65.25% 77	34.75% 41	118
Other	52.17% 24	47.83% 22	46

Q11: Since receiving your audit through the Home Energy Audit program, please indicate when, or if, you will complete any of the following improvements:

Answered: 121 Skipped: 19

	Already completed	Plan to in next 6 months	Plan to in 6-12 months	Want to but not sure when	Do not plan to at all	Home does not need	Total
Replace additional incandescent light bulbs with more efficient light bulbs (e.g., CFLs and LEDs)	59.32% 70	16.95% 20	8.47% 10	7.63% 9	3.39% 4	4.24% 5	118
Replace additional showerheads with low-flow models	36.75% 43	9.40% 11	3.42% 4	14.53% 17	15.38% 18	20.51% 24	117
Recycle an extra refrigerator or freezer	15.32% 17	3.60% 4	5.41% 6	13.51% 15	27.93% 31	34.23% 38	111
Replace an older, inefficient appliance with a new ENERGY STAR model	14.78% 17	4.35% 5	8.70% 10	27.83% 32	13.04% 15	31.30% 36	115
Service heating equipment	34.51% 39	21.24% 24	8.85% 10	7.08% 8	10.62% 12	17.70% 20	113
Service cooling equipment	28.95% 33	18.42% 21	10.53% 12	7.02% 8	10.53% 12	24.56% 28	114
Increase attic insulation	14.66% 17	13.79% 16	7.76% 9	20.69% 24	9.48% 11	33.62% 39	116
Increase wall insulation	8.77% 10	4.39% 5	2.63% 3	9.65% 11	21.93% 25	52.63% 60	114
Increase underfloor insulation	5.31% 6	12.39% 14	6.19% 7	22.12% 25	14.16% 16	39.82% 45	113
Seal air leaks	23.48% 27	35.65% 41	9.57% 11	10.43% 12	3.48% 4	17.39% 20	115
Seal duct work	15.32% 17	25.23% 28	8.11% 9	15.32% 17	5.41% 6	30.63% 34	111
Other	42.86% 12	10.71% 3	3.57% 1	10.71% 3	0.00% 0	32.14% 9	28

Q13: What benefits did you experience from the Home Energy Audit program? (Check all that apply)

Answered: 118   Skipped: 22

Answer Choices	Responses	
Cost savings	56.78%	67
Personal satisfaction	64.41%	76
Raised awareness of energy use	76.27%	90
Benefit to the environment	25.42%	30
Home improvement	48.31%	57
Comfort	49.15%	58
Other	5.93%	7
Total Respondents: 118		

Q14: What barriers do you encounter in making energy savings changes in your home? (Check all that apply)

Answered: 118 Skipped: 22

Answer Choices	Responses	
Cost	82.20%	97
Time	25.42%	30
Convenience	27.12%	32
Lack of necessity	20.34%	24
Do not know who to contact	9.32%	11
Other (please specify)	5.93%	7
Total Respondents: 118		

Q15: The most effective method for Idaho Power to provide information about energy efficiency is to: (Check all that apply)

Answered: 117   Skipped: 23

Answer Choices	Responses	
Offer classes in convenient locations	13.68%	16
Communicate information in local newspapers	16.24%	19
Communicate information on the Idaho Power website	26.50%	31
Communicate information on social media	18.80%	22
Offer a minimal cost home audit service	57.26%	67
Send newsletters or information directly to homeowners	51.28%	60
Send email communications to homeowners	29.91%	35
Send information in monthly Idaho Power bill	76.07%	89
Other (please specify)	5.98%	7
Total Respondents: 117		

Q16: How much do you agree with the following statements:

Answered: 117 Skipped: 23

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Total
My Home Energy Audit report contained valuable information	**69.83%** 81	**25.00%** 29	**3.45%** 4	**1.72%** 2	116
I would recommend the Home Energy Audit program to a friend or relative	**69.57%** 80	**26.09%** 30	**2.61%** 3	**1.74%** 2	115
I am satisfied with my overall experience with the Home Energy Audit program	**70.09%** 82	**22.22%** 26	**5.98%** 7	**1.71%** 2	117

Q18: Please identify your age in the ranges below:

Answered: 119   Skipped: 21

Answer Choices	Responses	
Under 25	0.00%	0
26-35	0.84%	1
36-50	15.13%	18
51-65	43.70%	52
Over 65	40.34%	48
Total		119

Q19: What is the highest level of education you completed?

Answered: 117 Skipped: 23

Answer Choices	Responses	
Less than high school	0.85%	1
Some high school	0.85%	1
High school graduate or equivalent	13.68%	16
Some college	23.93%	28
Two year Associate degree orTrade/Technical school	14.53%	17
Four year college degree	24.79%	29
Some graduate courses	6.84%	8
Advanced degree	14.53%	17
Total		117

Q20: May we use your name and comments in Idaho Power's communication efforts?

Answered: 119   Skipped: 21

Answer Choices	Responses	
Yes	54.62%	65
No	45.38%	54
Total		**119**

Q21: Do you have any issues or concerns you would like us to contact you about?

Answered: 116 Skipped: 24

Answer Choices	Responses	
Yes	12.93%	15
No	87.07%	101
Total		116

15021 A0060 IP-CAPAI 0000000

FILL IN EACH BUBBLE COMPLETELY

Using a black pen or pencil, fill in the bubble completely.
Please do not copy or fold forms.

YES NO

SAVINGS TARGET

1. How much would you like to save?
   - O $22 – Install the LED light bulbs, LED night light, and the Kitchen Faucet Aerator.
   - O $138 – Install the above items, unplug an unused refrigerator or freezer, and install the indoor clothes line.
   - O $320 – Complete all the Easy Savings® Quick Start Guide Steps.

HEATING

2. Have you lowered your heat during the day?
   O Yes, I lowered it O Yes, I plan to lower it O No

3. Have you lowered your heat at night?
   O Yes, I lowered it O Yes, I plan to lower it O No

4. Did you place the Thermostat Temperature Sticker near your thermostat?
   O Yes, I placed it O Yes, I plan to place it O No
   As seasons change, adjusting your thermostat just 5 degrees or more could SAVE up to $117 per year!

LIGHTING

5. Did you install the first 9-watt Light-Emitting Diode (LED)?
   O Yes, I installed it O Yes, I plan to install it O No

6. Did you install the second 9-watt Light-Emitting Diode (LED)?
   O Yes, I installed it O Yes, I plan to install it O No

7. Did you install the third 9-watt Light-Emitting Diode (LED)?
   O Yes, I installed it O Yes, I plan to install it O No

8. Did you install the LED Night Light?
   O Yes, I placed it O Yes, I plan to place it O No

FOLD - DO NOT PRINT

9. Did you install the Draft Stoppers?
   O Yes, I installed them O Yes, I plan to install them O No

10. Do you turn off lights in empty rooms more often now?
    O Yes O No
    Using LEDs and shutting off unused lights can SAVE up to $13 or more a year!

WATER

11. Did you install the Kitchen Faucet Aerator?
    O Yes, I installed it O Yes, I plan to install it
    O No, it does not fit pipes O No
    By installing a Kitchen Faucet Aerator, you could SAVE up to $9 a year!

12. Do you use cold water when you do your laundry?
    O Yes, always O Yes, Sometimes O Never

13. Did you place the Wash in Cold Water Magnet on your washing machine?
    O Yes, I placed it O Don't have a washing machine
    O Yes, I plan to place it O No
    By washing your laundry in cold water, you could SAVE up to $37 per year!

14. Did you use the Digital Thermometer to check the temperature of your water?
    O Yes O Yes, I plan to use it O No

15. Did you change the temperature setting of your water heater?
    O Yes, I raised it (warmer) O Yes, I lowered it (cooler) O No
    Lowering the temperature on your water heater can SAVE up to $10 a year!

APPLIANCES

16. Did you check the temperature of your refrigerator(s) and freezer(s)?
    O Yes O Yes, I plan to check it O No

17. Did you adjust the temperature of your refrigerator(s) and freezer(s)?
    O Yes, turned up (warmer) O Yes, turned down (cooler) O No
    Adjusting the setting of your refrigerator can SAVE up to $5 a year!

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18. Did you unplug your old or unused refrigerator(s) and freezers(s)?
    O Yes, I unplugged 1 unit O Yes, I unplugged 2 units O Not applicable
    O Yes, I plan to unplug 1 unit O Yes, I plan to unplug 2 units O No

19. Did you install the Indoor Clothes Line?
    O Yes O Yes, I plan to install it O No
    Unplugging old refrigerators and freezers and using the Indoor Clothes Line can SAVE up to $116 a year!

20. Did you place the Turn Your Computer Off Sticker on your computer?
    O Yes O I don't have a computer O No
    Turning your computer and monitor off when unused can SAVE $12 a year!

EASY SAVINGS® QUICK START GUIDE

21. How many items from your Easy Savings® Kit did you install?
    O All O 3 O 1
    O 4 or more O 2 O None

22. How effective was the Easy Savings Quick Start Guide in helping you become more energy efficient?
    O Very effective O Somewhat effective O Not effective at all O Didn't use

23. Now that you have completed the Easy Savings® Quick Start Guide, how much have you learned about saving energy and money in your home?
    O I learned a lot O I learned a little O Nothing

RETURN THIS COMPLETED SURVEY IN THE POSTAGE-PAID ENVELOPE FOUND INSIDE THE KIT OR VISIT WWW.GETWISE.ORG/SURVEY/IP-CAPAI AND RESPOND ONLINE FOR A CHANCE TO WIN $100!

IDAHO POWER-CAPAI
EASY SAVINGS SURVEY
Español en el otro lado

An IDACORP Company

COMPLETE AND RETURN THIS SURVEY FOR A CHANCE TO WIN

$100

ALL YOU HAVE TO DO IS...

1. **INSTALL THE ENERGY-EFFICIENCY PRODUCTS** in your Easy Savings kit at your home.
2. **IMPLEMENT THE QUICK STEPS** outlined in the Quick Start Guide and try the energy saving tips.
3. **COMPLETE AND RETURN THIS SURVEY** for a chance to win a $100!* *(Postage paid envelope included.)*
   OR COMPLETE IT ONLINE.
   Visit www.getwise.org/survey/IP-CAPAI

* For $100 drawing contest information, contact CAPAI at 208-375-7382
** All savings estimates are based on typical electrically heated Idaho households implementing all suggested changes. Your personal savings may vary.

111269

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2014-2015

IDAHO POWER
ENERGY WISE® PROGRAM SUMMARY REPORT

SUBMITTED BY:
RESOURCE ACTION PROGRAMS®

RESOURCEACTION
PROGRAMS

Idaho Power Energy Wise®
Program Summary Report
2014-2015

Made possible by:

IDAHO POWER®

An IDACORP Company

Submitted by:

RESOURCEACTION PROGRAMS

August 2015

““My son came home very excited to test the products. He had a lot of fun and has learned a lot. The kit was very easy to use. We were done in 15 minutes to test everything out.”

Jan Merrill, Parent
Ellis Elementary School

Table of Contents

"I liked having my son do the calculations to learn how much was being saved with new light bulbs."

Ann Waibel, Parent
Washington Elementary

Executive Summary

Resource Action Programs® (RAP) is pleased to present this Program Summary Report to Idaho Power, which summarizes the 2014-2015 Idaho Power Energy Wise® Program. The program was implemented in the Idaho Power service area in the state of Idaho by 6,699 teachers, students, and their families.

The following pages provide an overview of the program and materials, outline of program implementation, introduction to the program team, description of program enhancements, impact of the program, and summary of results from the home activities. In addition to this information, evaluations, letters, and comments are provided for a glimpse into actual participant feedback. Lastly, projected savings from the individual measures found within the Energy Wise Kit are also included.

Participant Satisfaction

A successful program excites and engages participants. Students, parents, and teachers are asked to evaluate the program and provide personal comments. A sample of the feedback is given in the margin. ›

Teachers who indicated parents supported the program.

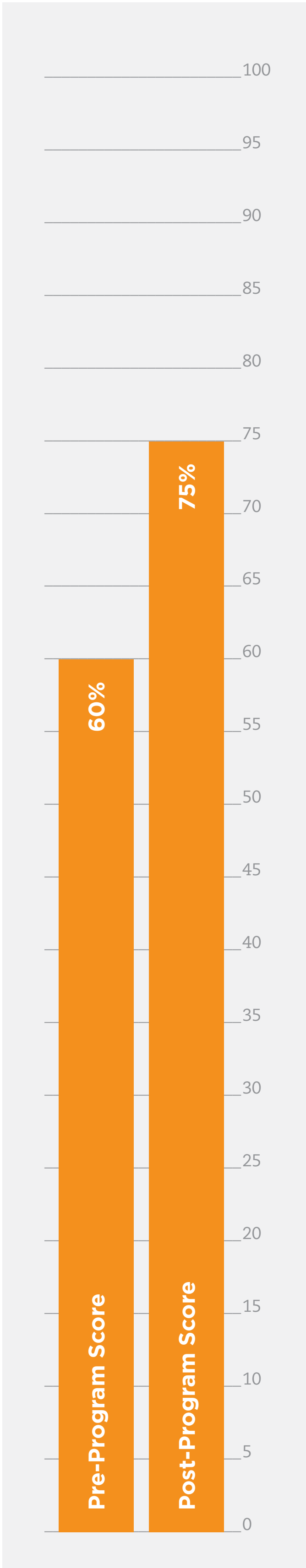
Teachers who indicated they would recommend this program to other colleagues.

Teachers who indicated they would conduct this program again.

A summary of responses can be found in Appendix D.

Knowledge Gained

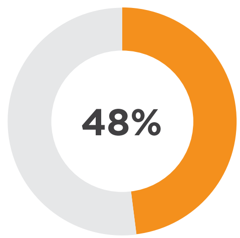
Identical tests were administered to the students prior to the program and again upon program completion to measure knowledge gained. Scores and subject knowledge improved from **60%** to **75%**.



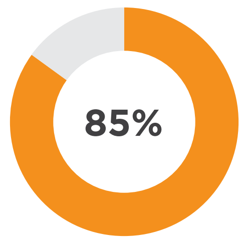
Measures Installed

Students completed take-home activities as part of the program and reported on the kit measures they installed in their homes.

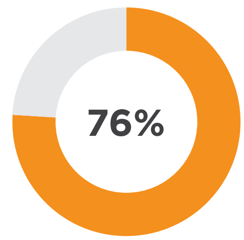
A summary of responses can be found in Appendix B.



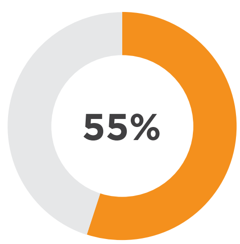
Students who reported they installed the High-Efficiency Showerhead.



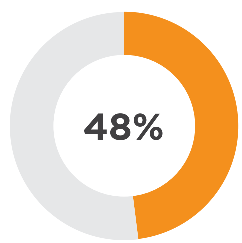
Students who indicated they installed the LED Night Light.



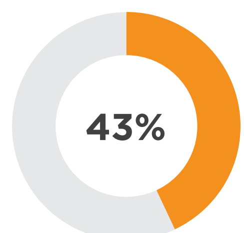
Students who reported they used the Shower Timer.



Students who reported they installed the 13-watt CFL.



Students who reported they installed the 18-watt CFL.



Students who reported they installed the 23-watt CFL.

Student Survey Response by Region

	Total	Capital	Canyon	Eastern	Southern	Western
Participants	6,699	1,423	2,484	1,014	982	796
Surveys Received	4,885	919	1,951	814	606	595
Percent Response	73%	65%	79%	80%	62%	75%

Energy and Water Savings Results

In addition to educating students and their parents, a primary program goal is to generate cost-effective energy and water savings. Student home surveys not only provided the data used in the savings projections, but also reinforced the learning benefits.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

PROJECTED ANNUAL SAVINGS	
11,448,794	gallons of water saved
1,476,013	kWh of electricity saved
46,187	therms of gas saved
11,448,794	gallons of wastewater saved

PROJECTED LIFETIME SAVINGS	
114,487,937	gallons of water saved
14,651,467	kWh of electricity saved
461,874	therms of gas saved
114,487,937	gallons of wastewater saved

PROJECTED ANNUAL SAVINGS PER HOME	
1,709	gallons of water saved
220	kWh of electricity saved
7	therms of gas saved
1,709	gallons of wastewater saved

PROJECTED LIFETIME SAVINGS PER HOME	
17,090	gallons of water saved
2,187	kWh of electricity saved
69	therms of gas saved
17,090	gallons of wastewater saved

“Our daughter taught us so much. We didn’t know some of these items existed. We will buy more shower heads and timers. We appreciate learning more about saving energy and are grateful for your sponsorship. Thank you!”

Jodi Erickson, Parent

Greenacres Elementary School

Program Overview

The Idaho Power Energy Wise® Program, a school-based energy efficiency education program, is designed to generate immediate and long-term resource savings by bringing interactive, real-world education home to students and their families. The 2014-2015 program was taught in grades 3-6 throughout the Idaho Power service area.

The Idaho Power Community Education Representative program team identifies and enrolls students and teachers within the designated service area. The program physically begins with classroom discussions in a Student Guide that provide the foundations of using energy and water efficiently, followed by hands-on, creative, problem solving activities led by the classroom teacher.

All program materials support state and national academic standards to allow the program to fit easily into a teacher's existing curriculum and requirements. The participating classroom teachers follow the Teacher Book and lesson plan. Information is given to guide lessons throughout the program in order to satisfy each student's individual needs, whether they are visual, auditory, or kinesthetic learners.

The Energy Wise Kit and Student Workbook comprise the take-home portion of the program. Students receive a kit containing high-efficiency measures they use to install within their homes. With the help of their parents/guardians, students install the kit measures and complete a home survey. The act of installing and monitoring new energy efficiency devices in their homes allows students to put their learning into practice. Here, participants and their parents/guardians realize actual water and energy savings within their home, benefitting two generations.

A critical element of RAP program design is the use of new knowledge through reporting. At the end of the program, the Idaho Power program team tabulates all participant responses—including home survey information, teacher responses, student letters, and parent feedback—and generates this Program Summary Report.

“They liked all aspects of this course. I was pleased with the level of engagement they demonstrated.”

Fred Anderson, Teacher

Groveland Elementary

Program Materials

Each participant in the Idaho Power Energy Wise® Program receives classroom materials and energy efficiency kits containing high-efficiency measures to perform the program's take-home activities. Program materials for students, parents/guardians, and teachers are outlined below.

Each Student & Teacher Receives

Student Guide

Student Workbook

Parent/Guardian Program Introduction Letter*

Student Survey Form

Certificate of Achievement

Energy Wise Kit Containing:

- High-Efficiency Showerhead*
- Shower Timer
- LED Night Light
- 13-watt Compact Fluorescent Lamp
- 18-watt Compact Fluorescent Lamp
- 23-watt Compact Fluorescent Lamp
- FilterTone® Alarm*
- Digital Thermometer*
- Reminder Stickers and Magnet Pack
- Flow Rate Test Bag
- Natural Resource Fact Chart
- Parent/Guardian Program Evaluation
- Installation DVD

Idaho Power "Get Wise" Wristband

Website Access at:

http://www.idahopower.com/wise

Toll-Free HELP Line

Each Teacher/Classroom Receives

Teacher Book

Step-by-Step Program Checklist

Lesson Plans

Idaho State and National Academic Standards Chart

Extra Activities

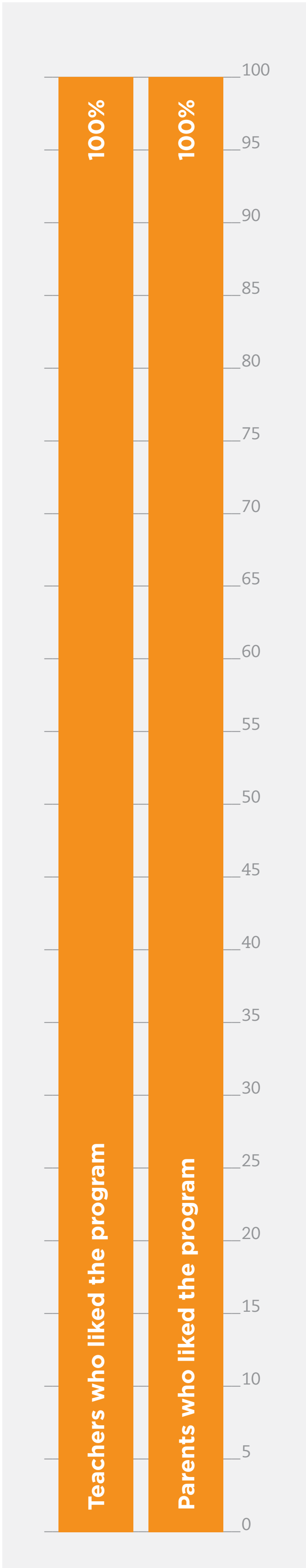
Teacher Program Evaluation

Pre/Post Student Survey Answer Keys

Electricity Poster

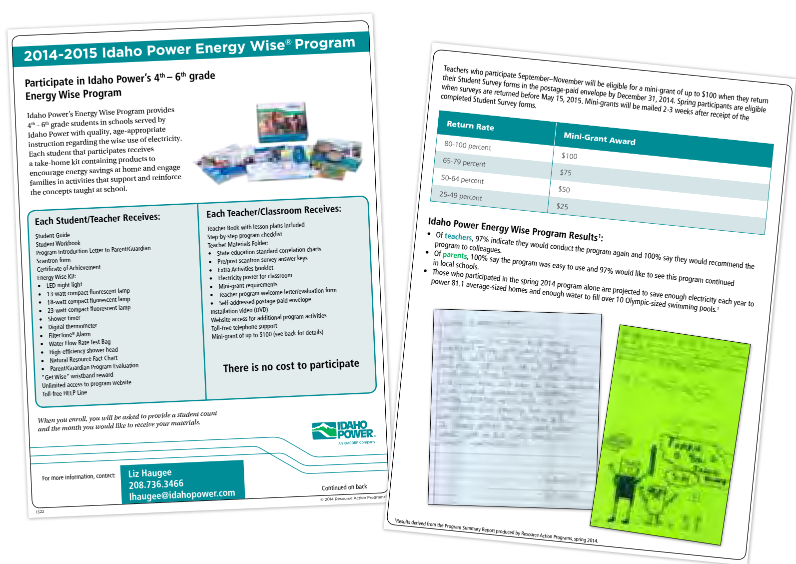
Self-Addressed Postage-Paid Envelope

* *Materials / Installation Instructions provided in English and Spanish*



Custom Branding

In addition to increasing resource awareness and efficiency, the program has been designed to strengthen bonds between Idaho Power and the community. One of the steps taken to ensure the greatest possible exposure is to feature the Idaho Power logo throughout each Energy Wise Kit. In addition to the kit, the Teacher Program Evaluation and Parent/Guardian Program Introduction Letter also feature Idaho Power branding. Further, a custom Teacher Solicitation Flyer was created for Community Education Representatives' program promotion and a cross-marketing Residential Energy Efficiency promotional brochure included to promote other energy-efficiency programs.



2014-2015 Idaho Power Energy Wise® Program

Participate in Idaho Power's 4th – 6th grade Energy Wise Program

Idaho Power's Energy Wise Program provides 4th – 6th grade students in schools served by Idaho Power with quality, age-appropriate instruction regarding the wise use of electricity. Each student that participates receives a take-home kit containing products to encourage energy savings at home and engage families in activities that support and reinforce the concepts taught at school.

Each Student/Teacher Receives:

Student Guide
Student Workbook
Program Introduction Letter to Parent/Guardian
Scantron form
Certificate of Achievement
Energy Wise Kit:
- LED night light
- 13-watt compact fluorescent lamp
- 18-watt compact fluorescent lamp
- 23-watt compact fluorescent lamp
- Shower timer
- Digital thermometer
- FilterTone® Alarm
- Water Flow Rate Test Bag
- High-efficiency shower head
- Natural Resource Fact Chart
- Parent/Guardian Program Evaluation

"Get Wise" wristband reward
Unlimited access to program website
Toll-free HELP Line

Each Teacher/Classroom Receives:

Teacher Book with lesson plans included
Step-by-step program checklist
Teacher Materials Folder:
- State education standard correlation charts
- Pre/post scantron survey answer keys
- Extra Activities booklet
- Electricity poster for classroom
- Mini-grant requirements
- Teacher program welcome letter/evaluation form
- Self-addressed postage-paid envelope

Installation video (DVD)
Website access for additional program activities
Toll-Free telephone support
Mini-grant of up to $100 (see back for details)

There is no cost to participate

When you enroll, you will be asked to provide a student count and the month you would like to receive your materials.

IDAHO POWER. An IDACORP Company

For more information, contact: Liz Haugee 208.736.3466 lhaugee@idahopower.com

Continued on back

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Teachers who participate September–November will be eligible for a mini-grant of up to $100 when they return their Student Survey forms in the postage-paid envelope by December 31, 2014. Spring participants are eligible when surveys are returned before May 15, 2015. Mini-grants will be mailed 2-3 weeks after receipt of the completed Student Survey forms.

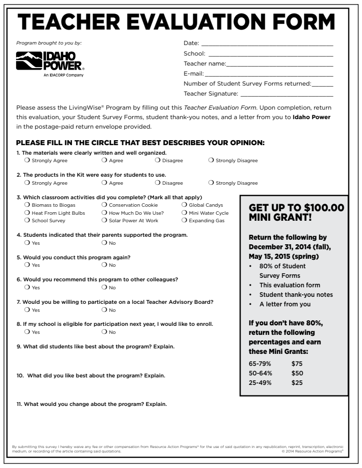
Return Rate	Mini-Grant Award
80-100 percent	$100
65-79 percent	$75
50-64 percent	$50
25-49 percent	$25

Idaho Power Energy Wise Program Results[1]:

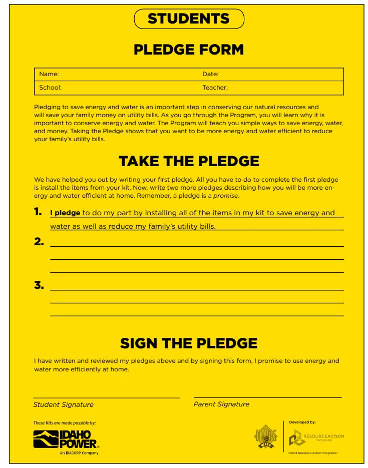
- Of teachers, 97% indicate they would conduct the program again and 100% say they would recommend the program to colleagues.
- Of parents, 100% say the program was easy to use and 97% would like to see this program continued in local schools.
- Those who participated in the spring 2014 program alone are projected to save enough electricity each year to power 81.1 average-sized homes and enough water to fill over 10 Olympic-sized swimming pools.[1]

[1]Results derived from the Program Summary Report produced by Resource Action Programs, spring 2014.

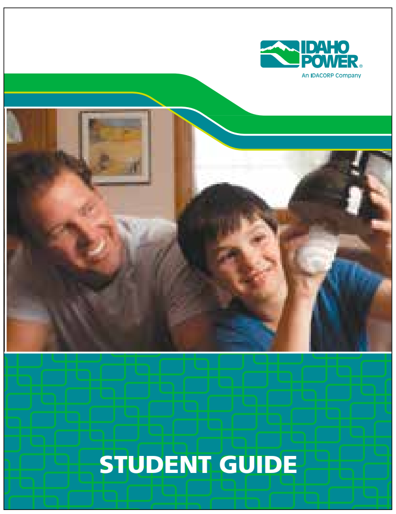
Program Materials



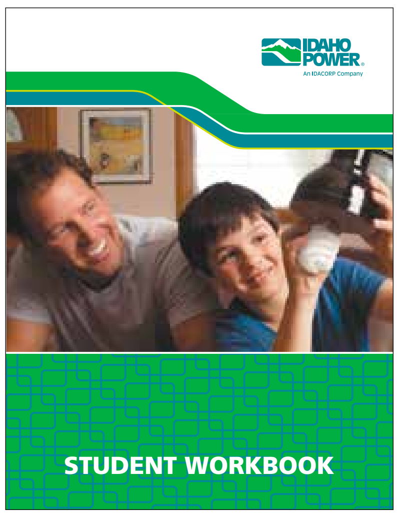
Teacher Evaluation Form



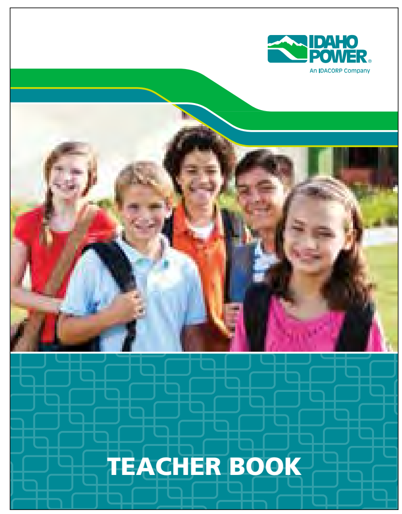
Parent Letter/Pledge Form



Student Guide



Student Workbook



Teacher Book

Certificate of Achievement

Kit Box

"The students liked trying all the new materials. They enjoyed installing them."

Meko Myers, Teacher

Valley View Elementary School

Program Implementation

The 2014-2015 Idaho Power Energy Wise® Program followed this comprehensive implementation schedule:

1. Identification of Idaho state and national academic standards & benchmarks
2. Curriculum development and refinement (completed annually)
3. Curriculum correlation to Idaho state and national academic standards & benchmarks
4. Materials modification to incorporate Idaho Power branding
5. Incentive program development
6. Teacher outreach and program introduction by Idaho Power CERs
7. Teachers enrolled in the program individually by Idaho Power CERs
8. Implementation dates scheduled with teachers by Idaho Power CERs
9. Program material delivered to coincide with desired implementation date
10. Delivery confirmation
11. Periodic contact to ensure implementation and teacher satisfaction
12. Program completion incentive offered
13. Results collection
14. Program completion incentive delivered to qualifying teachers
15. Thank you cards sent to participating teachers
16. Data analysis
17. Program Summary Report generated and distributed

Participating teachers are free to implement the program to coincide with their lesson plans and class schedules. Appendix C provides a comprehensive list of classrooms in grades 3-6 that participated during the 2014-2015 school year.

For more than 22 years, Resource Action Programs (RAP) has designed and implemented Measure-Based Education® programs that inspire change in household energy and water use while delivering significant, measurable resource savings. All RAP programs feature a proven blend of innovative education, comprehensive implementation services, and hands-on activities to put efficiency knowledge to work in students' homes.

RAP has a strong reputation for providing a high level of client service as part of a wide range of energy efficiency education solutions for utilities, municipalities, states, community agencies, corporations, and more. In 2013, RAP was the only conservation services provider honored by the American Council for an Energy-Efficient Economy (ACEEE) and the Alliance for Water Efficiency (AWE) as one of 12 top programs that provides sustained achievement. RAP was honored for market penetration, innovative design, and its ability to achieve substantial/sustained energy and water savings.

ACEEE
American Council for an Energy-Efficient Economy

Alliance for Water Efficiency

Program Team

RAP implements nearly 300 individual programs that serve more than 400,000 households each year. All-inclusive program delivery occurs in its 80,000 square-foot Nevada Program Center where implementation teams and support departments work together to provide:

- 1:1 teacher support
- Curriculum development
- Customized materials
- Data tracking and reporting
- Energy and water efficiency measures
- Graphic and web design
- Kit assembly
- Marketing communications
- Shipping
- Printing
- Program management
- Participant enrollment
- Warehousing

The Implementation Team

For the Idaho Power Energy Wise® Program, RAP assigned a specific implementation team to Idaho Power made up of a PMP®-designated Program Manager, CEM®-designated energy analyst, graphic designer, outreach personnel, educator, and administrative staff. This team immersed themselves into the Idaho Power brand, and handled all program implementation for Idaho Power. Idaho Power also received the benefit of fully staffed support departments, which worked with the implementation team to define success for Idaho Power. These departments include education, marketing, information technology, and warehouse/logistics.

Continuous Improvement

In addition to successful implementation of the Idaho Power Energy Wise Program, RAP engages in continuous program improvement, as well as enhancements to educational materials, with modifications based on emerging technology, industry trends, and EM&V findings.

As part of this plan, RAP utilizes an extensive network of educators for program feedback. This feedback ensures that educational components meet the changing needs of educators, keep information relevant to students, and, in turn, provide increased water and energy literacy amongst program participants.

"They loved working through the different components of the kit with their parents. I heard how much fun it was."

Anthony Haskett, Teacher
Ronald Reagan Elementary School

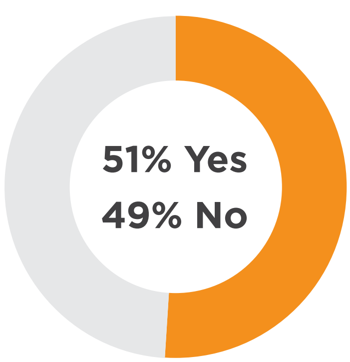
Program Impact

The Idaho Power Energy Wise® Program has had a significant impact within the community. As illustrated below, the program successfully educated participants about energy and water efficiency while generating resource savings through the installation of efficiency measures in homes. Home survey information was collected to track projected savings and provide household consumption and demographic data. Program evaluations and comments were collected from teachers, students, and parents. The following program elements were used to collect this data:

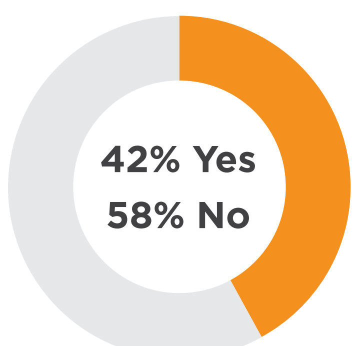
A. Home Survey for Capital Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 49 participating teachers in the Capital region, 40 (82%) returned survey results for the program. Students were asked to install the kit measures and complete the home activities with parent assistance. Of the 1,374 participating children in the Capital region, 919 (67%) returned completed surveys.

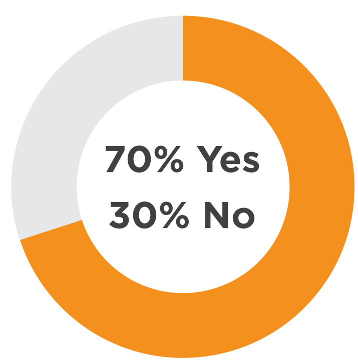
Did your family install the 13-watt Compact Fluorescent Lamp (CFL)?	**Yes - 51%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 42%**
Did your family change the way they use energy?	**Yes - 70%**



Students who indicated they installed the 13-watt Compact Fluorescent Lamp.



Students who indicated they installed the High-Efficiency Showerhead.

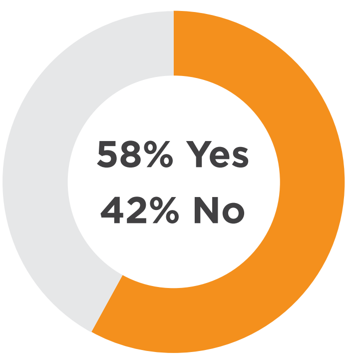


Students who indicated their family changed the way they use energy.

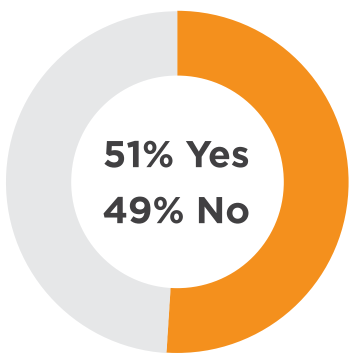
Home Survey for Canyon Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 83 participating teachers in the Canyon region, 75 (90%) returned survey results for the program. Students were asked to install the kit measures and complete the home activities with parent assistance. Of the 2,401 participating children in the Canyon region, 1,951 (81%) returned completed surveys.

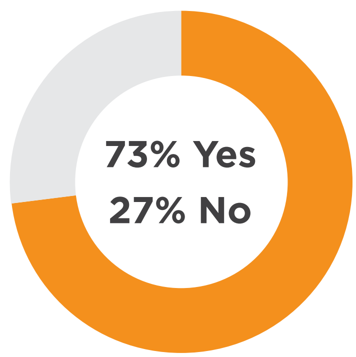
Did your family install the 13-watt Compact Fluorescent Lamp (CFL)?	**Yes - 58%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 51%**
Did your family change the way they use energy?	**Yes - 73%**



Students who indicated they installed the 13-watt Compact Fluorescent Lamp.



Students who indicated they installed the High-Efficiency Showerhead.

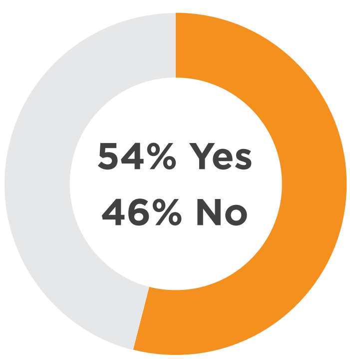


Students who indicated their family changed the way they use energy.

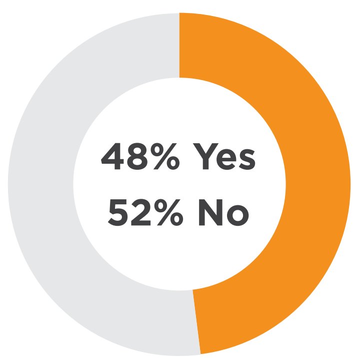
Home Survey for Eastern Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 39 participating teachers in the Eastern region, 35 (90%) returned survey results for the program. Students were asked to install the kit measures and complete the home activities with parent assistance. Of the 975 participating children in the Eastern region, 814 (83%) returned completed surveys.

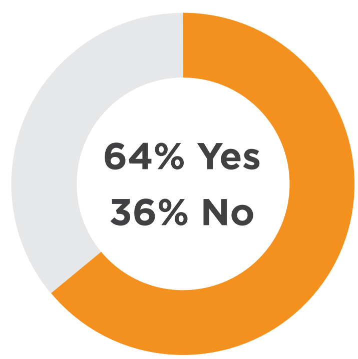
Did your family install the 13-watt Compact Fluorescent Lamp (CFL)?	**Yes - 54%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 48%**
Did your family change the way they use energy?	**Yes - 64%**



Students who indicated they installed the 13-watt Compact Fluorescent Lamp.



Students who indicated they installed the High-Efficiency Showerhead.

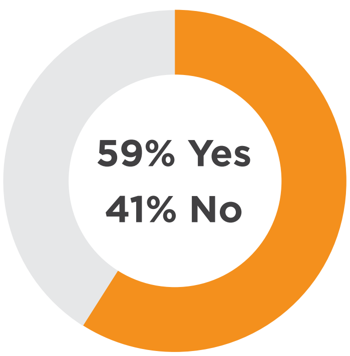


Students who indicated their family changed the way they use energy.

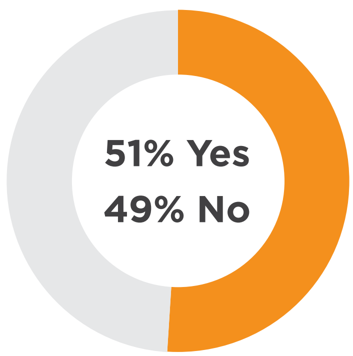
Home Survey for Southern Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 35 participating teachers in the Southern region, 23 (66%) returned survey results for the program. Students were asked to install the kit measures and complete the home activities with parent assistance. Of the 947 participating children in the Southern region, 606 (64%) returned completed surveys.

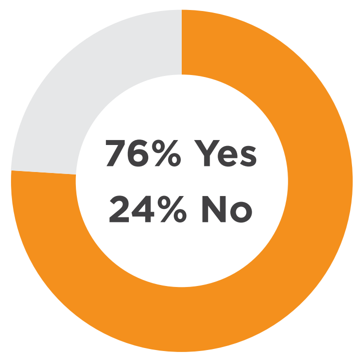
Did your family install the 13-watt Compact Fluorescent Lamp (CFL)?	**Yes - 59%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 51%**
Did your family change the way they use energy?	**Yes - 76%**



Students who indicated they installed the 13-watt Compact Fluorescent Lamp.



Students who indicated they installed the High-Efficiency Showerhead.

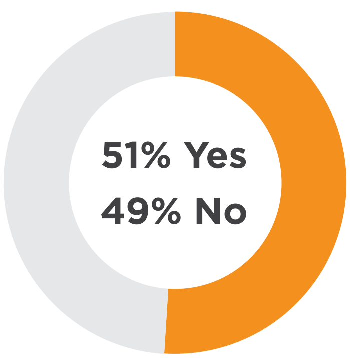


Students who indicated their family changed the way they use energy.

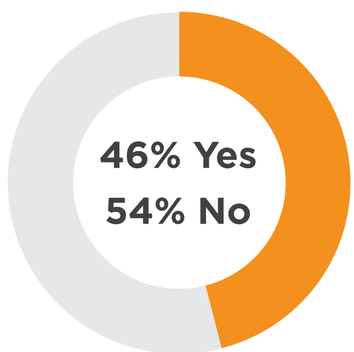
Home Survey for Western Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 20 participating teachers in the Western region, 17 (85%) returned survey results for the program. Students were asked to install the kit measures and complete the home activities with parent assistance. Of the 776 participating children in the Western region, 595 (77%) returned completed surveys.

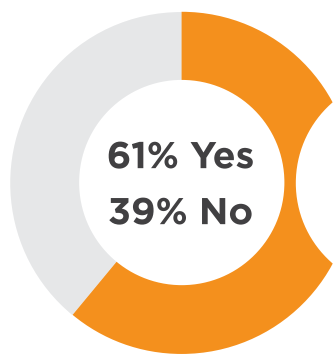
Did your family install the 13-watt Compact Fluorescent Lamp (CFL)?	**Yes - 51%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 46%**
Did your family change the way they use energy?	**Yes - 61%**



Students who indicated they installed the 13-watt Compact Fluorescent Lamp.



Students who indicated they installed the High-Efficiency Showerhead.

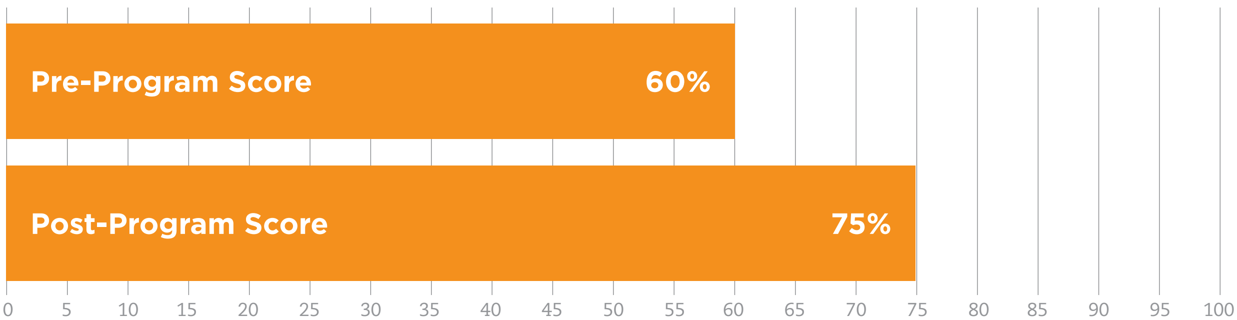


Students who indicated their family changed the way they use energy.

B. Pre-Program and Post-Program Tests

Students were asked to complete a 10-question test before the program was introduced and then again after it was completed to determine the knowledge gained through the program. The average student answered **6.0** questions correctly prior to being involved in the program and then improved to answer **7.5** questions correctly following participation. Of the 6,473 students participating, 4,885 returned survey responses.

Scores improved from 60% to 75%.



Pre-Program and Post-Program Test Questions

		Pre	Post
1	Which layer of Earth do we live on?		
	Crust	69%	87%
	Mantle	6%	3%
	Inner Core	7%	3%
	Outer Core	17%	7%
2	Non-Potable water is safe to drink.		
	True	23%	13%
	False	77%	87%
3	Which of these is not a renewable resource?		
	Wind	19%	11%
	Plants	5%	3%
	Gold	59%	77%
	Animals	16%	9%

4	Saving water saves energy.		
	True	86%	95%
	False	14%	5%
5	Which are fossil fuels?		
	Coal	21%	17%
	Oil	11%	6%
	Natural Gas	14%	8%
	All of the above	54%	69%
6	Which type of energy is created in the process of Photosynthesis?		
	Nuclear Energy	20%	15%
	Thermal Energy	25%	20%
	Chemical Energy	32%	54%
	Electric Energy	24%	11%
7	Which kit item will save the most natural resources?		
	Compact Fluorescent Lamp	19%	15%
	High-Efficiency Showerhead	35%	59%
	FilterTone® Alarm	18%	9%
	LED Night Light	28%	16%
8	Which major appliance uses the most energy?		
	Dishwasher	19%	15%
	Refrigerator	62%	67%
	Dryer	20%	18%
9	A Compact Fluorescent Lamp (CFL) uses more energy than an incandescent bulb.		
	True	41%	25%
	False	59%	75%
10	On-peak time is the best time to play video games.		
	True	28%	18%
	False	72%	82%

C. Home Activities—Summary

As part of the program, parents and students installed resource efficiency measures in their homes. They also measured the pre-existing devices to calculate savings that they generated. Using the family habits collected from the home survey as the basis for this calculation, 6,699 households are expected to save the following resource totals. Savings from these actions and new behaviors will continue for many years to come. Of the 6,473 students participating, 4,885 returned survey responses.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

Number of Participants:	**6,699**		
	Annual	**Lifetime**	
Projected reduction from Showerhead retrofit:	**11,448,794**	**114,487,937**	gallons
Product Life: **10 years**	**729,102**	**7,291,025**	kWh
	38,730	**387,305**	therms
Projected reduction from **13**-watt Compact Fluorescent Lamp (CFL):	**172,519**	**1,682,047**	kWh
Product Life: **10,000 hours**			
Projected reduction from **18**-watt Compact Fluorescent Lamp (CFL):	**140,646**	**1,371,283**	kWh
Product Life: **10,000 hours**			
Projected reduction from **23**-watt Compact Fluorescent Lamp (CFL):	**121,333**	**1,182,989**	kWh
Product Life: **10,000 hours**			
Projected reduction from LED Night Light retrofit:	**161,910**	**1,619,103**	kWh
Product Life: **10,000 hours**			
Projected reduction from FilterTone® installation:	**150,502**	**1,505,021**	kWh
Product Life: **10 years**	**7,457**	**74,569**	therms
TOTAL PROGRAM SAVINGS:	**11,448,794**	**114,487,937**	gallons
	1,476,013	**14,651,467**	kWh
	46,187	**461,874**	therms
TOTAL PROGRAM SAVINGS PER HOUSEHOLD:	**1,709**	**17,090**	gallons
	220	**2,187**	kWh
	7	**69**	therms

D. Teacher Program Evaluation

Program improvements are based on participant feedback received. One of the types of feedback obtained is from participating teachers via a Teacher Program Evaluation Form. They are asked to evaluate relevant aspects of the program and each response is reviewed for pertinent information. The following is feedback from the Teacher Program Evaluation for the Idaho Power Energy Wise Program. Of the 226 participating teachers, 157 returned teacher program evaluation surveys.

Teacher Response

(A summary of responses and regional data can be found in Appendix D)

100% of participating teachers indicated they would conduct the program again given the opportunity.

100% of participating teachers indicated they would recommend the program to their colleagues.

What did students like best about the program? Explain.

"Taking the kits home and installing the items and then sharing their experiences with the class."
Heather Tucker, Desert Springs Elementary School

"They liked all aspects of this course. I was pleased with the level of engagement they demonstrated."
Fred Anderson, Groveland Elementary

"They liked learning about different ways they could save energy to save money. They also liked that they kit allowed them to include their families in this activity."
Katie Strawser, Desert Springs Elementary School

"The students liked the energy-saving kits. They enthusiastically and conscientiously applied all the products they could."
Petra Vawter, Marsing Middle School

"The kits! We talked about them nearly every day!"
Amy Mattei, West Canyon Elementary

"The night light was a big hit. The student guide as it brought about good peer to peer discussions."
John Harlan, Central Elementary School

"They loved having their own booklets and the activities that came with the reading."
Maggie Mahler, Whittier Elementary School

What did you like best about the program? Explain.

"It created conversation about energy and what we use. It goes along well with our electricity unit."
Glen Kershaw, Mill Creek Elementary School

E. Parent/Guardian Program Evaluation

Parent involvement with program activities and their children is of paramount interest to both utilities and teachers in the program. When parents take an active role in their child's education it helps the schools and strengthens the educational process considerably. When students successfully engage their families in retrofit, installation, and home energy efficiency projects, efficiency messages are powerfully delivered to two generations in the same household. The program is a catalyst for this family interaction, which is demonstrated by feedback from Parent/Guardian Program Evaluations in each program. The following is feedback from the Parent/Guardian Program Evaluations for the Idaho Power Energy Wise Program. Of the 6,473 participating families, 107 parents returned program evaluation surveys.

Parent Response

(A summary of responses and regional data can be found in Appendix E)

98% of participating parents indicated that the program was easy to use.

99% of participating parents indicated they would continue to use the kit items after the completion of the program.

99% of participating parents indicated they would like to see this program continued in local schools.

As a parent, which aspect of the program did you like best?

"I liked having my son do the calculations to learn how much was being saved with new light bulbs."
Ann Waibel, Washington Elementary

"The children learn how much water and power is required to do normal day activities."
Ellen Makinster, Lake Ridge Elementary School

"I liked the shower head and timer the most. My kids shower way too long, so I think they will make a difference."
Steven Fisher, Indian Creek & Ross Elementary School

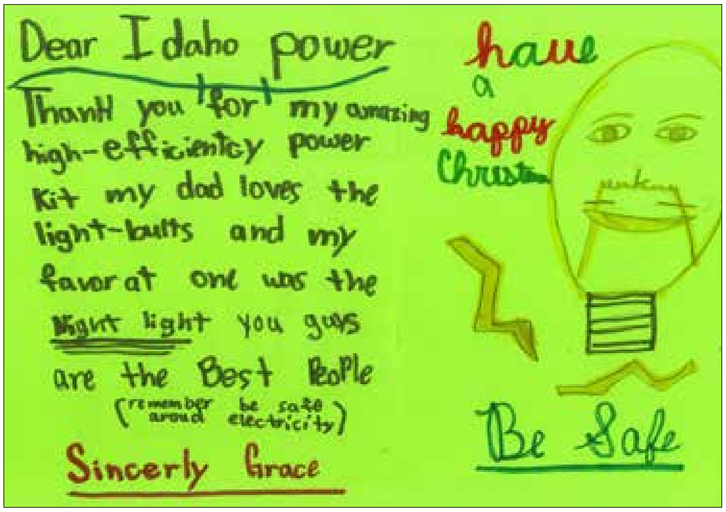
"That the kids learn the importance of using resources wisely and are taught ways to do so."
Kari Whitney, Filer Intermediate School

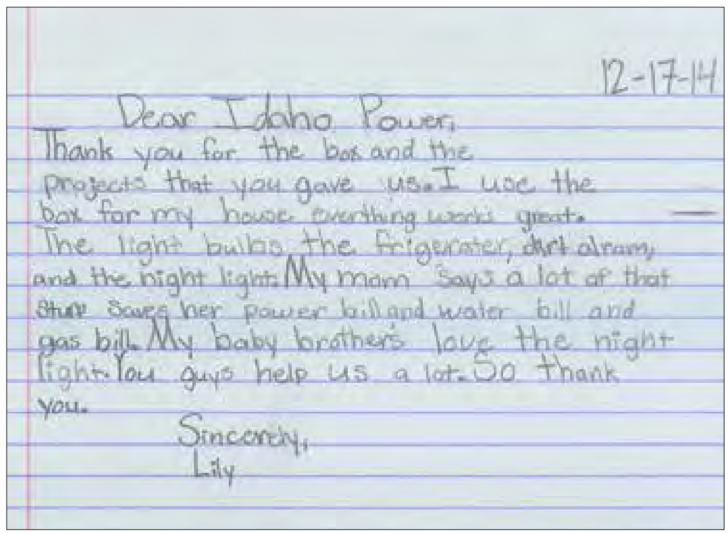
"I like that you are educating kids on the importance of saving energy."
Alexis Jimenez, Birch Elementary School

Are there any comments you would like to express to your child's program sponsor?

"This is an awesome program! I'm glad Idaho Power is taking an initiative to teach our young generations how to conserve resources. Way to go!"
Kari Whitney, Filer Intermediate School

F. Student Letters





12-17-14

Dear Idaho Power,

Thank you for the box and the projects that you gave us. I use the box for my house. everthing works great. The light bulbs, the frigerater, dort alram, and the night light. My mom says a lot of that stuff saves her power bill and water bill and gas bill. My baby brothers love the night light. You guys help us a lot. So thank you.

Sincerely,
Lily

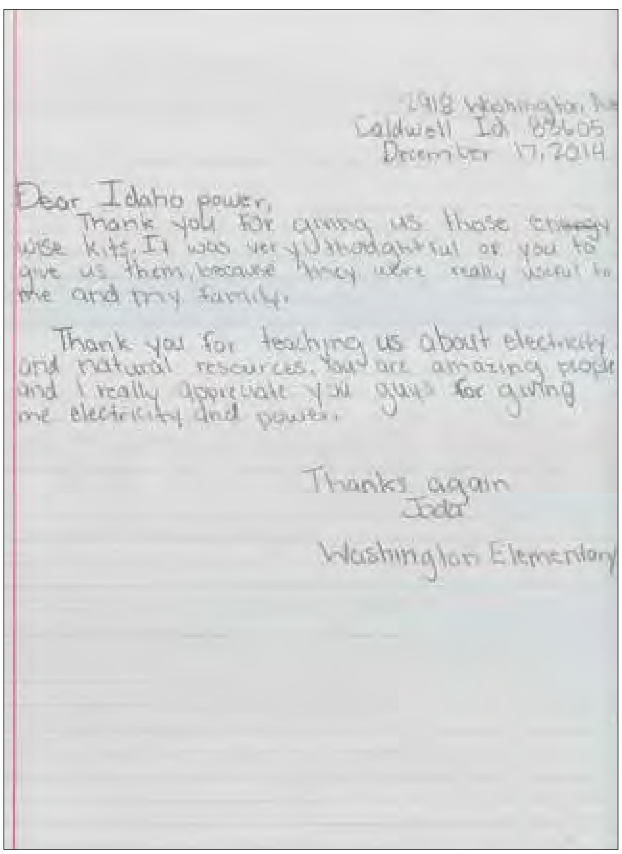
Dear Idaho Power Company

Thank you for giving us the box of supplies for our tests. It was a delight experimenting with all of the supplies. My favorite part of the test was the light bulbs. You saved my mom 5$ for lights. I had a great time playing with it.

Sincerely

Bailey

Student Letters

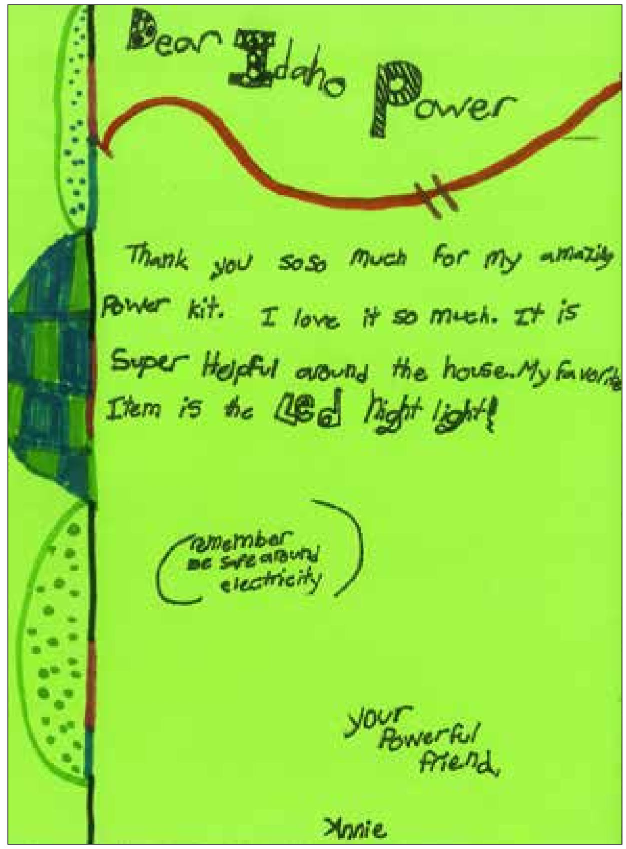

2918 Washington Ave
Caldwell Id 83605
December 17, 2014

Dear Idaho power,
Thank you for giving us those Energy wise kits. It was very thoughtful of you to give us them, because they were really useful to me and my family.

Thank you for teaching us about electricity and natural resources. You are amazing people and I really appreciate you guys for giving me electricity and power.

Thanks again
Jada

Washington Elementary

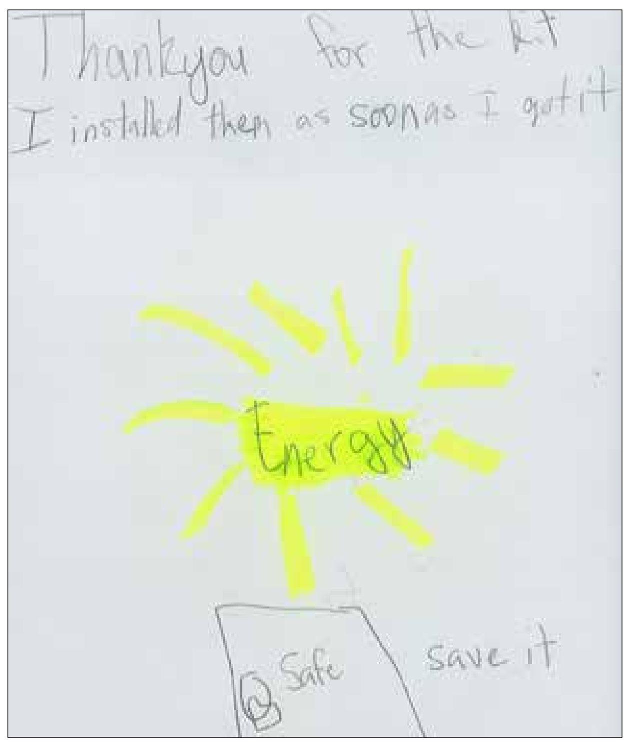

Dear Idaho Power

Thank you so so much for my amazing Power kit. I love it so much. It is Super Helpful around the house. My favorite Item is the LED night light!

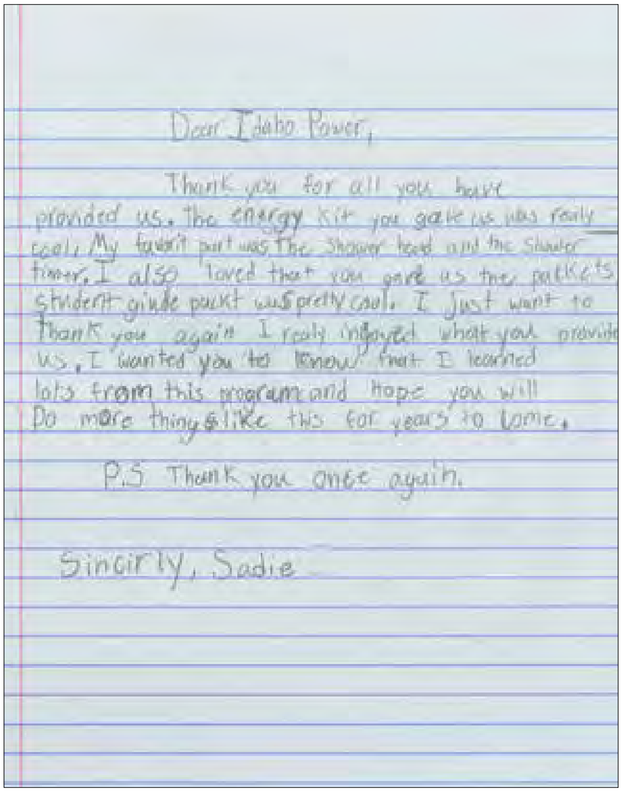
remember Be safe around electricity

your Powerful friend,

Annie


Thankyou for the kit
I installed them as soonas I got it

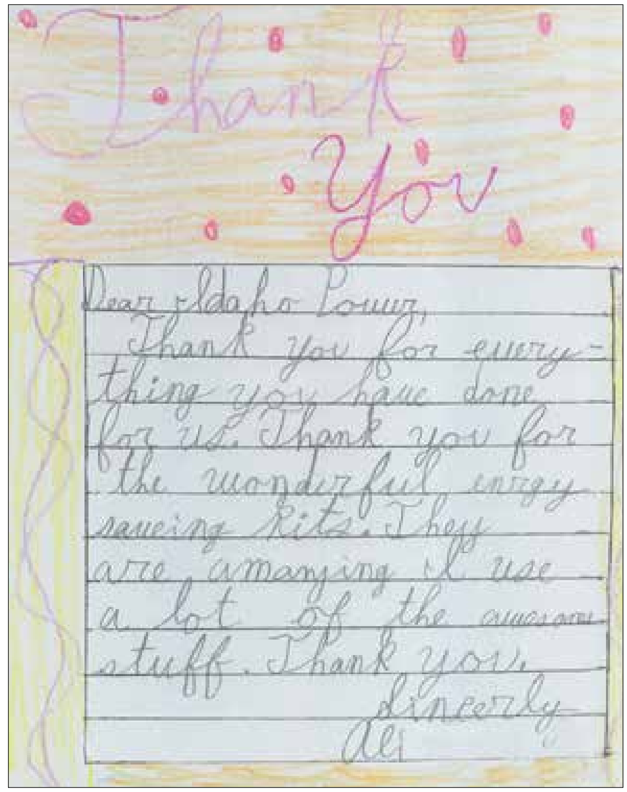
Student Letters


Dear Idaho Power,

Thank you for all you have provided us. The energy kit you gave us was really cool. My favorit part was the shower head and the shower timer. I also loved that you gave us the packets student guide packet was pretty cool. I just want to thank you again I realy injoyed what you provide us, I wanted you to know that I learned lots from this program and hope you will Do more things like this for years to come.

P.S Thank you once again.

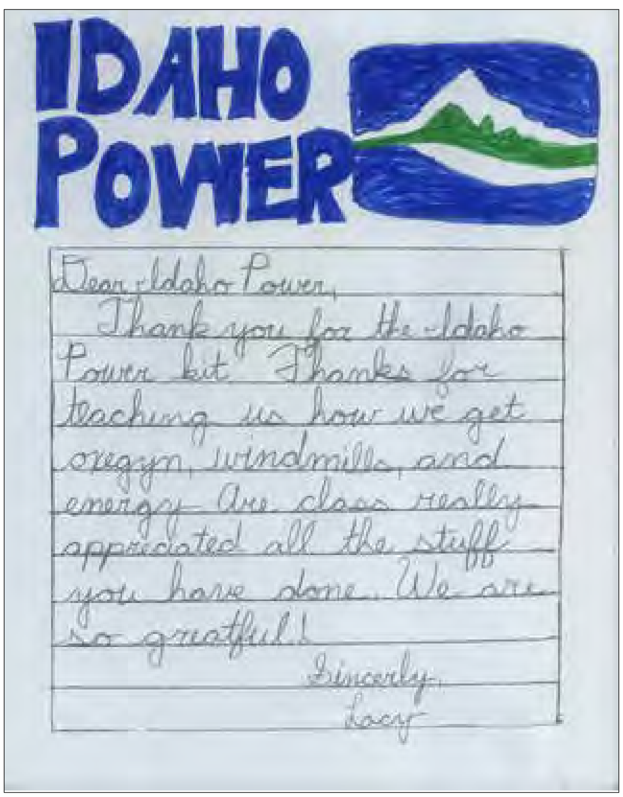
Sincirly, Sadie



Dear Idaho Power,

Thank you for everything you have done for us. Thank you for the wonderful energy saveing kits. They are amazing I use a lot of the awesome stuff. Thank you,

Sincerly
Ali



Dear Idaho Power,

Thank you for the Idaho Power kit. Thanks for teaching us how we get oxegyn, windmills, and energy. Are class really appreciated all the stuff you have done. We are so greatful!

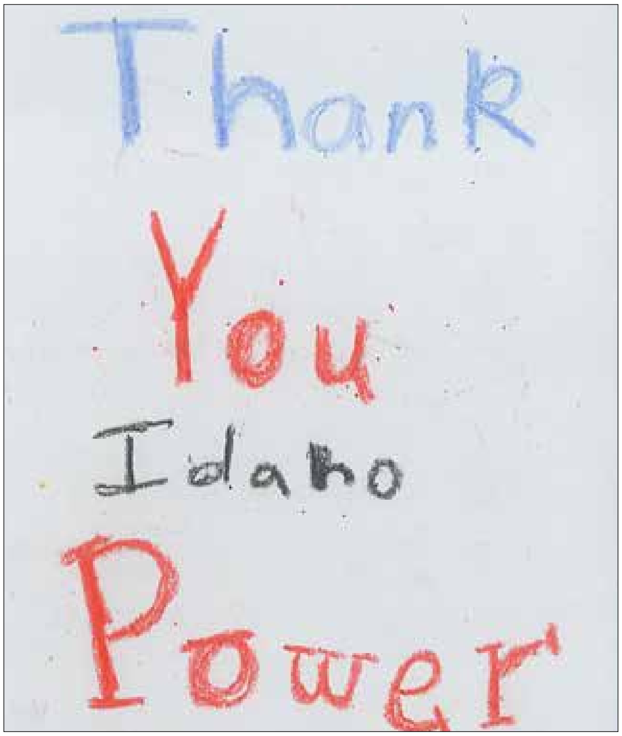
Sincerly,
Lacy

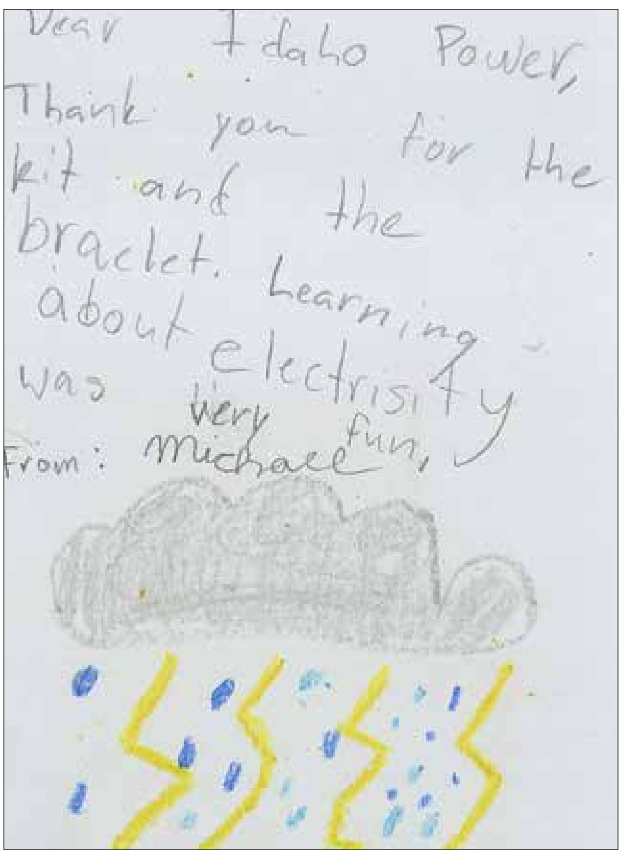
Dear Idaho Power,

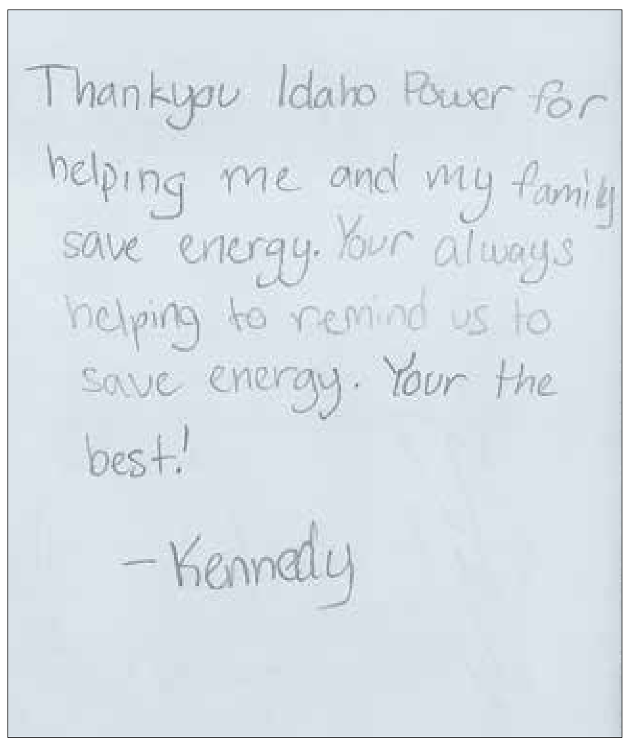
Thankyou for the kits and the workbooks. I learned how to save energy. I learned not to keep the water on while we are brushing our teeth. Thankyou for the nice things you do for everybody. Thankyou again. Idaho power is awesome!

Sincerely,
Donovan

Student Letters

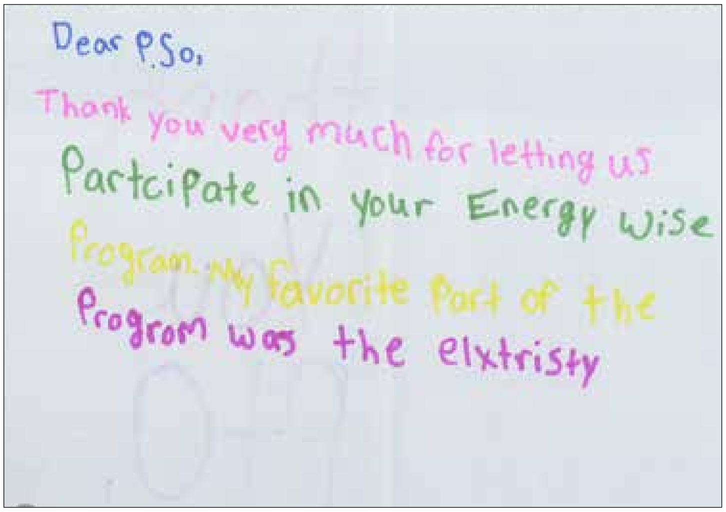


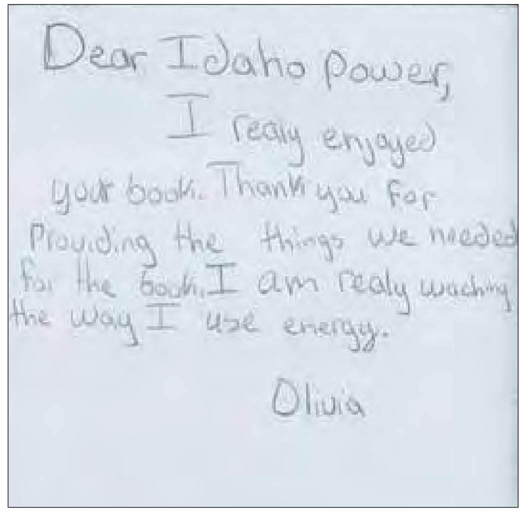

Dear Idaho Power,
Thank you for the kit and the braclet. Learning about electrisity was very fun,
From: michael

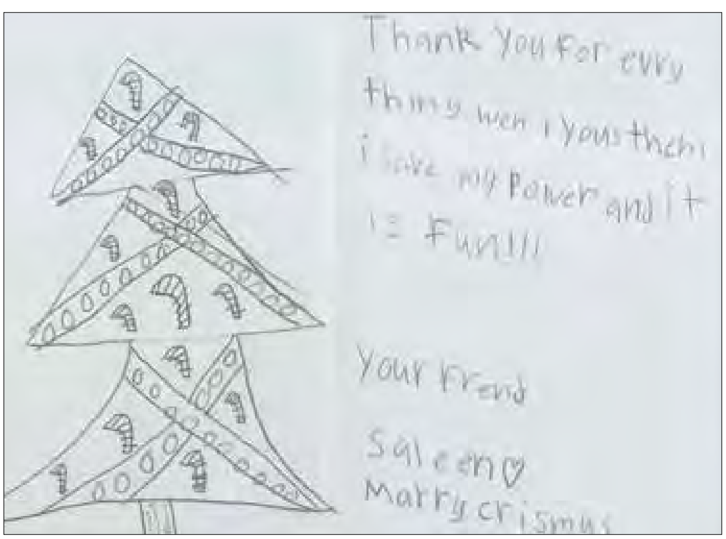

Thankyou Idaho Power for helping me and my family save energy. Your always helping to remind us to save energy. Your the best!

– Kennedy

Student Letters







"They liked learning about different ways they could save energy to save money. They also liked that the kit allowed them to include their families in this activity."

Katie Strawser, Teacher
Desert Springs Elementary School

Appendices

Appendix A

Appendix B

Appendix C

Appendix D

Appendix E

Projected Savings from Showerhead Retrofit

Showerhead Retrofit Inputs and Assumptions:

Average household size:	**5.09**	people[1]
Average number of full bathrooms per home:	**2.00**	full bathrooms per home[1]
% of water heated by gas:	**51.49%**	[1]
% of water heated by electricity:	**48.47%**	[1]
Installation / participation rate of:	**48.48%**	[1]
Average Showerhead has a flow rate of:	**2.01**	gallons per minute[1]
Retrofit Showerhead has a flow rate of:	**1.32**	gallons per minute[1]
Number of participants:	**6,699**	[1]
Shower duration:	**8.20**	minutes per day[2]
Showers per day per person:	**0.67**	showers per day[2]
Product life:	**10**	years[3]

Projected Water Savings:

Showerhead retrofit projects an **annual** reduction of:	**11,448,794**	gallons[4]
Showerhead retrofit projects a **lifetime** reduction of:	**114,487,937**	gallons[5]

Projected Electricity Savings:

Showerhead retrofit projects an **annual** reduction of:	**729,102**	kWh[2,6]
Showerhead retrofit projects a **lifetime** reduction of:	**7,291,025**	kWh[2,7]

Projected Natural Gas Savings:

Showerhead retrofit projects an **annual** reduction of:	**38,730**	therms[2,8]
Showerhead retrofit projects a **lifetime** reduction of:	**387,305**	therms[2,9]

1 *Data Reported by Program Participants.*

2 *(March 4, 2010). EPA WaterSense® Specification for Showerheads Supporting Statement. Retrieved from http://www.epa.gov/WaterSense/docs/showerheads_finalsuppstat508.pdf*

3 *Provided by manufacturer.*

4 *[(Average Household Size x Shower Duration x Showers per Day per Person) ÷ Average Number of Full Bathrooms per Home] x (Average Showerhead Flow Rate - Retrofit Showerhead Flow Rate) x Number of Participants x Installation Rate x 365 days*

5 *[(Average Household Size x Shower Duration x Showers per Day per Person) ÷ Average Number of Full Bathrooms per Home] x (Average Showerhead Flow Rate - Retrofit Showerhead Flow Rate) x Number of Participants x Installation Rate x 365 days x Product Life*

6 *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity*

7 *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Product Life*

8 *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas*

9 *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Product Life*

Projected Savings from FilterTone® Alarm Installation

FilterTone® Installation Inputs and Assumptions:

Annual energy (electricity) use by a central air conditioner:	**4,467**	kWh[1]
Annual energy (natural gas) use by a central space heating or furnace:	**421**	therms[1]
Projected increase in efficiency (electricity):	**1.75%**	[2]
Projected increase in efficiency (natural gas):	**0.92%**	[2]
Product life:	**10**	years[3]
Installation / participation rate of:	**28.74%**	[4]
Number of participants:	**6,699**	[4]

Projected Electricity Savings:

The FilterTone installation projects an **annual** reduction of:	**150,502**	kWh[5]
The FilterTone installation projects a **lifetime** reduction of:	**1,505,021**	kWh[6]

Projected Natural Gas Savings:

The FilterTone installation projects an **annual** reduction of:	**7,457**	therms[7]
The FilterTone installation projects a **lifetime** reduction of:	**74,569**	therms[8]

1 *U.S. Department of Energy, Energy Information Administration 2005 Residential Energy Consumption Web site for Mountain West States: http://www.eia.gov/consumption/residential/data/2005/*

2 *Reichmuth P.E., Howard. (1999). Engineering Review and Savings Estimates for the 'Filtertone' Filter Restriction Alarm.*

3 *Provided by manufacturer.*

4 *Data reported by program participants.*

5 *Annual energy (electricity) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (electricity) x Installation rate x Number of participants*

6 *Annual energy (electricity) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (electricity) x Installation rate x Number of participants x Product life*

7 *Annual energy (natural gas) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (natural gas) x Installation rate x Number of participants*

8 *Annual energy (natural gas) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (natural gas) x Installation rate x Number of participants x Product life*

Projected Savings from 13-watt CFL Retrofit

CFL Retrofit Inputs and Assumptions:

Product life:	**10,000**	hours[1]
Watts used by the compact fluorescent light bulb:	**13**	watts[1]
Hours of operation per day:	**2.81**	hours per day[2]
Watts used by the replaced incandescent light bulb:	**58.37**	watts[3]
Installation / participation rate of:	**55.34%**	[3]
Number of participants:	**6,699**	[3]

Projected Electricity Savings:

The CFL retrofit projects an **annual** reduction of:	**172,519**	kWh[2,4]
The CFL retrofit projects a **lifetime** reduction of:	**1,682,047**	kWh[2,5]

1 Provided by manufacturer.

2 Frontier Associates. (2011). Oncor's LivingWise Program: Measurement & Verification Update.

3 Data reported by program participants.

4 {[(Wattage of incandescent light bulb replaced - Wattage of compact fluorescent light bulb) x Hours of operation per day x 365 Days] ÷ 1,000} x Number of participants x Installation rate

5 {[(Wattage of incandescent light bulb replaced - Wattage of compact fluorescent light bulb) x Product Life] ÷ 1,000} x Number of participants x Installation rate

Projected Savings from 18-watt CFL Retrofit

CFL Retrofit Inputs and Assumptions:

Product life:	**10,000**	hours[1]
Watts used by the compact fluorescent light bulb:	**18**	watts[1]
Hours of operation per day:	**2.81**	hours per day[2]
Watts used by the replaced incandescent light bulb:	**60.64**	watts[3]
Installation / participation rate of:	**48.01%**	[3]
Number of participants:	**6,699**	[3]

Projected Electricity Savings:

The CFL retrofit projects an **annual** reduction of:	**140,646**	kWh[2,4]
The CFL retrofit projects a **lifetime** reduction of:	**1,371,283**	kWh[2,5]

1 Provided by manufacturer.

2 Frontier Associates. (2011). Oncor's LivingWise Program: Measurement & Verification Update.

3 Data reported by program participants.

4 {[(Wattage of incandescent light bulb replaced - Wattage of compact fluorescent light bulb) x Hours of operation per day x 365 Days] ÷ 1,000} x Number of participants x Installation rate

5 {[(Wattage of incandescent light bulb replaced - Wattage of compact fluorescent light bulb) x Product Life] ÷ 1,000} x Number of participants x Installation rate

Projected Savings from 23-watt CFL Retrofit

CFL Retrofit Inputs and Assumptions:

Product life:	**10,000**	hours[1]
Watts used by the compact fluorescent light bulb:	**23**	watts[1]
Hours of operation per day:	**2.81**	hours per day[2]
Watts used by the replaced incandescent light bulb:	**64.02**	watts[3]
Installation / participation rate of:	**43.05%**	[3]
Number of participants:	**6,699**	[3]

Projected Electricity Savings:

The CFL retrofit projects an **annual** reduction of:	**121,333**	kWh[2,4]
The CFL retrofit projects a **lifetime** reduction of:	**1,182,989**	kWh[2,5]

1 Provided by manufacturer.

2 Frontier Associates. (2011). Oncor's LivingWise Program: Measurement & Verification Update.

3 Data reported by program participants.

4 {[(Wattage of incandescent light bulb replaced - Wattage of compact fluorescent light bulb) x Hours of operation per day x 365 Days] ÷ 1,000} x Number of participants x Installation rate

5 {[(Wattage of incandescent light bulb replaced - Wattage of compact fluorescent light bulb) x Product Life] ÷ 1,000} x Number of participants x Installation rate

Appendix A

Projected Savings from LED Night Light Retrofit

Energy Efficient Night Light Retrofit Inputs and Assumptions:

Average length of use:	**4,380**	hours per year[1]
Average night light uses:	**7**	watts
Retrofit night light uses:	**0.5**	watts
Product life:	**10**	years[2]
Energy saved per year:	**28**	kWh per year
Energy saved over life expectancy:	**285**	kWh
Installation / participation rate of:	**84.89%**	[3]
Number of participants:	**6,699**	[3]

Projected Electricity Savings:

The Energy Efficient Night Light retrofit projects an **annual** reduction of:	**161,910**	kWh
The Energy Efficient Night Light retrofit projects a **lifetime** reduction of:	**1,619,103**	kWh

1 Assumption (12 hours per day)

2 Product life provided by manufacturer

3 Data reported by program participants

Home Check-Up

	Total	Capital	Canyon	Eastern	Southern	Western
Participants	6,699	1,423	2,484	1,014	982	796
Surveys Received	4,885	919	1,951	814	606	595
Percent Response	73%	65%	79%	80%	62%	75%

	Total	Capital	Canyon	Eastern	Southern	Western
1 What type of home do you live in?						
Single Family Home (Mobile)	9%	8%	9%	12%	9%	8%
Single Family Home (Manufactured)	8%	3%	6%	11%	11%	14%
Single Family Home (Built)	67%	77%	67%	59%	64%	67%
Multi-Family (2-4 units)	11%	9%	11%	13%	10%	9%
Multi-Family (5-20 units)	4%	3%	5%	4%	5%	2%
Multi-Family (21+ units)	1%	1%	1%	1%	2%	0%
2 Was your home built before 1992?						
Yes	40%	36%	30%	59%	46%	51%
No	60%	64%	70%	41%	54%	49%
3 Is your home owned or rented?						
Owned	68%	73%	66%	68%	63%	72%
Rented	32%	27%	34%	32%	37%	28%
4 How many kids live in your home (age 0-17)?						
1	12%	12%	11%	11%	13%	13%
2	29%	35%	28%	28%	27%	29%
3	28%	28%	28%	28%	29%	25%
4	16%	13%	17%	18%	15%	19%
5+	15%	11%	15%	14%	17%	15%

Due to rounding of numbers, percentages may not add up to 100%

Home Check-Up

(continued)

		Total	Capital	Canyon	Eastern	Southern	Western
5	How many adults live in your home (age 18+)?						
	1	12%	11%	11%	14%	12%	11%
	2	69%	73%	71%	65%	69%	67%
	3	12%	11%	11%	14%	13%	13%
	4	4%	4%	4%	4%	3%	6%
	5+	2%	1%	3%	2%	3%	2%
6	Does your home have a programmable outdoor sprinkler system?						
	Yes	65%	84%	73%	48%	55%	40%
	No	35%	16%	27%	52%	45%	60%
7	Does your home have a programmable thermostat?						
	Yes	73%	82%	79%	66%	67%	60%
	No	26%	18%	21%	34%	33%	40%
8	What is the main source of heating in your home?						
	Natural Gas	48%	62%	55%	42%	34%	22%
	Electric Heater	38%	30%	35%	38%	48%	51%
	Propane	4%	1%	2%	7%	6%	7%
	Heating Oil	1%	1%	1%	1%	2%	1%
	Wood	5%	2%	3%	7%	6%	14%
	Other	4%	4%	4%	5%	4%	6%
9	What type of air conditioning unit do you have?						
	Central Air Conditioner	70%	83%	79%	48%	55%	62%
	Evaporative Cooler	6%	4%	4%	8%	8%	7%
	Room Unit	14%	9%	11%	20%	18%	19%
	Don't Have One	11%	4%	6%	24%	18%	12%
10	Does your home have a dishwasher?						
	Yes	84%	96%	88%	74%	73%	77%
	No	16%	4%	12%	26%	27%	23%

Due to rounding of numbers, percentages may not add up to 100%

Home Check-Up

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
11 How many half-bathrooms are in your home?						
0	66%	59%	61%	77%	71%	76%
1	29%	36%	34%	19%	21%	20%
2	3%	3%	3%	2%	6%	2%
3	1%	1%	1%	1%	2%	1%
4+	1%	1%	0%	1%	0%	0%
12 How many full bathrooms are in your home?						
1	23%	15%	18%	32%	31%	32%
2	58%	56%	67%	45%	53%	53%
3	16%	24%	12%	20%	13%	11%
4	3%	4%	2%	2%	2%	3%
5+	1%	1%	1%	1%	1%	1%
13 How many toilets are in your home?						
1	17%	10%	13%	26%	23%	25%
2	46%	35%	48%	46%	52%	51%
3	29%	41%	33%	21%	18%	16%
4	6%	11%	5%	6%	5%	6%
5+	2%	3%	2%	2%	1%	3%
14 How is your water heated?						
Natural Gas	51%	65%	59%	46%	38%	25%
Electricity	48%	35%	41%	54%	62%	75%

Due to rounding of numbers, percentages may not add up to 100%

Home Activities

	Total	Capital	Canyon	Eastern	Southern	Western
Participants	**6,699**	1,423	2,484	1,014	982	796
Surveys Received	**4,885**	919	1,951	814	606	595
Percent Response	73%	65%	79%	80%	62%	75%

	Total	Capital	Canyon	Eastern	Southern	Western
1 What is the flow rate of your old showerhead?						
0 - 1.0 GPM	11%	7%	12%	12%	11%	14%
1.1 - 1.5 GPM	18%	16%	18%	20%	20%	20%
1.6 - 2.0 GPM	22%	22%	23%	24%	20%	21%
2.1 - 2.5 GPM	22%	27%	20%	20%	23%	21%
2.6 - 3.0 GPM	16%	16%	16%	15%	17%	16%
3.1+ GPM	11%	12%	12%	9%	9%	8%
2 Did you install the new High-Efficiency Showerhead?						
Yes	48%	42%	51%	48%	51%	46%
No	51%	58%	49%	52%	49%	54%
3 If you answered "yes" to question 2, what is the flow rate of your new showerhead?						
0 - 1.0 GPM	22%	19%	22%	24%	22%	22%
1.1 - 1.5 GPM	40%	41%	39%	39%	41%	41%
1.6 - 2.0 GPM	38%	40%	40%	37%	37%	37%
4 Did you use the Shower Timer?						
Yes	76%	74%	79%	74%	78%	69%
No	24%	26%	21%	26%	22%	31%
5 Did your family install the 13-watt Compact Fluorescent Lamp (CFL)?						
Yes	55%	51%	58%	54%	59%	51%
No	45%	49%	42%	46%	41%	49%

Due to rounding of numbers, percentages may not add up to 100%

Home Activities

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
6 If you answered "yes" to question 5, what is the wattage of the incandescent bulb you replaced?						
40-watt	20%	17%	22%	21%	22%	18%
60-watt	41%	46%	40%	39%	39%	39%
75-watt	14%	15%	12%	15%	15%	14%
100-watt	9%	9%	10%	9%	7%	9%
Other	16%	14%	16%	17%	16%	20%
7 Did your family install the 18-watt Compact Fluorescent Lamp (CFL)?						
Yes	48%	45%	50%	47%	51%	45%
No	52%	55%	50%	53%	49%	55%
8 If you answered "yes" to question 7, what is the wattage of the incandescent bulb you replaced?						
40-watt	15%	14%	14%	19%	14%	16%
60-watt	34%	39%	33%	35%	35%	30%
75-watt	22%	21%	23%	19%	24%	23%
100-watt	10%	12%	10%	8%	8%	10%
Other	18%	14%	19%	19%	19%	20%
9 Did your family install the 23-watt Compact Fluorescent Lamp (CFL)?						
Yes	43%	40%	45%	41%	47%	39%
No	57%	60%	55%	59%	53%	61%
10 If you answered "yes" to question 9, what is the wattage of the incandescent bulb you replaced?						
40-watt	14%	11%	13%	15%	16%	14%
60-watt	28%	32%	26%	31%	29%	22%
75-watt	18%	17%	17%	16%	20%	20%
100-watt	21%	25%	23%	14%	16%	22%
Other	21%	15%	21%	25%	20%	21%
11 Did your family install the FilterTone® Alarm?						
Yes	29%	27%	31%	24%	30%	28%
No	71%	73%	69%	76%	70%	72%

Due to rounding of numbers, percentages may not add up to 100%

Home Activities

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
12 How much did your family turn down the thermostat in winter for heating?						
1 - 2 Degrees	18%	20%	20%	14%	20%	13%
3 - 4 Degrees	19%	18%	21%	16%	19%	17%
5+ Degrees	14%	14%	15%	13%	12%	15%
Didn't Adjust Thermostat	49%	47%	45%	56%	49%	55%
13 How much did your family turn up the thermostat in summer for cooling?						
1 - 2 Degrees	15%	20%	16%	14%	11%	12%
3 - 4 Degrees	18%	18%	20%	14%	17%	18%
5+ Degrees	15%	15%	16%	12%	13%	18%
Didn't Adjust Thermostat	52%	47%	48%	61%	59%	52%
14 Did you install the LED Night Light?						
Yes	85%	84%	86%	83%	87%	84%
No	15%	16%	14%	17%	13%	16%
15 Did your family lower your water heater settings?						
Yes	26%	23%	30%	22%	29%	22%
No	74%	77%	70%	78%	71%	78%
16 Did your family raise the temperature on your refrigerator?						
Yes	17%	14%	21%	11%	18%	15%
No	83%	85%	79%	89%	82%	85%
17 Did you complete the optional online energy use activity?						
All of it	7%	6%	9%	5%	6%	8%
Some of it	17%	15%	20%	15%	21%	12%
None	75%	80%	71%	80%	72%	80%
18 Did you work with your family on this Program?						
Yes	71%	73%	73%	67%	74%	63%
No	29%	27%	27%	33%	26%	37%
19 Did your family change the way they use water?						
Yes	63%	64%	65%	57%	69%	57%
No	37%	36%	35%	43%	31%	43%

Due to rounding of numbers, percentages may not add up to 100%

Home Activities

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
20 Did your family change the way they use energy?						
Yes	70%	70%	73%	64%	76%	61%
No	30%	30%	27%	36%	24%	39%
21 How would you rate the Idaho Power Energy Wise® Program?						
Great	48%	51%	51%	47%	42%	45%
Pretty Good	33%	34%	33%	30%	39%	31%
Okay	15%	13%	14%	19%	15%	19%
Not So Good	3%	3%	2%	3%	4%	5%

Due to rounding of numbers, percentages may not add up to 100%

Participant List

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Canyon	Birch Elementary School	[redacted]	1	27	Yes
Canyon	Birch Elementary School	[redacted]	1	25	Yes
Canyon	Birch Elementary School	[redacted]	1	26	Yes
Canyon	Birch Elementary School	[redacted]	1	26	Yes
Canyon	Central Canyon Elementary School	[redacted]	1	28	Yes
Canyon	Central Elementary School	[redacted]	1	25	No
Canyon	Central Elementary School	[redacted]	1	23	Yes
Canyon	Central Elementary School	[redacted]	1	23	Yes
Canyon	Crimson Point Elementary	[redacted]	1	32	Yes
Canyon	Crimson Point Elementary	[redacted]	1	32	Yes
Canyon	Crimson Point Elementary	[redacted]	1	28	Yes
Canyon	Crimson Point Elementary	[redacted]	1	28	Yes
Canyon	Crimson Point Elementary	[redacted]	1	25	Yes
Canyon	Crimson Point Elementary	[redacted]	1	25	Yes
Canyon	Crimson Point Elementary	[redacted]	1	25	Yes
Canyon	Crimson Point Elementary	[redacted]	1	31	Yes
Canyon	Desert Springs Elementary School	[redacted]	1	26	Yes
Canyon	Desert Springs Elementary School	[redacted]	1	27	Yes
Canyon	Desert Springs Elementary School	[redacted]	1	27	Yes
Canyon	Desert Springs Elementary School	[redacted]	1	28	Yes
Canyon	Endeavor School	[redacted]	1	103	Yes
Canyon	Greenhurst Elementary School	[redacted]	1	29	No

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Canyon	Greenhurst Elementary School	[redacted]	1	28	Yes
Canyon	Idaho Arts Charter School	[redacted]	1	29	Yes
Canyon	Idaho Arts Charter School	[redacted]	1	30	Yes
Canyon	Idaho Arts Charter School	[redacted]	1	30	Yes
Canyon	Idaho Arts Charter School	[redacted]	1	30	Yes
Canyon	Iowa Elementary	[redacted]	1	31	Yes
Canyon	Iowa Elementary	[redacted]	1	3	Yes
Canyon	Iowa Elementary	[redacted]	0	27	Yes
Canyon	Iowa Elementary	[redacted]	1	28	Yes
Canyon	Lake Ridge Elementary	[redacted]	1	33	Yes
Canyon	Lake Ridge Elementary	[redacted]	1	33	Yes
Canyon	Lake Ridge Elementary	[redacted]	1	33	Yes
Canyon	Lakevue Elementary School	[redacted]	1	27	Yes
Canyon	Lakevue Elementary School	[redacted]	1	27	Yes
Canyon	Lakevue Elementary School	[redacted]	1	27	Yes
Canyon	Lakevue Elementary School	[redacted]	1	28	Yes
Canyon	Lewis & Clark Elementary	[redacted]	1	24	Yes
Canyon	Lewis & Clark Elementary	[redacted]	1	23	Yes
Canyon	Lewis & Clark Elementary	[redacted]	1	22	Yes
Canyon	Mill Creek Elementary School	[redacted]	1	31	Yes
Canyon	Mill Creek Elementary School	[redacted]	1	31	Yes
Canyon	Mill Creek Elementary School	[redacted]	1	31	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Canyon	Owyhee Elementary	[redacted]	1	29	Yes
Canyon	Owyhee Elementary	[redacted]	1	29	Yes
Canyon	Owyhee Elementary	[redacted]	1	29	Yes
Canyon	Reed Elementary	[redacted]	1	27	Yes
Canyon	Reed Elementary	[redacted]	1	22	No
Canyon	Reed Elementary	[redacted]	1	21	Yes
Canyon	Reed Elementary	[redacted]	1	23	Yes
Canyon	Ronald Reagan Elementary School	[redacted]	1	31	No
Canyon	Ronald Reagan Elementary School	[redacted]	1	33	Yes
Canyon	Ronald Reagan Elementary School	[redacted]	1	31	No
Canyon	Roosevelt Elementary School	[redacted]	1	37	No
Canyon	Roosevelt Elementary School	[redacted]	1	36	Yes
Canyon	Roosevelt Elementary School	[redacted]	1	37	Yes
Canyon	Ross Elementary School	[redacted]	1	27	No
Canyon	Ross Elementary School	[redacted]	1	23	No
Canyon	Sacajawea Elementary School	[redacted]	1	29	Yes
Canyon	Sacajawea Elementary School	[redacted]	1	29	Yes
Canyon	Sacajawea Elementary School	[redacted]	1	29	Yes
Canyon	Silver Trail Elementary School	[redacted]	1	28	Yes
Canyon	Silver Trail Elementary School	[redacted]	1	26	Yes
Canyon	Silver Trail Elementary School	[redacted]	0	2	Yes
Canyon	Silver Trail Elementary School	[redacted]	1	28	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Canyon	Teed Elementary	[redacted]	1	33	Yes
Canyon	Teed Elementary	[redacted]	1	33	Yes
Canyon	Teed Elementary	[redacted]	1	33	Yes
Canyon	Vallivue Middle School	[redacted]	1	15	Yes
Canyon	Washington Elementary School	[redacted]	1	27	Yes
Canyon	Washington Elementary School	[redacted]	1	27	Yes
Canyon	Washington Elementary School	[redacted]	1	27	Yes
Canyon	West Canyon Elementary	[redacted]	1	33	Yes
Canyon	West Canyon Elementary	[redacted]	1	34	Yes
Canyon	West Canyon Elementary	[redacted]	1	33	Yes
Canyon	Willow Creek Elementary	[redacted]	1	28	Yes
Canyon	Willow Creek Elementary	[redacted]	1	31	Yes
Canyon	Willow Creek Elementary	[redacted]	1	31	Yes
Canyon	Willow Creek Elementary	[redacted]	1	28	Yes
Canyon	Wilson Elementary School	[redacted]	1	18	Yes
Canyon	Wilson Elementary School	[redacted]	1	24	Yes
Canyon	Wilson Elementary School	[redacted]	1	17	Yes
Canyon	Wilson Elementary School	[redacted]	1	24	Yes
Canyon	Wilson Elementary School	[redacted]	1	24	Yes
Capital	Amity Elementary School	[redacted]	1	28	Yes
Capital	Amity Elementary School	[redacted]	1	29	Yes
Capital	Amity Elementary School	[redacted]	1	28	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	Barbara Morgan STEM Academy	[redacted]	1	29	No
Capital	Barbara Morgan STEM Academy	[redacted]	1	29	Yes
Capital	Barbara Morgan STEM Academy	[redacted]	1	29	Yes
Capital	Cecil Andrus Elementary	[redacted]	1	27	Yes
Capital	Cecil Andrus Elementary	[redacted]	1	27	Yes
Capital	Cecil Andrus Elementary	[redacted]	1	32	No
Capital	Cecil Andrus Elementary	[redacted]	1	28	No
Capital	Cecil Andrus Elementary	[redacted]	1	27	Yes
Capital	Cynthia Mann Elementary School	[redacted]	1	24	Yes
Capital	Cynthia Mann Elementary School	[redacted]	1	25	Yes
Capital	Cynthia Mann Elementary School	[redacted]	1	12	Yes
Capital	Eliza Hart Spalding Elementary School	[redacted]	1	31	No
Capital	Eliza Hart Spalding Elementary School	[redacted]	1	31	Yes
Capital	Eliza Hart Spalding Elementary School	[redacted]	1	31	Yes
Capital	Eliza Hart Spalding Elementary School	[redacted]	1	31	Yes
Capital	Hunter Elementary School	[redacted]	1	29	Yes
Capital	Hunter Elementary School	[redacted]	1	29	Yes
Capital	Hunter Elementary School	[redacted]	1	29	Yes
Capital	Hunter Elementary School	[redacted]	1	29	Yes
Capital	Hunter Elementary School	[redacted]	1	29	Yes
Capital	Longfellow Elementary School	[redacted]	1	25	Yes
Capital	Longfellow Elementary School	[redacted]	1	26	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	Mary McPherson Elementary School	[redacted]	1	28	Yes
Capital	Mary McPherson Elementary School	[redacted]	1	28	Yes
Capital	Mary McPherson Elementary School	[redacted]	1	28	Yes
Capital	Meridian Elementary	[redacted]	1	30	Yes
Capital	Meridian Elementary	[redacted]	1	30	Yes
Capital	Ponderosa Elementary School	[redacted]	1	30	Yes
Capital	Ponderosa Elementary School	[redacted]	1	30	No
Capital	Ponderosa Elementary School	[redacted]	1	31	Yes
Capital	Prospect Elementary	[redacted]	1	30	No
Capital	Prospect Elementary	[redacted]	1	30	Yes
Capital	Prospect Elementary	[redacted]	1	30	No
Capital	Prospect Elementary	[redacted]	1	29	Yes
Capital	St. Joseph's Catholic School	[redacted]	1	26	Yes
Capital	St. Joseph's Catholic School	[redacted]	1	27	Yes
Capital	Ustick Elementary School	[redacted]	1	24	Yes
Capital	Ustick Elementary School	[redacted]	1	23	Yes
Capital	Ustick Elementary School	[redacted]	1	22	Yes
Capital	Valley View Elementary School	[redacted]	1	32	Yes
Capital	Valley View Elementary School	[redacted]	1	32	Yes
Capital	Washington Elementary	[redacted]	1	30	No
Capital	Washington Elementary	[redacted]	1	30	Yes
Capital	Whittier Elementary School	[redacted]	1	23	No

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	Whittier Elementary School	[redacted]	1	26	Yes
Capital	Whittier Elementary School	[redacted]	1	31	Yes
Eastern	American Falls Intermediate School	[redacted]	1	11	No
Eastern	Claude A. Wilcox Elementary School	[redacted]	1	22	Yes
Eastern	Claude A. Wilcox Elementary School	[redacted]	1	22	Yes
Eastern	Claude A. Wilcox Elementary School	[redacted]	1	22	Yes
Eastern	Claude A. Wilcox Elementary School	[redacted]	1	22	Yes
Eastern	Donald D. Stalker Elementary School	[redacted]	1	20	Yes
Eastern	Donald D. Stalker Elementary School	[redacted]	1	20	Yes
Eastern	Donald D. Stalker Elementary School	[redacted]	1	20	Yes
Eastern	Ellis Elementary School	[redacted]	1	30	Yes
Eastern	Ellis Elementary School	[redacted]	1	30	No
Eastern	Ellis Elementary School	[redacted]	1	30	Yes
Eastern	Grace Lutheran School	[redacted]	1	26	Yes
Eastern	Greenacres Elementary School	[redacted]	1	25	Yes
Eastern	Greenacres Elementary School	[redacted]	1	25	Yes
Eastern	Groveland Elementary	[redacted]	1	23	Yes
Eastern	Groveland Elementary	[redacted]	1	24	Yes
Eastern	Indian Hills Elementary	[redacted]	1	26	Yes
Eastern	Indian Hills Elementary	[redacted]	1	26	Yes
Eastern	Indian Hills Elementary	[redacted]	1	26	Yes
Eastern	Indian Hills Elementary	[redacted]	1	26	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Eastern	Jefferson Elementary	[redacted]	1	18	Yes
Eastern	Jefferson Elementary	[redacted]	1	18	Yes
Eastern	Jefferson Elementary	[redacted]	1	18	Yes
Eastern	Lewis and Clark Elementary	[redacted]	1	27	Yes
Eastern	Lewis and Clark Elementary	[redacted]	1	26	Yes
Eastern	Lewis and Clark Elementary	[redacted]	1	27	Yes
Eastern	Ridge Crest Elementary School	[redacted]	1	30	Yes
Eastern	Ridge Crest Elementary School	[redacted]	1	29	Yes
Eastern	Ridge Crest Elementary School	[redacted]	1	28	Yes
Eastern	Rockland Elementary School	[redacted]	1	18	No
Eastern	Rockland Elementary School	[redacted]	1	11	No
Eastern	Salmon Middle/High School	[redacted]	1	36	Yes
Eastern	Salmon Middle/High School	[redacted]	1	36	Yes
Eastern	Snake River Middle School	[redacted]	1	80	Yes
Eastern	Stoddard Elementary School	[redacted]	1	20	Yes
Eastern	Stoddard Elementary School	[redacted]	1	20	Yes
Eastern	Stoddard Elementary School	[redacted]	1	20	Yes
Eastern	Washington Elementary School	[redacted]	1	19	Yes
Eastern	Washington Elementary School	[redacted]	1	18	Yes
Southern	Alturas Elementary (Woodside)	[redacted]	1	17	Yes
Southern	Alturas Elementary (Woodside)	[redacted]	1	15	Yes
Southern	Alturas Elementary (Woodside)	[redacted]	1	16	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Southern	Alturas Elementary (Woodside)	[redacted]	1	15	No
Southern	Canyonside Christian School	[redacted]	1	12	Yes
Southern	Filer Intermediate	[redacted]	1	29	No
Southern	Filer Intermediate	[redacted]	1	29	No
Southern	Filer Intermediate	[redacted]	1	29	No
Southern	Filer Intermediate	[redacted]	1	30	Yes
Southern	Heritage Academy	[redacted]	1	20	No
Southern	I.B. Perrine Elementary	[redacted]	1	26	No
Southern	I.B. Perrine Elementary	[redacted]	1	33	Yes
Southern	I.B. Perrine Elementary School	[redacted]	1	33	Yes
Southern	I.B. Perrine Elementary School	[redacted]	1	33	Yes
Southern	I.B. Perrine Elementary School	[redacted]	1	33	No
Southern	Kimberly Elementary	[redacted]	1	28	Yes
Southern	Kimberly Elementary	[redacted]	1	28	Yes
Southern	Kimberly Elementary	[redacted]	1	28	No
Southern	Kimberly Elementary	[redacted]	1	28	No
Southern	Lighthouse Christian School	[redacted]	1	11	Yes
Southern	Lighthouse Christian School	[redacted]	1	14	No
Southern	Summit Elementary	[redacted]	1	29	Yes
Southern	Summit Elementary	[redacted]	1	27	No
Southern	Summit Elementary	[redacted]	1	29	Yes
Southern	Summit Elementary	[redacted]	1	27	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Southern	Summit Elementary	[redacted]	1	28	No
Southern	Summit Elementary	[redacted]	1	28	Yes
Southern	Summit Elementary	[redacted]	1	28	Yes
Southern	Summit Elementary	[redacted]	1	27	Yes
Southern	Summit Elementary	[redacted]	1	27	Yes
Southern	Summit Elementary	[redacted]	1	27	Yes
Southern	Summit Elementary	[redacted]	1	27	Yes
Southern	Valley Elementary	[redacted]	0	1	Yes
Southern	Valley Elementary	[redacted]	1	24	Yes
Southern	Valley Elementary	[redacted]	1	26	Yes
Southern	Wendell Middle School	[redacted]	1	85	Yes
Western	Donnelly Elementary	[redacted]	1	21	Yes
Western	Emmett Middle School	[redacted]	1	65	Yes
Western	Emmett Middle School	[redacted]	1	60	Yes
Western	Emmett Middle School	[redacted]	1	68	Yes
Western	Fruitland Elementary School	[redacted]	1	26	No
Western	Fruitland Elementary School	[redacted]	1	26	No
Western	Fruitland Elementary School	[redacted]	1	26	Yes
Western	Fruitland Elementary School	[redacted]	1	26	Yes
Western	Fruitland Elementary School	[redacted]	1	30	Yes
Western	Homedale Elementary	[redacted]	1	22	Yes
Western	Homedale Elementary	[redacted]	1	95	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Western	Marsing Elementary School	[redacted]	1	18	Yes
Western	Marsing Middle School	[redacted]	1	75	Yes
Western	Park Intermediate	[redacted]	1	22	Yes
Western	Park Intermediate	[redacted]	1	23	Yes
Western	Park Intermediate	[redacted]	1	24	Yes
Western	Park Intermediate	[redacted]	1	26	Yes
Western	Park Intermediate	[redacted]	1	25	Yes
Western	Parma Middle School	[redacted]	1	90	Yes
Western	Pleasant Valley School	[redacted]	1	8	No
		TOTALS	226	6,473	
		TOTAL PARTICIPANTS	6,699		

Note: "T" represents number of teachers and "S" represents number of students

Teacher Program Evaluation Data

	Total	Capital	Canyon	Eastern	Southern	Western
Participants	226	49	83	39	35	20
Surveys Received	157	26	67	33	17	14
Percent Response	69%	53%	81%	85%	49%	70%

		Percent	Number
1	The materials were clearly written and well organized.		
	Strongly Agree	62%	96
	Agree	37%	58
	Disagree	1%	1
	Strongly Disagree	0%	0
2	The products in the kit were easy for students to use.		
	Strongly Agree	43%	66
	Agree	56%	87
	Disagree	1%	2
	Strongly Disagree	0%	0
3	Students indicated that their parents supported the program.		
	Yes	96%	149
	No	4%	7
4	Would you conduct this program again?		
	Yes	97%	151
	No	3%	4
5	Would you recommend this program to other colleagues?		
	Yes	99%	153
	No	1%	2
6	If my school is eligible for participation next year, I would like to enroll.		
	Yes	95%	147
	No	5%	8

Due to rounding of numbers, percentages may not add up to 100%

Parent/Guardian Program Evaluation Data

	Total	Capital	Canyon	Eastern	Southern	Western
Participants	6473	1374	2401	975	947	776
Surveys Received	107	14	38	18	33	4
Percent Response	2%	1%	2%	2%	3%	1%

		Percent	Number
1	Was the program easy for you and your child to use?		
	Yes	98%	105
	No	2%	2
2	Will you continue to use the kit items after the completion of the program?		
	Yes	99%	105
	No	1%	1
3	Would you like to see this program continued in local schools?		
	Yes	99%	105
	No	1%	1

Due to rounding of numbers, percentages may not add up to 100%

RESOURCE**ACTION**
PROGRAMS

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Idaho Power Shade Tree Survey

Monday, February 01, 2016

859

Total Responses

Complete Responses: 821

Q1: How did you hear about Idaho Power's Shade Tree Project? (Check all that apply)

Answered: 859   Skipped: 0

Answer Choices	Responses	
Letter from Idaho Power	**56.11%**	482
Friend or relative	**25.03%**	215
Neighbor	**4.54%**	39
Idaho Power employee	**4.89%**	42
Other (please specify)	**14.55%**	125
Total Respondents: 859		

Q2: What was the primary reason you participated in the program? (Mark one)

Answered: 859 Skipped: 0

Answer Choices	Responses	
Tree was free	18.98%	163
Home too warm in the summer	18.74%	161
Reduce energy bill	21.65%	186
Improve landscape/property value	12.57%	108
Wanted a tree	17.69%	152
Help the environment	6.29%	54
Other (please specify)	4.07%	35
Total		859

Q3: What kept you from planting a tree prior to the Shade Tree Project? (Mark one)

Answered: 855   Skipped: 4

Answer Choices	Responses	
Lack of knowledge	14.50%	124
Cost	55.56%	475
Time	10.53%	90
Other (please specify)	19.42%	166
Total		855

Q4: Where would you typically purchase a new tree? (Mark one)

Answered: 847   Skipped: 12

Answer Choices	Responses	
Garden section of a do-it-yourself/home improvement store	31.52%	267
Nursery/garden store	65.29%	553
Other (please specify)	3.19%	27
Total		847

Q5: How long did you spend on the online enrollment tool? (Mark one)

Answered: 852   Skipped: 7

Answer Choices	Responses	
10 minutes or less	56.34%	480
11-20 minutes	30.63%	261
21-30 minutes	7.86%	67
31 minutes or more	3.29%	28
Not applicable	1.88%	16
Total		852

Q6: Overall, how easy was it for you to use the online enrollment tool?

Answered: 849   Skipped: 10

Answer Choices	Responses	
Very easy	71.26%	605
Somewhat easy	25.21%	214
Somewhat difficult	1.77%	15
Very difficult	0.24%	2
Not applicable	1.53%	13
Total		**849**

Q7: How many trees did you pick up at the Shade Tree event?

Answered: 853   Skipped: 6

Answer Choices	Responses	
One	28.96%	247
Two	71.04%	606
Total		**853**

Q8: When did you plant your shade tree?

Answered: 247   Skipped: 612

Answer Choices	Responses	
Same day as the tree pickup	39.68%	98
1-3 days after the tree pickup	44.53%	110
4-7 days after the tree pickup	8.10%	20
More than 1 week after the tree pickup	6.07%	15
Did not plant the tree	1.62%	4
Total		247

Q9: On which side of your home did you plant your shade tree?

Answered: 239   Skipped: 620

Answer Choices	Responses	
North	4.18%	10
Northeast	3.35%	8
East	9.62%	23
Southeast	4.60%	11
South	9.21%	22
Southwest	23.85%	57
West	38.08%	91
Northwest	7.11%	17
Total		239

Q10: How far from the home did you plant your shade tree?

Answered: 240   Skipped: 619

Answer Choices	Responses	
20 feet or less	41.25%	99
21-40 feet	52.08%	125
41-60 feet	5.83%	14
More than 60 feet	0.83%	2
Total		240

Q11: How many shade trees did you plant?

Answered: 606   Skipped: 253

Answer Choices	Responses	
One tree	**1.65%**	10
Both trees	**95.71%**	580
Did not plant trees	**2.64%**	16
Total		**606**

Q12: When did you plant your shade tree?

Answered: 10   Skipped: 849

Answer Choices	Responses	
Same day as the tree pickup	20.00%	2
1-3 days after the tree pickup	50.00%	5
4-7 days after the tree pickup	30.00%	3
More than 1 week after the tree pickup	0.00%	0
Total		10

Q13: On which side of your home did you plant your shade tree?

Answered: 10 Skipped: 849

Answer Choices	Responses	
North	0.00%	0
Northeast	10.00%	1
East	10.00%	1
Southeast	10.00%	1
South	20.00%	2
Southwest	10.00%	1
West	30.00%	3
Northwest	10.00%	1
Total		10

Q14: How far from the home did you plant your shade tree?

Answered: 10   Skipped: 849

Answer Choices	Responses	
20 feet or less	40.00%	4
21-40 feet	60.00%	6
41-60 feet	0.00%	0
More than 60 feet	0.00%	0
Total		10

Q15: When did you plant your shade trees?

Answered: 580   Skipped: 279

(no label)	Same day as the tree pickup	1-3 days after the tree pickup	4-7 days after the tree pickup	More than 1 week after the tree pickup	Total
Tree 1	22.69% 130	51.13% 293	16.06% 92	10.12% 58	573
Tree 2	20.78% 117	49.20% 277	17.76% 100	12.26% 69	563

Q16: On which side of your home did you plant your shade trees?

Answered: 547   Skipped: 312

(no label)	North	Northeast	East	Southeast	South	Southwest	West	Northwest	Total
Tree 1	5.88% 32	4.23% 23	13.42% 73	7.72% 42	10.66% 58	14.89% 81	36.58% 199	6.62% 36	544
Tree 2	4.60% 25	5.16% 28	9.76% 53	8.66% 47	11.05% 60	15.47% 84	37.20% 202	8.10% 44	543

Q17: How far from the home did you plant your shade trees?

Answered: 562 Skipped: 297

(no label)	20 feet or less	21-40 feet	41-60 feet	More than 60 feet	Total
Tree 1	**34.94%** 196	**47.24%** 265	**15.69%** 88	**2.14%** 12	561
Tree 2	**29.56%** 162	**46.72%** 256	**19.34%** 106	**4.38%** 24	548

Q18: How satisfied are you with the information you received on the planting and care of your shade tree?

Answered: 841 Skipped: 18

Answer Choices	Responses	
Very satisfied	79.67%	670
Somewhat satisfied	16.41%	138
Somewhat dissatisfied	1.55%	13
Very dissatisfied	1.43%	12
Not applicable	0.95%	8
Total		**841**

Q19: What information did you find most valuable?

Answered: 832 Skipped: 27

Answer Choices	Responses	
Planting depth	53.61%	446
Circling roots	11.30%	94
Staking	8.41%	70
Watering	8.41%	70
Not applicable	9.86%	82
Other (please specify)	8.41%	70
Total		**832**

Q20: How much do you agree with the following statements:

Answered: 835   Skipped: 24

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Total
I am satisfied with the Shade Tree Project pick up event	**91.49%** 763	**7.67%** 64	**0.60%** 5	**0.24%** 2	834
It was easy to plant my shade tree	**86.92%** 718	**11.86%** 98	**0.97%** 8	**0.24%** 2	826
I would recommend the Shade Tree Project to a friend or relative	**95.44%** 795	**4.08%** 34	**0.36%** 3	**0.12%** 1	833
I am satisfied with my overall experience with the Shade Tree Project	**91.34%** 759	**7.34%** 61	**1.08%** 9	**0.24%** 2	631

Q22: May we use your name and comments in Idaho Power's communication efforts?

Answered: 828   Skipped: 31

Answer Choices	Responses	
Yes	59.30%	491
No	40.70%	337
Total		828

Q23: May we follow up with you if we have any questions regarding your responses to the survey questions?

Answered: 826   Skipped: 33

Answer Choices	Responses	
Yes	63.08%	521
No	36.92%	305
Total		826

Q25: When was this residence originally built? (Select when the building was originally constructed, not when it was remodeled, added to, or converted.)

Answered: 826   Skipped: 33

Answer Choices	Responses	
Before 1950	6.90%	57
1950–1959	3.51%	29
1960–1969	3.51%	29
1970–1979	14.53%	120
1980–1989	5.33%	44
1990–1999	18.16%	150
2000–2006	25.42%	210
2007–2015	22.28%	184
Don't know	0.36%	3
Total		**826**

Q26: What one fuel is most often used to heat this residence? (Mark one)

Answered: 826 Skipped: 33

Answer Choices	Responses	
Electricity	19.13%	153
Natural gas	73.97%	611
Propane	2.18%	18
Fuel Oil	0.48%	4
Wood	3.15%	26
Other (please specify)	1.09%	9
Total		**826**

Q27: What type of air conditioning system is used at this residence? (Check all that apply)

Answered: 826   Skipped: 33

Answer Choices	Responses	
None	1.33%	11
Central air conditioner	88.86%	734
Heat pump	7.14%	59
Individual room or window air conditioner	4.12%	34
Evaporative/swamp cooler	0.48%	4
Other (please specify)	1.09%	9
Total Respondents: 826		

Q28: What is your gender?

Answered: 813   Skipped: 46

Answer Choices	Responses	
Female	58.55%	476
Male	41.45%	337
Total		813

Q29: Which of the following best describes your age?

Answered: 815 Skipped: 44

Answer Choices	Responses	
Under 18	0.00%	0
18-24	1.10%	9
25-34	18.40%	150
35-44	26.63%	217
45-60	32.76%	267
Over 60	21.10%	172
Total		815

Q30: What is the highest level of education you have completed?

Answered: 817   Skipped: 42

Answer Choices	Responses	
Less than high school	0.37%	3
High school or equivalent	8.20%	67
Some college/technical school	39.05%	319
4-year college degree	29.87%	244
Some graduate courses	6.85%	56
Graduate degree	15.67%	128
Total		**817**

Idaho Power Weatherization Assistance Program

Sunday, January 24, 2016

211

Total Responses

Complete Responses: 211

Q2: Agency/Contractor Name:

Answered: 211   Skipped: 0

Answer Choices	Responses	
CCOA - Aging, Weatherization and Human Services	15.64%	33
Eastern Idaho Community Action Partnership	1.42%	3
El Ada Community Action Partnership	50.24%	106
South Central Community Action Partnership	14.22%	30
Southeastern Idaho Community Action Agency	14.22%	30
Community Connection of Northeast Oregon	0.00%	0
Community in Action	4.27%	9
Energy Zone, LLC	0.00%	0
Home Energy Management	0.00%	0
Savings Around Power	0.00%	0
Power Savers	0.00%	0
	0.00%	0
	0.00%	0
	0.00%	0
Total		211

Q4: Idaho Power program name:

Answered: 211   Skipped: 0

Answer Choices	Responses	
Weatherization Assistance for Qualified Customers	100.00%	211
Weatherization Solutions for Eligible Customers	0.00%	0
Total		211

Q5: How did you learn about the weatherization program(s)?

Answered: 204 Skipped: 7

Answer Choices	Responses	
Agency/Contractor flyer	21.57%	44
Idaho Power employee	4.90%	10
Idaho Power web site	4.90%	10
Friend or relative	45.59%	93
Letter in mail	4.90%	10
Other (please specify)	18.14%	37
Total		204

Q6: What was your primary reason for participating in the weatherization program?

Answered: 206   Skipped: 5

Answer Choices	Responses	
Reduce utility bills	86.41%	178
Improve comfort of home	44.17%	91
Furnace concerns	33.50%	69
Water heater concerns	13.11%	27
Improve insulation	32.04%	66
Other (please specify)	8.74%	18
Total Respondents: 206		

Q7: If you received any energy efficiency equipment upgrade as part of the weatherization, how well was the equipment's operation explained to you?

Answered: 197 Skipped: 14

Answer Choices	Responses	
Completely	92.39%	182
Somewhat	7.11%	14
Not at all	0.51%	1
Total		**197**

Q8: Which of the following did you learn about from the auditor or crew during the weatherization process? (Check all that apply)

Answered: 201 Skipped: 10

Answer Choices	Responses	
How air leaks affect energy usage	81.59%	164
How insulation affects energy usage	68.16%	137
How to program the new thermostat	47.76%	96
How to reduce the amount of hot water used	26.87%	54
How to use energy wisely	54.23%	109
How to understand what uses the most energy in my home	43.78%	88
Other (please specify)	3.48%	7
Total Respondents: 201		

Q9: Based on the information you received from the agency/contractor about energy use, how likely are you to change your habits to save energy?

Answered: 200   Skipped: 11

Answer Choices	Responses	
Very likely	**83.50%**	167
Somewhat likely	**14.00%**	28
Not very likely	**1.50%**	3
Not likely at all	**1.00%**	2
Total		**200**

Q10: How much of the information about energy use have you shared with other members of your household?

Answered: 185   Skipped: 26

Answer Choices	Responses	
All of it	82.16%	152
Some of it	14.59%	27
None of it	3.24%	6
Total		185

Q11: Based on the energy use information you shared with other members of your household, how likely do you think your household overall will change habits to save energy?

Answered: 195   Skipped: 16

Answer Choices	Responses	
Very likely	82.56%	161
Somewhat likely	15.90%	31
Somewhat unlikely	1.03%	2
Very unlikely	0.51%	1
Total		**195**

Q12: What habits are you and other members of your household most likely to change to save energy? (check all that apply)

Answered: 198 Skipped: 13

Answer Choices	Responses	
Washing full loads of clothes	64.65%	128
Washing full loads of dishes	46.46%	92
Turning off lights when not in use	85.35%	169
Unplugging electrical equipment when not in use	57.07%	113
Turning the thermostat up in the summer	51.52%	102
Turning the thermostat down in the winter	66.16%	131
Total Respondents: 198		

Q13: How much do you think the weatherization you received will affect the comfort of your home?

Answered: 202   Skipped: 9

Answer Choices	Responses	
Significantly	93.07%	188
Somewhat	6.44%	13
Very little	0.00%	0
Not at all	0.50%	1
Total		202

Q14: Rate the Agency/Contractor based on your interactions with them.

Answered: 203 Skipped: 8

	Excellent	Good	Fair	Poor	Total
Courteousness	**95.07%** 193	**4.93%** 10	**0.00%** 0	**0.00%** 0	203
Professionalism	**92.46%** 184	**7.54%** 15	**0.00%** 0	**0.00%** 0	199
Explanation of work to be performed on your home	**87.06%** 175	**12.44%** 25	**0.00%** 0	**0.50%** 1	201
Overall experience with Agency/Contractor	**92.54%** 186	**6.97%** 14	**0.00%** 0	**0.50%** 1	201

Q15: Were you aware of Idaho Power's role in the weatherization of your home?

Answered: 202 Skipped: 9

Answer Choices	Responses	
Yes	79.21%	160
No	20.79%	42
Total		202

Q16: Overall how satisfied are you with the weatherization program you participated in?

Answered: 203 Skipped: 8

Answer Choices	Responses	
Very satisfied	98.03%	199
Somewhat satisfied	1.48%	3
Somewhat dissatisfied	0.49%	1
Very dissatisfied	0.00%	0
Total		203

Q17: How has your opinion of Idaho Power changed as a result of its role in the weatherization program?

Answered: 202 Skipped: 9

Answer Choices	Responses	
Improved	89.11%	180
Stayed the same	10.89%	22
Decreased	0.00%	0
Total		202

Q18: How many people beside yourself live in your home year-round?

Answered: 148 Skipped: 63

Answer Choices	Responses	
1	42.57%	63
2	18.24%	27
3	18.92%	28
4	10.14%	15
5	4.05%	6
6 or more	6.08%	9
Total		148

Q19: How long have you been an Idaho Power customer?

Answered: 205   Skipped: 6

Answer Choices	Responses	
Less than 1 year	1.46%	3
1 - 10 years	26.83%	55
11 - 25 years	27.32%	56
26 years or more	44.39%	91
Total		205

Q20: Please select the category below that best describes your age:

Answered: 203   Skipped: 8

Answer Choices	Responses	
Under 25	1.97%	4
25 - 34	12.81%	26
35 - 44	10.84%	22
45 - 54	11.33%	23
55 - 64	27.59%	56
65 - 74	21.67%	44
75 or older	13.79%	28
Total		**203**

Q21: Select the response below that best describes the highest level of education you have attained:

Answered: 202   Skipped: 9

Answer Choices	Responses	
Less than High School	16.34%	33
High School graduate or GED	38.61%	78
Some College or Technical School	30.20%	61
Associate Degree	6.93%	14
College Degree (including any graduate school or graduate degrees)	7.92%	16
Total		202

Idaho Power Weatherization Programs

Tuesday, January 26, 2016

133

Total Responses

Complete Responses: 133

Q2: Agency/Contractor Name:

Answered: 133   Skipped: 0

Answer Choices	Responses	
CCOA - Aging, Weatherization and Human Services	0.00%	0
Eastern Idaho Community Action Partnership	0.00%	0
El Ada Community Action Partnership	0.00%	0
South Central Community Action Partnership	0.00%	0
Southeastern Idaho Community Action Agency	0.00%	0
Community Connection of Northeast Oregon	0.00%	0
Community in Action	0.00%	0
Energy Zone, LLC	30.83%	41
Home Energy Management	27.07%	36
Savings Around Power	10.53%	14
Power Savers	31.58%	42
	0.00%	0
	0.00%	0
	0.00%	0
Total		**133**

Q4: Idaho Power program name:

Answered: 133   Skipped: 0

Answer Choices	Responses	
Weatherization Assistance for Qualified Customers	0.00%	0
Weatherization Solutions for Eligible Customers	100.00%	133
Total		133

Q5: How did you learn about the weatherization program(s)?

Answered: 129   Skipped: 4

Answer Choices	Responses	
Agency/Contractor flyer	11.63%	15
Idaho Power employee	5.43%	7
Idaho Power web site	7.75%	10
Friend or relative	31.78%	41
Letter in mail	24.81%	32
Other (please specify)	18.60%	24
Total		**129**

Q6: What was your primary reason for participating in the weatherization program?

Answered: 131 Skipped: 2

Answer Choices	Responses	
Reduce utility bills	83.21%	109
Improve comfort of home	43.51%	57
Furnace concerns	17.56%	23
Water heater concerns	4.58%	6
Improve insulation	27.48%	36
Other (please specify)	9.16%	12
Total Respondents: 131		

Q7: If you received any energy efficiency equipment upgrade as part of the weatherization, how well was the equipment's operation explained to you?

Answered: 99   Skipped: 34

Answer Choices	Responses	
Completely	78.79%	78
Somewhat	11.11%	11
Not at all	10.10%	10
Total		99

Q8: Which of the following did you learn about from the auditor or crew during the weatherization process? (Check all that apply)

Answered: 123   Skipped: 10

Answer Choices	Responses	
How air leaks affect energy usage	80.49%	99
How insulation affects energy usage	73.98%	91
How to program the new thermostat	35.77%	44
How to reduce the amount of hot water used	34.96%	43
How to use energy wisely	53.66%	66
How to understand what uses the most energy in my home	58.54%	72
Other (please specify)	6.50%	8
Total Respondents: 123		

Q9: Based on the information you received from the agency/contractor about energy use, how likely are you to change your habits to save energy?

Answered: 123   Skipped: 10

Answer Choices	Responses	
Very likely	80.49%	99
Somewhat likely	18.70%	23
Not very likely	0.81%	1
Not likely at all	0.00%	0
Total		123

Q10: How much of the information about energy use have you shared with other members of your household?

Answered: 121   Skipped: 12

Answer Choices	Responses	
All of it	81.82%	99
Some of it	14.88%	18
None of it	3.31%	4
Total		121

Q11: Based on the energy use information you shared with other members of your household, how likely do you think your household overall will change habits to save energy?

Answered: 120 Skipped: 13

Answer Choices	Responses	
Very likely	70.83%	85
Somewhat likely	20.83%	25
Somewhat unlikely	5.00%	6
Very unlikely	3.33%	4
Total		**120**

Q12: What habits are you and other members of your household most likely to change to save energy? (check all that apply)

Answered: 120   Skipped: 13

Answer Choices	Responses	
Washing full loads of clothes	60.83%	73
Washing full loads of dishes	55.83%	67
Turning off lights when not in use	88.33%	106
Unplugging electrical equipment when not in use	55.00%	66
Turning the thermostat up in the summer	64.17%	77
Turning the thermostat down in the winter	68.33%	82
Total Respondents: 120		

Q13: How much do you think the weatherization you received will affect the comfort of your home?

Answered: 127   Skipped: 6

Answer Choices	Responses	
Significantly	92.91%	118
Somewhat	7.09%	9
Very little	0.00%	0
Not at all	0.00%	0
Total		127

Q14: Rate the Agency/Contractor based on your interactions with them.

Answered: 126   Skipped: 7

	Excellent	Good	Fair	Poor	Total
Courteousness	**93.65%** 118	**6.35%** 8	**0.00%** 0	**0.00%** 0	126
Professionalism	**92.86%** 117	**7.14%** 9	**0.00%** 0	**0.00%** 0	126
Explanation of work to be performed on your home	**91.20%** 114	**5.60%** 7	**2.40%** 3	**0.80%** 1	125
Overall experience with Agency/Contractor	**90.48%** 114	**8.73%** 11	**0.79%** 1	**0.00%** 0	126

Q15: Were you aware of Idaho Power's role in the weatherization of your home?

Answered: 125   Skipped: 8

Answer Choices	Responses	
Yes	90.40%	113
No	9.60%	12
Total		125

Q16: Overall how satisfied are you with the weatherization program you participated in?

Answered: 127 Skipped: 6

Answer Choices	Responses	
Very satisfied	94.49%	120
Somewhat satisfied	5.51%	7
Somewhat dissatisfied	0.00%	0
Very dissatisfied	0.00%	0
Total		127

Q17: How has your opinion of Idaho Power changed as a result of its role in the weatherization program?

Answered: 126   Skipped: 7

Answer Choices	Responses	
Improved	81.75%	103
Stayed the same	18.25%	23
Decreased	0.00%	0
Total		126

Q18: How many people beside yourself live in your home year-round?

Answered: 114   Skipped: 19

Answer Choices	Responses	
1	50.88%	58
2	16.67%	19
3	12.28%	14
4	11.40%	13
5	3.51%	4
6 or more	5.26%	6
Total		114

Q19: How long have you been an Idaho Power customer?

Answered: 128 Skipped: 5

Answer Choices	Responses	
Less than 1 year	1.56%	2
1 - 10 years	24.22%	31
11 - 25 years	23.44%	30
26 years or more	50.78%	65
Total		128

Q20: Please select the category below that best describes your age:

Answered: 129   Skipped: 4

Answer Choices	Responses	
Under 25	2.33%	3
25 - 34	7.75%	10
35 - 44	17.05%	22
45 - 54	12.40%	16
55 - 64	21.71%	28
65 - 74	21.71%	28
75 or older	17.05%	22
Total		**129**

Q21: Select the response below that best describes the highest level of education you have attained:

Answered: 126   Skipped: 7

Answer Choices	Responses	
Less than High School	8.73%	11
High School graduate or GED	30.95%	39
Some College or Technical School	32.54%	41
Associate Degree	12.70%	16
College Degree (including any graduate school or graduate degrees)	15.08%	19
Total		126

empowered community

Residential Laundry Habits Survey Results

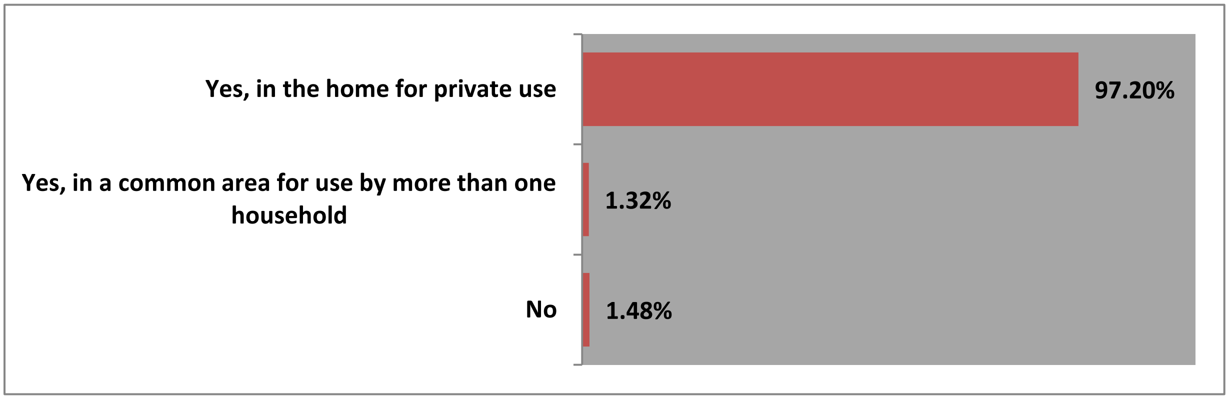
April 2015

Do you use a clothes washer at your home?

QUESTION TOTAL: 608

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Yes, in the home for private use	591	97.20%
O2	Yes, in a common area for use by more than	8	1.32%
O3	No	9	1.48%



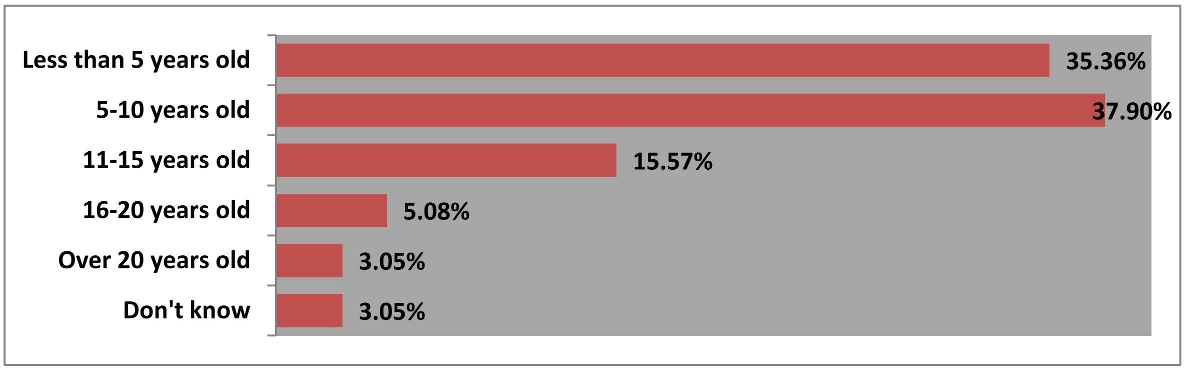
Approximately how old is the clothes washer used at your home?

(asked only of respondents who use a clothes washer at their home)

QUESTION TOTAL: 591

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Less than 5 years old	209	35.36%
O2	5-10 years old	224	37.90%
O3	11-15 years old	92	15.57%
O4	16-20 years old	30	5.08%
O5	Over 20 years old	18	3.05%
O6	Don't know	18	3.05%

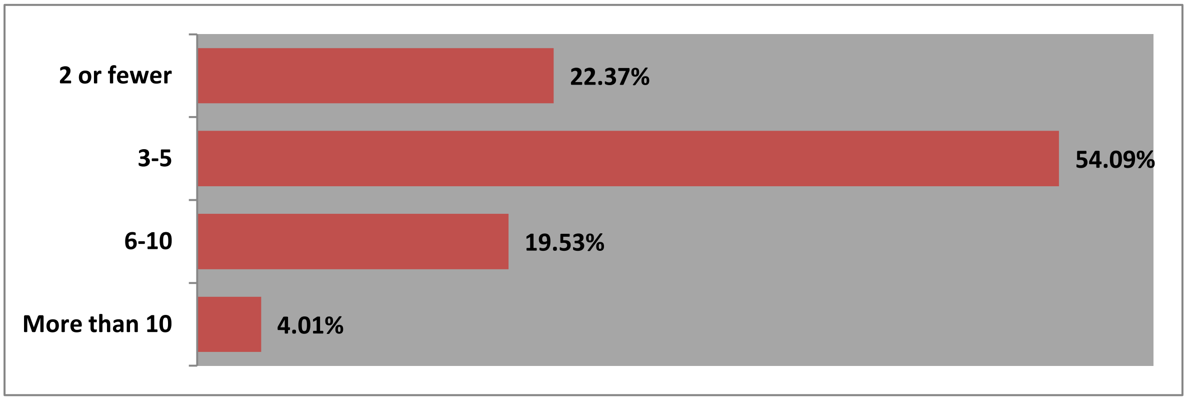


On average, how many washer loads of laundry do you do per week?

(asked only of respondents who use a clothes washer at their home)

QUESTION TOTAL: 599
NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	2 or fewer	134	22.37%
O2	3-5	324	54.09%
O3	6-10	117	19.53%
O4	More than 10	24	4.01%



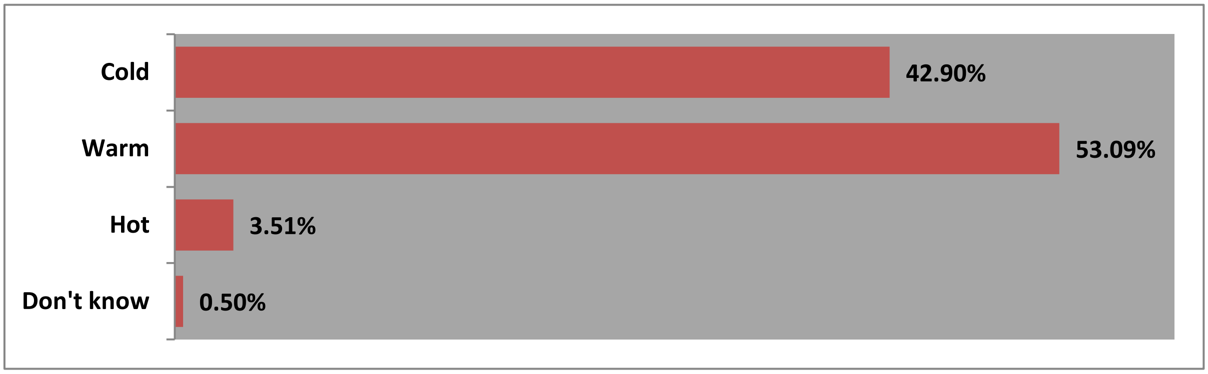
What water temperature do you use most often to wash your laundry?

(asked only of respondents who use a clothes washer at their home)

QUESTION TOTAL: 599

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Cold	257	42.90%
O2	Warm	318	53.09%
O3	Hot	21	3.51%
O4	Don't know	3	0.50%



What water temperature do you use most often to rinse your laundry?

(asked only of respondents who use a clothes washer at their home)

QUESTION TOTAL: 599

NO RESPONSE: 0

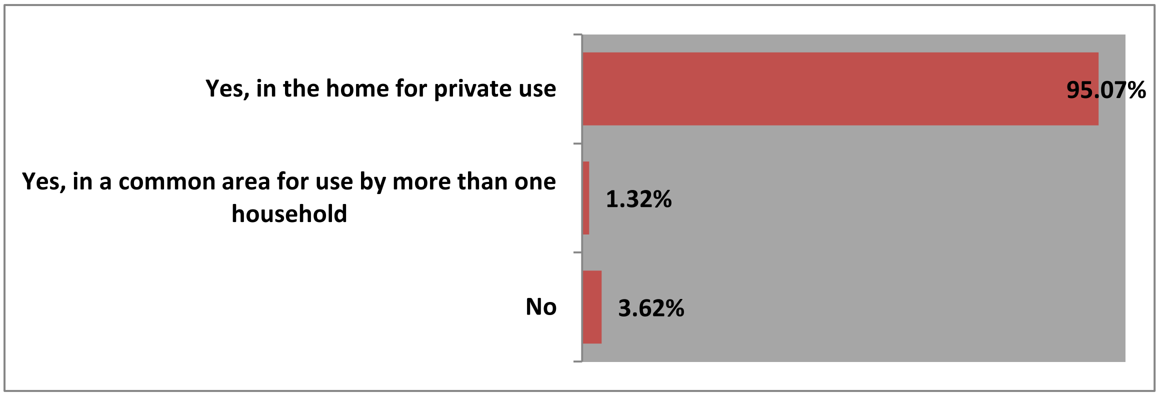
	OPTIONS	TOTAL	PERCENT
O1	Cold	506	84.47%
O2	Warm	81	13.52%
O3	Hot	4	0.67%
O4	Don't know	8	1.34%

Do you use a clothes dryer at your home?

QUESTION TOTAL: 608

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Yes, in the home for private use	578	95.07%
O2	Yes, in a common area for use by more than	8	1.32%
O3	No	22	3.62%



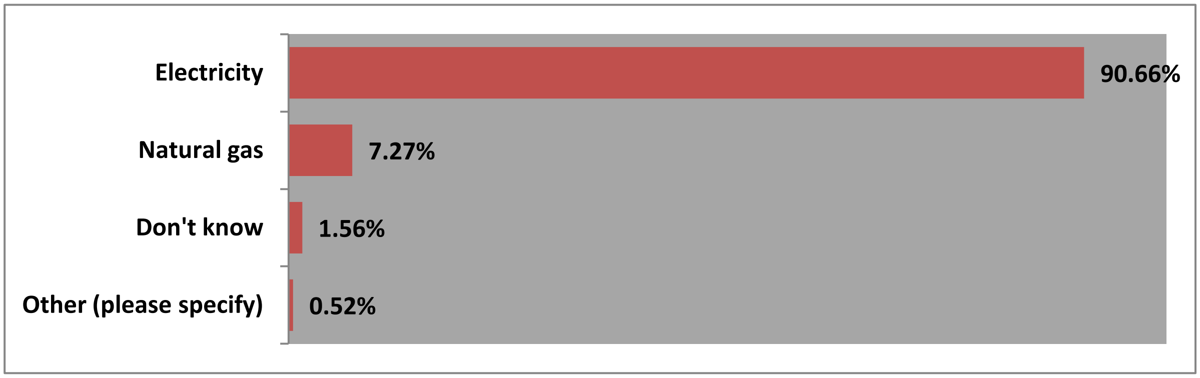
What type of fuel does the clothes dryer at your home use?

(asked only of respondents who use a clothes dryer at their home)

QUESTION TOTAL: 578

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Electricity	524	90.66%
O2	Natural gas	42	7.27%
O3	Don't know	9	1.56%
O4	Other (please specify)	3	0.52%



What type of fuel does the clothes dryer at your home use? **Other (please specify)**

Verbatim Responses	Total
Propane	3

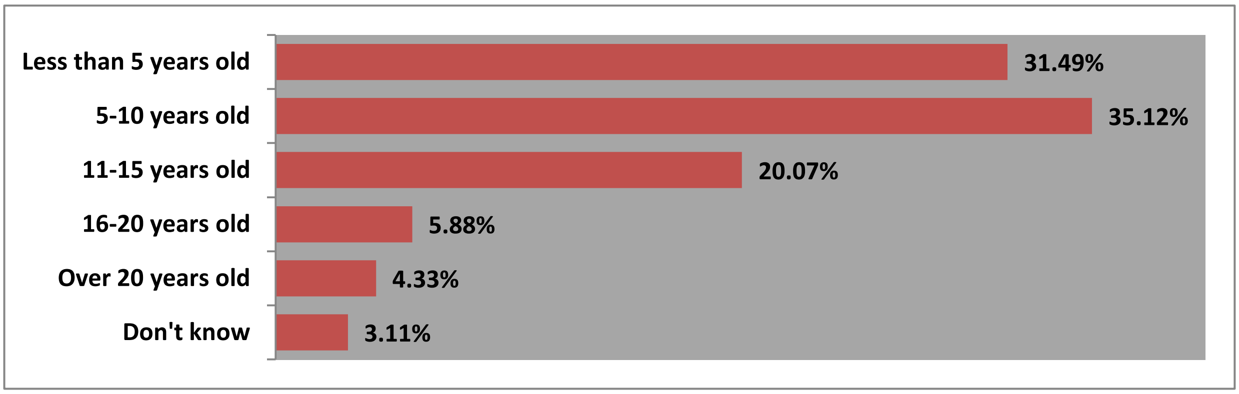
Approximately how old is the clothes dryer that is used at your home?

(asked only of respondents who use a clothes dryer at their home)

QUESTION TOTAL: 578

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Less than 5 years old	182	31.49%
O2	5-10 years old	203	35.12%
O3	11-15 years old	116	20.07%
O4	16-20 years old	34	5.88%
O5	Over 20 years old	25	4.33%
O6	Don't know	18	3.11%

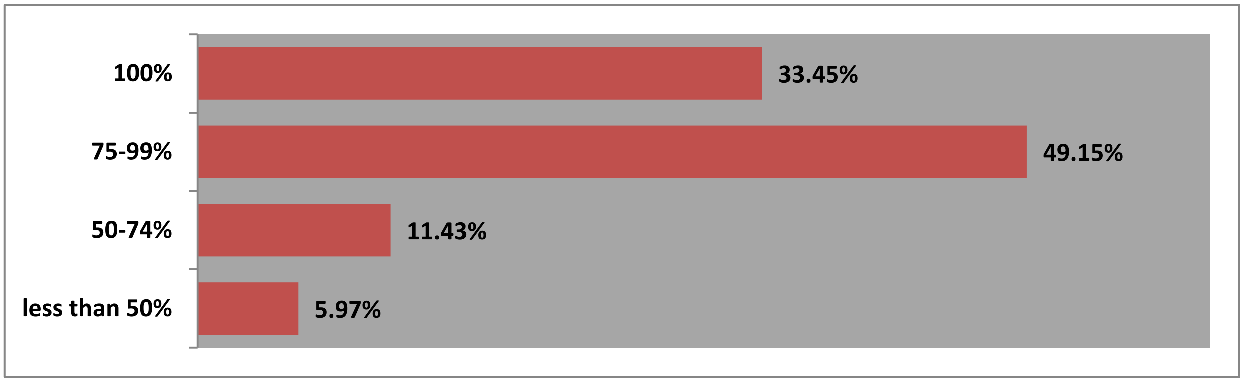


What percent of your laundry do you dry in a dryer?

(asked only of respondents who use a clothes dryer at their home)

QUESTION TOTAL: 586
NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	100%	196	33.45%
O2	75-99%	288	49.15%
O3	50-74%	67	11.43%
O4	less than 50%	35	5.97%

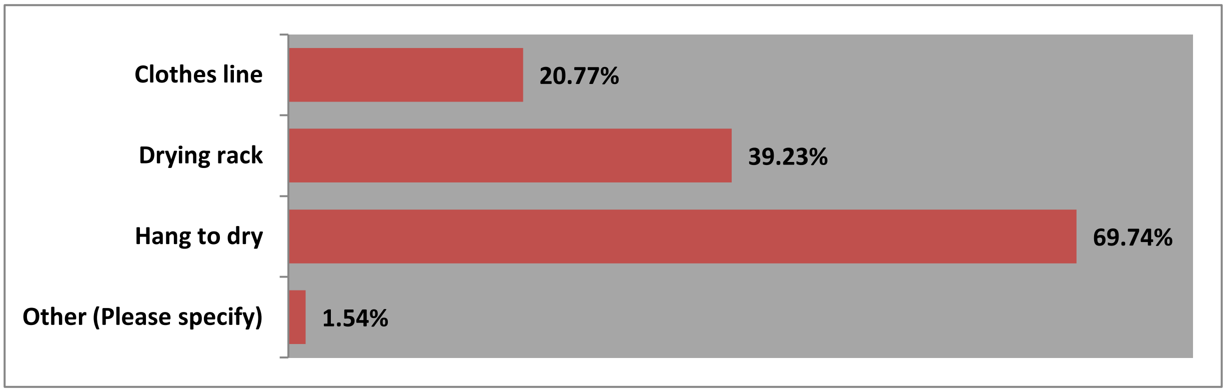


How do you dry the laundry that is not dried in a dryer?

(asked only of respondents who dry less than 100% of their clothes in a dryer)

QUESTION TOTAL:	390
NO RESPONSE:	0

	OPTIONS	TOTAL	PERCENT
O1	Clothes line	81	20.77%
O2	Drying rack	153	39.23%
O3	Hang to dry	272	69.74%
O4	Other (Please specify)	6	1.54%



How do you dry the laundry that is not dried in a dryer? **Other (Please specify)**

Verbatim Responses	Total
lay flat to dry	2
FENCE	1
Lay flat	1
Lay out	1
Shower rod near washer	1

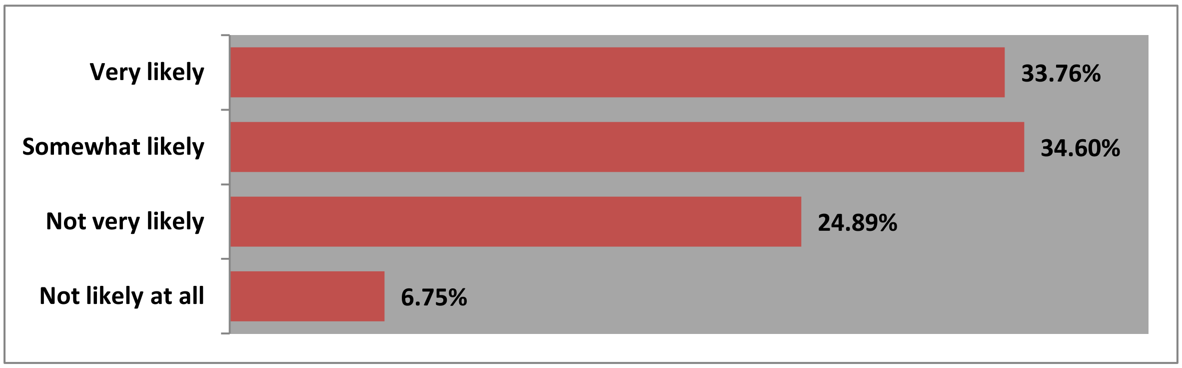
If you had a drying rack that you could use indoors to dry some, or all, of your laundry how likely would you be to use it?

(asked only of respondents who dry less than 100% of their clothes in a dryer and did not say they currently use a drying rack)

QUESTION TOTAL: 237

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Very likely	80	33.76%
O2	Somewhat likely	82	34.60%
O3	Not very likely	59	24.89%
O4	Not likely at all	16	6.75%

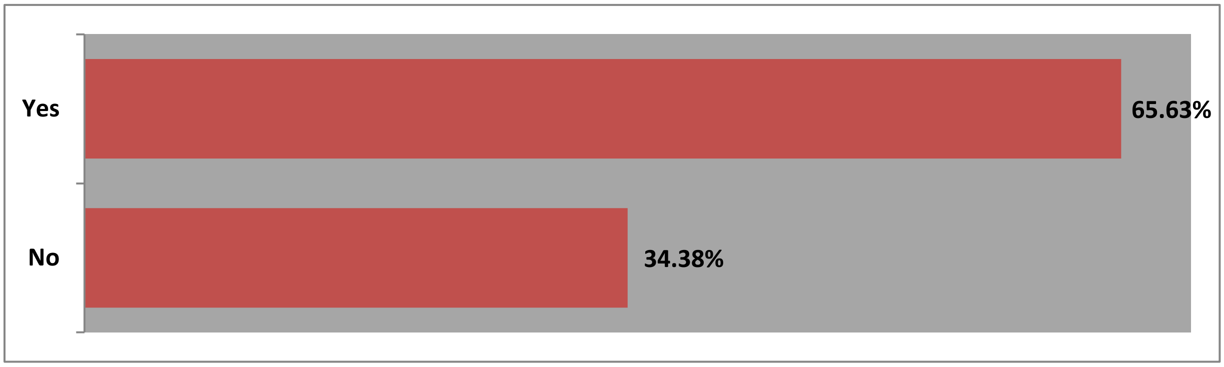


Are you aware that Idaho Power offers a variety of energy efficiency programs for residential customers?

QUESTION TOTAL: 608

NO RESPONSE: 0

	OPTIONS	TOTAL	PERCENT
O1	Yes	399	65.63%
O2	No	209	34.38%



What could Idaho Power do to increase your awareness of its energy efficiency programs?

QUESTION TOTAL:	209
NO RESPONSE:	44

Verbatim Responses	Total
Email	5
emails	3
Don't know	2
I don't know	2
newsletter	2
1 quit making me pay the $5 meter fee.	1
a flyer with a list of them (in the mail with the statement)	1
a link thru a social network, online 'n TV ads...include info in emailed/usps sent bills	1
A mailer or an email	1
advertise	1
advertise it	1
advertise more	1
Detailed email	1
direct mail	1
e mail me with new updates/put the information in the monthly bill	1
Educate the sheeple (HaHa good luck) The majority of the energy wasters are the uneducated. Unfortunately, they are all so the majority receiving assistance. If you were given free gas or subsidized for your gas consumption, would you even think about the MPGs of the vehicle you are driving. People only change if it affects their bottom line.	1
Either postal mail or email	1
e-mail	1
Email about rebates and promotions.	1
email and / or physical mailers	1
Email communication and possibly mailed flyers	1
email info to me or post on facebook. mailed flyers end up in the trash.	1
Email me	1
Email me about it. Send a story to local newspapers. Put it in your newsletter.	1
Email or letter	1
Email the info to me please. Mizzweaver@hotmail.com	1
Email the info.	1
Email the link	1
Email with short descriptions	1
Email!	1
email, include them in monthly bill online	1
email, newsletter, mailings.	1
Email, text message	1
Email. Facebook	1

Emails and fliers	1
Emails and mailings to customers	1
Emails or info on our statements.	1
emails to residential users	1
Emails with programs that are currently running and way to be more efficient.	1
emails? I'm more of an email reader than a pamphlet reader.	1
Facebook info	1
Fliers, ads on tv and radio	1
flyers in with the electricity bills	1
Flyers with the Power Bill.	1
Get my attention.	1
give more info on the variety of programs and the cost	1
Give more information about them without having to call or search for the information	1
Give rebate	1
have the link identified in the circular inserted in my bill	1
I am a renter, not a home owner----yet i pay my power bills and have to deal with a tremendously OLD and inefficient lighting, wood stove, and laundry machines. What opportunities are in place for many many limited income people like myself, who want to increase our energy efficiency but are limited by not owning their home? I have yet to see any real incentives for people like myself.	1
I am not aware of any although I new they existed I thought they were customer initiated.	1
I believe flyers are a great idea. If it's sent with the bill, it tends to get over looked.	1
I do not have air conditioning and that seems to be the only energy option I have ever seen.	1
I do not know	1
I don't know. offer a good rack?	1
I have no ideA.	1
I have seen flyer in my billing statement. Also commercials on TV. However, I am not sure these apply for me. I think my appliances are all energy efficent at this time.	1
I know they have a program for refrigerators but I wasn't aware of other ones. Did I miss it in your monthly newsletter? If so list them again in another issue.	1
I like mailings but they have to visually grab my attention. Email communication is also good.	1
I try to be as conservative as possible. I dry everything except better clothing, only till the wrinkles are out then hang to dry on a hanger. In bad weather, I string a cord in the house to dry sheets,sox,work clothes. I pick a day when the weather is better to wash sheets and towels. If there is more I can do, I am happy to learn about it.	1
If emailed to me I could check to see if any would work for us. That would give me the information and possibly a link to enroll That would be a convenient and efficient way for anyone to gain the information and enroll.	1
I'm not sure.	1
I'm not sure. Maybe an email with just one topic.	1
I'm sure you do plenty to raise awareness. I use bill pay and do not receive any paper from you as a result. This may be why I am not aware of some of your programs as I should be.	1

In a flyer with the bill	1
Include an informative flier with the bill on a regular basis such as once every 4 or 6 months.	1
Include in ON-LINE billing statement.	1
include info via email since on e-billing	1
Include info with my bill	1
include information with mailed bill	1
Indicate in the mailing what the energy efficiency programs are, cost, include, etc	1
Info in bills	1
inform me about the different programs	1
Insert in bill, e-mail.	1
just keep reminding us with the bill	1
Keep putting it with the bill. Just found out about duct work and applied.	1
Let us pore people win the $100 to try and buy a newer washers or dryers.	1
Letters, email, customer service rep calls	1
List it on my bill	1
mail	1
mail information	1
mail me the info	1
mailers or email	1
Mailings	1
make it appealing, I hate my new kenmore water saver waher, it runs for twice as long as my old one	1
Maybe inserts for people with paper bills and email for the rest of us.	1
Maybe mention it once in a while, in your advertising.	1
Mention it in the on line billing system.	1
more advertising - television, local newspaper	1
More promotional emails	1
more specific and unique mailings to our home -- not part of the bills	1
More surveys like this	1
N/A	1
na	1
news letters,e-mails, or texts	1
Newspaper article, insert in bill, email	1
Not sure. E-mail would probably be best.	1
Nothing	1
offer energy audits	1
Offer incentives? I guess I am not interested in them because I assume they all involve big costs, like replacing major appliances or windows. I can't afford anything like that.	1
Online advertising	1
Perhaps, identify which programs I could qualify for an notify me of them.	1
Probably by adding a pamphlet with the bill.	1

Provide information for energy efficiency programs that include customers that have natural gas as a heating source. All the programs I have checked into are available for customers that only use electricity. Energy efficiency should include all Idaho Power customers.	1
Provide some incentive to utilize the efficiency upgrades.	1
Put offers in with the bill, with a notice on the envelope - "Special Offers Inside".	1
Run TV commercials detailing the programs. Run radio commercials as well	1
Send a direct link to a website with a summary of the programs available.	1
send a personal letter to the home.	1
send an e-mail, or paper	1
send brochure for all programs for private residency to homes	1
Send brochures with monthly bills.	1
send either an email or normal mail information	1
send email and links in the emails of how to be energy efficent	1
send E-mail of the different energy saving that may help a person.	1
send emails	1
Send e-mails	1
Send emails about programs and rebates. Thanks.	1
Send emails about them	1
Send emails or mail flyers	1
send flyers	1
Send info in monthly bill	1
Send information via mail or email	1
send it in the mail	1
Send me an e-mail listing the energy efficiency programs offered, with links to additional information on each program such as criteria for participating in the program and anticipated benefits and costs for a program participant.	1
send me an email or letter about it with the bill. something different from the newsletter.	1
send me an email, or nice brochure in the mail. I like brochures better.	1
send me information on the programs offered	1
Send me information.	1
Send me some material in the mail separate from the bill.	1
send more info with the power bills. not just tips,but about programs to help needy with no cost efficient homes	1
send more information through the mail	1
Send notice with bills once a season or year? Doesn't help me when I primarily use ebills, though.	1
Send notices or have a website to learn about the energy efficiency programs	1
send out and explain in e-mails	1
Send out flyer	1
Send out flyers in the mail with Titles in big letters, "Idaho power wants you to know about their energy efficiency programs" "Helping you save on your electrical costs today, helps us save resources for you grand children's grand children tomorrow.	1
Send out newsletters in the mail or by email	1

Send out specific information or a call number where you could ask for that information. I think it is time that people need to be able to have an energy audit and then have it redone to see if they were able to fix the problems. Was at the Spring Fair in March, I was told I would be contacted by someone from Idaho power about my large power bill. That someone would go over my bills and my audit, that I paid for and get back with me with some help. I have not heard or been contacted as of this time. I'm quite disappointed. I did talk to 3 different people at the fair, each with the same solution. Give me your information and we will have one of our best people review and get back to you. Well???	1
Send program information through the mail.	1
send them by email	1
send them to me or refer me to a place to review	1
sent information through email or mail. I've tried to save energy to lower the cost but it seems like I couldn't figure out what? We did have a program few months back to save AC energy but that program was shutted down which is sad because it saved me money.	1
Separate mailings from bill inserts. I don't get those as I pay online through mycheckfree.	1
Special mailings.	1
Survey's like this. Fliers in the mail. E-mail, text, website, etc.	1
Tell me about them	1
Tell me about them - offer a specific program at a time.	1
Tell me about them somehow, email, newsletter, etc.	1
Tell me what they are: what is the program name, how it works, how do I access it, and what I should expect if I participate. Focus on one type of program at a time. Too much information given at the same time overwhelms me and I don't have time for that.	1
tell us ways to save on the items we use everyday. Put inserts that specifically address the most common waste of energy in our bill even on line.	1
TV ad	1
Tv commercials	1
We receive our bill and pay on computer. I don't get any information about Idaho Power unless you send me messages on internet	1
What I've seen is for low income or remove an old appliance programs so the "availability" limited to the rest of us.	1
What you are doing is fine	1

Technical Reference Manual 1.7

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1. Overview and Purpose of Deemed Savings Method

This Technical Reference Manual (TRM) is a compilation of stipulated algorithms and values for various energy efficiency measures implemented by Idaho Power Company's commercial demand side management programs and serves the Building Efficiency and Easy Upgrades programs by providing up to date savings estimates for the energy efficiency measures offered by the programs. This manual is intended to facilitate the cost effectiveness screening, planning, tracking, and energy savings reporting for the Building Efficiency and Easy Upgrades Energy Efficiency incentive programs. While the algorithms and stipulated values contained in this TRM are derived using best practices, the stipulated values should be reviewed and revised according to relevant industry research and impact evaluation findings as necessary to ensure that they remain accurate for the Building Efficiency and Easy Upgrades programs. The following sections describe many of the processes and cross-cutting assumptions used to derive the measure level savings estimates found in Section 2.

1.1. Purpose

This manual is intended to facilitate the cost effectiveness screening, planning, tracking, and energy savings reporting for the Building Efficiency and Easy Upgrades energy efficiency incentive programs. This document is intended to be a living document in which the stipulated values are revised according to relevant industry research and impact evaluation findings.

1.2. Methodology and Framework

The algorithms and stipulated values contained in this TRM are derived using current industry standard engineering best practices. Current relevant research, recent impact evaluations, and Technical Reference Manuals developed for other states and/or regions are referenced where appropriate. All energy savings algorithms in this TRM are designed to be applied using the simple engineering formulas defined for each measure in conjunction with the included stipulated values.

Each measure is presented first with a summary of the technology and typical expected (per unit) energy savings, expected useful life, and incremental cost estimates. The ‘typical’ per unit values leverage basic assumptions regarding the geographic distribution of program participants (e.g. weather zone) as well as participant demographics (for example distribution of building types, efficiency of current building stock, etc.). Each measure is accompanied by a spreadsheet calculator containing live formulas and all weights used to derive the typical per-unit estimates. It is expected that as better information is made available regarding program participants, or as program designs are adjusted these numbers will be updated accordingly.

Following the measure summary information, each measure section provides a description of its scope and the spectrum of eligible projects/equipment to which the algorithms and values apply. When applicable, a discussion of code compliance topics (for new construction projects) is included.

1.3. Weather Data Used for *Weather Sensitive* Measures

The service territory for Idaho Power Company covers much of southern Idaho and stretches into eastern Oregon. This is illustrated in Figure 1-1.In order to normalize expected annual energy savings and peak demand reductions for annual variations in weather patterns, all stipulated values for weather sensitive measures were derived using the industry standard Typical Meteorological Year (TMY3) weather data. While there are many weather stations in Idaho for which TMY3 data is available, it was determined that averaging the TMY3 weather across stations in two ASHRAE weather zones (zones 5 and 6) provided sufficient resolution without adding too many separate variations for stipulated values reported in the TRM.

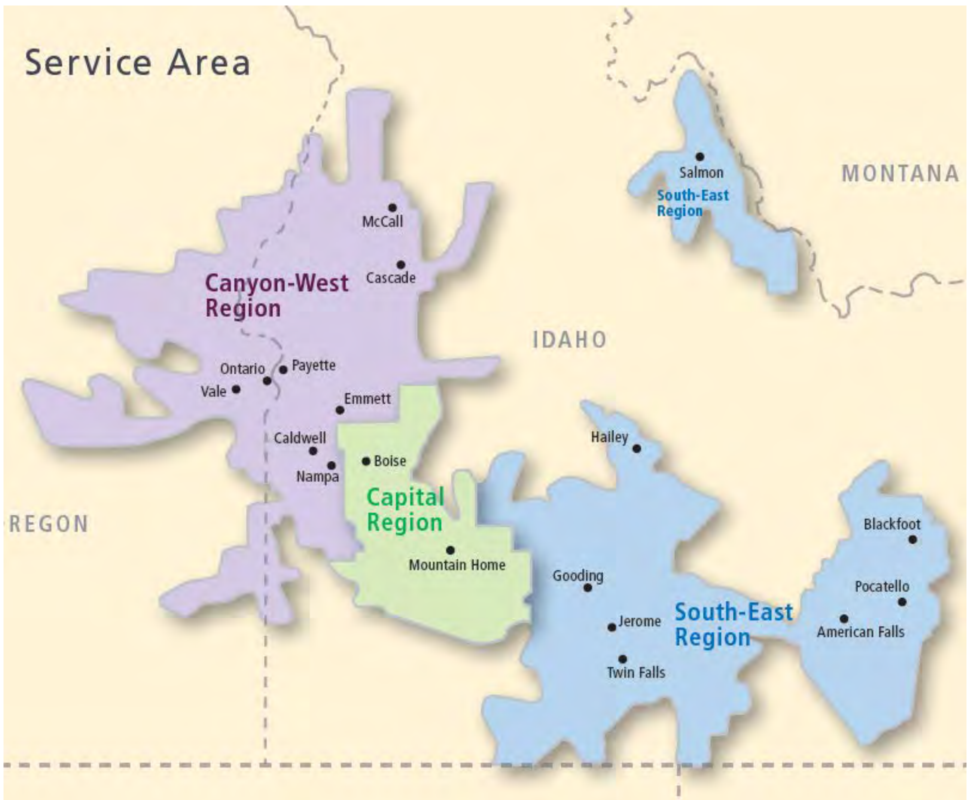

Figure 1-1 Map of Idaho Power Company Service Territory[1]

All stipulated values for weather sensitive measures (e.g. Equivalent Full Load Cooling Hours) are based on 'typical' weather data and provided separately for each of these two weather zones. A map of the ASHRAE weather zones is provided in Figure 1-2. When separate savings estimates are provided for different weather zones, the project location should be used to determine which of the values are applicable. The 'typical' energy savings values reported at the beginning of each measure's section assumes a weighted average between the two weather zones using weights of 80% and 20% for Zones 5 and 6 respectively.

[1] Map represents service territory at the time of this publication.

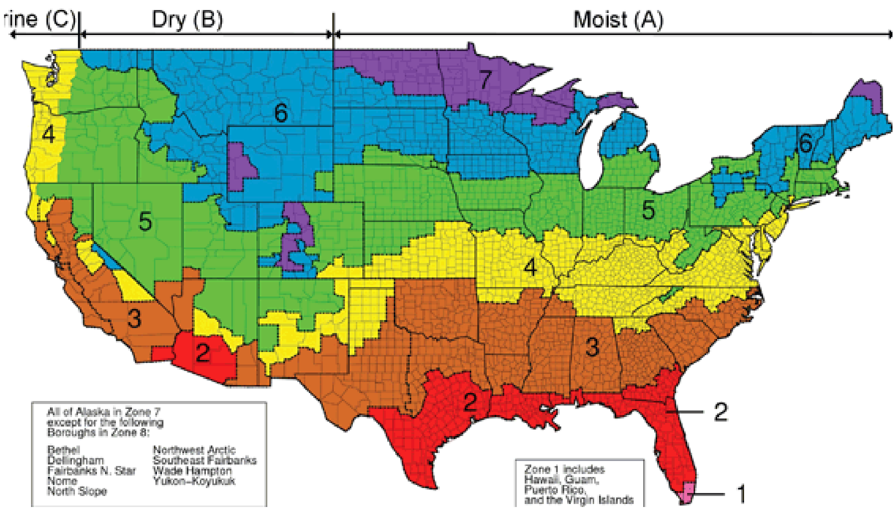

Figure 1-2 Map Illustrating ASHRAE Weather Zones[2]

While reviewing the weather data it was noted that while both weather zones are 'heating dominated' Weather Zone 6 is on average cooler that Weather Zone 5. Therefore, energy conservation measures targeting heating efficiency tend to perform much better in Zone 6. However; measures which result in a heating penalty tend to perform better in Zone 5. Monthly average dry bulb temperatures are compared for both weather zones in

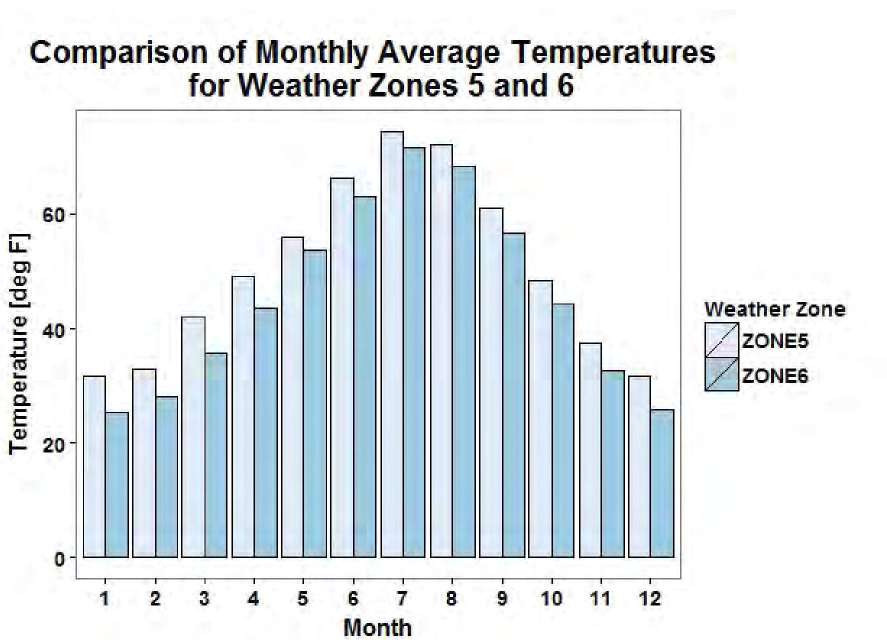

Figure 1-3 Comparison of Monthly Average Temperatures

[2] Note how Idaho is bisected by Zones 5 and 6

1.4. Peak Demand Savings and Peak Demand Window Definition

Where applicable peak demand savings estimates are derived using Idaho Power Company's peak period definition of: *weekdays from 12:00 PM to 8:00 PM, June 1 through August 31*. Hourly savings estimates are averaged over the aforementioned time period to report peak savings.

Coincidence Factors for Lighting

Coincidence factors are defined as the percentage of the demand savings which occur during Idaho Power Company's peak period (defined above). When hourly data are available these are calculated by averaging the hourly demand savings over the peak period definition. This is exemplified in Figure 1-4 which illustrates a hypothetical hourly savings profile. The highlighted region bounds the peak period definition and the CF is calculated by taking the average demand reduction during that period divided by the max demand reduction

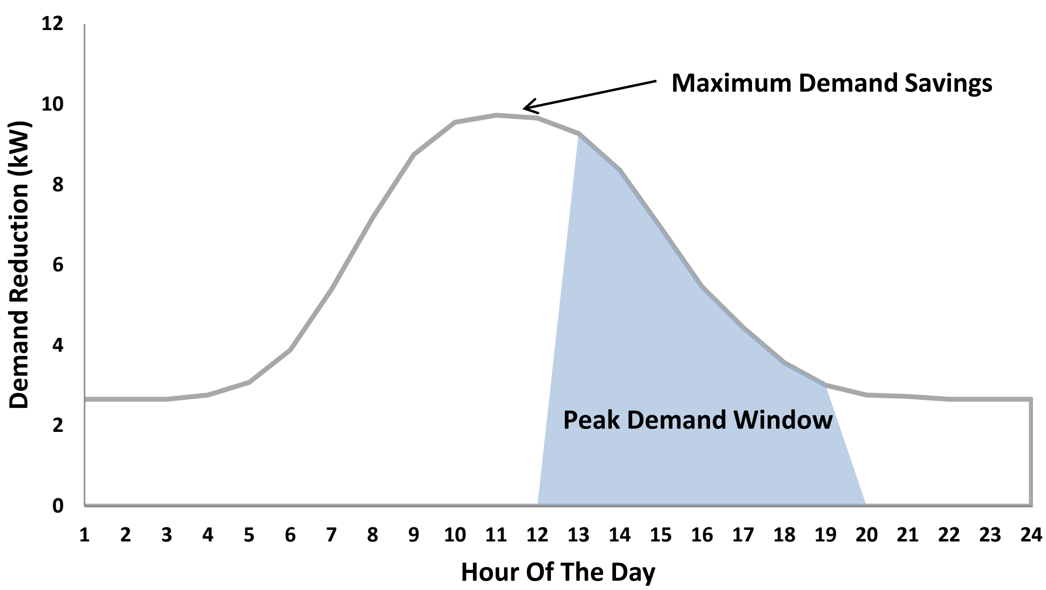

Figure 1-4 Hypothetical Hourly Savings Profile Used to Illustrate Calculation of Coincidence Factor

Thus in the example above let's suppose that the maximum Demand savings are 10 kW and the average kW reduction in the shaded area is 6 kW. The coincidence factor is calculated as follows:

$$Coincidence\ Factor = \frac{Average\ Reduction}{Max\ Reduction} = \frac{6\ kW}{10\ kW} = .6$$

1.5. Description of Prototypical Building Simulation Models

The estimated energy impacts for many of the measures in this TRM were developed using the help of building energy simulation modeling. All of the building simulations were performed using the DOE2.2 simulation software to simulation prototypical building models developed for the Database for Energy Efficiency Resources (DEER). A complete description of these models can be found in the DEER final report – though some aspects will be heighted here as they relate to the TRM.[3]

5 different *vintages* of 23 non-residential prototypical building models were developed for the DEER. These models include the following:

- Assembly,
- Education – Primary School,
- Education – Secondary School,
- Education – Community College,
- Education – University,
- Education – Relocatable Classroom,
- Grocery,
- Health/Medical – Hospital,
- Health/Medical – Nursing Home,
- Lodging – Hotel,
- Lodging – Motel,
- Manufacturing – Bio/Tech,
- Manufacturing – Light Industrial,
- Office – Large,
- Office – Small,
- Restaurant – Sit-Down,
- Restaurant – Fast-Food,
- Retail – 3-Story Large,
- Retail – Single-Story Large,
- Retail – Small,
- Storage – Conditioned,
- Storage – Unconditioned, and
- Storage – Refrigerated Warehouse.

A complete set of these models was pulled from the DEER for use in simulating various weather sensitive measures (including heating and cooling interactive factors for lighting). All simulations were run using the (2) Idaho specific weather data-set described in Section 1.3 for the buildings for which a measure was applicable. The hourly results were then compiled and typically normalized using the building conditioned area (ft^2) or installed cooling/heating capacity (Tons).

[3] Southern California Edision, Database for Energy Efficiency Resources (DEER) Update Study. 2005

Note that the newest vintage of a building type was selected for simulating impacts for *new construction* while the most applicable vintage was selected for retrofit.[4]

1.6. Application of Stacking Effects in the TRM

Often energy conservation projects involve ‘packages’ of measures implemented together. As measures are ‘stacked’ on top of one another the each add to the overall project energy savings, however; individual measure impacts are not always directly additive. This is because, unless otherwise noted, the ‘typical’ savings values reported within this TRM assume that the measure is implemented on its own, and do not presuppose the presence of other measures which may interact with the measure(s) installed (or simply improve the baseline equipment onto which the measure is installed). For example; let’s assume that a particular project involved the following energy conservation measures:

Order Implemented	Measure	Expected Savings	End-Use
1	High Efficiency Chiller	10%	Cooling
2	High Efficiency Chilled Water Pumps	3%	Pumps & Auxiliary
3	Water-side economizer	5%	Cooling

The first thing to note is that the first and third measures both impact the same *end-use* (cooling) while the second measure impacts the pumps & auxiliary *end-use*. This is important because measures generally interact with other measures applied to the same *end-use*. Thus, it is often safe to add energy savings for measures impacting different *end-uses* but problematic to add energy savings for measures impacting the same. In our example the waterside economizer interacts directly with the high efficiency chiller but less so with the pumps. When assessing the overall energy impacts for this project we must presuppose the presence of the high efficiency chiller in our baseline for the waterside economizer. This would look something like the following:

$$Energy\ Savings_{Measure1} = kWh_{Baseline} * Sav_{Measure1}$$
$$Energy\ Savings_{Measure2} = kWh_{Pumps\ \&\ Aux\ Baseline} * Sav_{Measure2}$$
$$Energy\ Savings_{Measure3} = (kWh_{Cooling\ Base} * Sav_{Measure1)} * Sav_{Measure3}$$

Notice how the energy savings calculations for Measure 3 (the waterside economizer) subtract out the impacts of Measure 1 (the high efficiency chiller) before applying $Sav_{Measure3}$. This must be done for all interacting measures in a project in order to prevent double counting energy impacts. One thing to note in this example is that had the waterside economizer been installed on a completely separate chiller (and one which was not impacted by the first measure) then the considerations discussed would not be needed as the two measures no longer interact. It is also important to note that while the measures provided in this example only impact a single end-use some measures have non-negligible impacts on multiple *end-uses* that must be considered. An

[4] The specific vintage selected was a function of the expected distribution of buildings of that type in the Idaho Power Service Territory.

example of such a measure is HVAC – Controls. Measures of this nature, where included in this TRM, have been designed to account for their interactions implicitly within the algorithms listed in the measure chapter. Measures for which interactive effects are already accounted are:

1) High efficiency lighting and lighting controls
2) HVAC Controls

All other measures in this TRM have been assigned an *end-use* which represents its primary impact. The user should be cognizant of these *end-uses* and only add measure savings (in projects involving multiple measures) when the *end-uses* are different *or* it is know with certainty that the measures impact totally separate pieces of equipment on that end-use. If *n* measures are identified to be installed and will impact the same equipment on the same *end-use* the following equation shall be used:

$$E_{Sav} = kWh_{Base} * (1 - (1 - Sav_1) * (1 - Sav_2) * \dots * (1 - Sav_1)$$

Where:

kWh_{Base}	Baseline annual energy use of the affected equipment
$Sav_{1,2,3,\dots,n}$	The relative savings (% reduction) expected from the energy efficiency measure

If the relative measure savings (% reduction) or the baseline annual energy use is unknown and the above equation cannot be used then the following conservative discount factors should be applied (multiplied) to the savings estimates for each measure according to the order implemented.

Table 1-1 Stacking Effect Discount Factors

Order Implemented	Discount Factor
1	1
2	.85
3	.74
4	.67
5	.62
6	.59

Application of Table 1-1 can be illustrated using the (3) measure example project discussed at the beginning of this section. For this example let’s assume that the individual measure savings (as calculated by the TRM chapters) are as follows:

Order	Measure	Relative Savings	End-Use	Individual Energy Savings	Table 1-1 Factor	Stacked Energy Savings
1	High Efficiency Chiller	10%	Cooling	300,000 kWh	1	300,000 kWh
2	High Efficiency Chilled Water Pumps	3%	Pumps & Auxiliary	25,000 kWh	1	25,000 kWh
3	Water-side economizer	5%	Cooling	50,000 kWh	.85	42,500 kWh
					Project Total :	367,500 kWh

2. Commercial and Industrial Deemed Savings Measures

This chapter contains the protocols and stipulated values for commercial and industrial measures covered by this TRM. Spreadsheets were developed for each measure and contain any calculations used to derive stipulated values (or deemed savings estimates). Each measure is presented first with a summary of the technology and typical expected (per unit) energy savings, expected useful life, and incremental cost estimates. The 'typical' per unit values leverage basic assumptions regarding the geographic distribution of program participants (e.g. weather zone) as well as participant demographics (for example distribution of building types, efficiency of current building stock, etc.) and are intended for use in cost effectiveness screening – not as deemed savings estimates (given their generality). Where applicable, deemed savings estimates are provided for various scenario in tables at the end of each measure's section.

Each measure is accompanied by a spreadsheet calculator containing live formulas and all weights used to derive the typical per-unit estimates. It is expected that as better information is made available regarding program participants, or as program designs are adjusted these numbers will be updated accordingly. Following the measure summary information, each measure section provides a description of its scope and the spectrum of eligible projects/equipment to which the algorithms and values apply. When applicable, a discussion of code compliance topics (for new construction projects) is included. It should also be noted that while savings estimates are provided for a multitude of measures (both for retrofit and new construction) a custom engineering analysis should be preferred for significantly large projects when possible. This is particularly true for projects involving VFDs, HVAC controls, and/or large 'packages' of multiple measures.

2.1. Efficient Interior Lighting and Controls (New Construction)

The following algorithms and assumptions are applicable to interior lighting systems installed in commercial and industrial spaces which are more efficient than required by prevailing codes and standards. This measure applies only to projects which represent new construction or major renovations.[5] The following tables summarize the 'typical' expected (per ft^2) energy impacts for lighting power density improvements and controls additions. Typical values are based on the algorithms and stipulated values described below and data from past program participants.[6]

Table 2-1 Typical Savings Estimates for 10% Interior Lighting LPD Improvement (New Construction)

	Retrofit	New Construction
Deemed Savings Unit	n/a	ft^2
Average Unit Energy Savings	n/a	.51 kWh
Average Unit Peak Demand Savings	n/a	.11 W
Expected Useful Life	n/a	14.3 Years
Average Incremental Cost	n/a	$0.26
Stacking Effect End-Use	n/a	

Table 2-2 Typical Savings Estimates for 20% Interior Lighting LPD Improvement

	Retrofit	New Construction
Deemed Savings Unit	n/a	ft^2
Average Unit Energy Savings	n/a	1.03 kWh
Average Unit Peak Demand Savings	n/a	.23 W
Expected Useful Life	n/a	14.3 Years
Average Incremental Cost	n/a	$0.51
Stacking Effect End-Use	n/a	

[5] Major renovations are defined to be any renovation or facility expansion project in which building permits were required and the lighting system had to be demonstrated to comply with a particular code or standard.

[6] See spreadsheet "1-TypicalCalcs_HighEffLight.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

Table 2-3 Typical Savings Estimates for >= 30% Interior Lighting LPD Improvement[7]

	Retrofit	New Construction
Deemed Savings Unit	n/a	ft^2
Average Unit Energy Savings	n/a	2.33 kWh
Average Unit Peak Demand Savings	n/a	.52 W
Expected Useful Life	n/a	14.3 Years
Average Incremental Cost	n/a	$0..89
Stacking Effect End-Use	n/a	

Table 2-4 Typical Savings Estimates for Daylighting Controls (New Construction)[8]

	Retrofit	New Construction
Deemed Savings Unit	n/a	ft^2
Average Unit Energy Savings	n/a	.94 kWh
Average Unit Peak Demand Savings	n/a	.24 W
Expected Useful Life	n/a	14.3 Years
Average Incremental Cost	n/a	$0.91
Stacking Effect End-Use	n/a	

Table 2-5 Typical Savings Estimates for Occupancy Sensors (New Construction)[9]

	Retrofit	New Construction
Deemed Savings Unit	n/a	Sensor
Average Unit Energy Savings	n/a	366 kWh
Average Unit Peak Demand Savings	n/a	87 W
Expected Useful Life	n/a	8 Years
Average Incremental Cost	n/a	$38.26
Stacking Effect End-Use	n/a	

[7] Note that the values listed for this measure assume the “typical” improvement in this category is a 45% reduction in interior LPD. This is based on observed lighting load reductions from past program participants. Note that an average % reduction was taken for participants whose LPD reduction fell within this category.

[8] Assumes that the half of the projects will also have a 10% reduction in the lighting power densities which reduce the savings potential for this measure.

[9] See previous footnote

Table 2-6 Typical Savings Estimates for Efficient Exit Signs

	Retrofit	New Construction
Deemed Savings Unit	n/a	Sign
Average Unit Energy Savings	n/a	28 kWh
Average Unit Peak Demand Savings	n/a	3.6 W
Expected Useful Life	n/a	16 Years
Average Incremental Cost	n/a	$10.83
Stacking Effect End-Use	n/a	

2.1.1. Definition of Eligible Equipment

All above-code interior lighting systems (fixtures, lamps, ballasts, etc.) are eligible. Eligibility is determined by calculating the lighting power density (LPD) for the installed system. If the LPD is at least 10% lower than allowed by code (see Section 2.1.2) then the system is eligible. Efficient equipment may include florescent fixtures, LED lamps, LED exit signs, compact florescent light bulbs, high intensity discharge lamps, etc.

In addition to efficient lighting fixtures, lighting controls are eligible under this measure. Eligible controls include: occupancy sensors (wall mounted and fixture mounted), daylighting controls, dimmers, and bi-level switches. Lighting controls are only eligible when not already required by the building code standard to which a project is permitted.

2.1.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the new construction scenario.

Retrofit (Early Replacement)

n/a

New Construction (Includes Major Remodel & Replace on Burn-Out)

Baseline equipment for this measure is defined as an installed lighting system with a maximum allowable LPD. The maximum allowable LPD is defined by the building code according to which the project was permitted. Current applicable standards are defined by ASHRAE 90.1-2004 and 90.1-2007.

Two paths are available for code compliance – the Building Area Method (ASHRAE 90.1, Section 9.5) and the Space-by-Space Method (ASHRAE 90.1, Section 9.6). Either can be used to determine baseline power density provided it is consistent with the method used by the project for code compliance.

Code Compliance Considerations for Lighting Controls

Section 9.4.1 Of the ASHRAE 90.1 Standard specifys mandatory automatic lighting controls for buildings greater than 5000 ft2 and in certain space types (See Section 9.4.1.2). If the building or space is not exempt from these mandatory provisions then the least efficient mandatory control strategy shall be assumed as baseline equipment. Note that prescriptive lighting control requirements are the same between the 2004 and 2007 versions of Standard 90.1.

2.1.3. Algorithms

Two sets of algorithms are provided for this measure. The first are algorithms for Lighting Power Density (LPD) reductions and/or for the addition of lighting controls. The second set of algorithms are included for high efficiency exit signs (which are treated separately by ASHRAE 90.1):

Algorithm 1 (Lighting Power Density Reduction and Controls Additions):

$$\Delta kWh = kWh_{base} - kWh_{Installed}$$

$$= A_{SF} * [LPD_{base} - LPD_{Installed} * (1 - CSF)] * HOU * HCIF_{Energy}$$

$$\Delta kW = (kW_{base} - kW_{Installed}) * CF$$

$$= ASF * [LPD_{base} - LPD_{Installed} * (1 - CSF)] * HCIF_{Demand} * CF$$

$$kWh/Unit_{Typical} = \Sigma\ (\Delta kWh/Unit_{building\ i} * W_{building\ i})$$

$$kWh/Unit_{building,\ i} = [LPD_{building\ i,\ base} - LPD_{building\ i,\ Installed} * (1 - CSF)] * HCIF_{Demand}$$

The above equations for *ΔkWh* and *ΔkW* can be simplified the following if a project involves only a lighting power density reduction or lighting controls addition:

Power density reduction only: $\Delta kWh = A_{SF} * [LPD_{base} - LPD_{Installed}] * HOU * HCIF_{Energy}$

Controls installation only: $\Delta kWh = A_{SF} * LPD_{Installed} * CSF * HOU * HCIF_{Energy}$

Algorithm 2 (High Efficiency Exit Signs):

$$\Delta kWh = kWh_{base} - kWh_{Installed}$$

$$= (W_{base} - W_{Installed}) * 8760 * HCIF_{Energy} * N_{Signs}$$

$$\Delta kW = (W_{base} - W_{Installed}) * N_{Signs}$$

2.1.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
HOU	Annual operating hours for the lighting system. Values for various building types are stipulated in Table 2-7. When available, actual system hours of use should be used.
LPD	Lighting power density baseline (base) and installed (meas) systems. This is defined as the total lighting system connected load divided by the lighted area. When using the Building Area method baseline LPD is defined by

	Table 2-8. When using the Space-By-Space method the LPD is defined by Table 2-9 and Table 2-10**Error! Reference source not found.**.
W	Exit Sign *base* and *installed* wattage. Note that the *base* wattage is defined by ASHRAE 90.1 to be 5 watts. See Table 2-14 for stipulated wattages.
CF	Peak coincidence factor. Represents the % of the connected load reduction which occurs during Idaho Power's peak period. For Exit signs the coincidence factor is defined to be unity.
HCIF	Heating and Cooling Interactive Factors. These account for the secondary impacts reductions in internal loads effect on HVAC systems by representing the expected "typical' impacts a reduction in the lighting power density will effect on electric space conditioning equipment. These are defined in Table 2-11 for various building types and climate zones.
CSF	Controls Savings Factor. This is defined as the % reduction in system hours of use (HOU) due do installed lighting controls. Stipulated values for this variable are provided in Table 2-13.
$kWh/Unit_{Typical}$	Typical measure savings on a per unit basis.
$kWh/Unit_{building,\ i}$	Typical measure savings for building type i on a per unit basis. Uses the baseline LPD for building type i as defined in Table 2-8. Measure LPD for building i is defined as the average installed LPD for past program participants of that building type.
$W_{building,i}$	Population weight for building type i. This is defined to be the square footage of building type i in past program participants divided by the total square footage of past participant building space

2.1.5. Sources

- ASHRAE, Standard 90.1-2004.
- ASHRAE, Standard 90.1-2007.
- Regional Technical Forum, draft Standard Protocol Calculator for Non-Residential Lighting improvements, http://rtf.nwcouncil.org/subcommittees/comlighting/Lighting%20Calculator_version%2012-6-2012.xlsx
- California DEER Prototypical Simulation models (modified), eQUEST-DEER 3-5.[10]
- California DEER Effective Useful Life worksheets: EUL_Summary_10-1-08.xls
- Acker, B., Van Den Wymelenberg, K., 2010. Measurement and Verification of Daylighting Photocontrols; Technical Report 20090205-01, Integrated Design Lab, University of Idaho, Boise, ID.

[10] Prototypical building energy simulations were used to generate Idaho specific Heating and Cooling Interactive Factors and Coincidence factors for various building and heating fuel types.

2.1.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-7 Stipulated Lighting Hours of Use (HOU) by Building Type[11]

Building Type	Hours of Use
Automotive Repair	4,056
College or University	2,300
Exterior 24 Hour Operation	8,760
Hospital	5,000
Industrial Plant with One Shift	2,250
Industrial Plant with Two Shifts	4,500
Industrial Plant with Three Shifts	8,400
Library	3,748
Lodging	3,000
Manufacturing	3,300
Office <20,000 sf	2,600
Office 20,000 to 100,000 sf	3,200
Office >100,000 sf	3,500
Other Health, Nursing, Medical Clinic	3,600
Parking Garage	4,368
Restaurant	4,800
Retail Mini Mart	6,500
Retail Boutique <5,000 sf	3,400
Retail 5,000 to 50,000 sf	3,900
Retail Supermarket	6,500
Retail Big Box >50,000 sf One-Story	4,800
Retail Anchor Store >50,000 sf Multistory	4,000
School K-12	2,200

[11] The values in this table are based on the most recent Regional Technical Forum draft Standard Protocol Calculator for Non-Residential Lighting improvements: http://rtf.nwcouncil.org/subcommittees/comlighting/Lighting%20Calculator_version%2012-6-2012.xlsx

Table 2-8 Baseline Lighting Power Densities By Building Type – Building Area Method[12]

Building Area Type	2004 LPD (W/ft2)	2007 LPD (W/ft2)
Automotive facility	0.9	0.9
Convention center	1.2	1.2
Courthouse	1.2	1.2
Dining: bar lounge/leisure	1.3	1.3
Dining: cafeteria/fast food	1.4	1.4
Dining: family	1.6	1.6
Dormitory	1	1
Exercise center	1	1
Gymnasium	1.1	1.1
Health-care clinic	1	1
Hospital	1.2	1.2
Hotel	1	1
Library	1.3	1.3
Manufacturing facility	1.3	1.3
Motel	1	1
Motion picture theater	1.2	1.2
Multifamily	0.7	0.7
Museum	1.1	1.1
Office	1	1
Parking garage	0.3	0.3
Penitentiary	1	1
Performing arts theater	1.6	1.6
Police/fire station	1	1
Post office	1.1	1.1
Religious building	1.3	1.3
Retail	1.5	1.5
School/university	1.2	1.2
Sports arena	1.1	1.1
Town hall	1.1	1.1
Transportation	1	1
Warehouse	0.8	0.8
Workshop	1.4	1.4

[12] These values are from Tables 9.5.1 in ASHRAE 90.1 for the Building Area method. Note that values for both 2004 and 2007 versions of Standard 90.1 are included.

Table 2-9 Baseline LPD For Common Spaces - Space-by-Space Method

Common Space Type [13]	LPD (W/ft2)
Office-Enclosed	1.1
Office-Open Plan	1.1
Conference/Meeting/Multipurpose	1.3
Classroom/Lecture/Training	1.4
For Penitentiary	1.3
Lobby	1.3
For Hotel	1.1
For Performing Arts Theater	3.3
For Motion Picture Theater	1.1
Audience/Seating Area	0.9
For Gymnasium	0.4
For Exercise Center	0.3
For Convention Center	0.7
For Penitentiary	0.7
For Religious Buildings	1.7
For Sports Arena	0.4
For Performing Arts Theater	2.6
For Motion Picture Theater	1.2
For Transportation	0.5
Atrium—First Three Floors	0.6
Atrium—Each Additional Floor	0.2
Lounge/Recreation	1.2
For Hospital	0.8
Dining Area	0.9
For Penitentiary	1.3
For Hotel	1.3
For Motel	1.2
For Bar Lounge/Leisure Dining	1.4
For Family Dining	2.1
Food Preparation	1.2
Laboratory	1.4
Restrooms	0.9
Dressing/Locker/Fitting Room	0.6
Corridor/Transition	0.5
For Hospital	1
For Manufacturing Facility	0.5
Stairs—Active	0.6
Active Storage	0.8

[13] In cases where both a common space type and a building specific type are listed, the building specific space type shall apply.

Common Space Type [13]	LPD (W/ft2)
For Hospital	0.9
Inactive Storage	0.3
For Museum	0.8
Electrical/Mechanical	1.5
Workshop	1.9
Sales Area	1.7

Table 2-10 Baseline LPD for Specific Spaces - Space-by-Space Method

Building Specific Space Types	LPD (W/ft2)
Playing Area	1.4
Exercise Area	0.9
Courtroom	1.9
Confinement Cells	0.9
Judges Chambers	1.3
Fire Station Engine Room	0.8
Sleeping Quarters	0.3
Post Office-Sorting Area	1.2
Convention Center-Exhibit Space	1.3
Card File and Cataloging	1.1
Stacks	1.7
Reading Area	1.2
Emergency	2.7
Recovery	0.8
Nurse Station	1
Exam/Treatment	1.5
Pharmacy	1.2
Patient Room	0.7
Operating Room	2.2
Nursery	0.6
Medical Supply	1.4
Physical Therapy	0.9
Radiology	0.4
Laundry—Washing	0.6
Automotive—Service/Repair	0.7
Low (<25 ft Floor to Ceiling Height)	1.2
High (>25 ft Floor to Ceiling Height)	1.7
Detailed Manufacturing	2.1
Equipment Room	1.2
Control Room	0.5
Hotel/Motel Guest Rooms	1.1
Dormitory—Living Quarters	1.1
General Exhibition	1
Restoration	1.7
Bank/Office—Banking Activity Area	1.5
Worship Pulpit, Choir	2.4
Fellowship Hall	0.9
Sales Area	1.7
Mall Concourse	1.7
Ring Sports Area	2.7

Building Specific Space Types	LPD (W/ft2)
Court Sports Area	2.3
Indoor Playing Field Area	1.4
Fine Material Storage	1.4
Medium/Bulky Material Storage	0.9
Parking Garage—Garage Area	0.2
Airport—Concourse	0.6
Air/Train/Bus—Baggage Area	1
Terminal—Ticket Counter	1.5

Table 2-11 Heating and Cooling Interactive Factors by Building Type and Weather Zone[14]

Building Type	Weather Zone 5		Weather Zone 6	
	kWh	*kW*	*kWh*	*kW*
Primary School	1.04	1.2	1.03	1.17
Secondary School	1.04	1.14	1.02	1.12
Community College	1.11	1.16	1.08	1.15
University	1.13	1.14	1.14	1.14
Hospital	1.09	1.04	1.08	1.06
Nursing Home	1.09	1.29	1.08	1.26
Hotel	1.15	1.16	1.14	1.15
Motel [15]	0.74	1.29	0.66	1.28
Light Manufacturing	1.05	1.25	1.04	1.23
Small Office	1.06	1.26	1.06	1.24
Large Office	1.08	1.14	1.07	1.14
Full Service Restaurant (Sit-Down)	1.06	1.25	1.05	1.22
Fast Food	1.05	1.2	1.04	1.19
Small Retail	1.07	1.29	1.06	1.25
Large 1-story Retail	1.07	1.3	1.06	1.27
3-story Retail	1.05	1.14	1.05	1.13
Conditioned Storage	1.03	1.09	1.01	1.02
Multi Family	1.03	1.26	1.02	1.24
Other	1.05	1.2	1.04	1.18

[14] Factors generated using DOE2.2 simulations based on the prototypical building models developed for the California Database for Energy Efficiency Resources using weather data based on the two Idaho weather zones. The values in this table make assumptions regarding ‘typical’ fuel sources and efficiencies for heating and cooling equipment. These numbers represent the expected “typical” impacts a reduction in the lighting power density will effect on electric space conditioning equipment.

[15] Note that these figures assume Motel HVAC systems are either heat-pumps or use electric resistance heating. If it is known that a particular motel uses gas heating then use the values for Hotel instead.

Table 2-12 Peak Demand Coincidence Factors by Building Type[16]

Building Type	CF
Primary School	0.48
Secondary School	0.48
Community College	0.6
University	0.76
Hospital	0.92
Nursing Home	0.9
Hotel	0.89
Motel	0.89
Light Manufacturing	0.98
Small Office	0.71
Large Office	0.85
Full Service Restaurant (Sit-Down)	0.95
Fast Food	0.95
Small Retail	0.47
Large 1-story Retail	0.78
3-story Retail	0.56
Conditioned Storage	0.8
Multi Family	0.43
Other	0.73

[16] Factors generated using prototypical lighting schedules found in the DEER building models and the definition for the Idaho Power Company's peak period (12 pm to 8 pm on weekdays between June 1st and August 31st).

Table 2-13 Controls Savings Factors by Building and Control Type[17]

Space Type	Occupancy Sensor	Daylight Sensor	Bi-level Switching	Dimmers, Wireless on/off Switches	Occupancy & Daylight
Assembly	36%	36%	6%	6%	40%
Break Room	20%	20%	6%	6%	40%
Classroom	18%	68%	6%	6%	34%
Computer Room	35%	18%	6%	6%	34%
Conference	35%	18%	35%	35%	40%
Dining	35%	18%	6%	6%	40%
Gymnasium	35%	35%	6%	6%	40%
Hallway	15%	15%	6%	6%	34%
Hospital Room	45%	63%	6%	6%	35%
Industrial	45%	72%	35%	35%	40%
Kitchen	30%	0%	6%	6%	34%
Library	15%	18%	6%	6%	34%
Lobby	25%	18%	6%	6%	40%
Lodging (Guest Rooms)	45%	0%	35%	35%	40%
Open Office	22%	29%	35%	35%	40%
Parking Garage	15%	18%	35%	0%	0%
Private Office	22%	29%	35%	35%	40%
Process	45%	0%	6%	6%	34%
Public Assembly	36%	36%	6%	6%	40%
Restroom	40%	0%	6%	6%	40%
Retail	15%	29%	6%	6%	34%
Stairs	25%	0%	0%	0%	18%
Storage	45%	0%	6%	6%	40%
Technical Area	35%	18%	6%	6%	34%
Warehouses	31%	31%	35%	35%	40%
Other	7%	18%	6%	6%	34%

[17] The values in this table are based on the most recent Regional Technical Forum draft Standard Protocol Calculator for Non-Residential Lighting improvements: http://rtf.nwcouncil.org/subcommittees/comlighting/Lighting%20Calculator_version%2012-6-2012.xlsx

Table 2-14 Stipulated Fixture Wattages for Various LED Exit Signs

Fixture Description	***Base*** **Fixture Wattage**	***Installed*** **Fixture Wattage**
LED Exit Sign, 0.5 Watt Lamp, Single Sided	5 W	0.5 W
LED Exit Sign, 1.5 Watt Lamp, Single Sided	5 W	1.5 W
LED Exit Sign, 2 Watt Lamp, Single Sided	5 W	2 W
LED Exit Sign, 3 Watt Lamp, Single Sided	5 W	3 W
LED Exit Sign, 0.5 Watt Lamp, Double Sided	10 W	1 W
LED Exit Sign, 1.5 Watt Lamp, Double Sided	10 W	3 W
LED Exit Sign, 2 Watt Lamp, Double Sided	10 W	4 W
LED Exit Sign, 3 Watt Lamp, Double Sided	10 W	6 W
Other/Unknown LED	5 W	2 W

2.2. Exterior Lighting Upgrades (New Construction)

The following algorithms and assumptions are applicable to exterior lighting systems installed in commercial and industrial spaces which are more efficient than required by prevailing codes and standards. This measure applies only to projects which represent new construction or major renovations.[18] The following table summarizes the 'typical' expected (per ft^2) energy impacts for lighting power density improvements and controls additions. Typical values are based on the algorithms and stipulated values described below and data from past program participants.[19]

Table 2-15 Typical Savings Estimates for 15% Exterior Lighting LPD Improvement (New Construction)

	Retrofit	New Construction
Deemed Savings Unit	n/a	kW (reduced)
Average Unit Energy Savings	n/a	4,059 kWh
Average Unit Peak Demand Savings	n/a	0 W
Expected Useful Life	n/a	15 Years
Average Material & Labor Cost	n/a	n/a
Average Incremental Cost	n/a	$ 168
Stacking Effect End-Use	Exterior Light	

2.2.1. Definition of Eligible Equipment

All above-code Exterior lighting systems (fixtures, lamps, ballasts, etc.) are eligible. Eligibility is determined by calculating the lighting power density (LPD) for the installed system. If the LPD is at least 15% lower than allowed by code (see Table 2-16 and Table 2-17) then the system is eligible. Efficient equipment may include florescent fixtures, LED lamps, LED exit signs, compact florescent light bulbs, high intensity discharge lamps, etc.

2.2.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the new construction scenario.

Retrofit (Early Replacement)

n/a

New Construction (Includes Major Remodel & Replace on Burn-Out)

Baseline equipment for this measure is defined as an installed lighting system with a maximum allowable LPD. The maximum allowable LPD is defined by the building code according to which

[18] Major renovations are defined to be any renovation or facility expansion project in which building permits were required and the lighting system had to be demonstrated to comply with a particular code or standard.

[19] See spreadsheet "2-TypicalCalcs_ExtLight.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

the project was permitted. Current applicable standards are defined by ASHRAE 90.1-2004 and 90.1-2007.

Code Compliance Considerations for Lighting Controls

Sections 9.4.4 and 9.4.5 of the ASHRAE 90.1 Standard specify energy efficiency and lighting power density requirements for non-exempt exterior lighting. [20] Table 9.4.5 lists the power density requirements for various building exteriors.

2.2.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = kWh_{base} - kWh_{meas}$$

$$= A_{SF} * [LPD_{base} - LPD_{meas} * (1 - CSF)] * HOU$$

$$\Delta kW = 0$$

$$kWh/Unit_{Typical} = \Sigma\ (\Delta kWh/Unit_{building\ i} * W_{building\ i})$$

2.2.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
HOU	Stipulated to be 4,059 hours. [21]
LPD	Lighting power density baseline (base) and installed (meas) systems. This is defined as the total lighting system connected load divided by the lighted area (or as defined by code). See Table 2-16 and Table 2-17
$kWh/Unit_{Typical}$	Typical measure savings on a per unit basis.
$W_{building,i}$	Population weight for application type *i*. This is defined to be the % of application type *i* in past program participants.

2.2.5. Sources

- ASHRAE, Standard 90.1-2004.
- ASHRAE, Standard 90.1-2007.

2.2.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

[20] Note that both Section 9.1 and Section 9.4.5 list applicable exemptions.

[21] Value is sourced from https://www.idahopower.com/AboutUs/RatesRegulatory/Tariffs/tariffPDF.cfm?id=39

Table 2-16 Baseline Power Densities for Exterior Lighting – Tradable Surfaces[22]

Area Type	Location	LPD	Units
Uncovered Parking Areas	Parking Lots and Drives	0.2	W/Ft^2
Building Grounds	Walkways less than 10 feet wide	1	W/ Linear Foot
	Walkways 10 feet wide or greater	1	W/ Linear Foot
	Plaza areas	0.2	W/Ft^2
	Special Feature Areas	0.2	W/Ft^2
	Stairways	1	W/Ft^2
Building Entrances and Exits	Main entries	30	W/ Linear Foot of Door Width
	Other Doors	20	W/ Linear Foot of Door Width
Canopies and Overhangs	Canopies (free standing and attached and overhangs)	1.3	W/Ft^2
Outdoor Sales	Open Areas (including vehicle sales lots)	0.5	W/Ft^2
	Street frontage for vehicle sales lots in addition to "open area" allowance	20	W/ Linear Foot

Table 2-17 Baseline Power Densities for Exterior Lighting – Non-Tradable Surfaces[23]

Area Type	LPD
Building Facades	0.2 W/ft² for each illuminated wall or surface or 5.0 W/linear foot for each illuminated wall or surface length
Automated teller machines and night depositories	270 W per location plus 90 W per additional ATM per location
Entrances and gatehouse inspection stations at guarded facilities	1.25 W/ft² of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
Loading areas for law enforcement, fire, ambulances and other emergency service vehicles	0.5 W/ft² of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
Drive-up windows at fast food restaurants	400 W per drive-through
Parking near 24-hour retail entrances	800 W per main entry

[22] Lighting power densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs and outdoor sales areas may be traded.

[23] Lighting power density calculations can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowances otherwise permitted in the "Tradable Surfaces" section of this table.

2.3. Efficient Vending Machines

ENERGY STAR qualified new and rebuilt vending machines incorporate more efficient compressors, fan motors, and lighting systems as well as low power mode option that allows the machine to be placed in low-energy lighting and/or low-energy refrigeration states during times of inactivity.

Table 2-18 summarizes the 'typical' expected (per machine) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-18 Typical Savings Estimates for Efficient Vending Machines[24]

	Retrofit	New Construction
Deemed Savings Unit	Machine	Machine
Average Unit Energy Savings	2,299 kWh	217 kWh
Average Unit Peak Demand Savings	2.39 kW	0.22 kW
Expected Useful Life[25]	14 Years	14 Years
Average Material & Labor Cost[26]	$ 3,360	n/a
Average Incremental Cost[27]	n/a	$ 200
Stacking Effect End-Use	Miscellaneous Loads	

2.3.1. Definition of Eligible Equipment

The eligible equipment is a new or rebuilt refrigerated vending machine that meets the ENERGY STAR 3.0 specifications which include low power mode. Each completed ENERGY STAR qualified machine shall receive a "refurbishment label/sticker" that includes the following information to indicate that the machine has been upgraded to ENERGY STAR performance levels:

- A new and discrete model number that is representative of that machine and rebuilding kit combination
- The date of rebuilding
- The ENERGY STAR certification mark

2.3.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

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[24] See spreadsheet "3-TypicalCalcs_EffVndMcn.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

[25] ENERGY STAR Calculator: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=VMC

[26] Cadmus Group: http://rtf.nwcouncil.org/meetings/2006/09/RTF%20091806%20-%20Vending%20Final-2.ppt

[27] See previous footnote

The baseline condition for retrofit is a refrigerated beverage vending machine that isn't qualified as Energy Star 3.0.

New Construction (Includes Major Remodel & Replace on Burn-Out)

The baseline condition for new construction is a machine that complies with the Department of Energy's (DOE) energy conservation standards for refrigerated beverage vending machines since 2012.

2.3.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = kWh/Unit * NUnits$$

$$kWh/Unit_{Typical} = \Sigma\ (\Delta kWh/Unit_{\ i} * W_i)$$

$$\Delta kW = kW/Unit * NUnits$$

$$kW/Unit_{Typical} = \Sigma\ (\Delta kW/Unit_{\ i} * W_i)$$

2.3.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
kWh/Unit	Per unit energy savings as stipulated in Table 2-19 and Table 2-20.
$kWh/Unit_{Typical}$	Typical measure savings on a per unit basis.
$\Delta kWh/Unit_i$	Unit savings for combination i of equipment types.
kW/Unit	Per unit demand savings as stipulated in Table 2-19 and Table 2-20.
$kW/Unit_{Typical}$	Typical measure demand savings on a per unit basis.
$\Delta kW/Unit_i$	Unit demand savings for combination i of equipment types.
$W_{,i}$	Population weight for each $\Delta kWh/Unit_i$ and $\Delta kW/Unit_i$.
NUnits	Number of Units

2.3.5. Sources

1. LBNL 2007: http://enduse.lbl.gov/info/LBNL-62397.pdf
2. Cadmus Energy Star Report: http://rtf.nwcouncil.org/meetings/2006/09/RTF%20091806%20-%20Vending%20Final-2.ppt
3. ENERGY STAR Calculator: http://search.energystar.gov/search?q=cache:4rntJv_yaV8J:www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/Calc_Vend_MachBulk.xls+xls&access=p&output=

xml_no_dtd&ie=UTF-8&client=default_frontend&site=default_collection&proxystylesheet=default_frontend&oe=UTF-8&c4d7-9284

2.3.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-19 Unit Energy Savings for Efficient Vending Machines - Retrofit[28]

Vending Machine Capacity (cans)	kWh Savings Per Machine Class A	kW Savings Per Machine Class A	kWh Savings Per Machine Class B	kW Savings Per Machine Class B
<500	1,848	1.677	1,602	1.453
500	2,567	2.765	2,299	2.476
699	2,162	2.101	1,883	1.83
799	2,712	2.833	2,409	2.516
800+	1,909	1.447	1,625	1.232

Table 2-20 Unit Energy Savings for Efficient Vending Machines – New Construction

Vending Machine Capacity (cans)	kWh Savings Per Machine Class A	kW Savings Per Machine Class A	kWh Savings Per Machine Class B	kW Savings Per Machine Class B
<500	66	0.06	168	0.152
500	269	0.289	180	0.194
699	279	0.271	185	0.18
799	304	0.317	199	0.208
800+	284	0.215	188	0.143

[28] See spreadsheet "3-TypicalCalcs_EffVndMcn.xlsx" for assumptions and calculations used to estimate the typical unit energy saving.

2.4. Vending Machine Controls

This measure relates to the installation of new controls on refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. Controls can significantly reduce the energy consumption of vending machine and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure relates to the installation of a new control on a new or existing unit. This measure should not be applied to ENERGY STAR qualified vending machines, as they already have built-in controls.

Table 2-21 through Table 2-23 summarizes the 'typical' expected (per machine controlled) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below. [29]

Table 2-21 Summary Deemed Savings Estimates for Beverage Vending Machine Controls

	Retrofit	New Construction
Deemed Savings Unit	Machine Controlled	Machine Controlled
Average Unit Energy Savings	519 kWh	222 kWh
Average Unit Peak Demand Savings	0 kW	0 kW
Expected Useful Life	5 Years	5 Years
Average Material & Labor Cost	$ 215.50	n/a
Average Incremental Cost	n/a	$ 180
Stacking Effect End-Use	Miscellaneous Loads	

Table 2-22 Summary Deemed Savings Estimates for Other Cold Product Vending Machine Controls

	Retrofit	New Construction
Deemed Savings Unit	Machine Controlled	Machine Controlled
Average Unit Energy Savings	519 kWh	222 kWh
Average Unit Peak Demand Savings	0 kW	0 kW
Expected Useful Life	5 Years	5 Years
Average Material & Labor Cost	$ 215.50	n/a
Average Incremental Cost	n/a	$ 180
Stacking Effect End-Use	Miscellaneous Loads	

[29] The Savings estimates provided in the summary tables are only given for a quick cost effectiveness test. The estimates are based on assumed weights for equipment types. See spreadsheet "4-TypicalCalcs_VndMcnCntrl.xlsx" for assumptions and calculations used to estimate the typical unit energy savings, EUL, and incremental costs.

Table 2-23 Summary Deemed Savings Estimates for Non-Cooled Snack Vending Machine Controls

	Retrofit	New Construction
Deemed Savings Unit	Machine Controlled	Machine Controlled
Average Unit Energy Savings	387 kWh	387 kWh
Average Unit Peak Demand Savings	0 kW	0 kW
Expected Useful Life	5 Years	5 Years
Average Material & Labor Cost	$ 108	n/a
Average Incremental Cost	n/a	$ 75
Stacking Effect End-Use	Miscellaneous Loads	

2.4.1. Definition of Eligible Equipment

The eligible equipment is a non-Energy Star qualified refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity. The controls must be equipped with a passive infrared occupancy sensor, a duplex receptacle, and a power cord for connecting the device to 120V power.

2.4.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

The baseline condition for retrofit is a non-Energy Star qualified refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

New Construction (Includes Major Remodel & Replace on Burn-Out)

The baseline condition for new construction is a machine without a control system that complies with the Department of Energy's (DOE) 2012 energy conservation standards for refrigerated beverage vending machines.

2.4.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * N_{Units}$$

$$\Delta kWh/Unit_i = kWh_{base} * U_{RR}$$

$$kWh_{base} = \sum (kWh_{base,i} * 365)$$

$$kWh_{code,class\ A} = 0.055 * V + 2.56$$

$$kWh_{code,class\ B} = 0.073 * V + 3.16$$

$$\Delta kW = 0$$

2.4.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment
ΔkWh/Unit	Stipulated per unit energy savings
ΔkW	Defined to be zero for this measure as it is assumed that controls are only effective during off-peak hours.
kWh_{base}	Annual energy consumption of *baseline* equipment for the i^{th} combination of equipment type.
$kWh_{code,\ Class\ A/B}$	Daily energy consumption for new construction (Class A or B) machine
U_{RR}	Usage Reduction Rate
N_{Units}	Number of Machines

2.4.5. Sources

1. DEER2011 EUL Summary http://www.deeresources.com/deer0911planning/downloads/EUL_Summary_10-1-08.xls
2. DEER2011 Cost Data
3. http://www.deeresources.com/deer0911planning/downloads/DEER2008_Costs_ValuesAndDocumentation_080530Rev1.zip
4. SCE Work Paper, SCE13CS005: Beverage Merchandise Controller
5. DEER2005 UpdateFinalReport_ItronVersion.pdf
6. LBNL 2007: http://enduse.lbl.gov/info/LBNL-62397.pdf
7. Cadmus Energy Star Report: http://rtf.nwcouncil.org/meetings/2006/09/RTF%20091806%20-%20Vending%20Final-2.ppt

2.4.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-24 Unit Energy Savings for Uncooled Vending Machine Controls[30]

Equipment	kWh Savings Per Machine
Uncooled Vending Machine	387

[30] Applies to both Retrofit and New Construction

Table 2-25 Unit Energy Savings for Retrofit Class A & B Cold Beverage Vending Machine Controls

Vending Machine Capacity (cans)	kWh Savings Per Machine
<500	519
500	653
699	592
799	700
800+	553
Weighted	632

Table 2-26 Unit Energy Savings for New Construction Class A Cold Beverage Vending Machine Controls

Vending Machine Capacity (cans)	kWh Savings Per Machine
<500	222
500	270
699	278
799	298
800+	282
Weighted	134

Table 2-27 Unit Energy Savings for New Construction Class B Cold Beverage Vending Machine Controls

Vending Machine Capacity (cans)	kWh Savings Per Machine
<500	280
500	300
699	309
799	331
800+	314
Weighted	151

Table 2-28 Unit Incremental Cost for Retrofit and New Construction Uncooled Vending Machine Controls

Measure Case Description	Measure Equipment Cost	Measure Labor Cost	Gross Measure Cost
Cold Drink Vending Machine	$180.00	$35.50	$215.50
Uncooled Snack Machine	$75.00	$33.00	$108.00

2.5. Efficient Washing Machines

This protocol discusses the calculation methodology and the assumptions regarding baseline equipment, efficient equipment, and usage patterns used to estimate annual energy savings expected from the replacement of a standard clothes washer with an ENERGY STAR or high efficiency clothes washer.

Table 2-29 summarizes the 'typical' expected (per machine) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-29 Summary Deemed Savings Estimates for Efficient Washing Machines[31]

	Retrofit	New Construction
Deemed Savings Unit	Machine	Machine
Average Unit Energy Savings	1,727 kWh	756 kWh
Average Unit Peak Demand Savings	0.86 kW	0.38 kW
Expected Useful Life[32]	10.7 Years	10.7 Years
Average Material & Labor Cost[33]	$ 1,470	n/a
Average Incremental Cost[34]	n/a	$ 200
Stacking Effect End-Use	Miscellaneous Loads	

2.5.1. Definition of Eligible Equipment

The eligible equipment is clothes washers meeting ENERGY STAR or better efficiency in small commercial applications that have **both** electric water heating (DHW) and electric dryers. The minimum efficiency is Modified Energy Factor (MEF) of ≥2.2 (ft^3/kWh/cycle) and Water Factor (WF) ≤ 4.5 (gal/ft^3/cycle). Currently, only front-loading clothes washers meet the ENERGY STAR standards.

2.5.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

The retrofit baseline condition is a standard efficiency washing machine. The RTF sources the latest CEC database which has non ENERGY STAR machine MEF ranging from 1.26 to 2.45 with an average of 1.63.

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[31] See spreadsheet "5-TypicalCalcs_EffWshMcn.xlsx" for assumptions and calculations used to estimate the typical unit energy savings, EUL, and incremental costs. There isn't a difference between new construction and retrofit because RTF specifies the measure for new and existing construction.

[32] ENERGY STAR Calculator: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=VMC

[33] Cadmus Group: http://rtf.nwcouncil.org/meetings/2006/09/RTF%20091806%20-%20Vending%20Final-2.ppt

[34] See previous footnote

New Construction (Includes Major Remodel & Replace on Burn-Out)

For new construction the baseline is the Federal efficiency standard MEF ≥1.60 (ft3/kWh/cycle) and WF ≤ 8.5 (gal/ft^3/cycle) for Top Loading washers and MEF ≥2.0 (ft3/kWh/cycle)/ (kWh) and WF ≤ 5.5 (gal/ft^3/cycle) for Front Loading washers. The RTF designates the baseline using MEF ranging from 1.65 to 2.45 with an average of 2.04 and WF ranging from 3.7 to 8.4 with an average of 5.99.

2.5.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * N_{Units}$$

$$\Delta kWh/Unit_{Typical} = \sum (\Delta kWh/Unit_{i} * W_{i})$$

$$\Delta kWh/Unit_{i,Intalled} = \Delta kWh_{Dryer} + \Delta kWh_{Water\ heat} + \Delta kWh_{Water\ treatment}$$

$$\Delta kWh_{Water\ heat} = Cap * 0.058 * WF^{1.3593} * C_{P} * M_{Water} * \Delta T/ (\eta_{Elec} * 3{,}412) * N_{Cycles}$$

$$\Delta kWh_{Water\ treatment} = Cap * WF * N_{Cycles} * kWh_{aeration}$$

$$\Delta kW = \Delta kW/Unit * N_{Units}$$

$$\Delta kW/Unit_{Typical} = \sum (\Delta kW/Unit_{i} * UF * W_{i})$$

2.5.4. Definitions

Δ kWh	Expected energy savings between baseline and installed equipment.
Δ kW	Demand energy savings between baseline and installed equipment.
Δ kWh/Unit	Per unit energy savings as stipulated in Table 2-30 and Table 2-31. If retrofit and capacity & WF are known, this can be calculated using the equation for $\Delta kWh/Unit_{i,Installed}$ above.
$\Delta kWh/Unit_{Typical}$	Typical measure energy savings on a per unit basis.
$\Delta kWh/Unit_{i,Installed}$	Calculated energy savings on a per unit basis for retrofit projects.
ΔkW/Unit	Per unit demand savings as stipulated in Table 2-30 and Table 2-31.
$\Delta kW/Unit_{Typical}$	Typical measure demand savings on a per unit basis.
W_i	Population weight for each $\Delta kWh/Unit_i$ and $\Delta kW/Unit_i$. Values used are from DOE's Commercial Clothes Washers Final Rule Technical Support Document
UF	Utilization Factor. This is defined to be 0.000499[35]
N_{Units}	Number of Machines
N_{Cycles}	Number of Cycles
Cap	Compartment Capacity of Washer (ft^3)
WF	Manufacturer rated water factor
kWh_{Dryer}	Dryer energy savings from washer lessening remaining moisture content

[35] See spreadsheet "5-TypicalCalcs_EffWshMcn.xlsx" for assumptions and calculations used to estimate the UF.

$\Delta kWh_{Water\ heat}$	Water heating savings from washer using less hot water
$\Delta kWh_{Water\ treatment}$	Energy savings from reduced wastewater aeration
$\Delta kWh_{Aeration}$	Aeration energy usage = 5.3 kWh/1000gal [36]
C_P	Specific Heat of water = 1 Btu/lb-F
M_{Water}	Mass of water = 8.3149 lbs/gallon
ΔT	Delta temperature. This is defined to be 80 (degree F)
η_{Elec}	Electric Water Heating Efficiency = 98%

2.5.5. Sources

1. Regional Technical Forum measure workbook: http://rtf.nwcouncil.org/measures/com/Com ClothesWasher_v2_0
2. Department of Energy (DOE) Technical Support Document, 2009: http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/46

2.5.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-30 Unit Energy Savings for Laundromat Efficient Washing Machines [37]

Measure	Program Type	kWh/Unit	kW/Unit
Energy Star Commercial Clothes Washer w/MEF 2.2 and higher, WF 4.5 and lower - Electric DHW & Dryer	New Construction	828	0.413
Energy Star Commercial Clothes Washer w/MEF 2.2 and higher, WF 4.5 and lower - Electric DHW & Dryer	Retrofit [38]	1,891	0.944

Table 2-31 Unit Energy Savings for Multifamily Efficient Washing Machines

Measure	Program Type	kWh/Unit	kW/Unit
Energy Star Commercial Clothes Washer w/MEF 2.2 and higher, WF 4.5 and lower - Electric DHW & Dryer	New Construction	469	0.234
Energy Star Commercial Clothes Washer w/MEF 2.2 and higher, WF 4.5 and lower - Electric DHW & Dryer	Retrofit	1072	0.535

[36] From Regional Technical Forum measure workbook

[37] See spreadsheet "5-TypicalCalcs_EffWshMcn.xlsx" for assumptions and calculations used to estimate the typical unit energy savings.

[38] Retrofit refers to early retirement (ER). For replace on burnout (ROB) use New Construction.

2.6. Wall Insulation

The following algorithms and assumptions are applicable to wall insulation installed in commercial spaces which are more efficient than existing insulation or prevailing codes and standards.

Wall insulation is rated by its R-value. An R-value indicates its resistance to heat flow – the higher the R-value, the greater the insulating effectiveness. The R-value depends on the type of insulation including its material, thickness, and density. When calculating the R-value of a multilayered installation, add the R-values of the individual layers.

Table 2-32 and Table 2-33 summarize the 'typical' expected (per insulation ft^2 square foot) energy impacts for this measure for *cooling only* and *cooling + heating* impacts respectively. Typical and deemed values are based on the algorithms and stipulated values described below.[39] The typical and deemed values reported in this chapter are based on a weighted average across multiple building types. The cooling savings assume either DX or Hydronic cooling (depending on what is considered 'typical' for that building type) while the heating component assumes DX air-cooled heat pumps.

Table 2-32 Typical Savings Estimates for Wall Insulation (Cooling Only)

	Retrofit	New Construction
Deemed Savings Unit	Insulation ft2	Insulation ft2
Average Unit Energy Savings	0.044 kWh	0.003 kWh
Average Unit Peak Demand Savings	0.028 W	0.002 W
Average Gas Impacts[40]	.022 Therms	.001 Therms
Expected Useful Life	25 Years	25 Years
Average Material & Labor Cost	$ 0.66	n/a
Average Incremental Cost	n/a	$ 0.12
Stacking Effect End-Use	Cooling	

[39] See spreadsheet "6-TypicalCalcs_WallInsul.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs for cooling savings.

[40] Note that the reported gas impacts assume that if savings are being claimed for cooling only the facility is gas heated. If the facility is electrically heated then these gas impacts are not applicable and savings should be based on the following table.

Table 2-33 Typical Savings Estimates for Wall Insulation (Cooling & Heating)

	Retrofit	New Construction
Deemed Savings Unit	Insulation ft2	Insulation ft2
Average Unit Energy Savings	0.414 kWh	0.028 kWh
Average Unit Peak Demand Savings	0.028 W	0.002 W
Expected Useful Life	25 Years	25 Years
Average Material & Labor Cost	$ 0.66	n/a
Average Incremental Cost	n/a	$ 0.12
Stacking Effect End-Use	Heating, Cooling	

2.6.1. Definition of Eligible Equipment

Eligible wall area is limited to the treated wall area of exterior walls (gross wall area, less window and door) where the insulation has been installed to the proposed R-value. Insulation must be installed in buildings, or portions of buildings, with central mechanical air conditioning or PTAC/PTHP systems. Qualifying wall insulation can be rigid foam, fiberglass bat, blown-in fiberglass or cellulose, assuming it meets or exceeds the required R-value. Radiant barriers will not be allowed as a substitute for insulation. The savings estimates for retrofit projects assume the baseline building has no wall insulation (e.g. an empty cavity).

2.6.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction. Note that heating savings are only applicable for facilities with electric heating.

Retrofit (Early Replacement)

If the project is retrofitting pre-existing insulation and the project does not represent a major renovation then the baseline efficiency is defined by the pre-existing insulation.

New Construction (New Construction, Replace on Burnout)

For New Construction, the baseline efficiency is defined as the minimum allowable R-value by the prevailing building energy code or standard according to which the project was permitted. Current applicable standards are defined by ASHRAE 90.1-2004 and 90.1-2007.

2.6.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh_{cool} + \Delta kWh_{heat}$$

$$\Delta kWh_{cool} = A * (CDD * 24)/(SEER * 1000) * (1/R_{base} - 1/R_{meas})$$

$$\Delta kWh_{heat} = A * (HDD * 24)/(HSPF * 3413) * (1/R_{base} - 1/R_{meas})$$

$$\Delta kW_{peak} = \Delta kWh_{cool} / EFLH_{cool} \ X \ CF$$

2.6.4. Definitions

A	Area of the insulation that was installed in square feet
HDD	Heating degree days, refer to Table 2-38 for typical heating degree days for different buildings. When possible, actual base temperatures should be used to calculate the HDD
CDD	Cooling degree days refer to Table 2-38 for typical cooling degree days for different buildings. When possible, actual base temperatures should be used to calculate the CDD.
R_{base}	The R-value of the insulation and support structure before the additional insulation is installed
R_{meas}	The total measure R-value of all insulation after the additional insulation is installed
EFLH	Annual equivalent full load cooling hours for the air conditioning unit. Values for various building types are stipulated in Table 2-40. When available, actual system hours of use should be used.
SEER	Seasonal Energy efficiency ratio of the air conditioning unit. This is defined as the ratio of the Annual cooling provided by the air conditioner (in BTUs), to the total electrical input (in Watts). Note that the IEER is an appropriate equivalent. If the SEER or IEER are unknown or unavailable use the following formula to estimate from the EER: [41] $SEER = .0507 * EER^2 + .5773 * EER + .4919$
HSPF	Heating Season Performance Factor. This is identical to the SEER (described above) as applied to Heat Pumps in heating mode. If only the heat pump COP is available then use the following: $HSPF = .5651 * COP^2 + .464 * COP + .4873$
CF	Peak coincidence factor. Represents the % of the connected load reduction which occurs during Idaho Power's peak period.
$\Delta kWh/Unit_{Retrofit}$	Typical measure savings on a per unit basis.
$\Delta kWh_{New\ Const}$	Savings reflecting the most efficient unit upgrading to the least efficient qualifying unit representing a conservative savings estimate for the measure.

2.6.5. Sources

1. ASHRAE, Standard 90.1-2004.
2. ASHRAE, Standard 90.1-2007.
3. California DEER Prototypical Simulation models (modified), eQUEST-DEER 3-5. [42]
4. California DEER Effective Useful Life worksheets: EUL_Summary_10-1-08.xls [43]

[41] Note that this formula is an approximation and should only be applied to EER values up to 15 EER.

[42] Prototypical building energy simulations were used to generate Idaho specific Heating and Cooling Interactive Factors and Coincidence factors for various building and heating fuel types.

[43] After reviewing the sources feeding into the DEER value of 20 years it was found that the 20 year determination was based on a DEER policy for maximum EUL. Since DEER sources supported a higher EUL the higher EUL is used here.

2.6.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-34 Deemed Energy Savings for Wall Insulation - Retrofit[44]

	W/ft2	kWh/ft²	Cost/ft²
R-2.5 to R-11			
Cooling	.028	.044	$0.66
Heating	0	.370	
Cooling & Heating	.028	.414	
R-2.5 to R-19			
Cooling	.032	.050	$0.92
Heating	0	.416	
Cooling & Heating	.032	.465	

Table 2-35 Deemed Energy Savings for Wall Insulation – New Construction[45]

	W/ft2	kWh/ft²	Cost/ft²
R-13 to R-19			
Cooling	.002	.003	$0.12
Heating	0	.025	
Cooling & Heating	.002	.028	
R-13 to R-21			
Cooling	.003	.004	$0.16
Heating	0	.030	
Cooling & Heating	.003	.033	

[44] See spreadsheet "6-TypicalCalcs_WallInsul.xlsx" for assumptions and calculations used to estimate the deemed unit energy savings.

[45] See spreadsheet "6-TypicalCalcs_WallInsul.xlsx" for assumptions and calculations used to estimate the deemed unit energy savings.

Table 2-36 Wall Insulation: Code Minimum R-values for Nonresidential Buildings in Zone 5[46]

Climate Zone 5	Opaque Element	ASHRAE 90.1 2004 Insulation Min. R-Value	ASHRAE 90.1 2007 Insulation Min. R-Value
Walls, Above-Grade	Mass	R-7.6 ci	R-11.4 ci
	Metal Building	R-13.0	R-13.0
	Steel-Framed	R-13.0 + R-3.8 ci	R-13.0 + R-7.5 ci
	Wood-Framed and Other	R-13.0	R-13.0 + R-3.8 ci
Wall, Below-Grade	Below-Grade Wall	NR	R-7.5 ci

Table 2-37 Wall Insulation: Code Minimum R-values for Nonresidential Buildings in Zone 6[47]

Climate Zone 6	Opaque Element	ASHRAE 90.1 2004 Insulation Min. R-Value	ASHRAE 90.1 2007 Insulation Min. R-Value
Walls, Above-Grade	Mass	R-9.5 ci	R-13.3 ci
	Metal Building	R-13.0	R-13.0
	Steel-Framed	R-13.0 + R-3.8 ci	R-13.0 + R-7.5 ci
	Wood-Framed and Other	R-13.0	R-13.0 + R-7.5 ci
Wall, Below-Grade	Below-Grade Wall	NR	R-7.5 ci

[46] Values stipulated from Table 5.5-5 ASHRAE 2004 and 2007. c.i. = continuous insulation, NR = no requirement

[47] Values stipulated from Table 5.5-6 in ASHRAE 2004 and 2007. c.i. = continuous insulation, NR = no requirement

Table 2-38 Stipulated Heating and Cooling Degree Days by Building Type[48]

	Zone 5		Zone 6	
Building Type	**HDD**	**CDD**	**HDD**	**CDD**
Assembly	256	104	274	91
Community College	229	116	214	101
Conditioned Storage	256	73	290	72
Fast Food Restaurant	258	103	284	81
Full Service Restaurant	273	88	289	76
High School	253	112	290	75
Hospital	272	93	293	94
Hotel	225	140	268	97
Large Retail 1 Story	240	122	264	101
Large Retail 3 Story	242	103	274	90
Large Office	229	131	247	121
Light Manufacturing	241	121	271	94
Medical Clinic	280	85	293	72
Motel	199	166	285	80
Multi Family	219	121	247	72
Nursing Home	300	65	300	79
Primary School	250	115	286	79
Small Office	226	131	256	106
Small Retail	244	117	271	94
University	229	131	247	109

[48] Values obtained from simulations of the DEER input models using eQuest to obtain typical baseline temperatures for each building. TMY3 weather data was collected and averaged over the ASHRAE weather Zones 5 and 6 to create heating and cooling degree days using the typical baseline temperatures.

Table 2-39 HVAC Coincidence Factors by Building Type

Building Type	Coincidence Factor
Assembly	0.47
Education - Community College	0.54
Education - Primary School	0.1
Education - Secondary School	0.1
Education - University	0.53
Grocery	0.54
Health/Medical - Hospital	0.82
Health/Medical - Nursing Home	0.49
Lodging - Hotel	0.67
Lodging - Motel	0.63
Manufacturing - Light Industrial	0.46
Office - Large	0.58
Office - Small	0.51
Restaurant - Fast-Food	0.48
Restaurant - Sit-Down	0.46
Retail - 3-Story Large	0.66
Retail - Single-Story Large	0.56
Retail - Small	0.49
Storage - Conditioned	0.41

Table 2-40 Heating and Cooling Equivalent Full Load Hours (EFLH) by Building Type[49]

	Zone 5		Zone 6	
Building Type	EFLH Cooling	EFLH Heating	EFLH Cooling	EFLH Heating
Assembly	879	966	758	1059
Education - Primary School	203	299	173	408
Education - Secondary School	230	406	196	514
Education - Community College	556	326	530	456
Education - University	697	341	721	449
Grocery	3437	1825	3762	2011
Health/Medical - Hospital	1616	612	1409	679
Health/Medical - Nursing Home	1049	1399	884	1653
Lodging - Hotel	1121	621	1075	780
Lodging - Motel	978	682	937	796
Manufacturing - Light Industrial	530	699	415	1088
Office - Large	746	204	680	221
Office - Small	607	256	567	360
Restaurant - Sit-Down	811	624	716	709
Restaurant - Fast-Food	850	722	734	796
Retail - 3-Story Large	765	770	644	998
Retail - Single-Story Large	724	855	576	998
Retail - Small	726	886	619	1138
Storage - Conditioned	335	688	242	989

[49] Prototypical building energy simulations were used to generate Idaho specific heating and cooling equivalent full load hours for various buildings.

2.7. Ceiling Insulation

The following algorithms and assumptions are applicable to ceiling insulation installed in commercial spaces which are more efficient than existing insulation or prevailing codes and standards.

Ceiling insulation is rated by its R-value. An R-value indicates its resistance to heat flow (where a higher the R-value indicates a greater insulating effectiveness). The R-value depends on the type of insulation including its material, thickness, and density. When calculating the R-value of a multilayered installation, add the R-values of the individual layers.

Table 2-41 summarizes the 'typical' expected (per insulation ft^2 square foot) energy impacts for this measure. Table 2-42 summarizes the deemed energy savings for the specific insulation upgrade cited. Typical and deemed values are based on the algorithms and stipulated values described below. The typical and deemed values reported in this chapter are based on a weighted average across multiple building types. The cooling savings assume either DX or Hydronic cooling (depending on what is considered 'typical' for that building type) while the heating component assumes DX air-cooled heat pumps.

Table 2-41 Typical Savings Estimates for Ceiling Insulation (Cooling Only) [50]

	Retrofit	New Construction
Deemed Savings Unit	Insulation ft2	Insulation ft2
Average Unit Energy Savings	.006 kWh	.0007 kWh
Average Unit Peak Demand Savings	.005 W	.0005 W
Average Gas Impacts	.003 Therms	0 Therms [51]
Expected Useful Life	25 Years	25 Years
Average Material & Labor Cost	$ 1.38	n/a
Average Incremental Cost	n/a	$ 0.20
Stacking Effect End-Use	Cooling	

50 See spreadsheet "7-TypicalCalcs_CeilingInsul.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs for cooling savings. Note that the reported gas impacts assume that if savings are being claimed for cooling only the facility is gas heated. If the facility is electrically heated then these gas impacts are not applicable and savings should be based on the following table.

51 While the therms impact for this measure is technically non-zero it is sufficiently small as to be considered negligible.

Table 2-42 Typical Savings Estimates for Ceiling Insulation (Cooling & Heating) [52]

	Retrofit	New Construction
Deemed Savings Unit	Insulation ft2	Insulation ft2
Average Unit Energy Savings	.035 kWh	.007 kWh
Average Unit Peak Demand Savings	.002 W	.005 W
Expected Useful Life	25 Years	25 Years
Average Material & Labor Cost	$ 1.38	n/a
Average Incremental Cost	n/a	$ 0.20
Stacking Effect End-Use	Heating, Cooling	

2.7.1. Definition of Eligible Equipment

Eligible roof/ceiling area is limited to buildings or potions of buildings with central mechanical air conditioning or PTAC systems. Qualifying ceiling insulation can be rigid foam, fiberglass bat, or blown-in fiberglass or cellulose a long as material is eligible, assuming it meets or exceeds the required R-value. The insulation must upgrade from R11 or less to a minimum of R24 or from R19 or less to a minimum of R38.

2.7.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

If the project is retrofitting pre-existing insulation then the baseline efficiency is defined by the pre-existing insulation.

New Construction (New Construction, Replace on Burnout)

For New Construction, the baseline efficiency is defined as the minimum allowable R-value by the prevailing building energy code or standard according to which the project was permitted. Current applicable standards are defined by ASHRAE 90.1-2004 and 90.1-2007.

2.7.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh_{cool} + \Delta kWh_{heat}$$

$$\Delta kWh_{cool} = A * (CDD * 24)/(SEER * 1000) * (1/R_{base} – 1/R_{meas})$$

$$\Delta kWh_{heat} = A * (HDD * 24)/(HSPF * 3413) * (1/R_{base} – 1/R_{meas})$$

$$\Delta kW_{peak} = \Delta kWh_{cool} / EFLH_{cool} * CF$$

[52] See spreadsheet “7-TypicalCalcs_CeilingInsul.xlsx” for assumptions and calculations used to estimate the typical unit energy savings and incremental costs for cooling and heating savings.

2.7.4. Definitions

A	Area of the insulation that was installed in square feet
HDD	Heating degree days, refer to Table 2-47 for typical heating degree days for different buildings. When possible, actual base temperatures should be used to calculate the HDD
CDD	Cooling degree days refer to Table 2-47 for typical cooling degree days for different buildings. When possible, actual base temperatures should be used to calculate the CDD.
R_{base}	The R-value of the insulation and support structure before the additional insulation is installed
R_{meas}	The total measure R-value of all insulation after the additional insulation is installed
EFLH	Annual equivalent full load cooling hours for the air conditioning unit. Values for various building types are stipulated in Table 2-49. When available, actual system hours of use should be used.
SEER	Seasonal Energy efficiency ratio of the air conditioning unit. This is defined as the ratio of the Annual cooling provided by the air conditioner (in BTUs), to the total electrical input (in Watts). Note that the IEER is an appropriate equivalent. If the SEER or IEER are unknown or unavailable use the following formula to estimate from the EER: SEER[53] $= .0507 * EER^2 + .5773 * EER + .4919$
HSPF	Heating Season Performance Factor. This is identical to the SEER (described above) as applied to Heat Pumps in heating mode. If only the heat pump COP is available then use the following: $HSPF = .5651 * COP^2 + .464 * COP + .4873$
CF	Peak coincidence factor. Represents the % of the connected load reduction which occurs during Idaho Power's peak period.
$\Delta kWh/Unit_{Retrofit}$	Typical measure savings on a per unit basis.
$\Delta kWh_{New\ Const}$	Savings reflecting the most efficient unit upgrading to the least efficient qualifying unit representing a conservative savings estimate for the measure.

2.7.5. Sources

1. ASHRAE, Standard 90.1-2004.
2. ASHRAE, Standard 90.1-2007.
3. California DEER Prototypical Simulation models (modified), eQUEST-DEER 3-5.[54]
4. California DEER Effective Useful Life worksheets: EUL_Summary_10-1-08.xls[55]

[53] Note that this formula is an approximation and should only be applied to EER values up to 15 EER.

[54] Prototypical building energy simulations were used to generate Idaho specific Heating and Cooling Interactive Factors and Coincidence factors for various building and heating fuel types.

[55] After reviewing the sources feeding into the DEER value of 20 years it was found that the 20 year determination was based on a DEER policy for maximum EUL. Since DEER sources supported a higher EUL the higher EUL is used here.

2.7.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-43 Deemed Energy Savings for Ceiling Insulation - Retrofit[56]

Insulation Values	W/ft2			kWh/ft2		
	Cooling	**Heating**	**Cooling & Heating**	**Cooling**	**Heating**	**Cooling & Heating**
R-11 to R-24	0.005	0.000	0.005	0.007	0.059	0.066
R-11 to R-38	0.006	0.000	0.006	0.009	0.077	0.087
R-11 to R-49	0.006	0.000	0.006	0.010	0.084	0.094
R-19 to R-38	0.002	0.000	0.002	0.004	0.032	0.035
R-19 to R-49	0.003	0.000	0.003	0.005	0.039	0.043
Weighted:	0.005	0.000	0.005	0.006	0.053	0.059

Table 2-44 Deemed Energy Savings for Ceiling Insulation – New Construction[57]

	W/ft2	**kWh/ft2**
R-38 to R-49		
Cooling	.0005	.0007
Heating	0	.006
Cooling & Heating	.0005	.007

[56] See spreadsheet "7-TypicalCalcs_CeilingInsul.xlsx" for assumptions and calculations used to estimate the deemed unit energy savings.

[57] See spreadsheet "7-TypicalCalcs_CeilingInsul.xlsx" for assumptions and calculations used to estimate the deemed unit energy savings.

Table 2-45 ASHRAE Baseline R–values for Nonresidential Buildings in Zone 5[58]

Zone 5	**Nonresidential 2004**	**Nonresidential 2007**
Opaque Element	Insulation Min. R-Value	Insulation Min. R-Value
Insulation Entirely above Deck	R-15.0 c.i.	R-20.0 c.i.
Metal Building	R-19.0	R-19.0
Attic and Other	R-30.0	R-38.0

Table 2-46 ASHRAE Baseline R–values for Nonresidential Buildings in Zone 6[59]

Zone 6	**Nonresidential 2004**	**Nonresidential 2007**
Opaque Element	Insulation Min. R-Value	Insulation Min. R-Value
Insulation Entirely above Deck	R-15.0 c.i.	R-20.0 c.i.
Metal Building	R-19.0	R-19.0
Attic and Other	R-38.0	R-38.0

[58] Values stipulated from ASHRAE 90.1 2004 and 2007 Table 5.5-5

[59] Values stipulated from ASHRAE 90.1 2004 and 2007 Table 5.5-6

Table 2-47 Base Heating and Cooling Degree Days by Building Type[60]

	Zone 5		Zone 6	
Building Type	HDD	CDD	HDD	CDD
Assembly	256	104	274	91
Community College	229	116	214	101
Conditioned Storage	256	73	290	72
Fast Food Restaurant	258	103	284	81
Full Service Restaurant	273	88	289	76
High School	253	112	290	75
Hospital	272	93	293	94
Hotel	225	140	268	97
Large Retail 1 Story	240	122	264	101
Large Retail 3 Story	242	103	274	90
Large Office	229	131	247	121
Light Manufacturing	241	121	271	94
Medical Clinic	280	85	293	72
Motel	199	166	285	80
Multi Family	219	121	247	72
Nursing Home	300	65	300	79
Primary School	250	115	286	79
Small Office	226	131	256	106
Small Retail	244	117	271	94
University	229	131	247	109

[60] Values obtained from simulations of the DEER input models using eQuest to obtain typical baseline temperatures for each building. TMY3 weather data was collected and averaged over the ASHRAE weather Zones 5 and 6 to create heating and cooling degree days using the typical baseline temperatures.

Table 2-48 HVAC Coincidence Factors by Building Type

Building Type	Coincidence Factor
Assembly	0.47
Education - Community College	0.54
Education - Primary School	0.10
Education - Secondary School	0.10
Education - University	0.53
Grocery	0.54
Health/Medical - Hospital	0.82
Health/Medical - Nursing Home	0.49
Lodging - Hotel	0.67
Lodging - Motel	0.63
Manufacturing - Light Industrial	0.46
Office - Large	0.58
Office - Small	0.51
Restaurant - Fast-Food	0.48
Restaurant - Sit-Down	0.46
Retail - 3-Story Large	0.66
Retail - Single-Story Large	0.56
Retail - Small	0.49
Storage - Conditioned	0.41

Table 2-49 Stipulated Equivalent Full Load Hours (EFLH) by Building Type[61]

	Zone 5		**Zone 6**	
Building Type	EFLH Cooling	EFLH Heating	EFLH Cooling	EFLH Heating
Assembly	879	966	758	1059
Education - Primary School	203	299	173	408
Education - Secondary School	230	406	196	514
Education - Community College	556	326	530	456
Education - University	697	341	721	449
Grocery	3437	1825	3762	2011
Health/Medical - Hospital	1616	612	1409	679
Health/Medical - Nursing Home	1049	1399	884	1653
Lodging - Hotel	1121	621	1075	780
Lodging - Motel	978	682	937	796
Manufacturing - Light Industrial	530	699	415	1088
Office - Large	746	204	680	221
Office - Small	607	256	567	360
Restaurant - Sit-Down	811	624	716	709
Restaurant - Fast-Food	850	722	734	796
Retail - 3-Story Large	765	770	644	998
Retail - Single-Story Large	724	855	576	998
Retail - Small	726	886	619	1138
Storage - Conditioned	335	688	242	989

[61] Prototypical building energy simulations were used to generate Idaho specific heating and cooling equivalent full load hours for various buildings.

2.8. Reflective Roof

This section covers installation of "cool roof" roofing materials in commercial buildings. Energy and demand saving are realized through reductions in the building cooling loads. The approach utilizes DOE-2.2 simulations on a series of commercial DEER prototypical building models.

Table 2-50 and Table 2-51 summarize the 'typical' expected (per ft^2) e*nergy impacts for this measure.* Typical values are based on the algorithms and stipulated values described below.

Table 2-50 Summary Deemed Savings Estimates for Low-Slope Roof (2:12 or less) Reflective Roof

	Retrofit	New Construction
Deemed Savings Unit	ft^2	ft^2
Average Unit Energy Savings	0.116 kWh	0.116 kWh
Average Unit Peak Demand Savings	0.095 W	0.095 W
Expected Useful Life [62]	15 Years	15 Years
Average Material & Labor Cost [63]	$ 7.84	n/a
Average Incremental Cost [64]	n/a	$ 0.05
Stacking Effect End-Use	Cooling	

Table 2-51 Summary Deemed Savings Estimates for Steep-Slope Roof (>2:12) Reflective Roof

	Retrofit	New Construction
Deemed Savings Unit	ft^2	ft^2
Average Unit Energy Savings	0.021 kWh	0.021 kWh
Average Unit Peak Demand Savings	0.017 W	0.017 W
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	$ 7.90	n/a
Average Incremental Cost	n/a	$0.11
Stacking Effect End-Use	Cooling	

2.8.1. Definition of Eligible Equipment

Eligible equipment includes all reflective roofing materials when applied to the roof above a space with central mechanical air conditioning or PTAC systems. The roof treatment must be Energy Star rated or tested through a Cool Roof Rating Council (CRRC) accredited laboratory. For low-slope (2:12 or less) roofs, the roof products must have an solar reflectivity of at least

[62] From 2008 Database for Energy-Efficiency Resources (DEER), Version 2008.2.05, "Effective/Remaining Useful Life Values", California Public Utilities Commission, December 16, 2008

[63] Labor costs from 2005 Database for Energy-Efficiency Resources (DEER), Version 2005.2.01, "Technology and Measure Cost Data", California Public Utilities Commission, October 26, 2005

[64] Material costs from common roof types found in EPA's Reducing Urban Heat Islands: Compendium of Strategies: http://www.epa.gov/heatisld/resources/pdf/CoolRoofsCompendium.pdf

0.70 and thermal emittance of 0.75. For steep slope(greater than 2:12) roofs, minimum solar reflectance is 0.25. Note that facilities with pre-existing cool roofs are not eligible for this measure.

2.8.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction.

Retrofit (Early Replacement)

The baseline equipment for retrofit projects is the pre-existing (non-cool roof) roofing material.

New Construction (Includes Major Remodel & Replace on Burn-Out)

The baseline for new construction projects is established by the constructions and materials typically employed for similar new construction buildings and roof constructions. For the purposes of calculating typical energy savings for this measure it is assumed that the baseline roofing material has a reflectance of 0.15.[65]

2.8.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * A$$

$$\Delta kW = \Delta kW/Unit * A$$

2.8.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
ΔkWh/Unit	Per unit energy savings as stipulated in Table 2-52 and Table 2-53 according to building type and climate zone.
ΔkW/Unit	Per unit demand reduction as stipulated in Table 2-52 and Table 2-53 according to building type and climate zone.
A	Area of cool roofing material installed [ft^2]

2.8.5. Sources

1. ASHRAE, Standard 90.1-2004.
2. ASHRAE, Standard 90.1-2007.
3. California DEER Prototypical Simulation models, eQUEST-DEER 3-5.[66]
4. ASHRAE. 2006. Weather data for building design standards. ANSI/ASHRAE Standard 169-2006.

[65] Value derived using common roof types performance specifications found in the EPA publication Reducing Urban Heat Islands: Compendium of Strategies: http://www.epa.gov/heatisld/resources/pdf/CoolRoofsCompendium.pdf

[66] Prototypical building energy simulation models were used to obtain U-Factor and SHGC values for each building type.

2.8.6. Sources

1. 2004-2005 Database for Energy Efficiency Resources (DEER) Update Study. December 2005
2. 2008 Database for Energy-Efficiency Resources (DEER), Version 2008.2.05, "Effective/Remaining Useful Life Values", California Public Utilities Commission, December 16, 2008
3. 2005 Database for Energy-Efficiency Resources (DEER), Version 2005.2.01, "Technology and Measure Cost Data", California Public Utilities Commission, October 26, 2005

2.8.7. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-52 Unit Energy Savings for Low-Slope (<= 2:12) Reflective Roof[67]

Building Type	Weather Zone 5		Weather Zone 6	
	kWh	W	kWh	W
Primary School	0.082	0.076	0.062	0.059
Secondary School	0.088	0.060	0.052	0.046
Community College	0.392	0.075	0.449	0.068
University	0.148	0.092	0.141	0.083
Hospital	0.086	0.050	0.076	0.052
Nursing Home	0.120	0.096	0.101	0.087
Hotel	0.137	0.054	0.124	0.049
Motel	0.099	0.152	-0.014	0.135
Light Manufacturing	0.078	0.069	0.062	0.062
Small Office	0.102	0.089	0.089	0.083
Large Office	0.202	0.227	0.167	0.183
Full Service Restaurant (Sit-Down)	0.119	0.098	0.092	0.084
Fast Food	0.072	0.046	0.053	0.041
Small Retail	0.117	0.099	0.095	0.084
Large 1-story Retail	0.140	0.112	0.112	0.095
3-story Retail	0.087	0.057	0.098	0.049
Conditioned Storage	0.049	0.051	0.018	0.014

[67] See spreadsheet "8-TypicalCalcs_CoolRoof.xlsx" for assumptions and calculations used to estimate the typical unit energy savings.

Table 2-53 Unit Energy Savings for Steep-Slope (> 2:12) Reflective Roof[68]

Building Type	Weather Zone 5		Weather Zone 6	
	kWh	W	kWh	W
Primary School	0.015	0.014	0.012	0.011
Secondary School	0.015	0.012	0.009	0.009
Community College	0.076	0.013	0.071	0.011
University	0.027	0.016	0.021	0.014
Hospital	0.014	0.008	0.013	0.008
Nursing Home	0.022	0.017	0.019	0.016
Hotel	0.026	0.009	0.028	0.008
Motel	0.017	0.026	-0.002	0.024
Light Manufacturing	0.014	0.012	0.011	0.011
Small Office	0.018	0.016	0.016	0.015
Large Office	0.037	0.038	0.032	0.030
Full Service Restaurant (Sit-Down)	0.021	0.017	0.017	0.015
Fast Food	0.013	0.008	0.010	0.007
Small Retail	0.021	0.018	0.017	0.015
Large 1-story Retail	0.025	0.020	0.020	0.017
3-story Retail	0.013	0.011	0.018	0.009
Conditioned Storage	0.010	0.012	0.006	0.005

[68] See spreadsheet “8-TypicalCalcs_CoolRoof.xlsx” for assumptions and calculations used to estimate the typical unit energy savings.

2.9. Efficient Windows

The following algorithm and assumptions are applicable to efficient windows in commercial spaces which provide a lower U-value than existing windows or prevailing codes and standards. Savings will be realized through reductions in the buildings cooling and heating loads. Note that window films and windows with too low an SHGC value can for many buildings increase the heating loads (unless the building has a significant internal load as is the case for example in hospitals and/or data centers). In a heating dominated climate such as Idaho the increase in heating loads can negate any reduction in the cooling loads. Energy impacts for this measure are largely due to the improved U-Value and care should be taken when selecting windows to ensure that the SHGC values are appropriate for the building and climate.

Table 2-54 and Table 2-55 summarize the 'typical' expected (per window ft^2) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below. [69]

Table 2-54 Typical Savings Estimates for Efficient Windows (Cooling Only)

	Retrofit	New Construction
Deemed Savings Unit	ft^2 Window Glass	ft^2 Window Glass
Average Unit Energy Savings	1.51 kWh	n/a
Average Unit Peak Demand Savings	1.11 W	n/a
Average Gas Impacts [70]	0.13 Therms	n/a
Expected Useful Life	25 Years	n/a
Average Material & Labor Cost	$ 20.66	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Cooling	

[69] Average unit energy and peak demand cooling savings are based on a weighted average of electric resistance and heat pump savings only. Average unit energy and peak demand cooling savings are based on a weighted average of chiller and dx cooling only. See spreadsheet "9-TypicalCalcs_Windows.xlsx" for additional assumptions and calculations, EUL, and incremental cost.

[70] Note that the reported gas impacts assume that if savings are being claimed for cooling only the facility is gas heated. If the facility is electrically heated then these gas impacts are not applicable and savings should be based on the following table.

Table 2-55 Typical Savings Estimates for Efficient Windows (Heating and Cooling)

	Retrofit	**New Construction**
Deemed Savings Unit	ft^2 Window Glass	ft^2 Window Glass
Average Unit Energy Savings	8.47 kWh	n/a
Average Unit Peak Demand Savings	1.11 W	n/a
Expected Useful Life	25 Years	n/a
Average Material & Labor Cost	$ 20.66	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Heating, Cooling	

Table 2-56 Typical Savings Estimates for Premium Windows (Cooling Only)

	Retrofit	**New Construction**
Deemed Savings Unit	ft^2 Window Glass	ft^2 Window Glass
Average Unit Energy Savings	2.12 kWh	0.40 kWh
Average Unit Peak Demand Savings	1.55 W	0.32 W
Average Gas Impacts [71]	0.16 Therms	0.10 Therms
Expected Useful Life	25 Years	25 Years
Average Material & Labor Cost	$ 22.08	n/a
Average Incremental Cost	n/a	$ 5.92
Stacking Effect End-Use	Cooling	

Table 2-57 Typical Savings Estimates for Premium Windows (Cooling and Heating)

	Retrofit	**New Construction**
Deemed Savings Unit	ft^2 Window Glass	ft^2 Window Glass
Average Unit Energy Savings	10.6 kWh	5.89 kWh
Average Unit Peak Demand Savings	1.55 W	0.32 W
Expected Useful Life	25 Years	25 Years
Average Material & Labor Cost	$ 22.08	n/a
Average Incremental Cost	n/a	$ 5.92
Stacking Effect End-Use	Heating, Cooling	

[71] Note that the reported gas impacts assume that if savings are being claimed for cooling only the facility is gas heated. If the facility is electrically heated then these gas impacts are not applicable and savings should be based on the following table.

2.9.1. Definition of Eligible Equipment

In order to be considered eligible equipment windows must be independently tested and certified according to the standards established by the National Fenestration Rating Council (NFRC). While the NFRC does provide such testing and certification - any NFRC-licensed independent certification and inspection agency can provide certification. One example of such a body is the American Architectural Manufacturers Association (AAMA). In addition, eligible windows must meet or exceed the following performance ratings:

Efficient Windows:	SHGC = any and U-factor <= 0.42
Premium Windows:	SHGC <= any and U-factor <= 0.3

Window films and shades are not eligible under this measure as they reduce the SHGC without providing an appreciable improvement in the U-Value and in many circumstances their addition would result in an increased heating load which negates or exceeds the reduction in cooling loads.

2.9.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

If the project is retrofitting pre-existing equipment than the baseline efficiency is defined by the pre-existing windows.

New Construction (Includes Major Remodel & Replace on Burn-Out)

For new construction, the baseline efficiency is defined as the minimum allowable window performance in the prevailing building energy code or standard to which the project was permitted. Current standards are defined by ASHRAE 90.1-2004 and 90.1-2007.

2.9.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$
\begin{aligned}
\Delta kWh &= \Delta kW_{Heating} + \Delta kWh_{Cooling} \\
&= \Delta kW_{Heating} * EFLH_{\text{Heating}} + \Delta kW_{Cooling} * EFLH_{\text{cooling}} \\
\Delta kW_{Heating} &= A * (U * (T_{out} - T_{in}) + SHGC * E_{t,Heating}) / COP_{Heating} \\
\Delta kW_{Cooling} &= A * (U * (T_{\text{out}} - T_{\text{in}}) + SHGC * E_{t,Cooling}) / COP_{Cooling} \\
\Delta kW_{peak} &= \Delta kW_{Cooling} * CF
\end{aligned}
$$

2.9.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW_{peak}	Expected demand reduction between baseline and installed equipment.

$\Delta kW_{Heating/Cooling}$	Non-coincident demand reduction for the *Heating* and *Cooling* end-uses.
U	Overall coefficient of heat transfer (U-Factor).
T_{in}	Indoor air temperature.
T_{out}	Outdoor air temperature.
SHGC	Solar heat gain coefficient.
E_t	Incident total irradiance found in Table 2-60.
COP	Coefficient of performance found in Table 2-62. $COP = EER / 3.412$
EFLH	Annual cooling or heating hours for the building. Values for various building types are stipulated in Table 2-63. When available, actual system hours of use should be used.
CF	Peak coincidence factor. Represents the % of the connected load reduction which occurs during Idaho Power's peak period which can be found in Table 2 54

2.9.5. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-58 Retrofit Deemed Savings per Sq. Ft.

Orientation	Savings Type	Premium Windows		Efficient Windows	
		kWh/sq. ft.	kW/sq. ft.	kWh/sq. ft.	kW/sq. ft.
North	Heating	22.25	n/a	16.14	n/a
	Cooling	-2.43	-0.002	-1.52	-0.001
	Heating and Cooling	19.83	-0.002	14.62	-0.001
South	Heating	-5.90	n/a	-2.63	n/a
	Cooling	6.80	0.005	4.63	0.003
	Heating and Cooling	0.89	0.005	1.99	0.003
West	Heating	10.61	n/a	8.38	n/a
	Cooling	2.91	0.003	2.03	0.002
	Heating and Cooling	13.52	0.003	10.41	0.002
East	Heating	6.98	n/a	5.96	n/a
	Cooling	1.19	0.000	0.89	0.000
	Heating and Cooling	8.18	0.000	6.85	0.000
Average	Heating	8.49	n/a	6.96	n/a
	Cooling	2.12	1.55	1.51	1.11
	Heating and Cooling	10.61	1.55	8.47	1.11

Table 2-59 New Construction Deemed Savings per Sq. Ft.

Orientation	Savings Type	Premium Windows	
		kWh/sq. ft.	*kW/sq. ft.*
North	Heating	5.49	n/a
	Cooling	0.40	0.000
	Heating and Cooling	5.89	0.000
South	Heating	5.49	n/a
	Cooling	0.40	0.000
	Heating and Cooling	5.89	0.000
West	Heating	5.49	n/a
	Cooling	0.40	0.000
	Heating and Cooling	5.89	0.000
East	Heating	5.49	n/a
	Cooling	0.40	0.000
	Heating and Cooling	5.89	0.000
Average	Heating	5.49	n/a
	Cooling	0.40	0.32
	Heating and Cooling	5.89	0.32

Table 2-60 Calculated Heating/Cooling E_{ti} for each Building Type[72]

	Weather Zone 5				Weather Zone 6			
	Heating		Cooling		Heating		Cooling	
Building Type	Electric Res.	Heat Pump	Chiller	DX	Electric Res.	Heat Pump	Chiller	DX
Assembly	-	43.94	-	128.26	-	44.26	-	134.58
Education - Primary School	-	43.15	-	122.55	-	46.45	-	141.08
Education - Secondary School	-	43.3	-	124.06	-	47.41	-	143.21
Education - Community College	39.09	-	121.6	-	38.38	-	128.99	-
Education - University	39.09	-	112.6	-	40.46	-	124.5	-
Health/Medical - Hospital	44.95	-	131.78	-	48.23	-	133.79	-
Health/Medical - Nursing Home	-	48.44	-	151.3	-	49.27	-	146
Lodging - Hotel	38.36	-	105.48	-	43.19	-	129.7	-
Lodging - Motel	36.76	-	99.9	-	46.21	-	139.43	-
Manufacturing - Light Industrial	41.7	-	119.09	-	44.25	-	132.94	-
Office - Large	39.09	-	112.6	-	40.46	-	116.65	-
Office - Small	-	38.37	-	112	-	41.94	-	125.9
Restaurant - Sit-Down	-	45.16	-	136.04	-	47.41	-	143.21
Restaurant - Fast-Food	-	44.01	-	128.26	-	45.78	-	138.19
Retail - 3-Story Large	41.81	-	128.26	-	44.26	-	135.21	-
Retail - Single-Story Large	41.7	-	117.66	-	42.73	-	128.46	-
Retail - Small	-	42.45	-	121.33	-	44.09	-	132.74
Storage - Conditioned	-	43.94	-	144.43	-	47.41	-	144.24

[72] See spreadsheet "9-TypicalCalcs_Windows.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

Table 2-61 Baseline U-Factor and SHGC for Each Building[73]

Building	U-Factor	North Facing SHGC	Non-North Facing SHGC
Assembly	0.81	0.70	0.65
Education - Primary School	0.81	0.70	0.65
Education - Secondary School	0.81	0.70	0.65
Education - Community College	0.81	0.70	0.64
Education - University	1.04	0.83	0.84
Grocery	0.81	0.71	0.70
Health/Medical - Hospital	0.81	0.70	0.65
Health/Medical - Nursing Home	0.81	0.70	0.64
Lodging - Hotel	0.81	0.70	0.64
Lodging - Motel	0.81	0.70	0.64
Manufacturing - Bio/Tech	0.81	0.71	0.70
Manufacturing - Light Industrial	0.81	0.71	0.70
Office - Large	0.81	0.71	0.70
Office - Small	0.81	0.71	0.70
Restaurant - Sit-Down	0.81	0.71	0.70
Restaurant - Fast-Food	0.81	0.71	0.70
Retail - 3-Story Large	0.81	0.71	0.70
Retail - Single-Story Large	0.81	0.71	0.70
Retail - Small	0.81	0.71	0.70
Storage - Conditioned	0.81	0.71	0.70
Storage - Unconditioned	0.81	0.71	0.70
Warehouse - Refrigerated	0.81	0.71	0.70

Table 2-62 Average Heating/Cooling COP[74]

Heating		Cooling	
Electric Resistance	Heat Pump	Chiller	DX
2.6	3.6	5.1	2.9

[73] See spreadsheet "9-TypicalCalcs_Windows.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

[74] Average COP by heating/cooling type stipulated in ASHRAE 90.1 2004 and 2007 code baseline efficiencies.

Table 2-63 Stipulated Equivalent Full Load Hours (EFLH) by Building Type[75]

	Zone 5		**Zone 6**	
Building Type	EFLH Cooling	EFLH Heating	EFLH Cooling	EFLH Heating
Assembly	879	966	758	1059
Education - Primary School	203	299	173	408
Education - Secondary School	230	406	196	514
Education - Community College	556	326	530	456
Education - University	697	341	721	449
Grocery	3437	1825	3762	2011
Health/Medical - Hospital	1616	612	1409	679
Health/Medical - Nursing Home	1049	1399	884	1653
Lodging - Hotel	1121	621	1075	780
Lodging - Motel	978	682	937	796
Manufacturing - Light Industrial	530	699	415	1088
Office - Large	746	204	680	221
Office - Small	607	256	567	360
Restaurant - Sit-Down	811	624	716	709
Restaurant - Fast-Food	850	722	734	796
Retail - 3-Story Large	765	770	644	998
Retail - Single-Story Large	724	855	576	998
Retail - Small	726	886	619	1138
Storage - Conditioned	335	688	242	989

[75] Prototypical building energy simulations were used to generate Idaho specific heating and cooling equivalent full load hours for various buildings.

Table 2-64 HVAC Coincidence Factors by Building Type

Building Type	CF
Assembly	0.47
Education - Community College	0.54
Education - Primary School	0.1
Education - Secondary School	0.1
Education - University	0.53
Grocery	0.54
Health/Medical - Hospital	0.82
Health/Medical - Nursing Home	0.49
Lodging - Hotel	0.67
Lodging - Motel	0.63
Manufacturing - Light Industrial	0.46
Office - Large	0.58
Office - Small	0.51
Restaurant - Fast-Food	0.48
Restaurant - Sit-Down	0.46
Retail - 3-Story Large	0.66
Retail - Single-Story Large	0.56
Retail - Small	0.49
Storage - Conditioned	0.41

2.10. HVAC Controls

This section covers the implementation of HVAC controls in commercial buildings. HVAC controls include economizers, demand controlled ventilation (DCV), and EMS controls. The discussion of eligible equipment provides more detail regarding the individual measures. HVAC controls garner energy savings by optimizing the algorithms by which HVAC equipment are operated. The approach used in this TRM to estimate energy impacts from such measures is based on DOE-2.2 simulations of prototypical commercial building models.[76]

The controls measures included in this chapter do not encompass equipment optimization, retro-commissioning, or commissioning. Such projects are demonstrated to have significant variance in energy impacts and short measure lives (lack of persistence). They are more suitable for a custom approach and are not included in the TRM. Measures of this nature include temperature set-point and equipment staging optimization, thermostat set-back overrides, and behavioral or maintenance oriented measures.

Table 2-65 though Table 2-67 summarize ‘typical’ expected (per ton of cooling) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.[77]

Table 2-65 Typical Savings Estimates for Air-Side Economizer Only (New and Repair)

	Retrofit	**New Construction**
Deemed Savings Unit	Ton of cooling	Ton of cooling
Average Unit Energy Savings	285 kWh	190 kWh
Average Unit Peak Demand Savings	.0144 kW	.0129 kW
Average Unit Gas Savings	0 Therms	0 Therms
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	$ 155.01 (New) $ 73.65 (Repair)	n/a
Average Incremental Cost	n/a	$81.36
Stacking Effect End-Use	n/a	

[76] The prototypical building models are sourced from the DEER 2008.

[77] See spreadsheet “10-TypicalCalcs_HVACcntrls.xlsx” for assumptions and calculations used to estimate the typical unit energy savings and incremental costs. Also note that the savings figures represented in these tables give equal weight to the four HVAC system types discussed later in this chapter

Table 2-66 Typical Savings Estimates for Demand Controlled Ventilation Only

	Retrofit	New Construction
Deemed Savings Unit	CFM of Air Controlled	CFM of Air Controlled
Average Unit Energy Savings	0.82 kWh	0.34 kWh
Average Unit Peak Demand Savings	0.08 W	0.03 W
Average Unit Gas Savings	0.04 Therms	0.02 Therms
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	$0.44	n/a
Average Incremental Cost	n/a	$0.30
Stacking Effect End-Use	n/a	

Table 2-67 Typical Deemed Savings Estimates for EMS Controls w/ 2 Strategies Implemented[78]

	Retrofit	New Construction
Deemed Savings Unit	Ton of cooling	Ton of cooling
Average Unit Energy Savings	636 kWh	418 kWh
Average Unit Peak Demand Savings	.11 kW	.07 kW
Average Unit Gas Savings	6 Therms	6 Therms
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	$197.98	n/a
Average Incremental Cost	n/a	$162.49
Stacking Effect End-Use	n/a	

Table 2-68 Typical Deemed Savings Estimates for EMS Controls w/ 4 Strategies Implemented[79]

	Retrofit	New Construction
Deemed Savings Unit	Ton of cooling	Ton of cooling
Average Unit Energy Savings	794 kWh	484 kWh
Average Unit Peak Demand Savings	.13 kW	.08 kW
Average Unit Gas Savings	17 Therms	9 Therms
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	$197.98	n/a
Average Incremental Cost	n/a	$162.49
Stacking Effect End-Use	n/a	

[78] Assumes that (2) controls measures are implemented on average.

[79] Assumes that (2) controls measures are implemented on average.

2.10.1. Definition of Eligible Equipment

Eligible equipment is based on applicable HVAC system type (note that any building with a system type that isn't included in Table 2-69 should follow a custom path) and appropriately implementing the controls measures listed in Table 2-70. Note that evaporative cooling equipment is not eligible for this measure.

Table 2-69 HVAC System Types

Item	System Type
1	VAV with chilled water coils
2	Packaged Variable Air Volume System (PVAVS)
3	Packaged Variable Air Volume System (PVAVS) Gas Heat
4	Packaged Variable Air Volume System (PVAVS) Electric Reheat
5	Packaged Variable Volume and Temperature (PVVT)
6	Packaged Variable Volume and Temperature (PVVT) Heat Pump
7	Water Source Heat Pump (WSHP)
8	Ground Source Heat Pump (GSHP)
9	Packaged Rooftop Unit / Split System
10	Packaged Rooftop Heat Pump Unit

Note that detailed descriptions for each of the above system types can be found in *ASHRAE Handbook – Systems*. A summary of the system types, their typical configurations, and how they are modeled in eQuest[80] can be found in *Building Energy Use and Cost Analysis Program Volume 3: Topics*.[81]

Table 2-70 EMS Measures

Item	Measure
1	Optimum Start/Stop
2	Economizer Controls
3	Demand Controlled Ventilation (DCV)
4	Supply Air Reset
5	Chilled Water Reset
6	Condenser Water Reset

Eligibility requirements for each of the control strategies listed above are as follows:

Optimum Start/Stop — The fan start time is delayed until the fan run time matches that needed to meet the desired zone temperatures. The fan stop time is advanced until the fan run time matches that needed to meet the desired zone temperatures.

Economizer Controls — The economizer is enabled whenever the outside air temperature is below the maximum allowed temperature. Enthalpy control is also allowed.

[80] The software package used to simulate energy impacts for this measure.

[81] http://doe2.com/download/DOE-22/DOE22Vol3-Topics.pdf

Demand Controlled Ventilation (DCV)	The minimum outside air fraction is varied based on a DCV sensor.
Supply Air Reset	The air temperature leaving the system cooling coil is reset based on outdoor air temperature.
Chilled Water Reset	The supply chilled water temperature is allowed to rise during low loads.
Condenser Water Reset	The cooling tower temperature floats with the load and wet-bulb temperature

2.10.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

The baseline equipment for retrofit projects is an existing mechanical HVAC system (see list in Table 2-69 for eligible systems) that has not implemented the control strategy (or strategies) claimed in the project. See Table 2-70 for a list of eligible control strategies. Note that evaporative cooling equipment is not eligible for this measure.

New Construction (Includes Major Renovations)

The baseline equipment for new construction projects is an HVAC system (see list in Table 2-69 for eligible systems) that meets the local building energy codes and standards.

<u>*Code Compliance Considerations for HVAC Controls*</u>

Some of the EMS measures in Table 2-70 are required by code for certain buildings and HVAC systems.

2.10.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/ton * Cap$$

$$\Delta kW = \Delta kW/ton * Cap$$

2.10.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
ΔkWh/ton	Energy savings on a per unit basis as stipulated in Table 2-71 though Table 2-82.
ΔkW/ton	Demand reduction on a per unit basis as stipulated in Table 2-71 though Table 2-82.
Cap	Capacity (in Tons) of the HVAC system on which the HVAC control(s) are

installed.

2.10.5. Sources

1. U.S. Bureau of Labor Statistics: http://www.bls.gov/data/inflation_calculator.htm
2. Database for Energy Efficiency Resources (DEER) 2008.

2.10.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-71 Energy Savings for Retrofit EMS Controls Climate Zone 5

# of Measures Implemented	HVAC System Type	kWh/Ton	kW/Ton
1	VAV with chilled water coils	514	0.078
2	VAV with chilled water coils	1,190	0.081
3	VAV with chilled water coils	1,758	0.255
4	VAV with chilled water coils	1,783	0.273
5	VAV with chilled water coils	1,851	0.317
6	VAV with chilled water coils	1,872	0.327
1	Packaged Variable Air Volume System (PVAVS)	362	0.155
2	Packaged Variable Air Volume System (PVAVS)	769	0.157
3	Packaged Variable Air Volume System (PVAVS)	810	0.172
4	Packaged Variable Air Volume System (PVAVS)	810	0.172
5	Packaged Variable Air Volume System (PVAVS)	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS)	n/a	n/a
1	Packaged Variable Air Volume System (PVAVS) Gas Heat	227	0.102
2	Packaged Variable Air Volume System (PVAVS) Gas Heat	349	0.103
3	Packaged Variable Air Volume System (PVAVS) Gas Heat	349	0.110
4	Packaged Variable Air Volume System (PVAVS) Gas Heat	349	0.110
5	Packaged Variable Air Volume System (PVAVS) Gas Heat	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS) Gas Heat	n/a	n/a
1	Packaged Variable Air Volume System (PVAVS) Electric Reheat	966	0.101
2	Packaged Variable Air Volume System (PVAVS) Electric Reheat	1,077	0.102
3	Packaged Variable Air Volume System (PVAVS) Electric Reheat	1,642	0.108
4	Packaged Variable Air Volume System (PVAVS) Electric Reheat	1,642	0.108
5	Packaged Variable Air Volume System (PVAVS) Electric Reheat	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS) Electric Reheat	n/a	n/a
1	Packaged Variable Volume and Temperature (PVVT)	225	0.105
2	Packaged Variable Volume and Temperature (PVVT)	417	0.107
3	Packaged Variable Volume and Temperature (PVVT)	421	0.117
4	Packaged Variable Volume and Temperature (PVVT)	421	0.117
5	Packaged Variable Volume and Temperature (PVVT)	n/a	n/a
6	Packaged Variable Volume and Temperature (PVVT)	n/a	n/a
1	Packaged Variable Volume and Temperature (PVVT) Heat Pump	382	0.105

# of Measures Implemented	HVAC System Type	kWh/Ton	kW/Ton
2	Packaged Variable Volume and Temperature (PVVT) Heat Pump	575	0.107
3	Packaged Variable Volume and Temperature (PVVT) Heat Pump	694	0.117
4	Packaged Variable Volume and Temperature (PVVT) Heat Pump	694	0.117
5	Packaged Variable Volume and Temperature (PVVT) Heat Pump	n/a	n/a
6	Packaged Variable Volume and Temperature (PVVT) Heat Pump	n/a	n/a
1	Water Source Heat Pump (WSHP)	258	0.104
2	Water Source Heat Pump (WSHP)	506	0.106
3	Water Source Heat Pump (WSHP)	566	0.116
4	Water Source Heat Pump (WSHP)	566	0.116
5	Water Source Heat Pump (WSHP)	n/a	n/a
6	Water Source Heat Pump (WSHP)	n/a	n/a
1	Ground Source Heat Pump (GSHP)	239	0.077
2	Ground Source Heat Pump (GSHP)	409	0.080
3	Ground Source Heat Pump (GSHP)	467	0.085
4	Ground Source Heat Pump (GSHP)	467	0.085
5	Ground Source Heat Pump (GSHP)	n/a	n/a
6	Ground Source Heat Pump (GSHP)	n/a	n/a
1	Packaged Rooftop Unit / Split System	232	0.117
2	Packaged Rooftop Unit / Split System	476	0.119
3	Packaged Rooftop Unit / Split System	476	0.119
4	Packaged Rooftop Unit / Split System	476	0.119
5	Packaged Rooftop Unit / Split System	n/a	n/a
6	Packaged Rooftop Unit / Split System	n/a	n/a
1	Packaged Rooftop Heat Pump Unit	401	0.117
2	Packaged Rooftop Heat Pump Unit	626	0.119
3	Packaged Rooftop Heat Pump Unit	758	0.125
4	Packaged Rooftop Heat Pump Unit	758	0.125
5	Packaged Rooftop Heat Pump Unit	n/a	n/a
6	Packaged Rooftop Heat Pump Unit	n/a	n/a

Table 2-72 Energy Savings for New Construction EMS Controls Climate Zone 5

# of Measures Implemented	HVAC System Type	kWh/Ton	kW/Ton
1	VAV with chilled water coils	167	0.012
2	VAV with chilled water coils	550	0.013
3	VAV with chilled water coils	580	0.027
4	VAV with chilled water coils	583	0.027
5	VAV with chilled water coils	634	0.064
6	VAV with chilled water coils	660	0.077
1	Packaged Variable Air Volume System (PVAVS)	231	0.099
2	Packaged Variable Air Volume System (PVAVS)	543	0.100
3	Packaged Variable Air Volume System (PVAVS)	592	0.116
4	Packaged Variable Air Volume System (PVAVS)	592	0.116
5	Packaged Variable Air Volume System (PVAVS)	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS)	n/a	n/a
1	Packaged Variable Air Volume System (PVAVS) Gas Heat	179	0.068
2	Packaged Variable Air Volume System (PVAVS) Gas Heat	283	0.069
3	Packaged Variable Air Volume System (PVAVS) Gas Heat	283	0.079
4	Packaged Variable Air Volume System (PVAVS) Gas Heat	283	0.079
5	Packaged Variable Air Volume System (PVAVS) Gas Heat	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS) Gas Heat	n/a	n/a
1	Packaged Variable Air Volume System (PVAVS) Electric Reheat	468	0.068
2	Packaged Variable Air Volume System (PVAVS) Electric Reheat	570	0.069
3	Packaged Variable Air Volume System (PVAVS) Electric Reheat	776	0.069
4	Packaged Variable Air Volume System (PVAVS) Electric Reheat	776	0.069
5	Packaged Variable Air Volume System (PVAVS) Electric Reheat	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS) Electric Reheat	n/a	n/a
1	Packaged Variable Volume and Temperature (PVVT)	137	0.072
2	Packaged Variable Volume and Temperature (PVVT)	306	0.074
3	Packaged Variable Volume and Temperature (PVVT)	311	0.085
4	Packaged Variable Volume and Temperature (PVVT)	311	0.085
5	Packaged Variable Volume and Temperature (PVVT)	n/a	n/a
6	Packaged Variable Volume and Temperature (PVVT)	n/a	n/a
1	Packaged Variable Volume and Temperature (PVVT) Heat Pump	271	0.072
2	Packaged Variable Volume and Temperature (PVVT) Heat Pump	441	0.074
3	Packaged Variable Volume and Temperature (PVVT) Heat Pump	559	0.086
4	Packaged Variable Volume and Temperature (PVVT) Heat Pump	559	0.086
5	Packaged Variable Volume and Temperature (PVVT) Heat Pump	n/a	n/a
6	Packaged Variable Volume and Temperature (PVVT) Heat Pump	n/a	n/a
1	Water Source Heat Pump (WSHP)	155	0.011

# of Measures Implemented	HVAC System Type	kWh/Ton	kW/Ton
2	Water Source Heat Pump (WSHP)	320	0.013
3	Water Source Heat Pump (WSHP)	380	0.024
4	Water Source Heat Pump (WSHP)	380	0.024
5	Water Source Heat Pump (WSHP)	n/a	n/a
6	Water Source Heat Pump (WSHP)	n/a	n/a
1	Ground Source Heat Pump (GSHP)	159	0.053
2	Ground Source Heat Pump (GSHP)	274	0.054
3	Ground Source Heat Pump (GSHP)	329	0.059
4	Ground Source Heat Pump (GSHP)	329	0.059
5	Ground Source Heat Pump (GSHP)	n/a	n/a
6	Ground Source Heat Pump (GSHP)	n/a	n/a
1	Packaged Rooftop Unit / Split System	190	0.098
2	Packaged Rooftop Unit / Split System	380	0.100
3	Packaged Rooftop Unit / Split System	380	0.100
4	Packaged Rooftop Unit / Split System	380	0.100
5	Packaged Rooftop Unit / Split System	n/a	n/a
6	Packaged Rooftop Unit / Split System	n/a	n/a
1	Packaged Rooftop Heat Pump Unit	358	0.098
2	Packaged Rooftop Heat Pump Unit	549	0.100
3	Packaged Rooftop Heat Pump Unit	654	0.106
4	Packaged Rooftop Heat Pump Unit	654	0.106
5	Packaged Rooftop Heat Pump Unit	n/a	n/a
6	Packaged Rooftop Heat Pump Unit	n/a	n/a

Table 2-73 Energy Savings for Retrofit EMS Controls Climate Zone 6

# of Measures Implemented	HVAC System Type	kWh/Ton	kW/Ton
1	VAV with chilled water coils	502	0.076
2	VAV with chilled water coils	1,212	0.085
3	VAV with chilled water coils	1,810	0.269
4	VAV with chilled water coils	1,728	0.259
5	VAV with chilled water coils	1,806	0.302
6	VAV with chilled water coils	1,827	0.313
1	Packaged Variable Air Volume System (PVAVS)	315	0.131
2	Packaged Variable Air Volume System (PVAVS)	677	0.137
3	Packaged Variable Air Volume System (PVAVS)	749	0.151
4	Packaged Variable Air Volume System (PVAVS)	749	0.151
5	Packaged Variable Air Volume System (PVAVS)	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS)	n/a	n/a
1	Packaged Variable Air Volume System (PVAVS) Gas Heat	209	0.078
2	Packaged Variable Air Volume System (PVAVS) Gas Heat	308	0.083
3	Packaged Variable Air Volume System (PVAVS) Gas Heat	308	0.089
4	Packaged Variable Air Volume System (PVAVS) Gas Heat	308	0.089
5	Packaged Variable Air Volume System (PVAVS) Gas Heat	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS) Gas Heat	n/a	n/a
1	Packaged Variable Air Volume System (PVAVS) Electric Reheat	1,051	0.085
2	Packaged Variable Air Volume System (PVAVS) Electric Reheat	1,142	0.091
3	Packaged Variable Air Volume System (PVAVS) Electric Reheat	1,663	0.092
4	Packaged Variable Air Volume System (PVAVS) Electric Reheat	1,663	0.092
5	Packaged Variable Air Volume System (PVAVS) Electric Reheat	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS) Electric Reheat	n/a	n/a
1	Packaged Variable Volume and Temperature (PVVT)	203	0.082
2	Packaged Variable Volume and Temperature (PVVT)	373	0.099
3	Packaged Variable Volume and Temperature (PVVT)	376	0.106
4	Packaged Variable Volume and Temperature (PVVT)	376	0.106
5	Packaged Variable Volume and Temperature (PVVT)	n/a	n/a
6	Packaged Variable Volume and Temperature (PVVT)	n/a	n/a
1	Packaged Variable Volume and Temperature (PVVT) Heat Pump	431	0.082
2	Packaged Variable Volume and Temperature (PVVT) Heat Pump	601	0.099
3	Packaged Variable Volume and Temperature (PVVT) Heat Pump	769	0.106
4	Packaged Variable Volume and Temperature (PVVT) Heat Pump	769	0.106
5	Packaged Variable Volume and Temperature (PVVT) Heat Pump	n/a	n/a

# of Measures Implemented	HVAC System Type	kWh/Ton	kW/Ton
6	Packaged Variable Volume and Temperature (PVVT) Heat Pump	n/a	n/a
1	Water Source Heat Pump (WSHP)	250	0.082
2	Water Source Heat Pump (WSHP)	478	0.098
3	Water Source Heat Pump (WSHP)	556	0.103
4	Water Source Heat Pump (WSHP)	556	0.103
5	Water Source Heat Pump (WSHP)	n/a	n/a
6	Water Source Heat Pump (WSHP)	n/a	n/a
1	Ground Source Heat Pump (GSHP)	246	0.065
2	Ground Source Heat Pump (GSHP)	397	0.075
3	Ground Source Heat Pump (GSHP)	472	0.077
4	Ground Source Heat Pump (GSHP)	472	0.077
5	Ground Source Heat Pump (GSHP)	n/a	n/a
6	Ground Source Heat Pump (GSHP)	n/a	n/a
1	Packaged Variable Air Volume (VAV) Unit	553	0.085
2	Packaged Variable Air Volume (VAV) Unit	1,416	0.097
3	Packaged Variable Air Volume (VAV) Unit	2,018	0.309
4	Packaged Variable Air Volume (VAV) Unit	2,027	0.323
5	Packaged Variable Air Volume (VAV) Unit	n/a	n/a
6	Packaged Variable Air Volume (VAV) Unit	n/a	n/a
1	Packaged Rooftop Unit / Split System	190	0.092
2	Packaged Rooftop Unit / Split System	417	0.109
3	Packaged Rooftop Unit / Split System	417	0.109
4	Packaged Rooftop Unit / Split System	417	0.109
5	Packaged Rooftop Unit / Split System	n/a	n/a
6	Packaged Rooftop Unit / Split System	n/a	n/a

Table 2-74 Energy Savings for New Construction EMS Controls Climate Zone 6

# of Measures Implemented	HVAC System Type	kWh/Ton	kW/Ton
1	VAV with chilled water coils	166	0.014
2	VAV with chilled water coils	551	0.018
3	VAV with chilled water coils	574	0.028
4	VAV with chilled water coils	577	0.028
5	VAV with chilled water coils	628	0.067
6	VAV with chilled water coils	655	0.081
1	Packaged Variable Air Volume System (PVAVS)	206	0.083
2	Packaged Variable Air Volume System (PVAVS)	480	0.089
3	Packaged Variable Air Volume System (PVAVS)	578	0.101
4	Packaged Variable Air Volume System (PVAVS)	578	0.101
5	Packaged Variable Air Volume System (PVAVS)	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS)	n/a	n/a
1	Packaged Variable Air Volume System (PVAVS) Gas Heat	164	0.057
2	Packaged Variable Air Volume System (PVAVS) Gas Heat	247	0.061
3	Packaged Variable Air Volume System (PVAVS) Gas Heat	247	0.069
4	Packaged Variable Air Volume System (PVAVS) Gas Heat	247	0.069
5	Packaged Variable Air Volume System (PVAVS) Gas Heat	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS) Gas Heat	n/a	n/a
1	Packaged Variable Air Volume System (PVAVS) Electric Reheat	506	0.057
2	Packaged Variable Air Volume System (PVAVS) Electric Reheat	588	0.061
3	Packaged Variable Air Volume System (PVAVS) Electric Reheat	772	0.061
4	Packaged Variable Air Volume System (PVAVS) Electric Reheat	772	0.061
5	Packaged Variable Air Volume System (PVAVS) Electric Reheat	n/a	n/a
6	Packaged Variable Air Volume System (PVAVS) Electric Reheat	n/a	n/a
1	Packaged Variable Volume and Temperature (PVVT)	125	0.059
2	Packaged Variable Volume and Temperature (PVVT)	269	0.072
3	Packaged Variable Volume and Temperature (PVVT)	272	0.080
4	Packaged Variable Volume and Temperature (PVVT)	272	0.080
5	Packaged Variable Volume and Temperature (PVVT)	n/a	n/a
6	Packaged Variable Volume and Temperature (PVVT)	n/a	n/a
1	Packaged Variable Volume and Temperature (PVVT) Heat Pump	300	0.059
2	Packaged Variable Volume and Temperature (PVVT) Heat Pump	444	0.072
3	Packaged Variable Volume and Temperature (PVVT) Heat Pump	607	0.080
4	Packaged Variable Volume and Temperature (PVVT) Heat Pump	607	0.080
5	Packaged Variable Volume and Temperature (PVVT) Heat Pump	n/a	n/a
6	Packaged Variable Volume and Temperature (PVVT) Heat Pump	n/a	n/a
1	Water Source Heat Pump (WSHP)	170	0.112

# of Measures Implemented	HVAC System Type	kWh/Ton	kW/Ton
2	Water Source Heat Pump (WSHP)	315	0.122
3	Water Source Heat Pump (WSHP)	391	0.129
4	Water Source Heat Pump (WSHP)	391	0.129
5	Water Source Heat Pump (WSHP)	n/a	n/a
6	Water Source Heat Pump (WSHP)	n/a	n/a
1	Ground Source Heat Pump (GSHP)	164	0.043
2	Ground Source Heat Pump (GSHP)	264	0.050
3	Ground Source Heat Pump (GSHP)	331	0.053
4	Ground Source Heat Pump (GSHP)	331	0.053
5	Ground Source Heat Pump (GSHP)	n/a	n/a
6	Ground Source Heat Pump (GSHP)	n/a	n/a
1	Packaged Rooftop Unit / Split System	172	0.077
2	Packaged Rooftop Unit / Split System	342	0.090
3	Packaged Rooftop Unit / Split System	342	0.090
4	Packaged Rooftop Unit / Split System	342	0.090
5	Packaged Rooftop Unit / Split System	n/a	n/a
6	Packaged Rooftop Unit / Split System	n/a	n/a
1	Packaged Rooftop Heat Pump Unit	347	0.077
2	Packaged Rooftop Heat Pump Unit	517	0.090
3	Packaged Rooftop Heat Pump Unit	691	0.094
4	Packaged Rooftop Heat Pump Unit	691	0.094
5	Packaged Rooftop Heat Pump Unit	n/a	n/a
6	Packaged Rooftop Heat Pump Unit	n/a	n/a

Table 2-75 Energy Savings for Retrofit Economizer Controls Only Climate Zone 5

HVAC System Type	kWh/Ton	kW/Ton
VAV with chilled water coils	857	0.0031
Packaged Variable Air Volume System (PVAVS)	462	0.0020
Packaged Variable Air Volume System (PVAVS) Gas Heat	134	0.0020
Packaged Variable Air Volume System (PVAVS) Electric Reheat	125	0.0020
Packaged Variable Volume and Temperature (PVVT)	208	0.0050
Packaged Variable Volume and Temperature (PVVT) Heat Pump	208	0.0050
Water Source Heat Pump (WSHP)	279	0.0060
Ground Source Heat Pump (GSHP)	191	0.0060
Packaged Rooftop Unit / Split System	267	0.0929
Packaged Rooftop Heat Pump Unit	267	0.0055

Table 2-76 Energy Savings for New Construction Economizer Controls Only Climate Zone 5

HVAC System Type	kWh/Ton	kW/Ton
VAV with chilled water coils	448	0.0013
Packaged Variable Air Volume System (PVAVS)	353	0.0020
Packaged Variable Air Volume System (PVAVS) Gas Heat	115	0.0020
Packaged Variable Air Volume System (PVAVS) Electric Reheat	109	0.0020
Packaged Variable Volume and Temperature (PVVT)	171	0.0040
Packaged Variable Volume and Temperature (PVVT) Heat Pump	171	0.0040
Water Source Heat Pump (WSHP)	170	-0.0550
Ground Source Heat Pump (GSHP)	127	0.0020
Packaged Rooftop Unit / Split System	194	0.0045
Packaged Rooftop Heat Pump Unit	194	0.0045

Table 2-77 Energy Savings for Retrofit Economizer Controls Only Climate Zone 6

HVAC System Type	kWh/Ton	kW/Ton
VAV with chilled water coils	901	0.0122
Packaged Variable Air Volume System (PVAVS)	415	0.0070
Packaged Variable Air Volume System (PVAVS) Gas Heat	109	0.0070
Packaged Variable Air Volume System (PVAVS) Electric Reheat	104	0.0060
Packaged Variable Volume and Temperature (PVVT)	183	0.0190
Packaged Variable Volume and Temperature (PVVT) Heat Pump	183	0.0190
Water Source Heat Pump (WSHP)	253	0.0210
Ground Source Heat Pump (GSHP)	169	0.0150
Packaged Rooftop Unit / Split System	246	0.0207
Packaged Rooftop Heat Pump Unit	246	0.0207

Table 2-78 Energy Savings for New Construction Economizer Controls Only Climate Zone 6

HVAC System Type	kWh/Ton	kW/Ton
VAV with chilled water coils	453	0.0041
Packaged Variable Air Volume System (PVAVS)	311	0.0070
Packaged Variable Air Volume System (PVAVS) Gas Heat	95	0.0060
Packaged Variable Air Volume System (PVAVS) Electric Reheat	90	0.0060
Packaged Variable Volume and Temperature (PVVT)	148	0.0160
Packaged Variable Volume and Temperature (PVVT) Heat Pump	148	0.0160
Water Source Heat Pump (WSHP)	165	0.0720
Ground Source Heat Pump (GSHP)	110	0.0090
Packaged Rooftop Unit / Split System	174	0.0165
Packaged Rooftop Heat Pump Unit	174	0.0165

Table 2-79 Energy Savings for Retrofit DCV Only Climate Zone 5

HVAC System Type	kWh/CFM	W/CFM
VAV with chilled water coils	2.75	0.57
Packaged Variable Air Volume System (PVAVS)	0.11	0.07
Packaged Variable Air Volume System (PVAVS) Gas Heat	-0.06	0.03
Packaged Variable Air Volume System (PVAVS) Electric Reheat	2.25	0.01
Packaged Variable Volume and Temperature (PVVT)	0.02	0.03
Packaged Variable Volume and Temperature (PVVT) Heat Pump	0.57	0.03
Water Source Heat Pump (WSHP)	0.95	0.04
Ground Source Heat Pump (GSHP)	0.73	0.03
Packaged Rooftop Unit / Split System	-0.10	0.02
Packaged Rooftop Heat Pump Unit	0.65	0.02

Table 2-80 Energy Savings for New Construction DCV Only Climate Zone 5

HVAC System Type	kWh/CFM	W/CFM
VAV with chilled water coils	0.09	0.035
Packaged Variable Air Volume System (PVAVS)	0.13	0.069
Packaged Variable Air Volume System (PVAVS) Gas Heat	-0.49	0.033
Packaged Variable Air Volume System (PVAVS) Electric Reheat	0.92	-0.011
Packaged Variable Volume and Temperature (PVVT)	0.02	0.035
Packaged Variable Volume and Temperature (PVVT) Heat Pump	0.55	0.036
Water Source Heat Pump (WSHP)	0.67	-0.102
Ground Source Heat Pump (GSHP)	0.55	0.022
Packaged Rooftop Unit / Split System	-0.09	0.022
Packaged Rooftop Heat Pump Unit	0.64	0.022

Table 2-81 Energy Savings for Retrofit DCV Only Climate Zone 6

HVAC System Type	kWh/CFM	W/CFM
VAV with chilled water coils	2.79	0.592
Packaged Variable Air Volume System (PVAVS)	0.22	0.060
Packaged Variable Air Volume System (PVAVS) Gas Heat	-0.15	0.019
Packaged Variable Air Volume System (PVAVS) Electric Reheat	2.09	-0.013
Packaged Variable Volume and Temperature (PVVT)	0.004	0.019
Packaged Variable Volume and Temperature (PVVT) Heat Pump	0.80	0.018
Water Source Heat Pump (WSHP)	0.93	0.053
Ground Source Heat Pump (GSHP)	0.73	0.029
Packaged Rooftop Unit / Split System	-0.10	0.005
Packaged Rooftop Heat Pump Unit	0.94	0.004

Table 2-82 Unit Energy Savings for New Construction DCV Only Climate Zone 6

HVAC System Type	kWh/CFM	W/CFM
VAV with chilled water coils	0.05	0.028
Packaged Variable Air Volume System (PVAVS)	0.29	0.052
Packaged Variable Air Volume System (PVAVS) Gas Heat	-0.59	0.019
Packaged Variable Air Volume System (PVAVS) Electric Reheat	0.88	-0.027
Packaged Variable Volume and Temperature (PVVT)	0.004	0.017
Packaged Variable Volume and Temperature (PVVT) Heat Pump	0.73	0.017
Water Source Heat Pump (WSHP)	0.71	0.191
Ground Source Heat Pump (GSHP)	0.56	0.026
Packaged Rooftop Unit / Split System	-0.09	0.004
Packaged Rooftop Heat Pump Unit	0.96	0.004

2.11. Hotel/Motel Guestroom Energy Management Systems

The following algorithms and assumptions are applicable to occupancy based Guest Room Energy Management Systems (GREM) installed in motel and hotel guest rooms. These systems use one or more methods to determine whether or not the guest room is occupied. If the room is un-occupied for a predetermined amount of time (typically 15 - 30 min) the thermostat set-point is set-back.

Table 2-83 through Table 2-85 summarize the 'typical' expected (per Ton) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below and data from past program participants.[82]

Table 2-83 Typical Savings Estimates for GREM (w/o Housekeeping Set-Backs)

	Retrofit	New Construction	
		IECC 2009	IECC 2012
Deemed Savings Unit	Ton	Ton	Ton
Average Unit Energy Savings	1,095 kWh	965 kWh	951 kWh
Average Unit Peak Demand Savings	0 kW	0 kW	0 kW
Expected Useful Life	11 Years	11 Years	11 Years
Average Material & Labor Cost	$150.61	-	-
Average Incremental Cost	-	$57.50	$57.50
Stacking Effect End-Use	Heating, Cooling		

Table 2-84 Typical Savings Estimates for GREM (With Housekeeping Set-Backs)

	Retrofit	New Construction	
		IECC 2009	IECC 2012
Deemed Savings Unit	Ton	Ton	Ton
Average Unit Energy Savings	235 kWh	196 kWh	194 kWh
Average Unit Peak Demand Savings	0 kW	0 kW	0 kW
Expected Useful Life	11 Years	11 Years	11 Years
Average Material & Labor Cost	$150.61	-	-
Average Incremental Cost	-	$57.50	$57.50
Stacking Effect End-Use	Heating, Cooling		

[82] See spreadsheet "11-TypicalCalcs_GREM.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs. Note that due to the limited savings available for gas heated facilities the numbers in these tables account only for electric heating fuel system types (e.g. heat-pumps and electric resistance coils).

Table 2-85 Typical Savings Estimates for GREM (Average) [83]

	Retrofit	New Construction	
		IECC 2009	IECC 2012
Deemed Savings Unit	Ton	Ton	Ton
Average Unit Energy Savings	665 kWh	581 kWh	572 kWh
Average Unit Peak Demand Savings	0 kW	0 kW	0 kW
Expected Useful Life	11 Years	11 Years	11 Years
Average Material & Labor Cost	$150.61	-	-
Average Incremental Cost	-	$57.50	$57.50
Stacking Effect End-Use	Heating, Cooling		

2.11.1. Definition of Eligible Equipment

Eligible systems include any occupancy based thermostatic set-back controls controlling an electrically heated system. Systems can be centralized or local controls. Systems must set-back room space temperatures by a minimum of 8 degrees F when the room is determined to be unoccupied. Temperature set-back must occur no longer than 30 minutes after the room is determined unoccupied. Eligible systems include, thermostat based controls, room key-card controls, and system check-in/check-out controls.

2.11.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. However; there are currently no building energy code requirements (as defined in ASHRAE 90.1) which mandate installation of Guestroom Occupancy Control Systems. As such the baseline for retrofit and new construction projects only differ in the efficiency of the existing HVAC systems and building envelope.

Retrofit (Early Replacement)

Baseline equipment for this measure is defined as a non-occupant based room thermostat (either manual or programmable) installed in the existing room.

New Construction (Includes Major Remodel)

Baseline equipment for this measure is defined as a non-occupant based room thermostat (either manual or programmable) installed in the designed room. Recently Idaho adopted IECC 2012 as the energy efficiency standard for new construction. Given the recent adoption the programs are expected to see participants permitted to either of these standards and savings for both are provided.

[83] The savings represented in this table give equal weight to the two prevailing baseline conditions (e.g. with and without a housekeeping set-back).

2.11.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = kWh/Unit * NUnits$$

$$\Delta kWhUnit_{typical} = \Sigma(\Delta kWh/Unit_i * W_i)$$

2.11.4. Definitions

ΔkWh — Expected energy savings between baseline and installed equipment.

ΔkWh/Unit — Per unit energy savings as stipulated in Table 2-86 and Table 2-87 according to case temperatures.

$\Delta kWh/Unit_{typical}$ — Typical measure savings on a per unit basis.

$\Delta kWh/Unit_i$ — Unit savings for combination i of building type (Hotel or Motel), housekeeping practices, weather zone, and heating fuel source.

W_i — Population weight for each ΔkWh/Uniti. Calculated by dividing the expected number of participants with ΔkWh/Uniti by the total number of expected participants.

2.11.5. Sources

1. Prototypical hotel and motel simulation models were developed in EnergyPlus by ADM Associates Inc. for this measure.
2. U.S. Department of Energy Report on PTAC and PTHP energy use in Lodging facilities: http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/ptac_pthps_tsd_ch7_09-30-08.pdf
3. Kidder Mathews, Real Estate Market Review (Seattle Hotel). 2010

2.11.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure. [84]

Table 2-86 Unit Energy Savings for GREM Systems - Retrofit

Housekeeping Setback	Weather Zone 5			Weather Zone 6		
	Heat-Pump	Gas	Electric Resistance	Heat-Pump	Gas	Electric Resistance
Yes	131	35	398	173	29	498
No	741	200	1,706	875	149	1,930

[84] Savings values are based on an assumed 46% annual average guestroom vacancy rate. This assumption is based on real estate market research for Boise, Idaho Falls, and Post Falls in 2010.

Table 2-87 Unit Energy Savings for GREM Systems – New Construction (IECC 2009)

Housekeeping Setback	Weather Zone 5			Weather Zone 6		
	Heat-Pump	Gas	Electric Resistance	Heat-Pump	Gas	Electric Resistance
Yes	97	26	359	131	22	453
No	611	165	1,582	735	125	1,815

Table 2-88 Unit Energy Savings for GREM Systems – New Construction (IECC 2012)

Housekeeping Setback	Weather Zone 5			Weather Zone 6		
	Heat-Pump	Gas	Electric Resistance	Heat-Pump	Gas	Electric Resistance
Yes	95	25	353	130	21	448
No	600	154	1,555	727	117	1,795

2.12. High Efficiency Air Conditioning

The following algorithms and assumptions are applicable to energy efficient air conditioning units installed in commercial spaces. This measure applies to projects which represent either equipment retrofit or new construction (including major renovations).

Table 2-88 and Table 2-89 summarizes the 'typical' expected (per ton) unit energy impacts for this measure.[85] Typical values are based on algorithms and stipulated values described below and data from past program participants. Note that Table 2-89 reports the incremental savings and costs associated with going from CEE Tier 1 to CEE Tier 2 and are therefore additive with those reported in Table 2-88.

Table 2-89 Typical Savings Estimates for High Efficiency Air Conditioning – Base to CEE Tier 1

	Retrofit	New Construction	
		IECC 2009	IECC 2012
Deemed Savings Unit	Tons	Tons	Tons
Average Unit Energy Savings	224 kWh	93 kWh	105 kWh
Average Unit Peak Demand Savings	0.15 kW	.06 kW	.07 kW
Expected Useful Life	15 Years	15 Years	15 Years
Average Material & Labor Cost	$ 959.31	n/a	n/a
Average Incremental Cost	n/a	$ 144.49	$ 158.83
Stacking Effect End-Use	Cooling		

Table 2-90 Typical Savings Estimates for High Efficiency Air Conditioning – CEE Tier 1 to CEE Tier 2

	Retrofit	New Construction	
		IECC 2009	IECC 2012
Deemed Savings Unit	Tons	Tons	Tons
Average Unit Energy Savings	48 kWh	48 kWh	48 kWh
Average Unit Peak Demand Savings	0.03 kW	.03 kW	.03 kW
Expected Useful Life	15 Years	15 Years	15 Years
Average Material & Labor Cost	n/a	n/a	n/a
Average Incremental Cost	$ 98.54	$ 98.54	$ 98.54
Stacking Effect End-Use	Cooling		

2.12.1. Definition of Eligible Equipment

All commercial unitary and split air conditioning system are eligible (This includes Package Terminal Air Conditioners) provided the installed equipment meets or exceeds current

[85] See spreadsheet "11-TypicalCalcs_GREM.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

Consortium for Energy Efficiency (CEE) Tier 1 efficiencies. High efficiency chillers are not eligible under this measure, but are included as a separate measure in this document. Note that projects replacing pre-existing heat-pump units with A/C only are eligible under this measure – though no impacts are considered for the heating component. Eligibility is determined by calculating the EER, SEER, and/or the IEER for the installed unit.

2.12.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

If the project is retrofitting pre-existing equipment in working condition then the baseline efficiency is defined by the pre-existing equipment. If the equipment being replaced is not in working order, then this is considered "replace on burn-out" and the baseline becomes new construction. Note that units replacing window/wall mounted air-conditioners, room air-conditioners, and/or evaporative cooling are not eligible for early replacement and are considered "New Construction."

New Construction (Includes Major Remodel & Replace on Burn-Out)

For New Construction, the baseline efficiency is defined as the minimum allowable EER by the prevailing building energy code or standard according to which the project was permitted. Current applicable standards are defined by ASHRAE 90.1-2004 and 90.1-2007. Recently Idaho adopted IECC 2012 as the energy efficiency standard for new construction. Given the recent adoption the programs are expected to see participants permitted to either of these standards and savings for both are provided. Note that this only impacts the savings for CEE Tier 1 units. The baseline efficiency for Tier 1 units is CEE Tier 0 (or code as applicable) while the baseline efficiency for Tier 2 units is CEE Tier 1.

2.12.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = Cap * (1/SEER_{base} - 1/SEER_{Installed}) / 1000 * EFLH$$

$$\Delta kW = Cap * (1/EER_{base} - 1/EER_{Installed}) / 1000 * CF$$

2.12.4. Definitions

ΔkWh Expected energy savings between baseline and installed equipment.

ΔkW_{peak} Expected peak demand savings.

EFLH Equivalent full load cooling hours of. Idaho specific EFLH are by weather zone and building in Table 2-94.

CF Peak coincidence factor. Represents the % of the connected load reduction which occurs during Idaho Power's peak period.

EER Energy Efficiency Ratio for *base* and *installed* systems. This is defined as the ratio of the cooling capacity of the air conditioner in British Thermal Units per hour, to the total electrical input in watts. Since ASHRAE does not provide EER requirements for air-cooled air conditioners < 65,000 Btu/h, assume the following conversion:

$$EER \approx -0.02 * SEER^2 + 1.12 * SEER$$

SEER Seasonal Energy efficiency ratio of the air conditioning unit. This is defined as the ratio of the Annual cooling provided by the air conditioner (in BTUs), to the total electrical input (in Watts). Note that the IEER is an appropriate equivalent. If the SEER or IEER are unknown or unavailable use the following formula to estimate from the EER: [86]

$$SEER = .0507 * EER^2 + .5773 * EER + .4919$$

Cap Nominal cooling capaity in kBTU/Hr (1 ton = 12,000BTU/Hr)

2.12.5. Sources

1. ASHRAE, Standard 90.1-2004.
2. ASHRAE, Standard 90.1-2007.
3. California DEER Prototypical Simulation models (modified), eQUEST-DEER 3-5. [87]
4. California DEER Effective Useful Life worksheets: EUL_Summary_10-1-08.California DEER Incremental Cost worksheets: Revised DEER Measure Cost Summary (05_30_2008) Revised (06_02_2008).xls
5. 2012 CEE building efficiency standards

2.12.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

[86] Note that this formula is an approximation and should only be applied to EER values up to 15 EER.

[87] Prototypical building energy simulations were used to generate Idaho specific Heating and Cooling Interactive Factors and Coincidence factors for various building and heating fuel types.

Table 2-91 Deemed Savings for High Efficiency A/C – Retrofit Baseline to CEE Tier 1

Measure Description	Expected Savings [kW/Ton]	Expected Savings [kWh/Ton]	Measure Cost [$/Ton]
Standard 5 ton or less unit – 11.8 SEER	0.08	176.5	$1,390.27
Standard 5-11 ton AC unit – 11.6 EER	0.12	181.1	$845.26
Standard 11-19 ton AC unit – 11.6 EER	0.13	170.0	$745.21
Standard 19-64 ton AC unit – 10.4 EER	0.13	179.7	$847.79
Standard 64 ton or greater unit – 9.8 EER	0.14	230.3	$781.57
Standard 5 ton or less unit – Water Cooled 14 EER	0.15	326.1	$855.23
Standard 5-11 ton AC unit – Water Cooled 13.9 EER	0.19	268.4	$767.93
Standard 11 ton or greater unit – Water Cooled 13.9 EER	0.21	286.8	$1,481.90
Standard All Capacities - PTAC	0.10	145.1	$1,020.09
Standard 5 ton or less VRF - 14 SEER	0.09	176.5	$1,142.71
Standard 5-11 ton VRF - 11.7 EER	0.23	268.8	$644.93
Standard 11-19 ton VRF - 11.7 EER	0.22	264.6	$634.98
Standard 19-64 ton VRF - 10.5 EER	0.24	283.2	$805.76

Table 2-92 Deemed Savings for High Efficiency A/C – New Construction (IECC 2009) Baseline to CEE Tier 1

Measure Description	Expected Savings [kW/Ton]	Expected Savings [kWh/Ton]	Incremental Cost [$/Ton]
Standard 5 ton or less unit – 11.8 SEER	0.03	50.9	$106.50
Standard 5-11 ton AC unit – 11.6 EER	0.03	47.4	$43.83
Standard 11-19 ton AC unit – 11.6 EER	0.02	31.4	$16.93
Standard 19-64 ton AC unit – 10.4 EER	0.02	30.6	$69.30
Standard 64 ton or greater unit – 9.8 EER	0.04	67.3	$136.63
Standard 5 ton or less unit – Water Cooled 14 EER	0.13	200.9	$207.12
Standard 5-11 ton AC unit – Water Cooled 13.9 EER	0.09	137.5	$278.96
Standard 11 ton or greater unit – Water Cooled 13.9 EER	0.10	148.2	$266.83
Standard All Capacities - PTAC	0.10	145.1	$188.16
Standard 5 ton or less VRF - 14 SEER	0.04	50.9	$271.18
Standard 5-11 ton VRF - 11.7 EER	0.13	137.5	$127.28
Standard 11-19 ton VRF - 11.7 EER	0.13	128.5	$93.51
Standard 19-64 ton VRF - 10.5 EER	0.14	137.2	$180.02

Table 2-93 Deemed Savings for High Efficiency A/C – New Construction (IECC 2012) Baseline to CEE Tier 1

Measure Description	Expected Savings [kW/Ton]	Expected Savings [kWh/Ton]	Incremental Cost [$/Ton]
Standard 5 ton or less unit – 11.8 SEER	0.03	50.9	$106.50
Standard 5-11 ton AC unit – 11.6 EER	0.07	101.6	$87.65
Standard 11-19 ton AC unit – 11.6 EER	0.06	87.4	$44.03
Standard 19-64 ton AC unit – 10.4 EER	0.06	99.2	$207.91
Standard 64 ton or greater unit – 9.8 EER	0.07	112.8	$222.02
Standard 5 ton or less unit – Water Cooled 14 EER	0.09	137.8	$107.76
Standard 5-11 ton AC unit – Water Cooled 13.9 EER	0.10	149.8	$298.89
Standard 11 ton or greater unit – Water Cooled 13.9 EER	0.07	105.0	$200.12
Standard All Capacities - PTAC	0.03	36.4	$87.75
Standard 5 ton or less VRF - 14 SEER	0.04	50.9	$271.18
Standard 5-11 ton VRF - 11.7 EER	0.13	190.7	$171.11
Standard 11-19 ton VRF - 11.7 EER	0.13	183.6	$120.60
Standard 19-64 ton VRF - 10.5 EER	0.14	204.4	$318.63

Table 2-94 Deemed Savings for High Efficiency A/C – CEE Tier 1 to CEE Tier 2[88]

Base Description	Expected Savings [kW/Ton]	Expected Savings [kWh/Ton]	Incremental Cost
Standard 5 ton or less unit – 12.3 SEER	0.028	44.1	$106.50
Standard 5-11 ton AC unit – 12.1 EER	0.033	51.6	$54.78
Standard 11-19 ton AC unit – 12.1 EER	0.026	39.9	$23.71
Standard 19-64 ton AC unit – 10.7 EER	0.043	67.7	$173.26
Standard 64 ton or greater unit – 10.3 EER	0.023	36.6	$85.39
Standard 5 ton or less VRF - 14 SEER	0.02	44.1	$285.03

[88] Note that CEE Tier 2 savings are the incremental savings (and cost) between Tier 1 and Tier 2.

Table 2-95 Stipulated Equivalent Full Load Cooling and Heating Hours (EFLH) by Building Type[89]

	Zone 5		Zone 6	
Building Type	*EFLH Cooling*	*EFLH Heating*	*EFLH Cooling*	*EFLH Heating*
Assembly	879	966	758	1059
Education - Primary School	203	299	173	408
Education - Secondary School	230	406	196	514
Education - Community College	556	326	530	456
Education - University	697	341	721	449
Grocery	3437	1825	3762	2011
Health/Medical - Hospital	1616	612	1409	679
Health/Medical - Nursing Home	1049	1399	884	1653
Lodging - Hotel	1121	621	1075	780
Lodging - Motel	978	682	937	796
Manufacturing - Light Industrial	530	699	415	1088
Office - Large	746	204	680	221
Office - Small	607	256	567	360
Restaurant - Sit-Down	811	624	716	709
Restaurant - Fast-Food	850	722	734	796
Retail - 3-Story Large	765	770	644	998
Retail - Single-Story Large	724	855	576	998
Retail - Small	726	886	619	1138

[89] Prototypical building energy simulations were used to generate Idaho specific heating and cooling equivalent full load hours for various buildings.

Table 2-96 HVAC Coincidence Factors by Building Type

Building Type	Coincidence Factor
Assembly	0.47
Education - Community College	0.54
Education - Primary School	0.1
Education - Secondary School	0.1
Education - University	0.53
Grocery	0.54
Health/Medical - Hospital	0.82
Health/Medical - Nursing Home	0.49
Lodging - Hotel	0.67
Lodging - Motel	0.63
Manufacturing - Light Industrial	0.46
Office - Large	0.58
Office - Small	0.51
Restaurant - Fast-Food	0.48
Restaurant - Sit-Down	0.46
Retail - 3-Story Large	0.66
Retail - Single-Story Large	0.56
Retail - Small	0.49
Storage - Conditioned	0.41

Table 2-97 CEE Minimum Efficiencies by Unit Type for All Tiers[90]

Equipment Type	Size Category	Heating Section Type	Subcategory	Tier 0	Tier 1	Tier 2
Air Conditioners, Air Cooled (Cooling Mode)	<65,000 Btu/h	All	Split System	NA	14.0 SEER	15.0 SEER
				NA	12.0 EER	12.5 EER
			Single Package	NA	14.0 SEER	15.0 SEER
				NA	11.6 EER	12.0 EER
	≥65,000 Btu/h and <135,000 Btu/h	Electric Res. Or None	Split System and Single Package	11.7 EER	11.7 EER	12.2 EER
				11.8 IEER	13.0 IEER	14.0 IEER
		All Other	Split System and Single Package	11.5 EER	11.5 EER	12.0 EER
				11.6 IEER	12.8 IEER	13.8 IEER
	≥135,000 Btu/h and <240,000 Btu/h	Electric Res. Or None	Split System and Single Package	11.7 EER	11.7 EER	12.2 EER
				11.8 IEER	12.5 IEER	13.2 IEER
		All Other	Split System and Single Package	11.5 EER	11.5 EER	12.0 EER
				11.6 IEER	12.3 IEER	13.0 IEER
	≥240,000 Btu/h and <760,000 Btu/h	Electric Res. Or None	Split System and Single Package	10.5 EER	10.5 EER	10.8 EER
				10.6 IEER	11.3 IEER	12.3 IEER
		All Other	Split System and Single Package	10.3 ER	10.3 EER	10.6 EER
				10.4 IEER	11.1 IER	12.1 IEER
	≥760,000 Btu/h	Electric Res. Or None	Split System and Single Package	9.9 EER	9.9 EER	10.4 EER
				10.0 IEER	11.1 IEER	11.6 IEER
		All Other	Split System and Single Package	9.7 EER	9.7 EER	10.2 EER
				9.8 IEER	10.9 IEER	11.4 IEER
Air Conditioners, Water Cooled	<65,000 Btu/h	All	Split System and Single Package	NA	14.0 EER	NA*
	≥65,000 Btu/h and <135,000 Btu/h	Electric Res. Or None	Split System and Single Package	NA	14.0 EER	NA*
				NA	15.3 IEER	NA*
		All Other	Split System and Single Package	NA	13.8 EER	NA*
				NA	15.1 IEER	NA*
	≥135,000 Btu/h	Electric Res. Or None	Split System and Single Package	NA	14.0 EER	NA*
				NA	14.8 IEER	NA*
		All Other	Split System and Single Package	NA	13.8 EER	NA*
				NA	14.6 IEER	NA*
VRF Air Cooled (Cooling Mode)	<65,000 Btu/h	All	Multisplit System	NA	14.0 SEER 12.0 EER	15.0 SEER 12.5 EER
	≥65,000 Btu/h and <135,000 Btu/h	Electric Res. Or None	Multisplit System	NA	11.7 EER 14.9 IEER	NA

[90] Values obtained from 2012 CEE building efficiency standards for unitary air conditioning units.

Equipment Type	Size Category	Heating Section Type	Subcategory	Tier 0	Tier 1	Tier 2
	≥135,000 Btu/h and <240,000 Btu/h	Electric Res. Or None	Multisplit System	NA	11.7 EER 14.4 IEER	NA
	≥240,000 Btu/h	Electric Res. Or None	Multisplit System	NA	10.5 EER 13.0 IEER	NA

*At this time, CEE is not establishing higher tier levels for this equipment size due to limited availability

2.13. High Efficiency Heat Pumps

The following algorithms and assumptions are applicable to energy efficient heat pump units installed in commercial spaces. This measure applies to projects which represent either equipment retrofit or new construction (including major renovations).

Table 2-97 through Table 2-99 summarize the 'typical' expected (per ton) unit energy impacts for this measure. Typical values are based on algorithms and stipulated values described below and data from past program participants. [91] Note that the values listed the tables below are averaged across each of the system efficiency and tonnage categories offered by the program. Table 2-103 through Table 2-108 at the end of this section provide individual savings and materials/labor costs.

Table 2-98 Typical Savings Estimates for High Efficiency Heat Pumps - Base to CEE Tier 1 (Cooling Only)

	Retrofit	**New Construction**	
		IECC 2009	IECC 2012
Deemed Savings Unit	Tons	Tons	Tons
Average Unit Energy Savings	213 kWh	79 kWh	87 kWh
Average Unit Peak Demand Savings	0.15 kW	.06 kW	.05 kW
Expected Useful Life	15 Years	15 Years	15 Years
Average Material & Labor Cost	$ 1,103	n/a	n/a
Average Incremental Cost	n/a	$ 339	$ 339
Stacking Effect End-Use	Cooling		

Table 2-99 Typical Savings Estimates for High Efficiency Heat Pumps - Base to CEE Tier 1 (Heating Only)

	Retrofit	**New Construction**	
		IECC 2009	IECC 2012
Deemed Savings Unit	Tons	Tons	Tons
Average Unit Energy Savings	1,098 kWh	685 kWh	245 kWh
Average Unit Peak Demand Savings	0 kW	0 kW	0 kW
Expected Useful Life	15 Years	15 Years	15 Years
Average Material & Labor Cost	$ 1,103	n/a	n/a
Average Incremental Cost	n/a	$ 339	$ 335
Stacking Effect End-Use	Heating		

[91] See spreadsheet "14-TypicalCalcs_HeatPumps_v2.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

Table 2-100 Typical Savings Estimates for High Efficiency Heat Pumps - Base to CEE Tier 1 (Heating And Cooling)

	Retrofit	New Construction	
		IECC 2009	IECC 2012
Deemed Savings Unit	Tons	Tons	Tons
Average Unit Energy Savings	1,311 kWh	765 kWh	332 kWh
Average Unit Peak Demand Savings	.15 kW	.06 kW	.05 kW
Expected Useful Life	15 Years	15 Years	15 Years
Average Material & Labor Cost	$ 1,103	n/a	n/a
Average Incremental Cost	n/a	$ 339	$ 335
Stacking Effect End-Use	Heating, Cooling		

Table 2-101 Typical Savings Estimates for High Efficiency Heat Pumps - CEE Tier 1 to Tier 2 (Cooling Only)

	Retrofit	New Construction
Deemed Savings Unit	Tons	Tons
Average Unit Energy Savings	44 kWh	44 kWh
Average Unit Peak Demand Savings	.03 kW	.03 kW
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	n/a	n/a
Average Incremental Cost	$ 83	$ 83
Stacking Effect End-Use	Cooling	

Table 2-102 Typical Savings Estimates for High Efficiency Heat Pumps - CEE Tier 1 to Tier 2 (Heating Only)

	Retrofit	New Construction
Deemed Savings Unit	Tons	Tons
Average Unit Energy Savings	60 kWh	60 kWh
Average Unit Peak Demand Savings	0 kW	0 kW
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	n/a	n/a
Average Incremental Cost	$ 83	$ 83
Stacking Effect End-Use	Heating	

Table 2-103 Typical Savings Estimates for High Efficiency Heat Pumps - CEE Tier 1 to Tier 2 (Heating and Cooling)

	Retrofit	New Construction
Deemed Savings Unit	Tons	Tons
Average Unit Energy Savings	104 kWh	104 kWh
Average Unit Peak Demand Savings	.03 kW	.03 kW
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	n/a	n/a
Average Incremental Cost	$ 83	$ 83
Stacking Effect End-Use	Cooling, Heating	

2.13.1. Definition of Eligible Equipment

All heat pump systems are eligible provided the installed equipment meets or exceeds current Consortium for Energy Efficiency (CEE) Tier 1 efficiencies. Note that projects replacing pre-existing A/C only units with heat-pump units are eligible under this measure. In such project the heating component must use a *new construction baseline* whereas the cooling component can use either (retrofit or new construction) baselines as deemed appropriate. Eligibility is determined by calculating the EER, SEER, IEER, and/or HSPF as appropriate for the installed unit.

2.13.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or New construction.

Retrofit (Early Replacement)

If the project is retrofitting pre-existing equipment in working condition then the baseline efficiency is defined by the pre-existing equipment. If the equipment being replaced is not in working order, then this is considered "replace on burn-out" and the baseline becomes new construction.

New Construction (Includes Major Remodel & Replace on Burn-Out)

For New Construction, the baseline efficiency is defined as the minimum allowable EER by the prevailing building energy code or standard according to which the project was permitted. Current applicable standards are defined by ASHRAE 90.1-2004 and 90.1-2007. Recently Idaho adopted IECC 2012 as the energy efficiency standard for new construction. Given the recent adoption the programs are expected to see participants permitted to either of these standards and savings for both are provided. Note that this only impacts the savings for CEE Tier 1 unit.

2.13.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh_{Cool} + \Delta kWh_{Heat}$$

$$= Cap * (1/EER_{base,\ cool} - 1/SEER_{Installed,\ cool}) / 1000 * EFLH_{Cool} + Cap * (1/EER_{base,\ Heat} - 1/HSPF_{Installed,\ Heat}) / 1000 * EFLH_{Heat}$$

$$\Delta kW_{peak} = Cap * (1/EER_{base,\ cool} - 1/EER_{Installed,\ cool}) / 1000 * CF$$

2.13.4. Definitions

ΔkWh Expected energy savings between baseline and installed equipment.

ΔkW_{peak} Expected peak demand savings.

EFLH Equivalent full load cooling hours of. Idaho specific EFLH are by weather zone and building in Table 2-106.

CF Peak coincidence factor. Represents the % of the connected load reduction which occurs during Idaho Power's peak period.

EER Energy Efficiency Ratio for *base* and *installed* systems in *cooling* and *heating* modes. This is defined as the ratio of the cooling capacity of the air conditioner in British Thermal Units per hour, to the total electrical input in watts. Since ASHRAE does not provide EER requirements for air-cooled air conditioners < 65,000 Btu/h, assume the following conversion:

$$EER \approx -0.02 * SEER^2 + 1.12 * SEER$$

SEER Seasonal Energy efficiency ratio of the air conditioning unit. This is defined as the ratio of the Annual cooling provided by the air conditioner (in BTUs), to the total electrical input (in Watts). Note that the IEER is an appropriate equivalent. If the SEER or IEER are unknown or unavailable use the following formula to estimate from the EER: [92]

$$SEER = .0507 * EER^2 + .5773 * EER + .4919$$

HSPF Heating Season Performance Factor. This is identical to the SEER (described above) as applied to Heat Pumps in heating mode. If only the heat pump COP is available then use the following:

$$HSPF = .5651 * COP^2 + .464 * COP + .4873$$

Cap Nominal cooling capaity in kBTU/Hr (1 ton = 12,000BTU/Hr)

[92] Note that this formula is an approximation and should only be applied to EER values up to 15 EER.

2.13.5. Sources

1. ASHRAE, Standard 90.1-2004.
2. ASHRAE, Standard 90.1-2007.
3. California DEER Prototypical Simulation models (modified), eQUEST-DEER 3-5.[93]
4. California DEER Effective Useful Life worksheets: EUL_Summary_10-1-08.California DEER Incremental Cost worksheets: Revised DEER Measure Cost Summary (05_30_2008) Revised (06_02_2008).xls

2.13.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-104 Deemed Energy Savings for Efficient Heat Pumps – Retrofit base to CEE Tier 1[94]

Measure Description	Demand Savings - Cooling [kW/Ton]	Energy Savings - Cooling [kWh/Ton]	Energy Savings - Heating [kWh/Ton]	Energy Savings - All [kWh/Ton]	Measure Cost
Standard 5 ton or less unit – 14 SEER	0.13	176	274	450	$1,365
Standard 5-11 ton HP unit – 11.1 EER	0.11	161	1,599	1,760	$810
Standard 11-19 ton HP unit – 10.7 EER	0.12	163	1,869	2,032	$734
Standard 19-64 ton HP unit – 10.1 EER	0.16	237	1,869	2,105	$669
Standard 1.5 ton or less Water Source HP - 14 EER	0.20	275	642	918	$1,056
Standard 1.5-5 ton Water Source HP - 14 EER	0.16	215	751	966	$1,056
Standard 5-11 ton Water Source HP - 14 EER	0.16	215	852	1,068	$1,056
Groundwater-source HP Less than 11 Tons - 16 EER	0.28	371	844	1,215	$1,622
Groundsource HP Less than 11 Tons - 13 EER	0.20	327	1,605	1,932	$5,381
Package Terminal Heat Pump - 10.8 EER	0.10	134	397	530	$1,449
Standard 5 ton or less VRF - 14 SEER	0.15	181	246	427	$1,471
Standard 5-11 ton VRF - 11.2 EER	0.12	274	820	1,094	$879
Standard 11-19 ton VRF - 10.8 EER	0.12	274	790	1,063	$805
Standard greater than 19 ton VRF - 10.2 EER	0.17	355	790	1,145	$736

[93] Prototypical building energy simulations were used to generate Idaho specific Heating and Cooling Interactive Factors and Coincidence factors for various building and heating fuel types.

[94] Heating COP was assumed to be 15% less efficient than the cooling EER after converting. The value was obtained from comparing ASHRAE code standards for heating and cooling efficiencies. See spreadsheet “14-TypicalCalcs_HeatPumps_v3.xlsx” for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

Table 2-105 Deemed Energy Savings for Efficient Heat Pumps – New Construction (IECC 2009) Base to CEE Tier 1

Measure Description	Demand Savings - Cooling [kW/Ton]	Energy Savings - Cooling [kWh/Ton]	Energy Savings - Heating [kWh/Ton]	Energy Savings - All [kWh/Ton]	Incr.Cost
Standard 5 ton or less unit – 14 SEER	0.04	51	74	125	$90
Standard 5-11 ton HP unit – 11.1 EER	0.01	19	1,038	1,058	$16
Standard 11-19 ton HP unit – 10.7 EER	0.02	21	1,245	1,266	$10
Standard 19-64 ton HP unit – 10.1 EER	0.05	70	1,245	1,315	$139
Standard 1.5 ton or less Water Source HP - 14 EER	0.11	145	345	490	$455
Standard 1.5-5 ton Water Source HP - 14 EER	0.07	96	430	526	$455
Standard 5-11 ton Water Source HP - 14 EER	0.07	96	510	606	$455
Groundwater-source HP Less than 11 Tons - 16 EER	0.18	238	539	777	$443
Groundsource HP Less than 11 Tons - 13 EER	0.11	185	1,014	1,199	$4,441
Package Terminal Heat Pump - 10.8 EER	n/a	n/a	n/a	n/a	n/a
Standard 5 ton or less VRF - 14 SEER	0.06	56	61	117	$216
Standard 5-11 ton VRF - 11.2 EER	0.02	133	259	391	$85
Standard 11-19 ton VRF - 10.8 EER	0.02	131	166	298	$81
Standard greater than 19 ton VRF - 10.2 EER	0.06	188	166	355	$206

Table 2-106 Deemed Energy Savings for Efficient Heat Pumps – New Construction (IECC 2012) Base to CEE Tier 1

Measure Description	Demand Savings - Cooling [kW/Ton]	Energy Savings - Cooling [kWh/Ton]	Energy Savings - Heating [kWh/Ton]	Energy Savings - All [kWh/Ton]	Incr.Cost
Standard 5 ton or less unit – 14 SEER	0.04	51	74	125	$90
Standard 5-11 ton HP unit – 11.1 EER	0.01	13	317	329	$11
Standard 11-19 ton HP unit – 10.7 EER	0.01	82	283	365	$7
Standard 19-64 ton HP unit – 10.1 EER	0.04	109	283	392	$121
Standard 1.5 ton or less Water Source HP - 14 EER	0.11	145	281	426	$455
Standard 1.5-5 ton Water Source HP - 14 EER	0.07	96	281	377	$455
Standard 5-11 ton Water Source HP - 14 EER	0.07	96	281	377	$455
Groundwater-source HP Less than 11 Tons - 16 EER	0.08	106	107	213	$436
Groundsource HP Less than 11 Tons - 13 EER	0.09	206	146	352	$4,433
Package Terminal Heat Pump - 10.8 EER	n/a	n/a	n/a	n/a	n/a
Standard 5 ton or less VRF - 14 SEER	0.04	48	68	115	$216
Standard 5-11 ton VRF - 11.7 EER	0.04	52	79	52	$80
Standard 11-19 ton VRF – 11.3 EER	0.04	58	84	142	$78
Standard greater than 19 ton VRF – 10.1 EER	0.04	65	84	149	$188

Table 2-107 Deemed Energy Savings for Efficient Heat Pumps – CEE Tier 1 to Tier 2

Measure Description	Demand Savings - Cooling [kW/Ton]	Energy Savings - Cooling [kWh/Ton]	Energy Savings - Heating [kWh/Ton]	Energy Savings - All [kWh/Ton]	Incr. Cost
Standard 5 ton or less unit – 14 SEER	0.028	44.1	60.4	104.5	$75
Standard 5 ton or less VRF - 14 SEER	0.02	39.4	56.8	96.2	$236

Table 2-108 Stipulated Equivalent Full Load Hours (EFLH) by Building Type[95]

Building Type	Zone 5		Zone 6	
	EFLH Cooling	**EFLH Heating**	**EFLH Cooling**	**EFLH Heating**
Assembly	879	966	758	1059
Education - Primary School	203	299	173	408
Education - Secondary School	230	406	196	514
Education - Community College	556	326	530	456
Education - University	697	341	721	449
Grocery	3437	1825	3762	2011
Health/Medical - Hospital	1616	612	1409	679
Health/Medical - Nursing Home	1049	1399	884	1653
Lodging - Hotel	1121	621	1075	780
Lodging - Motel	978	682	937	796
Manufacturing - Light Industrial	530	699	415	1088
Office - Large	746	204	680	221
Office - Small	607	256	567	360
Restaurant - Sit-Down	811	624	716	709
Restaurant - Fast-Food	850	722	734	796
Retail - 3-Story Large	765	770	644	998
Retail - Single-Story Large	724	855	576	998
Retail - Small	726	886	619	1138
Storage - Conditioned	335	688	242	989

[95] Prototypical building energy simulations were used to generate Idaho specific heating and cooling equivalent full load hours for various buildings.

Table 2-109 HVAC Coincidence Factors by Building Type

Building Type	Coincidence Factor
Assembly	0.47
Education - Community College	0.54
Education - Primary School	0.1
Education - Secondary School	0.1
Education - University	0.53
Grocery	0.54
Health/Medical - Hospital	0.82
Health/Medical - Nursing Home	0.49
Lodging - Hotel	0.67
Lodging - Motel	0.63
Manufacturing - Light Industrial	0.46
Office - Large	0.58
Office - Small	0.51
Restaurant - Fast-Food	0.48
Restaurant - Sit-Down	0.46
Retail - 3-Story Large	0.66
Retail - Single-Story Large	0.56
Retail - Small	0.49
Storage - Conditioned	0.41

Table 2-110 CEE Baseline Efficiency by Unit Type[96]

Equipment Type	Size Category	Heating Section Type	Subcategory	Tier 0	Tier 1	Tier 2
Air Conditioners, Air Cooled (Cooling Mode)	<65,000 Btu/h	All	Split System	NA	14.0 SEER 12.0 EER	15.0 SEER 12.5 EER
			Single Package	NA	14.0 SEER 11.6 EER	15.0 SEER 12.0 EER
	≥65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.3 EER 11.4 IEER	11.3 EER 12.3 IEER	NA* NA*
		All Other	Split System and Single Package	11.1 EER 11.2 IEER	11.1 EER 12.1 IEER	NA* NA*
	≥135,000 Btu/h and <240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	10.9 EER 11.0 IEER	10.9 EER 11.9 IEER	NA* NA*
		All Other	Split System and Single Package	10.7 EER 10.8 IEER	10.7 EER 11.7 IEER	NA* NA*
	≥240,000 Btu/h and <760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	10.3 EER 10.4 IEER	10.3 EER 10.9 IEER	NA* NA*
		All Other	Split System and Single Package	10.1 EER 10.2 IEER	10.1 EER 10.7 IEER	NA* NA*
Air Cooled (Heating Mode)	<65,000 Btu/h	-	Split System	NA	8.5 HSPF	9.0 HSPF
		-	Single Package	NA	8.0 HSPF	8.5 HSPF
	≥65,000 Btu/h and <135,000 Btu/h	-	47oF db/43oF wb Outdoor Air	NA	3.4 COP	NA*
		-	17oF db/15oF wb Outdoor Air	NA	2.4 COP	NA*
	≥135,000 Btu/h	-	47oF db/43oF wb Outdoor Air	NA	3.2 COP	NA*
		-	17oF db/15oF wb Outdoor Air	No Spec.	2.1 COP	NA*
Water Source (Cooling Mode)	<135,000 Btu/h	All	86oF Entering Water	No Spec.	14.0 EER	NA*
Water Source (Heating Mode)	<135,000 Btu/h	-	68oF Entering Water	No Spec.	4.6 COP	NA*

[96] These values are from 2012 CEE

2.14. High Efficiency Chillers

The following algorithms and assumptions are applicable to Electric Chillers installed in commercial spaces. This measure applies to projects which represent either equipment retrofit or new construction (including major renovations).

Table 2-109 summarizes the 'typical' expected unit energy impacts for this measure. Typical values are based on algorithms and stipulated values described below and data from past program participants. Note that the values listed in the table below are averaged across each of the system efficiency and tonnage categories offered by the program. Table 2-110 through Table 2-115 at the end of this section provide individual savings and materials/labor costs.

Table 2-111 Typical Savings Estimates for High Efficiency Chillers[97]

	Retrofit	**New Construction**
Deemed Savings Unit	Tons	Tons
Average Unit Energy Savings	340 kWh	250 kWh
Average Unit Peak Demand Savings	0.14 kW	0.10 kW
Expected Useful Life	20 Years	20 Years
Average Material & Labor Cost	$ 600.70	n/a
Average Incremental Cost	n/a	$ 45.58
Stacking Effect End-Use	Cooling	

2.14.1. Definition of Eligible Equipment

All commercial chiller units are eligible provided the installed equipment meets or exceeds current federal minimum efficiencies. Eligibility is determined by calculating the Integrated Part Load Value (IPLV) for the installed unit. The algorithms and stipulated assumptions stipulated for High Efficiency Chillers apply only to like-for-like chiller replacements and are not suited for addition of variable speed drives (VSDs) or plant optimization.

Only primary chillers will qualify. Chillers intended for backup service only are not eligible. Air-cooled chiller efficiencies must include condenser-fan energy consumption. Efficiency ratings for IPLV must be based on ARI standard rating conditions per ARI-550-98 & ARI-590-98.

2.14.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

If the project is retrofitting pre-existing equipment in working condition then the baseline efficiency is defined by the pre-existing equipment. If the equipment being replaced is not in

[97] See spreadsheet "11-TypicalCalcs_GREM.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

working order, then this is considered “replace on burn-out” and the baseline becomes new construction.

New Construction (Includes Major Remodel & Replace on Burn-Out)

For New Construction, the baseline efficiency is defined as the minimum allowable COP and IPLV by the prevailing building energy code or standard according to which the project was permitted. Current applicable standards are defined by ASHRAE 90.1-2004 and 90.1-2007.

2.14.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = Cap * (IPLVbase – IPLVmeas) * EFLH$$

$$\Delta kW = Cap * (IPLVbase – IPLVmeas) * CF$$

$$\Delta kWh/Unit_i = (IPLVbase – IPLVmeas) * EFLHi$$

2.14.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected peak demand savings.
IPLV[98]	Efficiency of high efficiency equipment expressed as Integrated Part Load Value in units of kW/Ton
Cap	Chiller nominal cooling capacity in units of Tons
CF	Peak coincidence factor. Represents the % of the connected load reduction which occurs during Idaho Power’s peak period.
EFLH	Annual Equivalent Full Load cooling hours for chiller. Values for various building types are stipulated in Table 2-113. When available, actual system hours of use should be used.
$\Delta kWh/Unit_i$	Typical measure savings on a per unit basis per kBTU/hr.

2.14.5. Sources

1. ASHRAE, Standard 90.1-2004.
2. ASHRAE, Standard 90.1-2007.
3. California DEER Prototypical Simulation models (modified), eQUEST-DEER 3-5.[99]

[98] Integrated Part Load Value is a seasonal average efficiency rating calculated in accordance with ARI Standard 550/590. It may be presented using one of several sets of units: EER, kW/ton, or COP.

[99] Prototypical building energy simulations were used to generate Idaho specific heating and cooling equivalent full load hours for various buildings.

4. California DEER Effective Useful Life worksheets: EUL_Summary_10-1-08.xls
5. California DEER Incremental Cost worksheets: Revised DEER Measure Cost Summary (05_30_2008) Revised (06_02_2008).xls

2.14.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-112 Deemed Measure Savings for Retrofit

Deemed Savings		kW/Ton	kWh/Ton	Measure Cost [$/Ton]
Air Cooled, with Condenser, Electronically Operated	All Sizes	0.258	622.26	$571.57
Water Cooled, Electrically Operated, Positive Displacement (Reciprocating)	≤150 Tons	0.173	416.73	$608.20
	>150 and ≤299 Tons	0.148	357.28	$582.74
	>300 Tons	0.106	254.55	$582.74
Water Cooled, Electrically Operated, Centrifugal	≤150 Tons	0.126	302.66	$626.09
	>150 and ≤299 Tons	0.088	211.2	$626.09
	>300 Tons	0.091	219.73	$607.45

Table 2-113 Deemed Measure Savings for New Construction

Deemed Savings		kW/Ton	kWh/Ton	Incremental Cost [$/Ton]
Air Cooled, with Condenser, Electronically Operated	All Sizes	0.196	472.44	$86.12
Water Cooled, Electrically Operated, Positive Displacement (Reciprocating)	≤150 Tons	0.134	322.46	$58.78
	>150 and ≤299 Tons	0.113	271.67	$49.52
	>300 Tons	0.074	178.27	$32.50
Water Cooled, Electrically Operated, Centrifugal	≤150 Tons	0.091	218.76	$39.88
	>150 and ≤299 Tons	0.056	135.62	$24.72
	>300 Tons	0.063	150.96	$27.52

Table 2-114 Minimum Efficiency Requirements

Equipment Type	Size Category	Minimum Efficiency
Air-Cooled Chiller with Condenser	< 150 Tons	IPLV: 14.0 EER or higher
	≥ 150 Tons	IPLV: 14.0 EER or higher
Water Cooled Chiller electronically operated, reciprocating & positive displacement	< 75 Tons	IPLV: 0.52 or less (kW/ton)
	≥ 75 and < 150 Tons	IPLV: 0.52 or less (kW/ton)
	≥ 150 and < 300 Tons	IPLV: 0.49 or less (kW/ton)
	≥ 300 Tons	IPLV: 0.49 or less (kW/ton)
Water Cooled Chiller electronically operated, centrifugal	< 150 Tons	IPLV: 0.52 or less (kW/ton)
	≥ 150 and < 300 Tons	IPLV: 0.52 or less (kW/ton)
	≥ 300 and < 600 Tons	IPLV: 0.45 or less (kW/ton)

Table 2-115 Stipulated Equivalent Full Load Hours (EFLH) by Building Type[100]

	Zone 5		Zone 6	
Assembly	879	966	758	1059
Education - Primary School	203	299	173	408
Education - Secondary School	230	406	196	514
Education - Community College	556	326	530	456
Education - University	697	341	721	449
Grocery	3437	1825	3762	2011
Health/Medical - Hospital	1616	612	1409	679
Health/Medical - Nursing Home	1049	1399	884	1653
Lodging - Hotel	1121	621	1075	780
Lodging - Motel	978	682	937	796
Manufacturing - Light Industrial	530	699	415	1088
Office - Large	746	204	680	221
Office - Small	607	256	567	360
Restaurant - Sit-Down	811	624	716	709
Restaurant - Fast-Food	850	722	734	796
Retail - 3-Story Large	765	770	644	998
Retail - Single-Story Large	724	855	576	998
Retail - Small	726	886	619	1138
Storage - Conditioned	335	688	242	989
Warehouse - Refrigerated	5096	79	5049	71

[100] Prototypical building energy simulations were used to generate Idaho specific heating and cooling equivalent full load hours for various buildings.

Table 2-116 HVAC Coincidence Factors by Building Type

Building Type	Coincidence Factor
Assembly	0.47
Education - Community College	0.54
Education - Primary School	0.10
Education - Secondary School	0.10
Education - University	0.53
Grocery	0.54
Health/Medical - Hospital	0.82
Health/Medical - Nursing Home	0.49
Lodging - Hotel	0.67
Lodging - Motel	0.63
Manufacturing - Light Industrial	0.46
Office - Large	0.58
Office - Small	0.51
Restaurant - Fast-Food	0.48
Restaurant - Sit-Down	0.46
Retail - 3-Story Large	0.66
Retail - Single-Story Large	0.56
Retail - Small	0.49
Storage - Conditioned	0.41

Table 2-117 Code Baseline COP and IPLV by Unit Type [101]

Equipment Type	Size	Minimum Efficiency 2004	Minimum Efficiency 2007
Air Cooled, with Condenser, Electronically Operated	All Capacities	2.80 COP 3.05 IPLV [102]	2.80 COP 3.05 IPLV
Air Cooled, without Condenser, Electronically Operated	All Capacities	3.10 COP 3.45 IPLV	3.10 COP 3.45 IPLV
Water Cooled, Electrically Operated, Positive Displacement (Reciprocating)	All Capacities	4.20 COP 5.05 IPLV	4.20 COP 5.05 IPLV
Water Cooled, Electrically Operated, Positive Displacement (Rotary and Scroll)	< 150 tons	4.45 COP 5.20 IPLV	4.45 COP 5.20 IPLV
	≥ 150 tons and < 300 tons	4.90 COP 5.60 IPLV	4.90 COP 5.60 IPLV
	≥ 300 tons	5.50 COP 6.15 IPLV	5.50 COP 6.15 IPLV
Water Cooled, Electrically Operated, Centrifugal	< 150 tons	5.00 COP 5.25 IPLV	5.00 COP 5.25 IPLV
	≥ 150 tons and < 300 tons	5.55 COP 5.90 IPLV	5.55 COP 5.90 IPLV
	≥ 300 tons	6.10 COP 6.40 IPLV	6.10 COP 6.40 IPLV
Air-Cooled Absorption Single Effect	All Capacities	0.60 COP	0.60 COP
Water-Cooled Absorption Single Effect	All Capacities	0.70 COP	0.70 COP
Absorption Double Effect, Indirect-Fired	All Capacities	1.00 COP 1.05 IPLV	1.00 COP 1.05 IPLV
Absorption Double Effect, Direct-Fired	All Capacities	1.00 COP 1.00 IPLV	1.00 COP 1.00 IPLV
Equipment Type	Size	Minimum Efficiency 2004	Minimum Efficiency 2007
Air Cooled, with Condenser, Electronically Operated	All Capacities	2.80 COP 3.05 IPLV	2.80 COP 3.05 IPLV
Air Cooled, without Condenser, Electronically Operated	All Capacities	3.10 COP 3.45 IPLV	3.10 COP 3.45 IPLV

[101] These values are from Tables 6.8.1 in ASHRAE 90.1 for the unit type method. Note that values for both 2004 and 2007 versions of Standard 90.1 are included. The chiller equipment requirements do not apply for chillers in low-temperature applications where the design leaving fluid temperature is < 40oF. COP refers to the full load efficiency and IPLV refers to the part time load efficiency.

[102] Note that all IPLV values are in units of COP which need to be converted to kW/Ton using the following formula: kW/Ton = 12/(COP*3.412)

2.15. Evaporative Coolers (Direct and Indirect)

Evaporative coolers provide an effective space cooling alternative to direct expansion units in dry climates such as found in Idaho. Evaporative coolers can be designed in direct and indirect configurations.

A direct evaporative cooler represents the simplest and most efficient approach by pulling air directly through a wetted media to cool the air before dispersing it into the space. A direct evaporative cooler will also humidify the incoming air which, depending on the ambient conditions, can lead to high indoor humidity levels.

Indirect evaporative coolers employ heat exchangers to cool dry outside air on one side with evaporatively cooled moist air on the other. The two air streams are kept separate and the moist air exhausted outside while the dry cool air is supplied indoors. These systems are more complex and often much larger than direct systems because they require more space for heat large exchangers. However; indirect coolers do not increase the indoor humidity levels. [103]

Table 2-116 through Table 2-118 summarize the 'typical' expected unit energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-118 Typical Savings Estimates for Evaporative Coolers (All) [104]

	Retrofit	New Construction	
		IECC 2009	IECC 2012
Deemed Savings Unit	Ton	Ton	Ton
Average Unit Energy Savings	392 kWh	353 kWh	342 kWh
Average Unit Peak Demand Savings	0.28 kW	0.26 kW	0.25 kW
Expected Useful Life	15 Years	15 Years	15 Years
Average Material & Labor Cost	$1,654	-	-
Average Incremental Cost	-	$840	$840
Stacking Effect End-Use		Cooling	

[103] Except by the normal relationship between temperature and relative humidity.

[104] Note that these figures assume a weighted average between direct and indirect evaporative coolers in both weather zones. See spreadsheet "16-TypicalCalcs_EvapDirectIndirect.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

Table 2-119 Typical Savings Estimates for Evaporative Coolers (Direct) [105]

	Retrofit	New Construction	
		IECC 2009	IECC 2012
Deemed Savings Unit	Ton	Ton	Ton
Average Unit Energy Savings	443 kWh	399 kWh	386 kWh
Average Unit Peak Demand Savings	0.32 kW	0.29 kW	0.28 kW
Expected Useful Life	15 Years	15 Years	15 Years
Average Material & Labor Cost	$1,178	-	-
Average Incremental Cost	-	$364	$364
Stacking Effect End-Use	Cooling		

Table 2-120 Typical Savings Estimates for Evaporative Coolers (Indirect) [106]

	Retrofit	New Construction	
		IECC 2009	IECC 2012
Deemed Savings Unit	Ton	Ton	Ton
Average Unit Energy Savings	316 kWh	285 kWh	276 kWh
Average Unit Peak Demand Savings	0.23 kW	0.21 kW	0.20 kW
Expected Useful Life	15 Years	15 Years	15 Years
Average Material & Labor Cost	$2,367	-	-
Average Incremental Cost	-	$1,553	$1,553
Stacking Effect End-Use	Cooling		

2.15.1. Definition of Eligible Equipment

Eligible equipment includes any direct or indirect evaporative cooler systems used to supplant direct expansion (DX) system of equivalent size (or greater). Evaporatively pre-cooled DX systems do not qualify under this measure.

2.15.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

Baseline equipment for retrofit projects is the pre-existing DX system.

New Construction (Includes Major Remodel)

Baseline equipment for New Construction projects is a new DX system meeting federal or local building energy code (whichever is applicable) minimum efficiency requirements. Recently

[105] Ibid. Note that these values are for Direct Evaporative units only.

[106] Ibid. Note that these values are for Indirect Evaporative units only.

Idaho adopted IECC 2012 as the energy efficiency standard for new construction. Given the recent adoption the programs are expected to see participants permitted to either of these standards and savings for both are provided.

2.15.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = kWh/Unit * Cap$$

$$\Delta kW = kW/Unit * Cap$$

2.15.4. Definitions

ΔkWh Expected energy savings between baseline and installed equipment.

ΔkW Expected peak demand savings between baseline and installed equipment.

Cap Nominal capacity (in Tons) of the air-cooled equipment

kWh/Unit Per unit energy savings as stipulated in Table 2-119 and Table 2-120.

kW/Unit Per unit demand savings as stipulated in Table 2-119 and Table 2-120.

2.15.5. Sources

1. California Energy Commission. Advanced Evaporative Cooling White Paper. 2004
2. Southwest Energy Efficiency Project & UC Davis Western Cooling Efficiency Center. SWEEP / WCEC Workshop On Modern Evaporative Cooling Technologies. 2007
3. 3012-14 Non-DEER Ex Ante measure work papers submitted by Southern California Edison and Pacific Gas and Electric. http://www.deeresources.com/

2.15.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-121 Unit Energy Savings for Evaporative Coolers – Weather Zone 5

	Retrofit		*New Construction (IECC 2009)*		*New Construction (IECC 2012)*	
Measure	kWh / Unit	kW / Unit	kWh / Unit	kW / Unit	kWh / Unit	kW / Unit
Direct Evaporative Cooler	456 kWh	0.32 kW	410 kWh	0.29 kW	397 kWh	0.28 kW
Indirect Evaporative Cooler	326 kWh	0.23 kW	293 kWh	0.21 kW	284 kWh	0.20 kW

Table 2-122 Unit Energy Savings for Evaporative Coolers – Weather Zone 6

	Retrofit		*New Construction (IECC 2009)*		*New Construction (IECC 2012)*	
Measure	kWh / Unit	kW / Unit	kWh / Unit	kW / Unit	kWh / Unit	kW / Unit
Direct Evaporative Cooler	391 kWh	0.32 kW	352 kWh	0.29 kW	341 kWh	0.28 kW
Indirect Evaporative Cooler	279 kWh	0..23 kW	251 kWh	0.21 kW	243 kWh	0.20 kW

2.16. Evaporative Pre-Cooler (For Air-Cooled Condensers)

Evaporative pre-coolers, when added to an air-cooled condenser coil, can improve both equipment capacity and energy efficiency. The algorithms and assumptions for this measure are applicable to retrofits in which a separate evaporative cooling system is added onto an air-cooled condenser. Such systems include saturated media, water nozzles (and associated water piping), and a rigid frame. The additional equipment is used to evaporatively pre-cool ambient air before it reaches the air-cooled condenser. This not a replacement of an air-cooled condenser with an evaporative condenser. Typical applications include refrigeration systems and air-cooled chillers.

The tables below summarize the 'typical' expected unit energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-123 Typical Savings Estimates for Evaporative Pre-Cooler (Installed on Chillers) [107]

	Retrofit	New Construction
Deemed Savings Unit	Ton	Ton
Average Unit Energy Savings	106 kWh	n/a
Average Unit Peak Demand Savings	.09 kW	n/a
Expected Useful Life	15 Years	n/a
Average Material & Labor Cost	$ 173	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Cooling	

Table 2-124 Typical Savings Estimates for Evaporative Pre-Cooler (Installed on Refrigeration Systems) [108]

	Retrofit	New Construction
Deemed Savings Unit	Ton	Ton
Average Unit Energy Savings	186 kWh	n/a
Average Unit Peak Demand Savings	.16 kW	n/a
Expected Useful Life	15 Years	n/a
Average Material & Labor Cost	$ 173	n/a
Average Incremental Cost	n/a	n/a

[107] See spreadsheet "17-TypicalCalcs_EvapPreCool.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

[108] See spreadsheet "17-TypicalCalcs_EvapPreCool.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

2.16.1. Definition of Eligible Equipment

Eligible equipment includes any retrofit in which equipment is added to an existing air-cooled condenser to evaporatively cool the ambient air temperature before reaching the condenser coils. Self-contained evaporative condensing coils are not eligible as part of this measure. Eligible systems must be purchased and installed by a qualified contractor.

2.16.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

The baseline equipment for retrofit projects is the existing air-cooled condenser coil in a properly working and maintained condition.

New Construction (Includes Major Remodel & Replace on Burn-Out)

The baseline equipment for new construction projects is defined to be a properly working and maintained air-cooled condenser coil with all required fan and head pressure controls as defined by the local energy codes and standards.

2.16.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = kWh/Unit * Cap$$

$$\Delta kW = kW/Unit * Cap$$

2.16.4. Definitions

ΔkWh Expected energy savings between baseline and installed equipment.

ΔkW Expected peak demand savings between baseline and installed equipment.

Cap Nominal capacity (in Tons) of the air-cooled equipment

kWh/Unit Per unit energy savings as stipulated in Table 2-123.

kW/Unit Per unit demand savings as stipulated in Table 2-123.

2.16.5. Sources

8. Bisbee, Dave & Mort, Dan. Evaporative Precooling System: Customer Advanced Technologies Program Report Technology Evaluation Report. 2010 [109]

[109] https://www.smud.org/en/business/save-energy/energy-management-solutions/documents/evapercool-tech-aug10.pdf

9. Shen, Bo et al. 2010. Direct Evaporative Precooling Model and Analysis. Oak Ridge National Laboratory. ORNL/TM-2010/231 [110]
10. One other internal monitoring study was referenced when deriving savings values for this measure; however, has not been made public.

2.16.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-125 Unit Energy Savings for Evaporative Pre-Cooler (For Air-Cooled Condensers)

Measure	kWh per Unit Savings	kW per Unit Savings
Evaporative Pre-Cooler (Installed on Chillers)	106	0.09
Evaporative Pre-Cooler (Refrigeration Systems)	186	0.16

[110] http://web.ornl.gov/info/reports/2010/3445605702460.pdf

2.17. Variable Frequency Drives (For HVAC Applications)

The following algorithms and assumptions are applicable to Variable Frequency Drives (VFDs) on HVAC fans and pumps installed in commercial spaces. This measure applies to projects which represent either equipment retrofit or new construction (including major renovations).

Table 2-124 summarizes the 'typical' expected unit energy impacts for this measure. Typical values are based on algorithms and stipulated values described below and data from past program participants.

Table 2-126 Summary Deemed Savings Estimates for VFDs Installed on Chilled Water Pumps, Condensing Water Pumps, and Cooling Tower Fans

	Retrofit	New Construction
Deemed Savings Unit	HP	HP
Average Unit Energy Savings	286 kWh	268 kWh
Average Unit Peak Demand Savings	0 kW	0 kW
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	$ 194.28	n/a
Average Incremental Cost	n/a	$ 165.33
Stacking Effect End-Use	Cooling	

Table 2-127 Summary Deemed Savings Estimates for VFDs Installed on Fans & Hot Water Pumps

	Retrofit	New Construction
Deemed Savings Unit	HP	HP
Average Unit Energy Savings	1,065 kWh	996 kWh
Average Unit Peak Demand Savings	0 kW	0 kW
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	$ 174.82	n/a
Average Incremental Cost	n/a	$ 142.05
Stacking Effect End-Use	Cooling	

2.17.1. Definition of Eligible Equipment

Only VFDs installed on variably loaded motors, from 5 to 300 horsepower, in HVAC applications are eligible under this measure. Note that systems of motors which are individually less than 5 horsepower are eligible provided that: 1) they are controlled by a common VFD, and 2) the aggregate horsepower of motors controlled by a single VFD is greater than 5 HP. New construction projects must meet or exceeds current federal minimum requirements and must not be required by the applicable building codes. Retrofit projects must remove or permanently disable any pre-existing throttling or flow control device(s), and cannot replace a pre-existing VFD.

2.17.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit or new construction.

Retrofit (Early Replacement)

If the project is retrofitting pre-existing equipment with a variable frequency drive then the baseline control strategy is defined by the pre-existing control strategy.

New Construction (Includes Major Remodel & Replace on Burn-Out)

For facilities that are installing VFDs during a new construction project the minimum HVAC fan/pump controls strategy is dictated by the prevailing building energy code or standard according to which the project was permitted. Current applicable control standards are defined by ASHRAE 90.1-2004 and 90.1-2007.

Code Compliance Considerations for HVAC VFDs

Section 6.5.3 Of the ASHRAE 90.1 Standard specifies horsepower threshold in which VFDs must be installed on individual fans in VAV air-side delivery systems. Section 6.5.4 specifies a horsepower threshold for pumps in hydronic variable flow systems. Note that the is the system has less than three control valves then it is exempt from the VFD requirement. Section 6.5.5 specifies a horsepower threshold for heat rejections fans such as cooling tower fans. Note that the threshold for VAV fans does changes between the 2004 and 2007 versions of Standard 90.1.

2.17.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = .746 * HP * LF / \eta_{motor} * HRS * ESF$$

$$\Delta kW = 0$$

2.17.4. Definitions

ΔkWh Expected energy savings between baseline and installed equipment.

ΔkW Peak demand savings are defined to be zero for this measure.

HP Manufacturer name plate rated horsepower of the motor.

LF Load Factor. Ratio between the actual load and the rated load. Motor efficiency curves typically result in motors being most efficient at approximately 75% of the rated load. The default value is 0.75.

η_{motor} Manufacturer name plate efficiency of the motor at full load.

HRS Annual operating hours of VFD. Values for various building types and end uses are stipulated in Table 2-126.

ESF Energy Savings Factor. Percent of baseline energy consumption saved by installing a VFD. The appropriate ESF can be found in Table 2-127.

2.17.5. Sources

1. ASHRAE, Standard 90.1-2004.
2. ASHRAE, Standard 90.1-2007.
3. California DEER Effective Useful Life worksheets: EUL_Summary_10-1-08.xls
4. California DEER Incremental Cost worksheets: Revised DEER Measure Cost Summary (05_30_2008) Revised (06_02_2008).xls

2.17.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-128 Stipulated Hours of Use for Commercial HVAC Motors

Building Type	Motor Usage Group	Zone 5	Zone 6
Assembly	Chilled Water Pump	2,111	1,877
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	2,111	1,877
	HVAC Fan	6,132	1,753
	Cooling Tower Fan	1,050	851
Education – Primary School	Chilled Water Pump	649	584
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	649	584
	HVAC Fan	3,454	1,752
	Cooling Tower Fan	711	559
Education – Secondary School	Chilled Water Pump	649	584
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	649	584
	HVAC Fan	3,454	1,752
	Cooling Tower Fan	711	559
Education – Community College	Chilled Water Pump	1,861	1,694
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,861	1,694
	HVAC Fan	4,795	1,752
	Cooling Tower Fan	1,050	851
Education – University	Chilled Water Pump	1,861	1,694
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,861	1,694
	HVAC Fan	4,795	1,752
	Cooling Tower Fan	1,050	851
Grocery	Chilled Water Pump	1,861	1,694
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,861	1,694
	HVAC Fan	5,423	1,752
	Cooling Tower Fan	1,050	851
Health/Medical – Hospital	Chilled Water Pump	2,485	2,028
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	2,485	2,028
	HVAC Fan	8,760	1,753
	Cooling Tower Fan	1,050	851
Health/Medical – Nursing Home	Chilled Water Pump	2,485	2,028
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	2,485	2,028
	HVAC Fan	8,760	1,753
	Cooling Tower Fan	1,050	851

Building Type	Motor Usage Group	Zone 5	Zone 6
Lodging – Hotel	Chilled Water Pump	2,485	2,028
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	2,485	2,028
	HVAC Fan	8,760	1,753
	Cooling Tower Fan	1,050	851
Lodging – Motel	Chilled Water Pump	1,861	1,694
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,861	1,694
	HVAC Fan	5,423	1,752
	Cooling Tower Fan	1,050	851
Manufacturing – Light Industrial	Chilled Water Pump	1,418	1,306
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,418	1,306
	HVAC Fan	4,672	1,752
	Cooling Tower Fan	1,050	851
Office – Large	Chilled Water Pump	1,612	1,472
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,612	1,472
	HVAC Fan	5,047	1,752
	Cooling Tower Fan	1,050	851
Office – Small	Chilled Water Pump	1,612	1,472
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,612	1,472
	HVAC Fan	5,047	1,752
	Cooling Tower Fan	1,050	851
Restaurant – Sit Down	Chilled Water Pump	1,861	1,694
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,861	1,694
	HVAC Fan	5,423	1,752
	Cooling Tower Fan	1,050	851
Restaurant – Fast Food	Chilled Water Pump	1,861	1,694
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,861	1,694
	HVAC Fan	5,423	1,752
	Cooling Tower Fan	1,050	851
Retail – 3 Story	Chilled Water Pump	1,861	1,694
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,861	1,694
	HVAC Fan	5,423	1,752
	Cooling Tower Fan	1,050	851
Retail – Single Story	Chilled Water Pump	1,861	1,694
	Heating Hot Water Pump	6,133	6,610

Building Type	Motor Usage Group	Zone 5	Zone 6
	Condenser Water Pump	1,861	1,694
	HVAC Fan	5,423	1,752
	Cooling Tower Fan	1,050	851
Retail – Small	Chilled Water Pump	1,861	1,694
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,861	1,694
	HVAC Fan	5,423	1,752
	Cooling Tower Fan	1,050	851
Storage – Conditioned	Chilled Water Pump	1,418	1,306
	Heating Hot Water Pump	6,133	6,610
	Condenser Water Pump	1,418	1,306
	HVAC Fan	4,672	1,752
	Cooling Tower Fan	1,050	851

Table 2-129 Stipulated Energy Savings Factors (ESF) for Commercial HVAC VFD Installations

Building Type	Motor Usage Group	Zone 5	Zone 6
Assembly	Chilled Water Pump	0.313	0.300
	Heating Hot Water Pump	0.411	0.401
	Condenser Water Pump	0.313	0.300
	HVAC Fan	0.297	0.284
	Cooling Tower Fan	0.301	0.278
Education – Primary School	Chilled Water Pump	0.363	0.357
	Heating Hot Water Pump	0.301	0.384
	Condenser Water Pump	0.363	0.357
	HVAC Fan	0.258	0.254
	Cooling Tower Fan	0.324	0.311
Education – Secondary School	Chilled Water Pump	0.363	0.357
	Heating Hot Water Pump	0.301	0.384
	Condenser Water Pump	0.363	0.357
	HVAC Fan	0.258	0.254
	Cooling Tower Fan	0.324	0.311
Education – Community College	Chilled Water Pump	0.319	0.306
	Heating Hot Water Pump	0.309	0.395
	Condenser Water Pump	0.319	0.306
	HVAC Fan	0.303	0.289
	Cooling Tower Fan	0.310	0.286
Education – University	Chilled Water Pump	0.319	0.306
	Heating Hot Water Pump	0.309	0.395
	Condenser Water Pump	0.319	0.306
	HVAC Fan	0.303	0.289
	Cooling Tower Fan	0.310	0.286
Grocery	Chilled Water Pump	0.319	0.306
	Heating Hot Water Pump	0.309	0.395
	Condenser Water Pump	0.319	0.306
	HVAC Fan	0.303	0.289
	Cooling Tower Fan	0.310	0.286
Health/Medical – Hospital	Chilled Water Pump	0.294	0.285
	Heating Hot Water Pump	0.331	0.429
	Condenser Water Pump	0.294	0.285
	HVAC Fan	0.278	0.269
	Cooling Tower Fan	0.279	0.268
Health/Medical – Nursing Home	Chilled Water Pump	0.294	0.285
	Heating Hot Water Pump	0.331	0.429
	Condenser Water Pump	0.294	0.285
	HVAC Fan	0.278	0.269
	Cooling Tower Fan	0.279	0.268

Building Type	Motor Usage Group	Zone 5	Zone 6
Lodging – Hotel	Chilled Water Pump	0.294	0.285
	Heating Hot Water Pump	0.331	0.429
	Condenser Water Pump	0.294	0.285
	HVAC Fan	0.278	0.269
	Cooling Tower Fan	0.279	0.268
Lodging – Motel	Chilled Water Pump	0.319	0.306
	Heating Hot Water Pump	0.309	0.395
	Condenser Water Pump	0.319	0.306
	HVAC Fan	0.303	0.289
	Cooling Tower Fan	0.310	0.286
Manufacturing – Light Industrial	Chilled Water Pump	0.317	0.303
	Heating Hot Water Pump	0.307	0.396
	Condenser Water Pump	0.317	0.303
	HVAC Fan	0.300	0.287
	Cooling Tower Fan	0.307	0.280
Office – Large	Chilled Water Pump	0.319	0.305
	Heating Hot Water Pump	0.307	0.395
	Condenser Water Pump	0.319	0.305
	HVAC Fan	0.302	0.289
	Cooling Tower Fan	0.309	0.285
Office – Small	Chilled Water Pump	0.319	0.305
	Heating Hot Water Pump	0.307	0.395
	Condenser Water Pump	0.319	0.305
	HVAC Fan	0.302	0.289
	Cooling Tower Fan	0.309	0.285
Restaurant – Sit Down	Chilled Water Pump	0.319	0.306
	Heating Hot Water Pump	0.309	0.395
	Condenser Water Pump	0.319	0.306
	HVAC Fan	0.303	0.289
	Cooling Tower Fan	0.310	0.286
Restaurant – Fast Food	Chilled Water Pump	0.319	0.306
	Heating Hot Water Pump	0.309	0.395
	Condenser Water Pump	0.319	0.306
	HVAC Fan	0.303	0.289
	Cooling Tower Fan	0.310	0.286
Retail – 3 Story	Chilled Water Pump	0.319	0.306
	Heating Hot Water Pump	0.309	0.395
	Condenser Water Pump	0.319	0.306
	HVAC Fan	0.303	0.289
	Cooling Tower Fan	0.310	0.286
Retail – Single Story	Chilled Water Pump	0.319	0.306
	Heating Hot Water Pump	0.309	0.395

Building Type	Motor Usage Group	Zone 5	Zone 6
	Condenser Water Pump	0.319	0.306
	HVAC Fan	0.303	0.289
	Cooling Tower Fan	0.310	0.286
Retail – Small	Chilled Water Pump	0.319	0.306
	Heating Hot Water Pump	0.309	0.395
	Condenser Water Pump	0.319	0.306
	HVAC Fan	0.303	0.289
	Cooling Tower Fan	0.310	0.286
Storage – Conditioned	Chilled Water Pump	0.317	0.303
	Heating Hot Water Pump	0.307	0.396
	Condenser Water Pump	0.317	0.303
	HVAC Fan	0.300	0.287
	Cooling Tower Fan	0.307	0.280

2.18. Water-Side Economizers

The following algorithms and assumptions are applicable to energy efficient air conditioning units installed in commercial spaces. This measure applies to projects which represent either equipment retrofit or new construction (including major renovations).

Table 2-128 summarizes the 'typical' expected (per combined chillers tonnage) unit energy impacts for this measure. Typical values are based on algorithms and stipulated values described below and data from past program participants.

Table 2-130 Typical Savings Estimates for Water-Side Economizers

	Retrofit	New Construction
Deemed Savings Unit	Ton (Chillers)	Ton (Chillers)
Average Unit Energy Savings	184 kWh	154 kWh
Average Unit Peak Demand Savings	0 kW	0 kW
Expected Useful Life	10 Years	10 Years
Average Material & Labor Cost	$ 462.69	n/a
Average Incremental Cost	n/a	$ 462.69
Stacking Effect End-Use	Cooling	

2.18.1. Definition of Eligible Equipment

Eligibility is determined by the installed cooling system. A water cooled chilled water plant must be present and a separate cooling tower installed dedicated to providing free cooling to the chilled water loop.

2.18.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction. For both cases the assumed baseline is a water cooled chilled water plant with no waterside free cooling capabilities.

Retrofit (Early Replacement)

If the project is adding waterside economizing capabilities to a pre-existing chilled water system then it is considered a retrofit except when the project involves an expansion of capacity of the chilled water plant.

New Construction (Includes Major Remodel & Replace on Burn-Out)

Waterside economizer additions on new chilled water plants and on pre-existing plants undergoing expansion are considered new construction for the purposes of this measure.

2.18.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = Cap_{supplanted} * \Delta kWh/Ton$$

2.18.4. Definitions

ΔkWh — Expected energy savings between baseline and installed equipment.

ΔkWh/Ton — Per unit energy savings as stipulated by weather zone.

$Cap_{supplanted}$ — The combined rated capacities of all the chillers supplanted by the waterside economizer.

2.18.5. Sources

11. California DEER Prototypical Simulation models (modified), eQUEST-DEER 3-5002E [111]

2.18.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-131 Water Side Economizer Savings [112]

Zone	Retrofit Savings (ΔkWh/Ton)	New Construction Savings (ΔkWh/Ton)
5	183	153
6	186	155

[111] Prototypical building energy simulations were used to generate Idaho specific kWh savings for various buildings.

[112] See "19-TypicalCalcs_WaterEcono.xlsx" for assumptions and calculations used to estimate the typical unit energy savings.

2.19. Kitchen: Refrigerators/Freezers

The following algorithms and assumptions are applicable to the installation of a new reach-in commercial refrigerator, or freezer meeting ENERGY STAR 2.0 efficiency standards. ENERGY STAR labeled commercial refrigerators and freezers are more energy efficient because they are designed with components such as ECM evaporator and condenser fan motors, hot gas anti-sweat heaters, and/or high-efficiency compressors, which will significantly reduce energy consumption.

Table 2-130 and Table 2-131 summarize 'typical' expected (per unit) energy impacts for this measure can be found. Typical values are based on the algorithms and stipulated values described below. [113]

Table 2-132 Typical Savings Estimates for ENERGY STAR Refrigerators (< 30 ft^3) [114]

	Retrofit	New Construction
Deemed Savings Unit	Refrigerator	Refrigerator
Average Unit Energy Savings	6.2 kWh	6.2 kWh
Average Unit Peak Demand Savings	0.66 W	0.66 W
Expected Useful Life	12 Years	12 Years
Average Material & Labor Cost	$ 7,626	n/a
Average Incremental Cost	n/a	$ 108
Stacking Effect End-Use	Refrigeration	

Table 2-133 Typical Savings Estimates for ENERGY STAR Refrigerators (30 to 50 ft^3)

	Retrofit	New Construction
Deemed Savings Unit	Refrigerator	Refrigerator
Average Unit Energy Savings	5.4 kWh	5.4 kWh
Average Unit Peak Demand Savings	0.58 W	0.58 W
Expected Useful Life	12 Years	12 Years
Average Material & Labor Cost	$ 12,133	n/a
Average Incremental Cost	n/a	$ 135
Stacking Effect End-Use	Refrigeration	

113 See spreadsheet "20-TypicalCalcs_KitchFrigFrzrIce.xlsx" for assumptions and calculations used to estimate the typical unit energy savings, EUL, and incremental costs.

There isn't a difference between new construction and retrofit because the retrofit baseline is at least as efficient as that required by federal equipment standards.

114 These numbers do not include chest refrigerators. Inclusion of chest refrigerators would increase the 'typical' savings estimates.

Table 2-134 Typical Savings Estimates for ENERGY STAR Freezers (< 30 ft^3)

	Retrofit	New Construction
Deemed Savings Unit	Freezer	Freezer
Average Unit Energy Savings	28 kWh	28 kWh
Average Unit Peak Demand Savings	3.0 W	3.0 W
Expected Useful Life	12 Years	12 Years
Average Material & Labor Cost	$ 11,052	n/a
Average Incremental Cost	n/a	$ 163
Stacking Effect End-Use	Refrigeration	

Table 2-135 Typical Savings Estimates for ENERGY STAR Freezers (30 to 50 ft^3)

	Retrofit	New Construction
Deemed Savings Unit	Freezer	Freezer
Average Unit Energy Savings	75 kWh	75 kWh
Average Unit Peak Demand Savings	8.0 W	8.0 W
Expected Useful Life	12 Years	12 Years
Average Material & Labor Cost	$ 12,806	n/a
Average Incremental Cost	n/a	$ 35
Stacking Effect End-Use	Refrigeration	

2.19.1. Definition of Eligible Equipment

The eligible equipment is a new commercial vertical solid, glass door refrigerator or freezer, or vertical chest freezer meeting the minimum ENERGY STAR 2.0 efficiency level standards.

2.19.2. Definition of Baseline Equipment

The baseline equipment used to establish energy savings estimates for this measure is established by the Regional Technical Forum (RTF). The RTF uses an existing solid or glass door refrigerator or freezer meeting the minimum federal manufacturing standards as specified by the Energy Policy Act of 2005. The RTF sources a market potential study for and uses a baseline that is more efficient than *code*. Consequently, there is no distinction between baselines for new construction and retrofit projects

Retrofit (Early Replacement)

See explanation above

New Construction (Includes Major Remodel & Replace on Burn-Out)

See explanation above

2.19.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * N_{Units}$$

$$\Delta kW = \Delta kW/Unit * N_{units}$$

$$= \Delta kWh/Unit * CF / Hours$$

2.19.4. Definitions

ΔkWh Expected energy savings between baseline and installed equipment.

ΔkW Demand energy savings between baseline and installed equipment.

kWh/Unit Per unit energy savings as stipulated in Table 2-134 and Table 2-135.

kW/Unit Per unit demand savings.

$\Delta kW/Unit_i$ Unit demand savings for combination i of type, harvest rate, and/or volume.

CF Coincidence Factor = 0.937

Hours Annual operating hours = 8760

N_{Units} Number of refrigerators or freezers

2.19.5. Sources

12. Regional Technical Forum measure workbooks: http://rtf.nwcouncil.org/measures/com/ComFreezer_v3.xlsm & http://rtf.nwcouncil.org/measures/com/ComRefrigerator_v3.xlsm
13. Illinois Technical Reference Manual

2.19.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-136 Unit Energy and Demand Savings for Units 15 to 30 cu.ft[115]

Measure Category	Energy Savings (kWh/yr)	Peak Reduction (W)
Solid Door Refrigerator	4.8	0.52
Glass Door Refrigerator	7.5	0.8
Chest Refrigerator (Solid)	29	3.1
Chest Refrigerator (Glass)	181	19.4
Solid Door Freezers	9.9	1.06
Glass Door Freezers	46.2	4.94
Chest Freezer (Solid)	0.0	0.0
Chest Freezer (Glass)	7.8	0.84

Table 2-137 Unit Energy and Demand Savings for Units 30 to 50 cu.ft.[116]

Measure Category	Energy Savings (kWh/yr)	Peak Reduction (W)
Solid Door Refrigerator	5.3	0.57
Glass Door Refrigerator	5.5	0.59
Chest Refrigerator (Solid)	29	3.1
Chest Refrigerator (Glass)	181	19.4
Solid Door Freezers	3.9	0.42
Glass Door Freezers	146	15.6
Chest Freezer (Solid)	0.0	0.0
Chest Freezer (Glass)	7.8	0.84

[115] See spreadsheet “20-TypicalCalcs_KitchFrigFrzrIce.xlsx” for assumptions and calculations used to estimate the typical unit energy saving.

[116] See spreadsheet “20-TypicalCalcs_KitchFrigFrzrIce.xlsx” for assumptions and calculations used to estimate the typical unit energy saving.

Table 2-138 List of Incremental Cost Data For Refrigerators and Freezers. [117]

Type	Size Category	Incremental Cost	Average Cost
Solid Door Freezers	0 to 15 cu.ft.	n/a	$25
	15 to 30 cu.ft.	($118)	
	30 to 50 cu.ft.	$38	
	50 + cu.ft.	$153	
Glass Door Freezers	0 to 15 cu.ft.	n/a	$256
	15 to 30 cu.ft.	$443	
	30 to 50 cu.ft.	$32	
	50 + cu.ft.	$293	
Chest Freezer (Solid or Glass)	-	($517)	($517)
Solid Door Refrigerators	0 to 15 cu.ft.	($115)	($30)
	15 to 30 cu.ft.	$16	
	30 to 50 cu.ft.	$52	
	50 + cu.ft.	($73)	
Glass Door Refrigerators	0 to 15 cu.ft.	($16)	$158
	15 to 30 cu.ft.	$199	
	30 to 50 cu.ft.	$219	
	50 + cu.ft.	$229	
Chest Refrigerator	-	$1	$1

[117] From RTF Workbook: http://rtf.nwcouncil.org/measures/com/ComFreezer_v3.xlsm

Table 2-139 List of Materials Cost Data for Refrigerators and Freezers. [118]

Size Category	Qualifying Products Average List Price
Solid Door Refrigerators	
0<V<15	$ 3,484.00
15<=V<30	$ 6,513.17
30<=V<50	$ 12,111.17
50<=V	$ 17,694.20
Glass Door Refrigerators	
0<V<15	$ 3,181.67
15<=V<30	$ 8,739.33
30<=V<50	$ 12,155.60
50<=V	$ 16,747.75
Chest Refrigerators (Solid and Glass)	
All Sizes	$ 4,097.38
Solid Door Freezers	
0<V<15	n/a
15<=V<30	$ 7,204.67
30<=V<50	$ 13,033.33
50<=V	$ 18,738.25
Glass Door Freezers	
0<V<15	n/a
15<=V<30	$ 14,899.00
30<=V<50	$ 12,578.50
50<=V	$ 19,299.00
Chest Freezers (Solid and Glass)	
All Sizes	$ 1,487.70

[118] From RTF Workbook: http://rtf.nwcouncil.org/measures/com/ComFreezer_v3.xlsm

2.20. Kitchen: Ice Machines

The following algorithms and assumptions are applicable to the installation of a new commercial ice machine meeting ENERGY STAR 2.0 efficiency standards. The ENERGY STAR label is applied to air-cooled, cube-type ice machines including ice-making head, self-contained, and remote-condensing units.

Table 2-138 and Table 2-139 summarize the 'typical' expected (per unit) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below. [119]

Table 2-140 Typical Savings Estimates for Ice Machines (<200 lbs/day)

	Retrofit	New Construction
Deemed Savings Unit	Machine	Machine
Average Unit Energy Savings	336 kWh	336 kWh
Average Unit Peak Demand Savings	.07 kW	.07 kW
Expected Useful Life	10 Years	10 Years
Average Material & Labor Cost	$ 2,165	n/a
Average Incremental Cost	n/a	$ 189
Stacking Effect End-Use	Refrigeration	

Table 2-141 Typical Savings Estimates for Ice Machines (>200 lbs/day)

	Retrofit	New Construction
Deemed Savings Unit	Machine	Machine
Average Unit Energy Savings	341 kWh	341 kWh
Average Unit Peak Demand Savings	.07 kW	.07 kW
Expected Useful Life	10 Years	10 Years
Average Material & Labor Cost	$ 4,800	n/a
Average Incremental Cost	n/a	$ 480
Stacking Effect End-Use	Refrigeration	

2.20.1. Definition of Eligible Equipment

The eligible equipment is a new commercial ice machine meeting the minimum ENERGY STAR 2.0 efficiency level standards.

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[119] See spreadsheet "21-TypicalCalcs_KitchIceMcn.xlsx" for assumptions and calculations used to estimate the typical unit energy savings, EUL, and incremental costs.

There isn't a difference between new construction and retrofit because the retrofit baseline is at least as efficient as that required by federal equipment standards.

2.20.2. Definition of Baseline Equipment

The baseline condition for retrofit and new construction is established by the RTF. The RTF uses a commercial ice machine meeting federal equipment standards established January 1, 2010. The RTF sources a market potential study for and uses a baseline that is more efficient than *code*. Consequently, there is no distinction between baselines for new construction and retrofit projects

Retrofit (Early Replacement)

See explanation above

New Construction (Includes Major Remodel & Replace on Burn-Out)

See explanation above

2.20.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * N_{Units}$$

$$= [(kWh_{base} - kWh_{Installed}) * H * Hours/(24*100) + \Delta kWh_{wastewater}]* N_{Units}$$

$$\Delta kW = \Delta kW/Unit * N_{Units}$$

$$= \Delta kWh/Unit_{i,ice} * CF / Hours$$

2.20.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Demand energy savings between baseline and installed equipment.
ΔkWh/Unit	Per unit energy savings as stipulated in Table 2-140.
ΔkW/Unit	Per unit demand savings as stipulated in Table 2-140.
$kWh_{base/Installed}$	Daily energy usage of *base* (baseline) or *installed* ice machines.
$\Delta kWh_{wastewater}$	Annual savings from reduced water usage.
CF	Coincidence Factor = 0.937 [120]
H	Harvest Rate (pounds of ice made per day)
Hours	Annual operating hours = 4400

[120] From Illinois TRM

N_{Units} Number of refrigerators or freezers

2.20.5. Sources

14. Regional Technical Forum measure workbooks:
15. http://rtf.nwcouncil.org/measures/com/ComIceMaker_v1_1.xlsx
16. SDG&E Work Paper: WPSDGENRCC0004, “Commercial Ice Machines”
17. Illinois Technical Reference Manual

2.20.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-142 Unit Energy Savings for Ice Machine [121]

Measure	kWh per Unit Savings	kW per Unit Savings
Energy Star Air Cooled Ice Making Head Unit <=200 lbs/day ice	297	0.063
Energy Star Air Cooled Ice Making Head Unit >200 lbs/day ice	1,153	0.246
Energy Star Air Cooled Self-Contained Unit <=200 lbs/day ice	184	0.039
Energy Star Air Cooled Self-Contained Unit >200 lbs/day ice	450	0.096
Energy Star Air Cooled Remote Condensing Unit <=200 lbs/day ice	394	0.084
Energy Star Air Cooled Remote Condensing Unit >200 lbs/day ice	1,082	0.231
CEE Tier 2 Water Cooled Ice Making Head Unit <=200 lbs/day ice	232	0.049
CEE Tier 2 Water Cooled Ice Making Head Unit >200 lbs/day ice	744	0.158
CEE Tier 2 Water Cooled Self-Contained Unit <=200 lbs/day ice	137	0.029
CEE Tier 2 Water Cooled Self-Contained Unit >200 lbs/day ice	343	0.073
CEE Tier 3 Air Cooled Ice Making Head Unit <=200 lbs/day ice	448	0.095
CEE Tier 3 Air Cooled Ice Making Head Unit >200 lbs/day ice	1,587	0.338
CEE Tier 3 Water Cooled Ice Making Head Unit <=200 lbs/day ice	357	0.076
CEE Tier 3 Water Cooled Ice Making Head Unit >200 lbs/day ice	1,371	0.292
CEE Tier 3 Air Cooled Self-Contained Unit <=200 lbs/day ice	385	0.082
CEE Tier 3 Air Cooled Self-Contained Unit >200 lbs/day ice	950	0.202
CEE Tier 3 Water Cooled Self-Contained Unit <=200 lbs/day ice	292	0.062
CEE Tier 3 Water Cooled Self-Contained Unit >200 lbs/day ice	734	0.156
CEE Tier 3 Air Cooled Remote Condensing Unit <=200 lbs/day ice	636	0.135
CEE Tier 3 Air Cooled Remote Condensing Unit >200 lbs/day ice	1,747	0.372

[121] Values given are based on assumed weights for harvest rates. Savings vary significantly between harvest rates.

Table 2-143 Unit Incremental Cost for Ice Machines

Harvest Rate (H)	New Construction & ROB	Retrofit - ER
100-200 lb ice machine	$189	$2,165
201-300 lb ice machine	$818	$3,260
301-400 lb ice machine	$281	$2,740
401-500 lb ice machine	$63	$2,646
501-1000 lb ice machine	$233	$3,728
1001-1500 lb ice machine	$550	$5,301
>1500 lb ice machine	$866	$7,668

2.21. Kitchen: Efficient Dishwashers

The following algorithms and assumptions are applicable to the installation of new high and low temp under counter, single tank door type, single tank conveyor, and multiple tank conveyor dishwashers installed in a commercial kitchen meeting ENERGY STAR efficiency standards. ENERGY STAR dishwashers save energy in four categories: reduction in wastewater processing, building water heating, booster water heating, and idle energy. Building water heating and booster water heating can be either electric or natural gas.

Table 2-142 and Table 2-143 summarize the 'typical' expected (per machine) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below. [122]

Table 2-144 Typical Savings Estimates for Efficient Commercial Dishwashers (All Electric)

	Retrofit	New Construction
Deemed Savings Unit	Machine	Machine
Average Unit Energy Savings	5,561 kWh	5,561 kWh
Average Unit Peak Demand Savings	0.41 kW	0.41 kW
Expected Useful Life	12 Years	12 Years
Average Material & Labor Cost	$ 3,978	n/a
Average Incremental Cost	Machine	$ 3, 978
Stacking Effect End-Use	Miscellaneous Loads	

Table 2-145 Typical Savings Estimates for Efficient Commercial Dishwashers (Gas Heater with Electric Booster)

	Retrofit	New Construction
Deemed Savings Unit	Machine	Machine
Average Unit Energy Savings	1,761 kWh	1,761 kWh
Average Unit Peak Demand Savings	0.23 kW	0.23 kW
Expected Useful Life	12 Years	12 Years
Average Material & Labor Cost	$ 3,978	n/a
Average Incremental Cost	Machine	$ 3,978
Stacking Effect End-Use	Miscellaneous Loads	

[122] Savings estimates are only given for a quick cost effectiveness test. The estimates are based on assumed weights for equipment types. See spreadsheet "22-TypicalCalcs_KitchDshWshr.xlsx" for assumptions and calculations used to estimate the typical unit energy savings, expected useful life, coincidence factor, and incremental costs. Note that there isn't a difference between new construction and retrofit because code doesn't constrain commercial dishwasher efficiencies. The baseline used in the RTF is conservative.

Table 2-146 Typical Savings Estimates for Efficient Residential Dishwashers (All Electric)

	Retrofit	New Construction
Deemed Savings Unit	Machine	Machine
Average Unit Energy Savings	2,210 kWh	2,210 kWh
Average Unit Peak Demand Savings	0.19 kW	0.19 kW
Expected Useful Life	12 Years	12 Years
Average Material & Labor Cost	$ 232	n/a
Average Incremental Cost	Machine	$ 232
Stacking Effect End-Use	Miscellaneous Loads	

Table 2-147 Typical Savings Estimates for Efficient Residential Dishwashers (Gas Heater with Electric Booster)

	Retrofit	New Construction
Deemed Savings Unit	Machine	Machine
Average Unit Energy Savings	821 kWh	821 kWh
Average Unit Peak Demand Savings	0.10 kW	0.10 kW
Expected Useful Life	12 Years	12 Years
Average Material & Labor Cost	$ 232	n/a
Average Incremental Cost	Machine	$ 232
Stacking Effect End-Use	Miscellaneous Loads	

2.21.1. Definition of Eligible Equipment

The eligible equipment is an ENERGY STAR certified dishwasher meeting the thresholds for idle energy rate (kW) and water consumption (gallons/rack) limits listed in the tables below. Maximum idle rates are determined by both machine type and sanitation approach (chemical/low temp versus high temp). Dishwashers installed with both gas hot water and gas booster water heating are not eligible. However; dishwashers installed with electric booster water heating are eligible in buildings using gas hot water heating.

Table 2-148 Idle Rate Requirements for Low Temperature Dishwashers

	Post Condition	
Type	Idle Energy Rate (kW)	Water Consumption (GPR)
Undercounter	0.20	0.95
Door type	0.40	0.87
Single tank conveyor	0.55	0.56
Multiple tank conveyor	0.96	0.386

Table 2-149 Idle Rate Requirements for High Temperature Dishwashers

	Post Condition	
Type	Idle Energy Rate (kW)	Water Consumption (GPR)
Undercounter	0.38	0.74
Door type	0.55	0.68
Single tank conveyor	1.45	0.39
Multiple tank conveyor	1.84	0.35

2.21.2. Definition of Baseline Equipment

The baseline condition is a dishwasher that's not ENERGY STAR certified and doesn't meet the efficiency thresholds for idle energy rate (kW) and water consumption (gallons/rack).

2.21.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * N_{Units}$$

$$\Delta kW = \Delta kW/Unit * N_{Units}$$

$$\Delta kW/Unit = (\Delta kWh/Unit / Hrs_{Idle}) * CF$$

2.21.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
kWh/Unit	Per unit energy savings as stipulated in Table 2-149and Table 2-150.
kW/Unit	Per unit demand savings as stipulated in Table 2-149and Table 2-150.
CF	Coincidence Factor [123]
NUnits	Number of dishwashers
Hrs_{Idle}	Annual Idle Hours. Values for this input are stipulated in Table 2-149 and Table 2-150.

[123] From Illinois TRM

2.21.5. Sources

18. Regional Technical Forum measure workbook: http://rtf.nwcouncil.org/measures/com/ComDishwasher_v1_2.xlsm
19. Illinois Technical Reference Manual

2.21.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-150 Coincidence Factor for Kitchen: Efficient Dishwashers 118 [124]

Location	CF
Fast Food Limited Menu	0.32
Fast Food Expanded Menu	0.41
Pizza	0.46
Full Service Limited Menu	0.51
Full Service Expanded Menu	0.36
Cafeteria	0.36

Table 2-151 Unit Energy Savings and Incremental Costs for All Electric Kitchen: Efficient Dishwashers [125]

Equipment Type	Electric Savings (kWh)	Demand Savings (kW)	Idle Hours	Inc. Cost - Retrofit	Inc. Cost - New Construction
Low Temp Under Counter	3,271	0.283	3375	$232.00	$232
Low Temp Door Type	3,684	0.135	1632	$2,659	$2,659
Low Temp Single Tank Conveyor	3,067	0.281	3600	$5,882	$5,882
Low Temp Multi Tank Conveyor	6,864	0.588	3600	$3,394	$3,394
High Temp Under Counter	1,150	0.103	3375	$232	$232
High Temp Door Type	4,586	0.269	1632	$2,659	$2,659
High Temp Single Tank Conveyor	7,265	0.540	3600	$5,882	$5,882
High Temp Multi Tank Conveyor	7,897	0.658	3600	$3,394	$3,394

[124] From Illinois TRM

[125] See spreadsheet "22-TypicalCalcs_KitchDshWshr.xlsx" for assumptions and calculations used to estimate the typical unit energy savings.

Table 2-152 Unit Energy Savings and Incremental Costs for Gas Heater with Electric Booster Kitchen: Efficient Dishwashers

Equipment Type	Electric Savings (kWh)	Demand Savings (kW)	Idle Hours	Inc. Cost - Retrofit	Inc. Cost - New Construction
Low Temp Under Counter	975	0.116	3375	$2,297	$232
Low Temp Door Type	-352	-0.087	1632	$2,297	$2,659
Low Temp Single Tank Conveyor	1,337	0.150	3600	$2,297	$5,882
Low Temp Multi Tank Conveyor	1,862	0.209	3600	$2,297	$3,394
High Temp Under Counter	668	0.080	3375	$2,297	$232
High Temp Door Type	1,684	0.416	1632	$2,297	$2,659
High Temp Single Tank Conveyor	2,275	0.255	3600	$2,297	$5,882
High Temp Multi Tank Conveyor	3,761	0.421	3600	$2,297	$3,394

2.22. Refrigeration: Efficient Refrigerated Cases

This protocol estimates savings for installing high efficiency refrigerated cases. Efficient cases have low- or no-heat glass doors, efficient fan motors, efficient lighting, and efficient evaporators.

Table 2-151 summarizes the 'typical' expected (per linear foot) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-153 Typical Savings Estimates for Efficient Refrigerated Cases [126]

	Retrofit	New Construction
Deemed Savings Unit	Linear ft.	n/a
Average Unit Energy Savings	Table 2-152	n/a
Average Unit Peak Demand Savings	Table 2-152	n/a
Expected Useful Life	12 Years	n/a
Average Material & Labor Cost	$906.27	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

2.22.1. Definition of Eligible Equipment

Efficient cases with doors must have low- or no-heat glass doors, efficient fan motors, efficient lighting, and evaporators that raise the suction temperature set point by at least 3° F. Efficient cases without doors must the same features excluding door requirements. Savings for cases that don't satisfy all requirements must be treated under their corresponding measure chapters (e.g. efficient lighting, evaporator fans, and/or low-no-heat glass).

2.22.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the retrofit scenario. For purposes of the energy savings estimates open cases are assumed to utilize night covers for 6 hours at night.

Retrofit (Early Replacement)

The baseline condition is assumed to be a standard refrigerated case. A standard case is defined as any refrigerated case without any of the following equipment:

1) Low- or no-heat door glass (applies only to fixtures with doors)
2) ECM fan motors
3) LED case lighting
4) Evaporator controls which raise the suction temperature set-point by at least 3° F

New Construction (Includes Major Remodel & Replace on Burn-Out)

[126] See spreadsheet "23-TypicalCalcs_EffCases.xlsx" for assumptions and calculations used to estimate the typical unit energy savings, EUL, and incremental cost.

New construction is not eligible for this measure as this measure is assumed to be standard practice.

2.22.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * N_{Units}$$

$$\Delta kW = \Delta kW/Unit * N_{Units}$$

2.22.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
ΔkWh/Unit	The unit annual energy savings. Stipulated values for this input are listed by weather zone in Table 2-152.
ΔkW/Unit	The unit peak reduction. Stipulated values for this input are listed by weather zone in Table 2-152.
N_{Units}	Number of linear feet of refrigerated case

2.22.5. Sources

20. DEER Measure Cost Summary: http://www.deeresources.com/deer0911planning/downloads/DEER2008_Costs_ValuesAndDocumentation_080530Rev1.zip
21. DEER EUL/RUL Values: http://www.deeresources.com/deer0911planning/downloads/EUL_Summary_10-1-08.xls

2.22.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-154 Unit Energy Savings for Efficient Refrigerated Cases

Case Type (Std. to Eff.)	*Climate Zone 5*		*Climate Zone 6*	
	Per Unit kWh Savings	Per Unit kW Savings	Per Unit kWh Savings	Per Unit kW Savings
Med-Temp Open to Med-Temp Open	65.6	0.019	64.8	0.015
Med-Temp Open to Med-Temp w/doors	322.7	0.047	357.8	-0.002
Low-Temp w/doors to Low-Temp w/doors	38.2	0.003	38.2	0.003
Low-Temp Open to Low-Temp w/doors	772.1	0.034	797.8	0.048
Low-Temp Coffin to Low-Temp w/doors	85.9	-0.047	120.7	-0.041

2.23. Refrigeration: ASH Controls

Anti-sweat heater (ASH) controls turn off door heaters when there is little or no risk of condensation. There are two commercially available control strategies that achieve “on-off” control of door heaters based on either: (1) the relative humidity of the air in the store or (2) the “conductivity” of the door (which drops when condensation appears). In the first strategy, the system activates door heaters when the relative humidity in a store rises above a specific set-point and turns them off when the relative humidity falls below that set-point. In the second strategy, the sensor activates the door heaters when the door conductivity falls below a certain set-point and turns them off when the conductivity rises above that set-point. Without controls, anti-sweat heaters run continuously whether they are necessary or not. Savings are realized from the reduction in energy used by not having the heaters running at all times. In addition, secondary savings result from reduced cooling load on the refrigeration unit when the heaters are off.

The following algorithms and assumptions are applicable to ASH controls installed on commercial glass door coolers and freezers.

Table 2-153 summarizes the ‘typical’ expected (per linear ft. of case) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-155 Typical Savings Estimates for ASH Controls [127]

	Retrofit	New Construction
Deemed Savings Unit	linear ft. of case	n/a
Average Unit Energy Savings	208 kWh	n/a
Average Unit Peak Demand Savings	23.7 W	n/a
Expected Useful Life	8 Years	n/a
Average Material & Labor Cost	$ 40.00 [128]	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

2.23.1. Definition of Eligible Equipment

The eligible equipment is assumed to be a door heater control on a commercial glass door cooler or refrigerator utilizing humidity or conductivity control. This does not apply to special doors with low/no anti-sweat heat.

2.23.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the retrofit scenario.

[127] See spreadsheet “24-TypicalCalcs_ASH.xlsx” for assumptions and calculations used to estimate the typical unit energy savings, expected useful life, and incremental costs.

[128] The cost is based on the most recent Regional Technical Forum Measure Workbook for this measure:

http://rtf.nwcouncil.org/measures/Com/ComGroceryAntiSweatHeaters_v1_0.xlsm

Retrofit (Early Replacement)

The baseline condition is assumed to be a commercial glass door cooler or refrigerator with a standard heated door with no controls installed.

New Construction (Includes Major Remodel & Replace on Burn-Out)

n/a

2.23.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = W_{Installed} * 8760(1 + F_{waste} / (EER * DF)) * (1 - F_{Sav}) / 1000$$

$$\Delta kW = \Delta kWh / 8760$$

2.23.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
$W_{Installed}$	Connected load (kW) for typical reach-in refrigerator or freezer door and frame with a heater.
L	Length of the cases in linear feet.
EER	Energy Efficiency Ratio for the annual average refrigeration system.
DF	Degradation Factor accounts for the refrigeration and HVAC systems ages, condenser cleanliness and condition, and evaporative or air cooled condenser.
F_{waste}	Waste Heat Factor. Defined as the percentage of ASH energy use that is converted into heat in the case and must be removed by the refrigeration system. Stipulated values for this figure are provided in Table 2-154.
F_{Sav}	ASH run-time reduction Factor. Stipulated values for this figure are provided in Table 2-154.

2.23.5. Sources

22. June 2001 edition of ASHRAE Journal
23. Regional Technical Forum, Measure Workbooks http://rtf.nwcouncil.org/measures/Com/ComGroceryAntiSweatHeaters_v1_0.xlsm
24. http://rtf.nwcouncil.org/measures/com/ComGroceryDisplayCaseECMs_v2_2.xlsm

2.23.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-156 Connected Load for Typical Reach-In Case [129]

Case Type	kW_{Base}	EER	DF	F_{waste}	F_{Sav}	ΔW/linear ft. case	ΔkWh/linear ft. case
Low Temperature	72	5.12	0.98	0.35	0.5	38.7	339
Medium Temperature	43	11.2	0.98	0.35	0.8	8.8	76.8
Average	57	8.2	0.98	0.35	0.65	23.7	208

[129] The values are based on the most recent Regional Technical Forum Measure Workbook for this measure. http://rtf.nwcouncil.org/measures/Com/ComGroceryAntiSweatHeaters_v1_0.xlsm

2.24. Refrigeration: Auto-Closer

Auto-closers on freezers and coolers can reduce the amount of time that doors are open, thereby reducing infiltration and refrigeration loads.

The following algorithms and assumptions are applicable to auto-closers installed on reach-in and walk-in coolers and freezers.

Table 2-155 through Table 2-158 summarize the 'typical' expected (per door) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below. [130]

Table 2-157 Typical Savings Estimates for Auto-Closers (Walk-In, Low-Temp)

	Retrofit	**New Construction**
Deemed Savings Unit	Door	n/a
Average Unit Energy Savings	2,547 kWh	n/a
Average Unit Peak Demand Savings	0.27 kW	n/a
Expected Useful Life	8 Years	n/a
Average Material & Labor Cost	$ 139.32	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

Table 2-158 Typical Savings Estimates for Auto-Closers (Walk-In, Med-Temp)

	Retrofit	**New Construction**
Deemed Savings Unit	Door	n/a
Average Unit Energy Savings	575 kWh	n/a
Average Unit Peak Demand Savings	0.14 kW	n/a
Expected Useful Life	8 Years	n/a
Average Material & Labor Cost	$ 139.32	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

[130] See spreadsheet "25-TypicalCalcs_AutoCloser_v2.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

Table 2-159 Typical Savings Estimates for Auto-Closers (Reach-In, Low-Temp)

	Retrofit	New Construction
Deemed Savings Unit	Door	n/a
Average Unit Energy Savings	560 kWh	n/a
Average Unit Peak Demand Savings	0.07 kW	n/a
Expected Useful Life	8 Years	n/a
Average Material & Labor Cost	$ 139.32	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

Table 2-160 Typical Savings Estimates for Auto-Closers (Reach-In, Med-Temp)

	Retrofit	New Construction
Deemed Savings Unit	Door	n/a
Average Unit Energy Savings	373 kWh	n/a
Average Unit Peak Demand Savings	0.06 kW	n/a
Expected Useful Life	8 Years	n/a
Average Material & Labor Cost	$ 139.32	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

2.24.1. Definition of Eligible Equipment

The eligible equipment is an auto-closer that must be able to firmly close the door when it is within one inch of full closure.

2.24.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the retrofit scenario.

Retrofit (Early Replacement)

The baseline equipment is doors not previously equipped with functioning auto-closers and assumes the walk-in doors have strip curtains.

New Construction (Includes Major Remodel & Replace on Burn-Out)

n/a

2.24.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * N_{Units}$$

$$\Delta kW = \Delta kW/Unit * N_{Units}$$

2.24.4. Definitions

ΔkWh — Expected energy savings between baseline and installed equipment.

ΔkW — Expected demand reduction between baseline and installed equipment.

ΔkWh/Unit — Unit energy savings estimates. Stipulated values for this input are provided in Table 2-159 based on case type and temperature.

ΔkW/Unit — Unit demand savings estimates. Stipulated values for this input are provided in Table 2-159 based on case type and temperature.

N_{Units} — Number of doors onto which this measure is installed.

2.24.5. Sources

25. Regional Technical Forum, Measure Workbooks http://rtf.nwcouncil.org/measures/com/ComGroceryAutoCloser_v1_0.xlsm
26. http://rtf.nwcouncil.org/measures/com/ComGroceryDisplayCaseECMs_v2_2.xlsm
27. Workpaper PGECOREF110.1 – Auto-Closers for Main Cooler or Freezer Doors
28. DEER Measure Cost Summary: http://www.deeresources.com/deer0911planning/downloads/DEER2008_Costs_ValuesAndDocumentation_080530Rev1.zip

2.24.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-161 Unit Energy and Demand Savings Estimates

Case Temperature	ΔkWh/Unit	ΔkW/Unit
Low Temperature (Reach-in)	560	0.07
Medium Temperature (Reach-in)	373	0.06
Low Temperature (Walk-in)	2,547	0.27
Medium Temperature (Walk-in)	575	0.14

2.25. Refrigeration: Condensers

The following algorithms and assumptions are applicable to efficient air and evaporative cooled refrigeration condensers. Condensers can be oversized in order to take maximum advantage of low ambient dry-bulb (for air-cooled) or wet-bulb (for evaporative cooled) temperatures.

Table 2-160 summarizes the 'typical' expected (per ton) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-162 Summary Deemed Savings Estimates for Efficient Refrigeration Condenser

	Retrofit	New Construction
Deemed Savings Unit	Ton	ton
Average Unit Energy Savings	120 kWh	114 kWh
Average Unit Peak Demand Savings	0.118 kW	0.112 kW
Expected Useful Life	15 Years	15 Years
Average Material & Labor Cost	$ 695.56 [131]	n/a
Average Incremental Cost	n/a	$ 35.00 [132]
Stacking Effect End-Use	Refrigeration	

2.25.1. Definition of Eligible Equipment

Efficient condenser retrofits must have floating head pressure controls, staged or VSD controlled fans, must operate with subcooling of 5°F or more at design conditions and have a TD of 8°F of less for low-temp systems, 13°F or less for med-temp systems and 18°F or less for evaporative condensers.

2.25.2. Definition of Baseline Equipment

Baseline equipment for this measure is determined by the nature of the project. There are two possible scenarios: retrofit (early replacement) or new construction.

Retrofit (Early Replacement)

The baseline equipment for retrofit projects is the existing condenser coil in a properly working and maintained condition.

New Construction (Includes Major Remodel & Replace on Burn-Out)

The baseline equipment for new construction projects is defined to be a properly working and maintained condenser coil with all required fan and head pressure controls as defined by the local energy codes and standards.

2.25.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

[131] From DEER 2005 Database

[132] From Ameren TRM

$$\Delta kWh = \Delta kWh/Unit * N_{Units}$$

$$\Delta kW = \Delta kW/Unit * N_{units}$$

2.25.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
ΔkWh/Unit	Per unit energy savings as stipulated in Table 2-161.
ΔkW/Unit	Per unit demand savings as stipulated in Table 2-161.
N_{units}	Number of condensers installed on individual systems

2.25.5. Sources

29. Ameren Missouri Technical Resource Manual

2.25.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-163 Unit Energy Savings for Efficient Refrigeration Condenser[133]

Measure	kWh/Ton	kW/Ton
Energy Efficient Condenser - Retrofit	120	0.118
Energy Efficient Condenser – New Construction	114	0.112

[133] From Ameren Missouri Technical Resource Manual

2.26. Refrigeration: Controls

Floating-head pressure controls take advantage of low outside air temperatures to reduce the amount of work for the compressor by allowing the head pressure to drop and rise along with outdoor conditions. Dropping the head pressure during low outdoor ambient temperature conditions (less than 70 degrees F) reduces compressor energy consumption and overall runtime. Floating suction pressure requires controls to reset refrigeration system target suction temperature based on refrigerated display case or walk-in temperature, rather than operating at a fixed suction temperature set-point. This also reduces compressor energy consumption and overall runtime.

Table 2-162 Typical Savings Estimates for Floating Suction Pressure Controls (Only)

	Retrofit	New Construction
Deemed Savings Unit	HP	HP
Average Unit Energy Savings	104 kWh	77 kWh
Average Unit Peak Demand Savings	19 W	10 W
Expected Useful Life	16 Years	16 Years
Average Material & Labor Cost	$86.91	n/a
Average Incremental Cost	n/a	$53.75
Stacking Effect End-Use	Refrigeration	

Table 2-163 Typical Savings Estimates for Floating Head Pressure Controls (Only)

	Retrofit	New Construction
Deemed Savings Unit	HP	HP
Average Unit Energy Savings	440 kWh	225 kWh
Average Unit Peak Demand Savings	17 W	11 W
Expected Useful Life	16 Years	16 Years
Average Material & Labor Cost	$272.60	n/a
Average Incremental Cost	n/a	$166.60
Stacking Effect End-Use	Refrigeration	

Table 2-164 summarizes the 'typical' expected (per unit) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-164 Typical Savings Estimates for Floating Suction Pressure Controls (Only)

	Retrofit	New Construction
Deemed Savings Unit	HP	HP
Average Unit Energy Savings	104 kWh	77 kWh
Average Unit Peak Demand Savings	19 W	10 W
Expected Useful Life	16 Years	16 Years
Average Material & Labor Cost	$86.91	n/a
Average Incremental Cost	n/a	$53.75
Stacking Effect End-Use	Refrigeration	

Table 2-165 Typical Savings Estimates for Floating Head Pressure Controls (Only)

	Retrofit	New Construction
Deemed Savings Unit	HP	HP
Average Unit Energy Savings	440 kWh	225 kWh
Average Unit Peak Demand Savings	17 W	11 W
Expected Useful Life	16 Years	16 Years
Average Material & Labor Cost	$272.60	n/a
Average Incremental Cost	n/a	$166.60
Stacking Effect End-Use	Refrigeration	

Table 2-166 Typical Savings Estimates for Floating Head and Suction Pressure Controls

	Retrofit	New Construction
Deemed Savings Unit	HP	HP
Average Unit Energy Savings	544 kWh	302 kWh
Average Unit Peak Demand Savings	36 W	21 W
Expected Useful Life	16 Years	16 Years
Average Material & Labor Cost	$359.51	n/a
Average Incremental Cost	n/a	$220.35
Stacking Effect End-Use	Refrigeration	

2.26.1. Definition of Eligible Equipment

Refrigeration systems having compressors with motors rated 1 horsepower or larger are eligible. A head pressure control valve (flood-back control valve) must be installed to lower minimum condensing head pressure from fixed position (180 psig for R-22; 210 psig for R-404a) to a saturated pressure equivalent to 70 degrees F or less. Either a balanced-port or electronic expansion valve that is sized to meet the load requirement at a 70 degree condensing temperature must be installed. Alternatively, a device may be installed to supplement refrigeration feed to each evaporator attached to condenser that is reducing head pressure.

2.26.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction.

Retrofit (Early Replacement)

The baseline equipment for retrofit projects is the existing refrigeration system without floating head and/or suction pressure controls.

New Construction (Includes Major Remodel & Replace on Burn-Out)

The baseline equipment for New Construction projects is a refrigeration system meeting current federal energy efficiency requirements and without floating head and/or suction pressure controls.

2.26.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * Cap$$

$$\Delta kW = \Delta kW/Unit * Cap$$

2.26.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
ΔkWh/Unit	Per unit energy savings as stipulated in Table 2-165 and Table 2-166 according to building type, building vintage, and baseline refrigeration system type.
ΔW/Unit	Per unit demand savings (in Watts) as stipulated in Table 2-165 and Table 2-166 according to building type, building vintage, and baseline refrigeration system type.
Cap	The capacity (in Tons) of the refrigeration system(s) onto which controls are being installed.

2.26.5. Sources

30. DEER Database for Energy-Efficient Resources. Version 2011 4.01
31. DEER Measure Cost Summary: http://www.deeresources.com/deer0911planning/downloads/DEER2008_Costs_ValuesAndDocumentation_080530Rev1.zip
32. Regional Technical Forum UES workbook for Floating Head Pressure Controls: http://rtf.nwcouncil.org/measures/com/ComGroceryFHPCSingleCompressor_v1_1.xls

2.26.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-167 Unit Energy and Demand Savings estimates for Retrofit Projects

Measure Description	ΔkWh/HP	ΔW/HP
Grocery, Floating Suction Pressure	104	17.27
Grocery, Floating Head Pressure, Fixed Setpoint (air-cooled)	325	-0.81
Grocery, Floating Head Pressure, Fixed Setpoint (evap-cooled)	466	4.59
Grocery, Floating Head Pressure, Variable Setpoint (air-cooled)	345	9.05
Grocery, Floating Head Pressure, Variable Setpoint (evap-cooled)	484	26.89
Grocery, Floating Head Pressure, Variable Setpt & Speed (air-cooled)	520	21.90
Grocery, Floating Head Pressure, Variable Setpt & Speed (evap-cooled)	515	30.85
Ref Warehse, Floating Suction Pressure	115	57.89
Ref Warehse, Floating Head Pressure, Fixed Setpoint (evap-cooled)	351	45.10
Ref Warehse, Floating Head Pressure, Variable Setpoint (evap-cooled)	351	45.10
Ref Warehse, Floating Head Pressure, Variable Setpt & Speed (evap-cooled)	467	45.10

Table 2-168 Unit Energy and Demand Savings estimates for New Construction Projects

Measure Description	ΔkWh/HP	ΔW/HP
Grocery, Floating Suction Pressure	78	9.62
Grocery, Floating Head Pressure, Fixed Setpoint (air-cooled)	120	0.00
Grocery, Floating Head Pressure, Fixed Setpoint (evap-cooled)	184	-23.55
Grocery, Floating Head Pressure, Variable Setpoint (air-cooled)	169	16.24
Grocery, Floating Head Pressure, Variable Setpoint (evap-cooled)	190	0.62
Grocery, Floating Head Pressure, Variable Setpt & Speed (air-cooled)	411	63.16
Grocery, Floating Head Pressure, Variable Setpt & Speed (evap-cooled)	226	4.96
Ref Warehse, Floating Suction Pressure	70	12.31
Ref Warehse, Floating Head Pressure, Fixed Setpoint (evap-cooled)	352	28.06
Ref Warehse, Floating Head Pressure, Variable Setpoint (evap-cooled)	352	28.06
Ref Warehse, Floating Head Pressure, Variable Setpt & Speed (evap-cooled)	438	28.06

2.27. Refrigeration: Door Gasket

Tight fitting gaskets inhibit infiltration of warm, moist air into the cold refrigerated space, thereby reducing the cooling load. Aside from the direct reduction in cooling load, the associated decrease in moisture entering the refrigerated space also helps prevent frost on the cooling coils. Frost build-up adversely impacts the coil's, heat transfer effectiveness, reduces air passage (lowering heat transfer efficiency), and increases energy use during the defrost cycle. Therefore, replacing defective door gaskets reduces compressor run time and improves the overall effectiveness of heat removal from a refrigerated cabinet.

The following algorithms and assumptions are applicable to door gaskets installed on reach-in and walk-in coolers and freezers.

Table 2-167 summarizes the 'typical' expected (per linear ft. of gasket) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-169 Typical Savings Estimates for Door Gaskets

	Retrofit	New Construction
Deemed Savings Unit	linear ft. of gasket	n/a
Average Unit Energy Savings	2.4 kWh	n/a
Average Unit Peak Demand Savings	0.27 W	n/a
Expected Useful Life	4 Years	n/a
Average Material & Labor Cost	$ 9.61 [134]	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

2.27.1. Definition of Eligible Equipment

The eligible equipment is a new door gasket and must replace a worn or damaged gasket on the main insulated solid door of a walk-in cooler. Replacement gaskets must meet the manufacturer's specifications regarding dimensions, materials, attachment method, style, compression, and magnetism.

2.27.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the retrofit scenario.

Retrofit (Early Replacement)

The baseline equipment is a door gasket that has a tear that is at least large enough for a hand to pass through (6 inches).

New Construction (Includes Major Remodel & Replace on Burn-Out)

[134] Weighted Cost from DEER Measure Cost Summary

n/a

2.27.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh_{unit} * L$$
$$\Delta W = \Delta W_{unit} * L$$

2.27.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔW	Expected demand reduction (in Watts) between baseline and installed equipment.
ΔkWh_{unit}	Deemed kWh savings stipulated in Table 2-168.
ΔW_{unit}	Deemed kW savings stipulated in Table 2-168.
L	Length of gasket replaced in feet.

2.27.5. Sources

33. CPUC Reports of Strip Curtains and Gaskets
    http://rtf.nwcouncil.org/subcommittees/grocery/CPUC%20Strip&Gasket%202010.zip
34. Regional Technical Forum, Measure Workbooks
    http://rtf.nwcouncil.org/measures/com/ComGroceryDoorGasketReplacement_v1_0.xlsm
    http://rtf.nwcouncil.org/measures/com/ComGroceryDisplayCaseECMs_v2_2.xlsm
    http://rtf.nwcouncil.org/measures/com/ComGroceryWalkinECM_v1_1.xlsm
35. DEER Measure Cost Summary:
    http://www.deeresources.com/deer0911planning/downloads/DEER2008_Costs_ValuesAndDocumentation_080530Rev1.zip

2.27.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-170 Unit Energy Savings for Door Gaskets[135]

Case Type	ΔkWh_{unit}	ΔW_{unit}
Reach-In (Low-Temp)	*3.16*	*0.36*
Reach-In (Med-Temp)	0.53	0.06
Walk-In (Low-Temp)	5.10	0.58
Walk-In (Med-Temp)	0.70	0.08

[135] Walk-in values obtained from CPUC reports. Reach-in values referenced by using a similar reach-in to walk-in ratio as RTF

2.28. Refrigerator: Evaporator Fans

Existing standard efficiency evaporator fan motors in reach-in and walk-in freezers and coolers can be retrofitted with high-efficiency motors and/or controllers. These measures save energy by reducing fan usage, refrigeration load (due to heat from motors), and compressor energy (from electronic temperature control).The following algorithms and assumptions are applicable to reach-in and walk-in evaporator fans.

Table 2-169 through Table 2-171 summarize the 'typical' expected (per motor) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described on the next page. [136]

Table 2-171 Typical Savings Estimates for Reach-in and Walk-in Evaporator Fan Controls

	Retrofit	New Construction
Deemed Savings Unit	Motor	n/a
Average Unit Energy Savings	408 kWh	n/a
Average Unit Peak Demand Savings	42 W	n/a
Expected Useful Life	15 Years	n/a
Average Material & Labor Cost	$ 161.74	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

Table 2-172 Typical Savings Estimates for Walk-in Evaporator Fan Motors

	Retrofit	New Construction
Deemed Savings Unit	Motor	n/a
Average Unit Energy Savings	593 kWh	n/a
Average Unit Peak Demand Savings	61 W	n/a
Expected Useful Life	15 Years	n/a
Average Material & Labor Cost	$ 296.78	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

[136] See spreadsheet "29-TypicalCalcs_EvapFans.xlsx" for assumptions and calculations.

Table 2-173 Typical Savings Estimates for Reach-in Evaporator Fan Motors

	Retrofit	New Construction
Deemed Savings Unit	Motor	n/a
Average Unit Energy Savings	318 kWh	n/a
Average Unit Peak Demand Savings	44 W	n/a
Expected Useful Life	15 Years	n/a
Average Material & Labor Cost	$ 84.45	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

2.28.1. Definition of Eligible Equipment

The eligible equipment for high-efficiency evaporator fan motors is Electronically Commutated (ECM) or Permanent Split Capacitor (PSC) motors. PSC motors can only replace shaded pole (SP) motors, and ECM motors can replace either SP or PSC motors. Eligible fan motor controls can either be 2 speed (hi/low) or cycle the fans (on/off). Controls must cut fan motor power by at least 75 percent during the compressor “off” cycle.

2.28.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the retrofit scenario.

Retrofit (Early Replacement)

The baseline equipment for high-efficiency evaporator fan motors is SP or PSC evaporator fan motors in reach-in and walk-in freezers and coolers. SP motors can be retrofitted with either ECMs or PSCs. Existing PSC motors can only be retrofitted with ECMs. The baseline for controls is a fan that operated continuously and at full speed prior.

New Construction (Includes Major Remodel & Replace on Burn-Out)

n/a

2.28.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = N_{Units} * [(kWh_{Fan}) + (kWh_{Fan} * 3.413) / EER]$$

$$\Delta kW = N_{Units} * kWh_{Fan} * CF / Hours$$

$$kWh_{Fan,\ \mathrm{motor}} = (kW_{motor,\ \mathrm{base}} - kW_{motor,\ Installed}) * Hours$$

$$kWh_{Fan,\ \mathrm{control}} = (kWh_{control,\ base} - kWh_{control,\ Installed})$$

$$kW_{motor,\ base} = Watts_{base} / (\eta_{base} * 1000)$$

$$kW_{motor,\ Installed} = Watts_{Installed} / (\eta_{Installed} * 1000)$$

$$kWh_{control,\ base} = Watts_{base} * Hours / (\eta_{base} * 1000)$$

$$kWh_{control,\ Installed} = kWh_{fullspeed} + kWh_{lowspeed}$$

$$kWh_{fullspeed} = kWh_{control,\ base} * Run\ Time\ \%$$

$$kWh_{lowspeed} = \%\ Speed^{2.5} * kWh_{contro,\ base} * Run\ Time\ \%$$

2.28.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
N_{Units}	Number of fans
Hours	Annual operating hours
CF	Coincidence Factor
$kW_{motor,\ i}$	Connected load of the *base* and *installed* motors
$Watts_{base/Installed}$	Baseline motor output wattage - If unknown, see Table 2-173 and Table 2-176.
$\eta_{base/Installed}$	Efficiency of baseline (*base*) or *installed* motor(s) - If unknown, see Table 2-173 and Table 2-176.
$kWh_{control,\ i}$	Fan annual energy usage before (*base*) and after (*Installed*) controls
kWh_{Fan}	Fan motor annual energy usage
$kWh_{fullspeed}$	Fan annual energy usage at full speed
$kWh_{lowspeed}$	Fan annual energy usage at low speed
Run Time %	Run Time % - Percent of time that fan is at corresponding speed see Table 2-178.
% Speed	Ratio of low speed to full speed in a percent = 35% see Table 2-178.

2.28.5. Sources

36. Regional Technical Forum, Measure Workbooks
http://rtf.nwcouncil.org/measures/com/ComGroceryDisplayCaseECMs_v2_2.xlsm
http://rtf.nwcouncil.org/measures/com/ComGroceryWalkinEvapFanECMController_v1_1.xls

http://rtf.nwcouncil.org/measures/com/ComGroceryWalkinECM_v1_1.xlsm

37. EnergySmart Grocer Invoice Data
38. AHRI Standard 1200 – 2006
39. Federal Rulemaking for Commercial Refrigeration Equipment, Technical Support Document. 2009
40. Pennsylvania TRM

2.28.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-174 Evaporator Fan Motor Output and Input Power for Reach-ins

Motor Output [137] (watts)	SP Input (watts)	ECM Input (watts)	PSC Input (watts)	ECM Efficiency [138]	PSC Efficiency	SP Efficiency
9	45	14	31	66%	29%	20%
19.5	97.5	29.5	67.2	66%	29%	20%
37	185	56	128	66%	29%	20%

[137] From RTF Workbook: http://rtf.nwcouncil.org/measures/com/ComGroceryDisplayCaseECMs_v2_2.xlsm

[138] Values from AHRI Standard 1200 - 2006

Table 2-175 Un-Weighted Baseline kWh Savings for Reach-ins [139]

Retrofit Type	Base Power (Watts)	Installed Power (Watts)	Annual Hours	EER	Energy Savings (kWh/motor)
Med Temp Shaded Pole to ECM - 9 Watt Output	45	14	8,760	9	379
Med Temp Shaded Pole to ECM - 19.5 Watt Output	98	30	8,760	9	821
Med Temp Shaded Pole to ECM - 37 Watt Output (1/20 HP)	185	56	8,760	9	1,558
Low Temp Shaded Pole to ECM - 9 Watt Output	45	14	8,030	5	424
Low Temp Shaded Pole to ECM in display case - 19.5 Watt Output	98	30	8,030	5	918
Low Temp Shaded Pole to ECM - 37 Watt Output (1/20 HP)	185	56	8,030	5	1,742
Med Temp Shaded Pole to PSC - 9 Watt Output	45	31	8,760	9	169
Med Temp Shaded Pole to PSC - 19.5 Watt Output	98	67	8,760	9	366
Med Temp Shaded Pole to PSC - 37 Watt Output (1/20 HP)	185	128	8,760	9	694
Low Temp Shaded Pole to PSC - 9 Watt Output	45	31	8,030	5	189
Low Temp Shaded Pole to PSC in display case - 19.5 Watt Output	98	67	8,030	5	409
Low Temp Shaded Pole to PSC - 37 Watt Output (1/20 HP)	185	128	8,030	5	776
Med Temp PSC to ECM - 9 Watt Output	31	14	8,760	9	210
Med Temp PSC to ECM - 19.5 Watt Output	67	30	8,760	9	455
Med Temp PSC to ECM - 37 Watt Output (1/20 HP)	128	56	8,760	9	864
Low Temp PSC to ECM - 9 Watt Output	31	14	8,030	5	235
Low Temp PSC to ECM in display case - 19.5 Watt Output	67	30	8,030	5	509
Low Temp PSC to ECM - 37 Watt Output (1/20 HP)	128	56	8,030	5	966

Table 2-176 Average Savings and Incremental Cost by Evaporator Fan Motor Type for Reach-ins

Retrofit Type	kWh Savings	kW Savings	Incremental Cost
SP to ECM	477	0.049	$84.45
SP to PSC	212	0.022	$84.45
PSC to ECM	265	0.027	$84.45

[139] kWh algorithms from RTF Workbook: http://rtf.nwcouncil.org/measures/com/ComGroceryDisplayCaseECMs_v2_2.xlsm

Table 2-177 Evaporator Fan Motor Output and Input Power for Walk-ins[140]

Motor Output (watts)	SP Input (watts)	ECM Input (watts)	PSC Input (watts)	ECM Efficiency	PSC Efficiency[141]	SP Efficiency
16-23	75	30	48	66%	41%	26%
37	142	56	90	66%	41%	26%
49.7	191	75	121	66%	41%	26%

[140] All values except PSC Efficiency are from RTF Workbook: http://rtf.nwcouncil.org/measures/com/ComGroceryWalkinEvapFanECMController_v1_1.xls

[141] PSC Efficiency from Pennsylvania TRM

Table 2-178 Un-Weighted Baseline kWh Savings for Walk-ins[142]

Retrofit Type	Base Power (Watts)	Installed Power (Watts)	Annual Hours	EER	Total Energy Savings (kWh/motor)
Med Temp Shaded Pole to ECM - 16-23 Watt Output	75	30	8,760	11.16	520
Med Temp Shaded Pole to ECM - 37 Watt Output (1/20 HP)	142	56	8,760	11.16	987
Med Temp Shaded Pole to ECM - 49.7 Watt Output (1/15 HP)	191	75	8,760	11.16	1325
Low Temp Shaded Pole to ECM - 16-23 Watt Output	75	30	8,760	5.12	664
Low Temp Shaded Pole to - 37 Watt Output (1/20 HP)	142	56	8,760	5.12	1259
Low Temp Shaded Pole to ECM - 49.7 Watt Output (1/15 HP)	191	75	8,760	5.12	1691
Med Temp Shaded Pole to PSC - 16-23 Watt Output	75	48	8,760	11.16	314
Med Temp Shaded Pole to PSC - 37 Watt Output (1/20 HP)	142	90	8,760	11.16	596
Med Temp Shaded Pole to PSC - 49.7 Watt Output (1/15 HP)	191	121	8,760	11.16	800
Low Temp Shaded Pole to PSC - 16-23 Watt Output	75	48	8,760	5.12	401
Low Temp Shaded Pole to - 37 Watt Output (1/20 HP)	142	90	8,760	5.12	760
Low Temp Shaded Pole to PSC - 49.7 Watt Output (1/15 HP)	191	121	8,760	5.12	1021
Med Temp PSC to ECM - 16-23 Watt Output	48	30	8,760	11.16	206
Med Temp PSC to ECM - 37 Watt Output (1/20 HP)	90	56	8,760	11.16	391
Med Temp PSC to ECM - 49.7 Watt Output (1/15 HP)	121	75	8,760	11.16	525
Low Temp PSC to ECM - 16-23 Watt Output	48	30	8,760	5.12	263
Low Temp PSC to - 37 Watt Output (1/20 HP)	90	56	8,760	5.12	499
Low Temp PSC to ECM	121	75	8,760	5.12	670
- 49.7 Watt Output (1/15 HP)					

[142] kWh algorithms are based on RTF Workbook: http://rtf.nwcouncil.org/measures/com/ComGroceryWalkinECM_v1_1.xlsm

Table 2-179 Average Savings and Incremental Cost by Evaporator Fan Motor Type for Walk-ins

Retrofit Type	kWh Savings	kW Savings	Incremental Cost
SP to ECM	659	0.068	$304.58
SP to PSC	398	0.041	$226.53
PSC to ECM	261	0.027	$304.58

Table 2-180 Un-Weighted Baseline kWh Savings for Walk-in Evaporator Fan Controls

Baseline Fan							Evap Fan Controls					Energy Savings		
							Full Speed		Low Speed					
Walk-in Temp	Motor Type	Output Power (Watts)	EER	Input Power (Watts)	Annual Hours	Annual Energy (kWh)	Run Time %	Annual Energy (kWh)	Run Time %	% Speed	Annual Energy (kWh)	Direct (kWh)	Refrig. (kWh)	Total (kWh)
Med	SP	16-23	11.16	75	8,760	657	52%	342	48%	35%	23	293	89	382
Med	SP	37 (1/20 hp)	11.16	142	8,760	1247	52%	648	48%	35%	43	555	170	725
Med	SP	49.7 (1/15 hp)	11.16	191	8,760	1675	52%	871	48%	35%	58	746	228	974
Low	SP	16-23	5.12	75	8,760	657	68%	447	32%	35%	15	195	130	325
Low	SP	37 (1/20 hp)	5.12	142	8,760	1247	68%	848	32%	35%	29	370	247	617
Low	SP	49.7 (1/15 hp)	5.12	191	8,760	1675	68%	1139	32%	35%	39	497	331	828
Med	PSC	16-23	11.16	48	8,760	417	52%	217	48%	35%	14	185	57	242
Med	PSC	37 (1/20 hp)	11.16	90	8,760	791	52%	411	48%	35%	28	352	108	460
Med	PSC	49.7 (1/15 hp)	11.16	121	8,760	1062	52%	552	48%	35%	37	473	145	617
Low	PSC	16-23	5.12	48	8,760	417	68%	283	32%	35%	10	124	82	206
Low	PSC	37 (1/20 hp)	5.12	90	8,760	791	68%	538	32%	35%	18	235	156	391
Low	PSC	49.7 (1/15 hp)	5.12	121	8,760	1062	68%	722	32%	35%	25	315	210	525
Med	ECM	16-23	11.16	30	8,760	259	52%	135	48%	35%	9	115	35	150
Med	ECM	37 (1/20 hp)	11.16	56	8,760	491	52%	255	48%	35%	17	219	67	286
Med	ECM	49.7 (1/15 hp)	11.16	75	8,760	660	52%	343	48%	35%	23	294	90	384
Low	ECM	16-23	5.12	30	8,760	259	68%	176	32%	35%	6	77	51	128

Baseline Fan							Evap Fan Controls					Energy Savings		
Low	ECM	37 (1/20 hp)	5.12	56	8,760	491	68%	334	32%	35%	11	146	97	243
Low	ECM	49.7 (1/15 hp)	5.12	75	8,760	660	68%	449	32%	35%	15	196	131	326

Table 2-181 Average Savings and Incremental Cost by Evaporator Fan Motor Type for Walk-in Evaporator Fan Controls

Motor Type	kWh Savings	kW Savings	Incremental Cost
SP	452	0.046	$161.74
PSC	285	0.029	$161.74
ECM	178	0.018	$161.74

2.29. Refrigeration: Insulation

This measure applies to installation of insulation on existing bare suction lines (the larger diameter lines that run from the evaporator to the compressor) that are located outside of the refrigerated space. Insulation impedes heat transfer from the ambient air to the suction lines, thereby reducing undesirable system superheat. This decreases the load on the compressor, resulting in decreased compressor operating hours, and energy savings. Table 2-180 and Table 2-181 summarize the 'typical' expected (per foot) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-182 Typical Savings Estimates for Suction Line Insulation for Medium-Temperature Coolers

	Retrofit	New Construction
Deemed Savings Unit	Linear Foot	n/a
Average Unit Energy Savings	7.5 kWh	n/a
Average Unit Peak Demand Savings	1.6 W	n/a
Expected Useful Life	11 Years	n/a
Average Material & Labor Cost	$ 4.46 [143]	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

Table 2-183 Typical Savings Estimates for Suction Line Insulation for Low-Temperature Freezers

	Retrofit	New Construction
Deemed Savings Unit	Linear Foot	n/a
Average Unit Energy Savings	12 kWh	n/a
Average Unit Peak Demand Savings	2.3 W	n/a
Expected Useful Life	11 Years	n/a
Average Material & Labor Cost	$ 4.46 [144]	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

2.29.1. Definition of Eligible Equipment

Insulation must insulate bare refrigeration suction lines of 2-1/4 inches in diameter or less on existing equipment only. Medium temperature lines require 3/4 inch of flexible, closed-cell, nitrite rubber or an equivalent insulation. Low temperature lines require 1-inch of insulation that is in compliance with the specifications above. Insulation exposed to the outdoors must be protected from the weather (i.e. jacketed with a medium-gauge aluminum jacket).

[143] From SCE Work Paper: WPSCNRRN0003.1

[144] From SCE Work Paper: WPSCNRRN0003.1

2.29.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the retrofit scenario.

Retrofit (Early Replacement)

The baseline condition is an un-insulated (bare) refrigeration suction line.

New Construction (Includes Major Remodel & Replace on Burn-Out)

New construction is not eligible since installation of insulation on refrigerant suction line is standard practice.

2.29.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * L$$

$$\Delta kW = \Delta kW/Unit * L$$

2.29.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
ΔkWh/Unit	Unit energy savings. Stipulated values for this input are listed in Table 2-182.
ΔkW/Unit	Unit demand savings. Stipulated values for this input are listed in Table 2-182.
L	Length of insulation installed.

2.29.5. Sources

41. Southern California Edison Company, "Insulation of Bare Refrigeration Suction Lines", Work Paper WPSCNRRN0003.1
42. Pennsylvania Technical Reference Manual

2.29.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-184 Unit Energy Savings for Suction Line Insulation[145]

Case Type	***ΔkW/ft***	***ΔkWh/ft***
Medium-Temperature Coolers	0.001548	7.5
Low-Temperature Freezers	0.00233	12

[145] See spreadsheet "30-TypicalCalcs_RefIns.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs. Unit energy savings are referenced from the DEER for California climate zone 16 (which exhibits the most similar weather to Idaho). Note that these savings do not exhibit significant sensitivity to outdoor weather.

2.30. Refrigeration: Night Covers

Night covers are deployed during facility unoccupied hours in order to reduce refrigeration energy consumption. These types of display cases can be found in small and medium to large size grocery stores. The air temperature inside low-temperature display cases is below 0°F and between 0°F to 30°F for medium-temperature and between 35°F to 55°F for high-temperature display cases. The main benefit of using night covers on open display cases is a reduction of infiltration and radiation cooling loads. It is recommended that these covers have small, perforated holes to decrease moisture buildup. The following algorithms and assumptions are applicable to night covers installed on existing open-type refrigerated display cases.

Table 2-183 summarizes the 'typical' expected (per ft. of the opening width) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-185 Typical Savings Estimates for Night Covers

	Retrofit	New Construction
Deemed Savings Unit	ft. of case	n/a
Average Unit Energy Savings	29 kWh	n/a
Average Unit Peak Demand Savings	0.0 kW	n/a
Expected Useful Life	5 Years	n/a
Average Material & Labor Cost	$ 42.20 [146]	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Refrigeration	

2.30.1. Definition of Eligible Equipment

The eligible equipment is assumed to be a refrigerated case with a continuous cover deployed during overnight periods. Characterization assumes covers are deployed for six hours daily.

2.30.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the retrofit scenario.

Retrofit (Early Replacement)

The baseline equipment is assumed to be an open refrigerated case with no continuous covering deployed during overnight periods.

New Construction (Includes Major Remodel & Replace on Burn-Out)

n/a

146

2.30.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * L$$

$$\Delta kW = 0$$

2.30.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Defined to be zero for this measure. Demand savings are zero because it is assumed that the covers aren't used during the peak period.
ΔkWh/Unit	Per unit energy savings as stipulated in Table 2-184 according to case temperature and climate zone.

2.30.5. Sources

43. SCE Workpaper: "Night Covers for Open Vertical and Horizontal LT and Open Vertical MT Display Cases," SCE13RN005.0
44. RTF Workbook: http://rtf.nwcouncil.org/measures/com/ComGroceryDisplayCaseECMs_v2_2.xlsm
45. DEER Measure Cost Summary: http://www.deeresources.com/deer0911planning/downloads/DEER2008_Costs_ValuesAndDocumentation_080530Rev1.zip

2.30.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-186 Unit Energy Savings for Refrigeration: Night Covers

CZ	Case Type	Savings (kWh/ft)
5	Low Temperature	66.67
5	Medium Temperature	28.99
6	Low Temperature	75
6	Medium Temperature	30.43

2.31. Refrigeration: No-Heat Glass

New low heat/no heat door designs incorporate heat reflective coatings on the glass, gas inserted between the panes, non-metallic spacers to separate the glass panes, and/or non-metallic frames (such as fiberglass). This protocol documents the energy savings attributed to the installation of special glass doors with low/no anti-sweat heaters for low temp cases. Table summarizes the 'typical' expected (per door) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-187 Typical Savings Estimates for Low/No Heat Doors[147]

	Retrofit	New Construction
Deemed Savings Unit	Door	Door
Average Unit Energy Savings	281 kWh	253 kWh
Average Unit Peak Demand Savings	0.17 kW	0.15 kW
Expected Useful Life	12 Years	12 Years
Average Material & Labor Cost	$472	n/a
Average Incremental Cost	n/a	$386
Stacking Effect End-Use	Refrigeration	

2.31.1. Definition of Eligible Equipment

The eligible equipment is a no-heat/low-heat clear glass on an upright display case. It is limited to door heights of 57 inches or more. Doors must have either heat reflective treated glass, be gas filled, or both. This measure applies to low temperature cases only—those with a case temperature below 0°F. Doors must have 3 or more panes. Total door rail, glass, and frame heater wattage cannot exceed 54 Watts per door for low temperature display cases.

2.31.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the retrofit scenario.

Retrofit (Early Replacement)

The baseline condition is assumed to be a commercial glass door that consists of two-pane glass, aluminum doorframes and door rails, and door and frame heaters. For the purposes of calculating typical energy savings for this measure it is assumed that the baseline door and frame heaters consume 214 Watts per door.

New Construction (Includes Major Remodel & Replace on Burn-Out)

n/a

[147] See spreadsheet "32-TypicalCalcs_NoHeatGlass.xlsx" for assumptions and calculations used to estimate the typical unit energy savings, EUL, and incremental cost.

2.31.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * N_{Units}$$

$$\Delta kW = \Delta kW/Unit * N_{Units}$$

2.31.4. Definitions

ΔkWh Expected energy savings between baseline and installed equipment.

ΔkW Expected demand reduction between baseline and installed equipment.

ΔkWh/Unit Per unit energy savings. Stipulated values for this input can be found in Table […].

ΔkW/Unit Per unit peak reduction. Stipulated values for this input can be found in Table […].

N_{Units} Total number of doors installed.

2.31.5. Sources

46. Southern California Edison. Low ASH Display Doors Work Paper: SCE13RN018.0
47. DEER EUL/RUL Values: http://www.deeresources.com/deer0911planning/downloads/EUL_Summary_10-1-08.xls

2.31.6. Stipulated Valies

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-188 Stipulated Energy and Demand Savings Estimates for "No-Heat Glass"

	ΔkWh/Unit	ΔkW/Unit
Weather Zone 5	295.4	0.175
Weather Zone 6	223.9	0.14

2.32. PC Management Software

This measure relates to the installation of a centralized energy management system that controls when desktop computers and monitors plugged into a network power down to lower power mode states. Savings come from an increase in the rate of time spent in the "Off" state due to the ability of the network application to shut the computer down when not in prolonged use. The shift in hours from idle state to off state is based on empirical studies of power management installations. Savings vary by building type according to HVAC interaction factor.

Table 2-187 summarizes the 'typical' expected (per machine controlled) energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-189 Typical Savings Estimates for PC Power Management Software

	Retrofit	New Construction
Deemed Savings Unit	Machine Controlled	n/a
Average Unit Energy Savings	135 kWh	n/a
Average Unit Peak Demand Savings	6 W	n/a
Expected Useful Life	4 Years	n/a
Average Material & Labor Cost	$12	n/a
Average Incremental Cost	n/a	n/a
Stacking Effect End-Use	Miscellaneous Loads	

2.32.1. Definition of Eligible Equipment

The eligible equipment is a network of standard desktop computers and monitors, with no centralized power management software. Eligible software must allow IT administrators to control desktop power consumption within the network from a central location and include a reporting feature to enable monitoring and validation of the energy savings. Reports must also provide a catalog of systems (and their locations) under management.

2.32.2. Definition of Baseline Equipment

There are two possible project baseline scenarios – retrofit and new construction. This measure currently only addresses the retrofit scenario.

Retrofit (Early Replacement)

The baseline condition is a network of standard desktop computers and monitors, with no centralized power management software. Baseline desktop usage is derived as a weighted mix of Energy Star compliant and non-compliant models, and a mix of desktop categories. Baseline duty cycle is drawn from empirical studies, taking into account the enabled built-in power management of computers and monitors before applying the effects of a centralized power management control.

New Construction (Includes Major Remodel & Replace on Burn-Out)

n/a

2.32.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

$$\Delta kWh = \Delta kWh/Unit * N_{Units}$$

$$\Delta kW = \Delta kW/Unit * N_{Units}$$

2.32.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkWh/Unit	Per unit energy savings as stipulated in Table **2-188**.
ΔkW/Unit	Per unit demand savings as stipulated in Table **2-188**.
N_{Units}	Total number of computers controlled.

2.32.5. Sources

48. Regional Technical Forum, Measure Workbooks http://rtf.nwcouncil.org/measures/measure.asp?id=95/ NonResNetCompPwrMgt_v3_0.xls

2.32.6. Stipulated Values

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-190 Unit Energy Savings for PC Power Management Software [148]

Building	HVAC System	ΔkWh/Unit	ΔkW/Unit
K-12 School	Electric Heat	83.9	0.003
K-12 School	Heat Pump	124.4	0.004
K-12 School	Gas Heat	159.2	0.006
Large Office/Central HVAC	Electric Heat	131.4	0.006
Large Office/Central HVAC	Heat Pump	147.6	0.007
Large Office/Central HVAC	Gas Heat	160.6	0.008
Other/Packaged HVAC	Electric Heat	98.7	0.005
Other/Packaged HVAC	Heat Pump	138.2	0.007
Other/Packaged HVAC	Gas Heat	172.2	0.008

[148] See spreadsheet “33-NonResNetCompPwrMgt_v3_0.xlsx” for assumptions and calculations used to estimate the typical unit energy and peak demand savings.

2.33. Variable Frequency Drives (Process Applications)

Variable Frequency drives can provide energy efficient operation for fans and pumps used in processes applications. The savings potential for Variable Frequency Drives in process applications is highly variable and dependent upon its application. For this reason it is best for the energy impacts for such projects to be determined via a custom path. The method below can be used to assess energy impacts for projects in which a VFD is installed on either a fan or centrifugal pump serving a process application.

Table 2-189 summarizes the 'typical' expected energy impacts for this measure. Typical values are based on the algorithms and stipulated values described below.

Table 2-191 Variable Frequency Drives (Process Applications) [149]

	Retrofit	New Construction
Deemed Savings Unit	HP	HP
Average Unit Energy Savings	1,377 kWh	1,319 kWh
Average Unit Peak Demand Savings	0.16 kW	0.16 kW
Expected Useful Life	12 Years	12 Years
Average Material & Labor Cost	$332	n/a
Average Incremental Cost	n/a	$332
Stacking Effect End-Use	Process	

2.33.1. Definition of Eligible Equipment

Only VFDs installed on variably loaded motors, from 5 to 300 horsepower, in process applications are eligible under this measure. [150] Note that systems of motors which are individually less than 5 horsepower are eligible provided that: 1) they are controlled by a common VFD, and 2) the aggregate horsepower of motors controlled by a single VFD is greater than 5 HP. Eligible applications are limited to fans and centrifugal pumps serving a process load. Examples of such loads include (but are not limited to) wastewater effluent pumping, ventilation fans for agricultural sheds, and dairy vacuum pumps. Fans and pumps used for Heating, Ventilation and Air-Conditioning in occupant comfort applications are not eligible under this measure.

2.33.2. Definition of Baseline Equipment

When electing to use an engineering calculation approach (Algorithm 2 below) the reported savings estimates must be *production neutral*. Since the impact of facility production rates is implicit in the motor load profile care should be taken to ensure that the *baseline* and *measure* motor load profiles developed for each site are based on a facility 'typical' production. In cases where the project constitutes an expansion due to increased production (or new construction)

[149] See spreadsheet "34-TypicalCalcs_ProcessVFD.xlsx" for assumptions and calculations used to estimate the typical unit energy savings and incremental costs.

[150] The term "process" here denotes any industrial or agricultural VFD driven application which does not serve space conditioning equipment for occupant comfort.

the most reliable production estimates should be used. There are two possible project baseline scenarios - retrofit and new construction.

Retrofit (Early Replacement)

In early replacement retrofit scenarios the baseline equipment is the pre-existing pump/fan, motor, and flow control strategy. Production levels (to the extent that they impact equipment energy use) are assumed to be 'typical' for the facility.

New Construction (Includes Major Remodel & Replace on Burn-Out)

Baseline equipment for new construction projects (including retrofits that result in an expansion of equipment capacity) is defined by the "industry standard" for affected processes. If no industry standard can be identified then the facility (or others operated by the same company) should be explored to identify whether or not *older* and similar production lines can be used to define baseline equipment. If none of the above are present (or applicable) then the baseline equipment is assumed to be the least efficient variant of what is installed. Production levels (to the extent that they impact equipment energy use) are assumed to be the most reliable estimate of 'typical' production rates for the facility.

2.33.3. Algorithms

The following energy and demand savings algorithms are applicable for this measure:

Algorithm 1: Deemed

$$\Delta kWh_{Deemed} = kWh/Unit * P_{Nominal}$$

$$\Delta kW_{Deemed} = kW/Unit * P_{Nominal}$$

Algorithm 2: Engineering Formulas[151]

$$\Delta\ kWh_{Eng} = \sum P_{motor} * Hr_i * (F_{base,\ i} - F_{meas,\ i})$$

$$\Delta\ kW_{Eng} = P_{motor} * (F_{base,\ i} - F_{meas,\ i}) * CF$$

$$P_{motor} = .745 * P_{Nominal} * LF / \eta$$

$$F_i = \beta_1 + \beta_2 * Spd_i + \beta_3 * Spdi^2 + \beta_4 * Spdi^3$$

2.33.4. Definitions

ΔkWh	Expected energy savings between baseline and installed equipment.
ΔkW	Expected demand reduction between baseline and installed equipment.
P_{motor}	The electrical power draw of the motor at pump design conditions.
$P_{nominal}$	The nominal horsepower of the motor
LF	The load factor for the motor when operating at pump design conditions.

[151] TCFhese formulas are applied in the workbook titled "34-TypicalCalcs_ProcessVFD.xlsx". The spreadsheet titled "Site Specific Calculator" can be used to estimate project energy impacts using the engineering formula based approach.

η	Motor nameplate efficiency.
F_i	The motor process loading factor at motor % Speed *i*. This is calculated using the curve-fit coefficients β_1 through β_4 found in Table 2-191. The appropriate factors are selected based on the flow control type for the baseline. Coefficients for flow control VFD are selected for the measure factors ($F_{meas,\ i}$). For any project, it must first be determined how often the motor/VFD will operate at different speeds.
SPD_i	Motor percent speed (e.g. 10% = 10)
Hr_i	The time spent (in units of hours) at speed *i*
CF	The coincidence factor. If unknown for the project a value of .77 should be used.

2.33.5. Sources

49. Regional Technical Forum Unit Energy Savings calculator for Agricultural: Variable Frequency Drives – Dairy (http://rtf.nwcouncil.org/measures/ag/AgDairyVFD_v1_2.xls)
50. Regional Technical Forum Unit Energy Savings calculator for Agricultural: Variable Frequency Drives - Potato/Onion Shed

    (http://rtf.nwcouncil.org/measures/ag/AgPotatoOnionShedVFD_v1_3.xls)
51. Evaluation Results from 2011 Easy Upgrades, 2011 Building Efficiency, and 2010 Custom Efficiency Incentive Programs.

The following tables stipulate allowable values for each of the variables in the energy and demand savings algorithms for this measure.

Table 2-192 Deemed Per/HP savings values

Measure	Energy Savings [kWh/HP]	Peak Demand Savings [kW/HP]
Process VFD	1,377	0.16

Table 2-193 Coefficients for Process Loading Factors (F^i) Curve-Fits

Flow Control Type	β1	β2	β3	β4
Throttling Valve	55.2124	0.637	-0.0019	0
Eddy Current Clutch	16.39683	-0.05647	0.01237	-3 x 10-5
Mechanical (Torque Converter)	13.51137	0.34467	0.01269	-7 x 10-5
Bypass, Recirculation Valve	102	0	0	0
VFD	27.44751	-1.00853	0.01762	0

Table 2-194 Coincidence Factors

Application	CF
Site Specific	As Measured
Other	.77

3. Appendix A: Document Revision History

Table 3-1Document Revision History

Date	Modified Version	Revised Version	Description of Changes
4/01/14	-	1.0	Initial Adoption of TRM.
11/04/14	1.0	1.1	Added *PVVT* and *GSHP* system types to HVAC Controls measure chapter. Updates were made to values in the summary tables which provide a unit savings estimate based on an assumed average of system types. System type specific values were added to the remaining applicable tables in this section. Updated tables include Table 2-65 through Table 2-82.
04/16/15	1.1	1.2	Added *WSHP* system type to HVAC Controls measure chapter. Updates were made to values in the summary tables which provide a unit savings estimate based on an assumed average of system types. System type specific values were added to the remaining applicable tables in this section. Updated tables include Table 2-65 through Table 2-82.
05/19/15	1.2	1.3	Found typo in several tables (Table 2-65 through Table 2-82). Table values updated to reflect corresponding calculator spreadsheets.
05/27/15	1.3	1.4	Found typo in several tables (Table 2-66 through Table 2-67). Table values updated to reflect corresponding calculator spreadsheets.
06/26/15	1.4	1.5	Updated savings values for Evaporative Pre-Cooler measure (Chapter 17) to incorporate data from new source. Accounts for the fact that the studies used to determine savings are biased towards R-22 and that R-410A has higher savings potential. New numbers assume a mix of both refrigerants, but a predominance of R-410A.
08/06/15	1.5	1.6	Made small revisions to three chapters: 1) Sections 2.12 and 2.13: Expanded description of eligible equipment to include changing from A/C only to Heat-Pump and visa versa. 2) Section 2.10: Added references for the reader which provide full descriptions of the listed HVAC system types. 3) Section 2.16: Updated numbers in Table 2-123 to reflect those in summary table and consistent with the previous update.

Date	Modified Version	Revised Version	Description of Changes
10/02/2015	1.6	1.7	Updated (4) measures to include energy savings under IECC 2012. Note that only a handful of measures were affected by the IECC 2012 code update: 1) High Efficiency A/C 2) High Efficiency Heat Pumps 3) Guest Room Occupancy Sensors 4) Direct/Indirect Evaporative Coolers

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Evaluations

EVALUATIONS

Table 4. 2015 Evaluations

Report Title	Program or Sector	Analysis Performed by	Study Manager	Study/Evaluation Type
2015 Flex Peak Program End-of-Season Annual Report	Commercial/Industrial	Idaho Power	Idaho Power	Annual Report
2015 Irrigation Peak Rewards Program Report	Irrigation	Idaho Power	Idaho Power	Annual Report
A/C Cool Credit Impact Evaluation	Residential	CLEAResult	Idaho Power	Impact
Flex Peak Demand Response Program 2015 Impact Evaluation	Commercial/Industrial	CLEAResult	Idaho Power	Impact
Impact and Process Evaluation of Idaho Power's Ductless Heat Pump Program	Residential	Applied Energy Group	Idaho Power	Impact/Process
Impact and Process Evaluation of Idaho Power's Home Improvement Program	Residential	Applied Energy Group	Idaho Power	Impact/Process
Impact and Process Evaluation of Idaho Power's See ya later, refrigerator® Program	Residential	Applied Energy Group	Idaho Power	Impact/Process
Irrigation Peak Rewards Program 2015 Impact Evaluation	Irrigation	CLEAResult	Idaho Power	Impact

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2015 Flex Peak Program
End-of-Season Annual Report

November 3, 2015

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Attachment

CLEAResult 2015 Impact Evaluation

Background

The Flex Peak Program ("Program") is a voluntary demand response ("DR") program available to industrial and large commercial customers that are capable of reducing their electrical energy loads for short periods during summer peak days. By reducing demand on extreme system load days during summer months, the Program reduces the amount of generation and transmission resources required to serve customers. This Program, along with Idaho Power Company's ("Idaho Power" or "Company") other DR programs, Irrigation Peak Rewards and the Residential Air Conditioner Cycling Program, has helped to delay the need to build supply-side resources.

Idaho Power filed an application with the Idaho Public Utilities Commission ("Commission") on February 4, 2015, in Case No. IPC-E-15-03 requesting authority to replace the existing optional FlexPeak Management DR program that was managed by a third-party contractor with an optional DR program that would be managed by the Company. The Commission issued Order No. 33292 on May 7, 2015, authorizing the Company to implement an internally managed Flex Peak Program under Schedule 82 in Idaho and continue recovery of its DR program costs in the manner it had been previously.

As part of Order No. 33292, the Commission ordered the Company to file an annual end-of-season report that should include the number of participants, number of participating sites, megawatts ("MW") of DR under contract, MW of DR realized and incented per dispatch, percent of nominated MW achieved in each dispatch event by participant, and a detailed program cost analysis. This report addresses the annual end-of-season reporting requirements.

Page 8 of the Commission's order also requires Idaho Power to file a separate, one-time report no later than May 7, 2016, that discusses the Company's experience in running the Program, how the Program's costs and benefits compare to those achieved under the prior program, how participants have performed under the structure, and whether changes might improve the Program. The Company will file the one-time report in 2016.

Program Details

The Program pays participants a financial incentive for reducing load within their facility and is active June 15 to August 15, between the hours of 2 p.m. to 8 p.m. on non-holiday weekdays.

Customers with the ability to nominate or provide load reduction of at least 20 kilowatts ("kW") are eligible to enroll in the Program. The 20 kW threshold allows a broad range of customers the ability to participate in the Program. Participants receive notification of a load reduction event ("event") two hours prior to the start of the event, and events last between two to four hours. The Flex Peak Program provided approximately 28 MW at the generation level of committed load reduction based on the 2015 nomination amounts.

The parameters of the Flex Peak Program are in Schedule 82, and include the following:

- A minimum of three load reduction events would occur each Program season
- Events could occur any weekday, excluding July 4, between the hours of 2 p.m. and 8 p.m.
- Events could occur up to four hours per day and up to 15 hours per week, but no more than 60 hours per Program season
- Idaho Power would give notification to participants two hours prior to the initiation of an event
- If prior notice of a load reduction event had been sent, Idaho Power could choose to cancel the event and notify participants of cancellation 30 minutes prior to the start of the event

Program Incentives

The Flex Peak Program includes both a fixed and variable incentive payment. The fixed incentive is calculated by multiplying the actual kW reduction by $3.25 for weeks when an event is called, or the weekly nominated kW amount by $3.25 for weeks when an event is not called. The variable energy incentive is calculated by multiplying the kW reduction by the event duration hours to achieve the total kilowatt-hour ("kWh") reduction during an event. The variable incentive payment is $0.16 per kWh and is implemented for events that occur after the first three events.

The Program also includes an incentive adjustment of $2.00 when participants do not achieve their nominated amount during load reduction events. This adjustment amount is used for the first three events. After the third event, the adjustment is reduced to $0.25 per kW. Incentives are calculated using Idaho Power's interval metering billing data and participants' incentive checks were mailed within 30 days of the end of the Program season. Participants were mailed their incentive checks by September 15 in 2015. The incentive structure offered for the 2015 season is listed in Table 1.

Table 1.

Fixed Capacity Payment Rate*	**Variable Energy Payment Rate****
$3.25 per Weekly Effective kW Reduction	$0.16 per kWh (Actual kW x Hours of Event)
Adjustment for first three events	**Adjustment after first three events**
$2.00 per kW not achieved up to nomination	$0.25 per kW not achieved up to nomination

*To be prorated for partial weeks

**Does not apply to first three Program events

Program Results

The results throughout this report are at the generation level and system losses have been taken into account. Idaho Power called three load reduction events in 2015. The first event occurred on June 30, the second on July 21, and the third on August 4. The maximum realization rate during the season was 96.6% and the average for all three events combined was 79.6%. The realization rate is the percentage of load reduction achieved versus the amount of load reduction committed for an event. The highest hourly load reduction achieved was during the July 21 event at 25.6 MW.

Participants had a committed load reduction of 28.1 MW in the first week of the Program, which was the peak committed load reduction for the season. This weekly commitment, or “nomination”, was comprised of 38 participants totaling 72 sites. Out of the total number of sites, 57 sites participated in the 2014 season, and 15 sites were newly added in 2015. There were 36 sites that did not re-enroll from the 2014 season. Of the 36 sites that did not re-enroll, 17 were from one customer that chose not to participate in 2015. However, of the sites that did not re-enroll last season, Idaho Power has received information from customers that three sites will be enrolled in 2016. The committed load reduction at the end of the season was 26.37 MW, which was achieved by 71 facility sites. One site dropped out of the Program during the season due to its primary pump being taken down and replaced.

The first event was called on Tuesday, June 30. Participants were notified at 2 p.m. for a four-hour event from 4-8 p.m. The total nomination for this event was 27.72 MW. The average load reduction was 23.6 MW. The highest hourly load reduction was 24.1 MW during hour three. The realization rate for this event was 86.7%.

The second event was called on Tuesday, July 21. Participants were notified at 2 p.m. for a four-hour event from 4-8 p.m. The total nomination for this event was 26.4 MW. The average load reduction was 24.9 MW. The highest hourly load reduction was 25.6 during hour one. The realization rate for this event was 96.6%.

The third event was called on Tuesday, August 4. Participants were notified at 2 p.m. for a three-hour event from 4-7 p.m. The total nomination for this event was 26.2 MW. The average load reduction was 13.8 MW. The highest hourly load reduction was 14.6 MW during hour three. The realization rate for this event was 55.4%. This was primarily due to one customer with two sites that was not able to provide their typical load reduction because of production issues caused by outages from range fires. These two sites achieved a realization rate of 8% in the August 4 event, compared to an average of 113% for the first two events. Had the site’s realization rate for the August 4 event been the average of its realization rates from the first two events, the realization rate for this event would have been 94.8%.

Participation

In anticipation of the 2015 Program season, Idaho Power utilized direct customer mailings to encourage both past participants and new customers to enroll. Several communications were sent to former FlexPeak Management program participants prior to the Commission approving Schedule 82 to advise them about the possible upcoming Program changes. The Commission granted authorization for the new Company-managed Program on May 7, 2015. Idaho Power had just over 30 days to recruit customers for the Flex Peak Program before the season began on June 15, 2015.

In May 2015, Program enrollment mailings were sent to all customers that had participated in prior seasons from 2012 to 2014. Contents of this mailing included Program details, a Program application, the Program's incentive structure, and a listing of the customer's eligible service points. Additionally, the Idaho Power Program Specialist and Customer Representatives answered specific customer questions by phone, email, and face to face contact, which helped inform participants of new Program details.

Despite changes to the Program, most past participants and sites re-enrolled. The number of sites enrolled in the Program for 2015 was 72. Of those 72 sites, 57 were previously enrolled during the 2014 season. Those 57 returning sites accounted for 79% of the 2015 enrolled service points. The Program also retained 34 of the 48 participants from the 2014 season for a 71% customer retention rate.

In 2015, the average nominated kW per site was 378 kW, while the average load reduction was 291 kW per site. The 72 enrolled sites nominated an average of 26.9 MW across the three events and included 38 unique participants. The average number of sites enrolled per participant was 3.1.

Figure 1 represents Idaho Power's service area divided into five regional areas: Western, Canyon, Capital, Southern, and Eastern.

Figure 1.

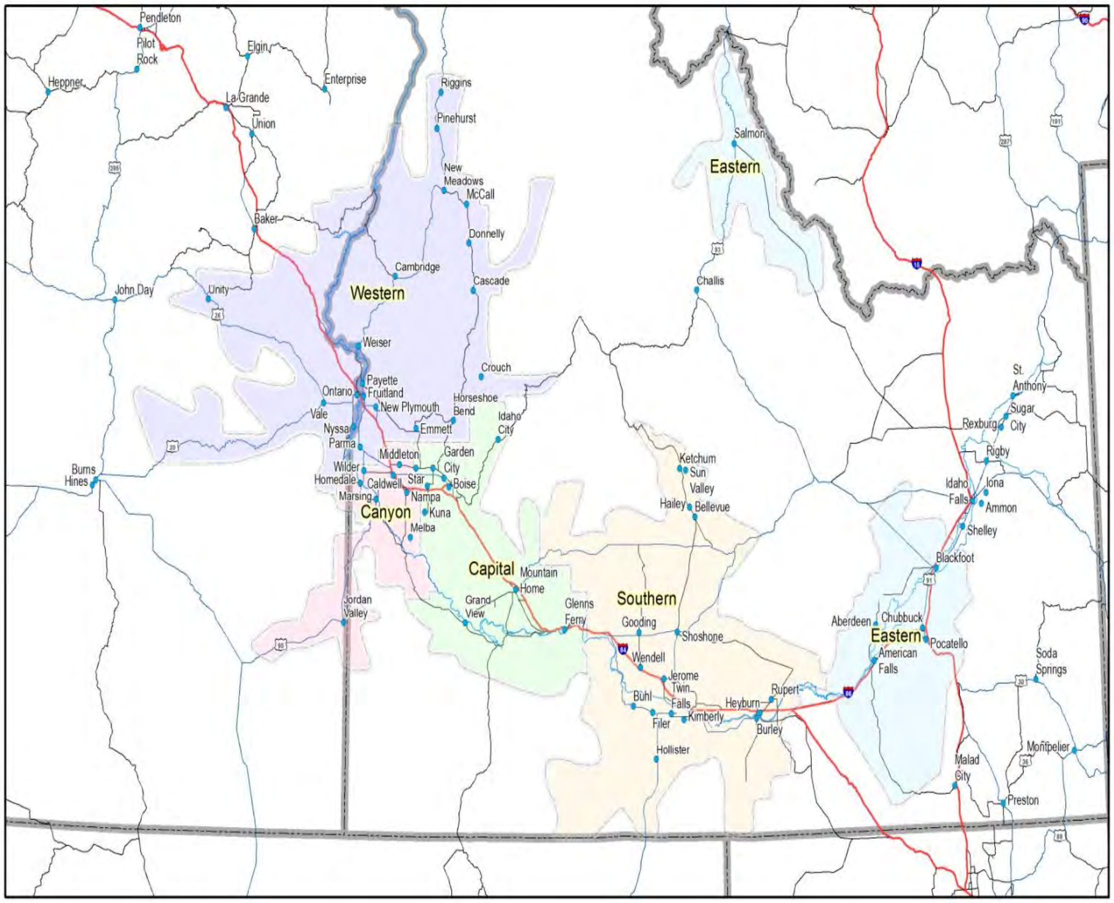


Figure 2 represents the 72 service points that enrolled in 2015 and their distribution by Idaho Power's regional service areas.

Figure 2.

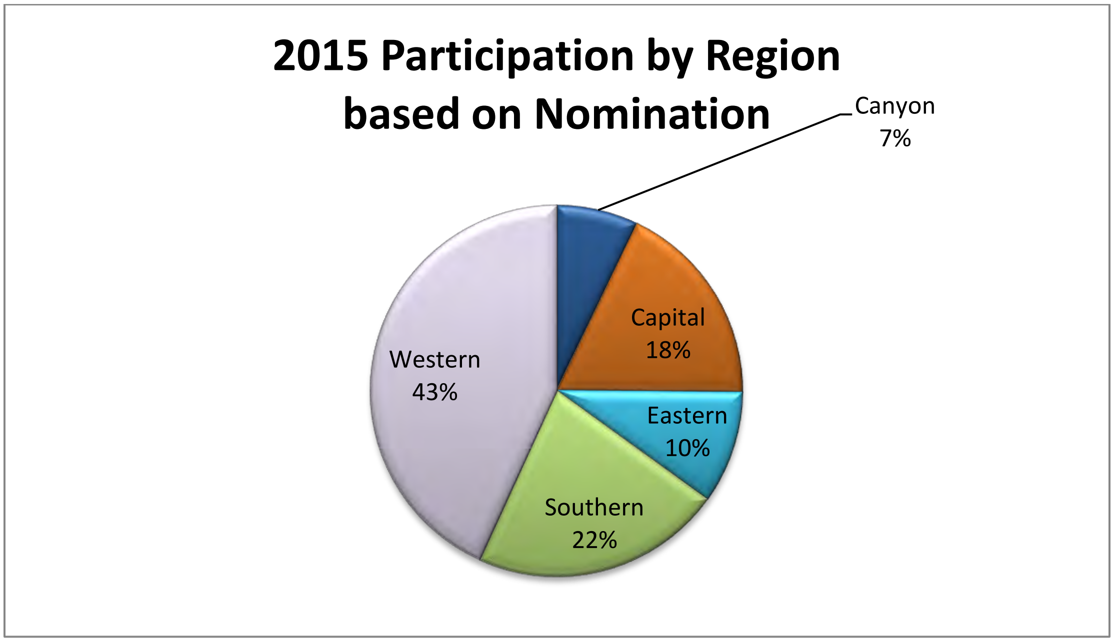
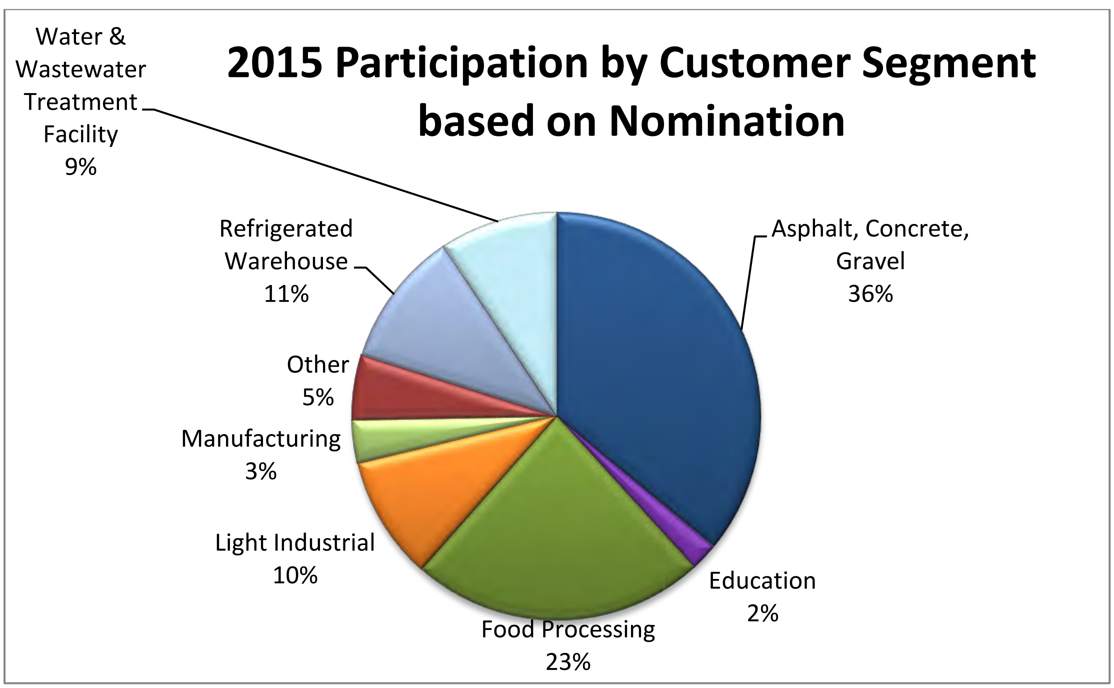


Figure 3 represents the 72 service points that enrolled in 2015 and their diversity per customer segment.

Figure 3.



Operations

Interval metering data provides Idaho Power the ability to view all participants' load after events. This metering data was used to calculate the reduction achieved per site during load reduction events. Using this data, Idaho Power provided participants post-event usage reports that showed hourly baseline, actual usage, and reduction during an event. This tool assisted participants in refining their nomination for future events. This data provides information useful in determining which participating sites may have an opportunity to provide more reduction or change their reduction strategy if nomination amounts were not achieved.

Based on individual event performance, Idaho Power contacted participants if their reduction was 25% less than the nominated amount for the event. When a participant did not achieve at least 75% of their nominated amount, there were often one or more of the following factors that influenced the performance:

- Production requirements prevented the ability to curtail or fully implement all load reduction measures within facility

- Building operators and/or maintenance personnel were out of town or unavailable during event day

- Enrolled facility was offline or not in production during entire load reduction event or baseline period due to reduced hours of operation

Load Reduction Analysis

Potential load reduction impacts in 2015 were verified by an impact evaluation performed by a third-party contractor, CLEAResult. The impact evaluation report performed by CLEAResult is included as an attachment to this report. The goals of the impact evaluation were to calculate load reduction in MW under Idaho Power's methodology, as well as the methodology that was previously used for the Program. The evaluation also analyzed and verified load reduction per site and per event.

The baseline that load reductions are measured against during load reduction events is calculated using a 10-day period. The baseline is the average kW of the highest energy usage days during the event availability time (2-8 p.m.) from the highest three days out of the last 10 non-event weekdays. Individual baselines are calculated for each facility site. Once the original baseline is calculated, there is an additional piece included in the methodology called the Day-of-Adjustment ("DOA") that is used to arrive at the adjusted baseline.

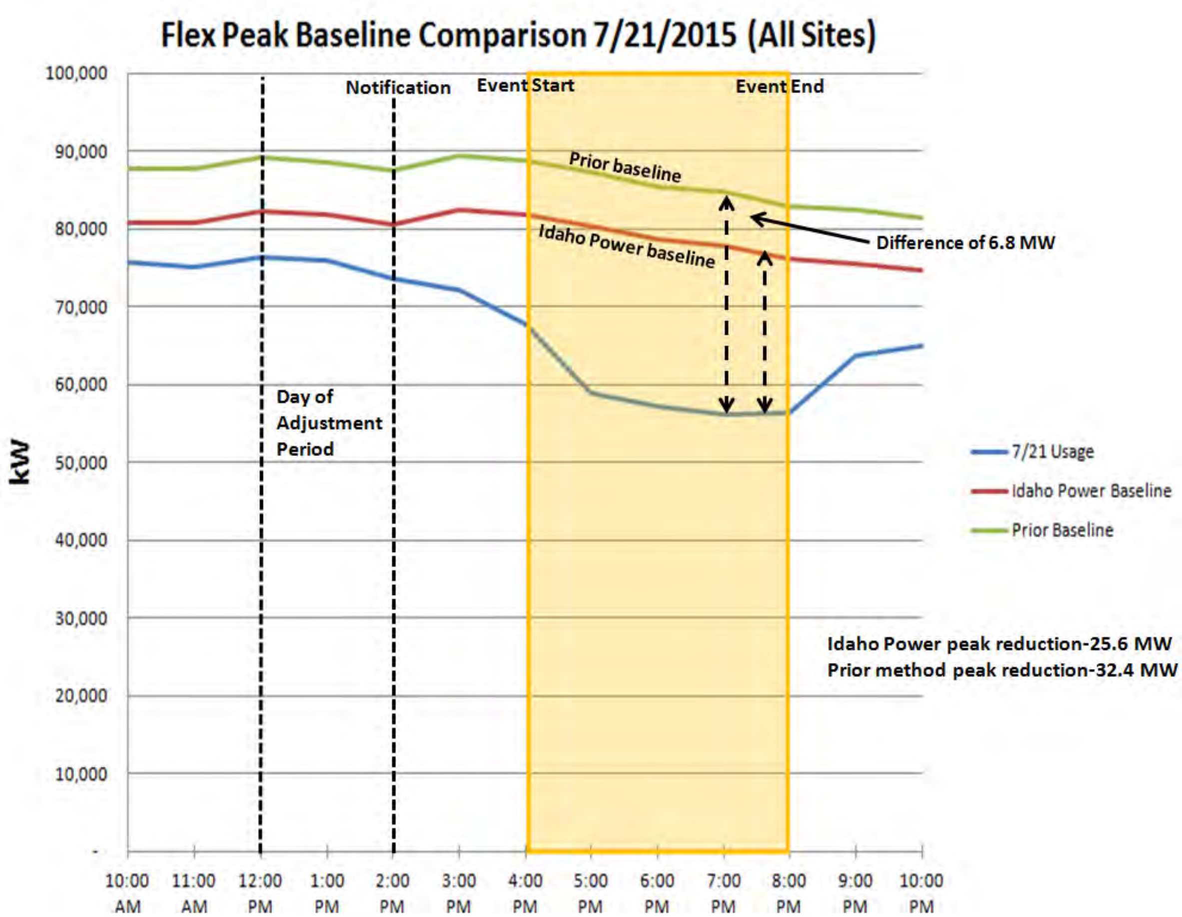
Adjustments address situations where load is lower or higher than it has historically been and the baseline does not accurately reflect the load behavior immediately prior to the event. The DOA is applied to each site's original baseline by accounting for the difference between the average baseline kW and the average curtailment day kW during hours two-three prior to the start of the event. The DOA is calculated as a flat kW and is applied to all baseline hours and capped at +/- 20% of the original baseline kW. The DOA is symmetrical, having either an upward or downward adjustment to the baseline, and is applied to the original baseline kW for each facility site for each hour during the Program event.

In determining the reduction amount for each event, there was variation from the previous baseline methodology compared to the current baseline methodology used in 2015 due to the DOA.

While both methods are commonly accepted throughout the industry, Idaho Power believes having a symmetrical DOA with caps is a more equitable way to calculate load reduction for both participants and the Company. The baseline and DOA methodologies will be compared in greater detail in the one-time Flex Peak Program report to be filed in 2016 per Order No. 33292.

Figure 4 represents the measured reduction from Idaho Power's baseline and DOA methodology versus the prior program baseline methodology for the second event on July 21, 2015.

Figure 4.



CLEAResult also analyzed the realization rate for each event with all sites aggregated together, as well as on an individual site basis.

Table 2 shows the Program realization rates for 2015 based on peak load reduction per event.

Table 2.

Event Date	Idaho Power Baseline & DOA	Previous Baseline & DOA
June 30, 2015	86.7%	91.3%
July 21, 2015	96.6%	121.1%
August 4, 2015	55.45%	80.2%
Season Average	**79.6%**	**97.5%**

Table 3 shows the realization rate per site for each participant in the Program.

Table 3.

Participant Number	June 30 Event Realization	July 21 Event realization	August 4 Event Realization	Season Realization
1	2%	2%	9%	4%
2	39%	59%	66%	55%
3	100%	129%	62%	97%
4	17%	128%	127%	91%
5	84%	206%	90%	127%
6	51%	69%	34%	51%
7	190%	14%	13%	100%
8	90%	74%	121%	95%
9	156%	70%	76%	101%
10	395%	71%	198%	221%
11	59%	38%	95%	64%
12	0%	11%	7%	6%
13	170%	168%	116%	151%
14	2%	60%	96%	53%
15	1%	92%	38%	44%
16	60%	46%	15%	40%
17	124%	106%	0%	77%
18	159%	163%	157%	160%
19	103%	71%	110%	95%
20	81%	106%	77%	88%
21	1%	61%	54%	39%
22	46%	113%	103%	87%
23	0%	19%	24%	14%
24	35%	0%	109%	48%
25	28%	0%	184%	71%
26	169%	79%	160%	136%
27	392%	277%	19%	229%
28	103%	89%	0%	64%

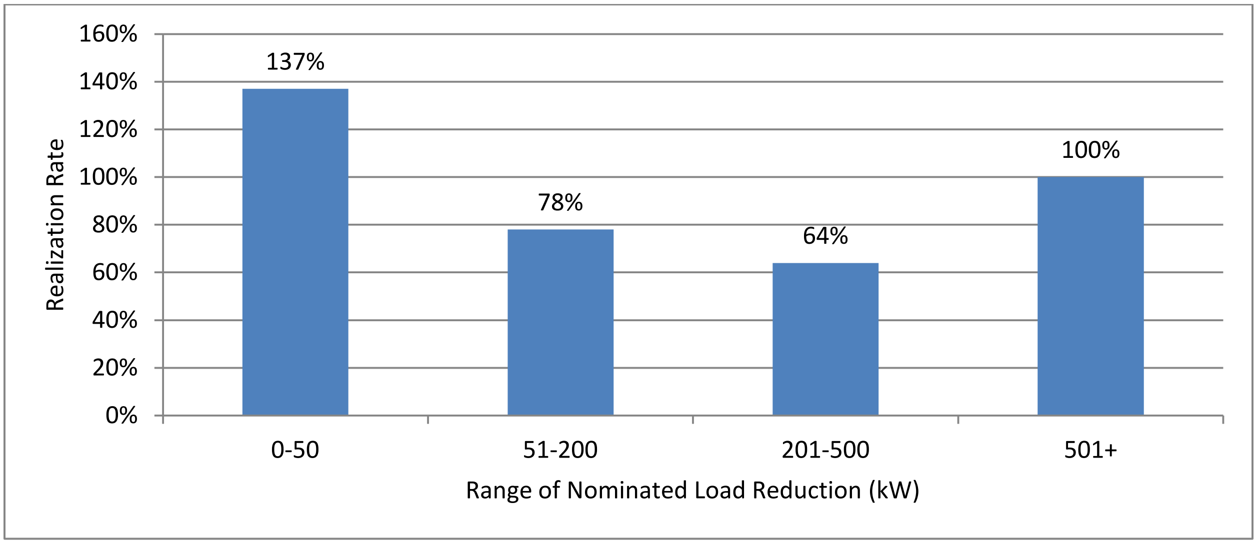
29	635%	80%	155%	290%
30	0%	0%	92%	31%
31	14%	62%	71%	49%
32	93%	76%	108%	92%
33	65%	42%	12%	40%
34	78%	80%	159%	106%
35	95%	76%	83%	85%
36	90%	77%	79%	82%
37	82%	102%	117%	100%
38	55%	74%	71%	67%

When broken out across four size classes, the sites with the smallest nominated load reduction, 0 – 50 kW, achieved the highest average realization rate across the three events: 137%. The highest realization rate among all nomination groups was the smallest at 0-50 kW, which supports that the Program change in allowing smaller participants to enroll helped increase both the Program participation and overall realization rate.

The second largest size class, 201 – 500 kW, achieved the lowest average realization rate: 64%. The 201-500 kW group had the largest portion of sites enrolled for the Program and was very diverse in size and facility type. The lower realization rates for this group were due to production requirements and key personnel being unavailable to implement the full curtailment of the sites. Idaho Power will work with this customer segment to help refine nominations to more closely align with realistic reduction opportunities which will increase the realization rate specific to this group.

Figure 5 below represents the realization rate achieved by each nomination group, averaged across all three events.

Figure 5.



The realization rate analysis results show that maximum load reduction was realized in the middle of the Program season. This time period is the last week of June through the middle of July, which correlates with Idaho Power's overall summer system peak.

Program Costs

Program costs totaled $563,292 through October 1, 2015. Incentive payments were the largest expenditure comprising 87% of total costs. The incentive payments were fixed capacity payments resulting from the three events called during the 2015 Program season. Variable energy payments were not made during the season because the variable energy payment is implemented starting with the fourth event. Total Program costs during 2014 were $1,563,211 or $44.66 per kW based on 35 MW. Total Program costs for 2015 were $22.53 per kW based on 25 MW. By managing the Flex Peak Program internally the Company saved its customers nearly $1 million compared to 2014 program costs.

Table 4 displays the 2015 Program costs through October 1, 2015, by category.

Table 4.

Item	2015 Program Costs
Materials & Equipment	$984
Contract Services	$8,138
Incentive payments	$487,857
Marketing & Administration	$66,313
Total	**$563,292**

Benefit-Cost Analysis

The benefit-cost analysis for the Flex Peak Program is based on a 20-year model that uses financial and demand-side management alternative cost assumptions from the *2015 Integrated Resource Plan* ("IRP"). As part of the public workshops in conjunction with Case No. IPC-E-13-14, Idaho Power and other stakeholders agreed in a settlement agreement ("Settlement") on a new method for valuing DR. The Settlement, as approved in Commission Order No. 32923, determined that the annual cost of operating the three DR programs for the maximum allowable 60 hours must be no more than $16.7 million. This amount was reevaluated in the 2015 IRP, as agreed upon in the Settlement, to be $18.5 million.

The preliminary cost estimate through October 1, 2015, of operating the three DR programs in 2015 was $8.9 million. It is estimated that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $11.4 million which is still below the total annual costs agreed upon in the 2013 Settlement as revised in the 2015 IRP.

Idaho Power's cost-effectiveness for DR programs is updated annually. A more comprehensive benefit-cost analysis will be included in the Company's annual 2016 Demand-Side Management Report when all the data will be available.

Customer Satisfaction Results

Idaho Power conducted a post-season survey that was sent via email to all participants enrolled in the Program. The survey focused on quantifiable questions that encouraged customer feedback that could be used to improve the Program in future years. Questions were based on a five point rating scale. Idaho Power received a response rate of 51%. The results of the survey were favorable and participants were satisfied, as shown below:

- When asked, overall the application process was easy to understand, 5 being "strongly agree," the average response was 4.5

- When asked, how clear were the notification messages for the Flex Peak Program events, 5 being "very clear," the average response was 4.9
- When asked, how prepared you were for each of the events called this year, 5 being "very prepared," the average response was 4.2
- When asked, how helpful was the post-event performance data in helping you refine future nominations for the Program, 5 being "very useful," the average response was 4.9
- When asked, how helpful was Idaho Power with any questions you had regarding the Flex Peak Program, 5 being "very helpful," the average response was 4.6
- When asked, how satisfied are you with the timeliness of receiving your incentive payment, 5 being "very satisfied," the average response was 4.7
- When asked, how satisfied are you with your incentive amount, 5 being "very satisfied," the average response was 4.2
- When asked, how satisfied are you with your overall experience with the Flex Peak Program, 5 being "very satisfied," the average response was 4.5
- When asked, how likely you would be to re-enroll in the Flex Peak Program in the future, 5 being "very likely," the average response was 4.9

Program Activities for 2016

Recruitment efforts for the 2016 season will begin in the fourth quarter of 2015 and first quarter of 2016 to encourage participation for the 2016 Program season. Idaho Power will meet with existing participants during the off-season from either their Idaho Power Customer Representative or the Program Specialist to discuss past season performance and upcoming season details. New customers will be identified mid-winter with field visits and will have a follow up communication in early spring. Several new large customers verbally committed to enrolling for the 2016 season at the end of the 2015 season as the groundwork had been laid during the active season to recruit them for the future. The Company has also published an article promoting the Flex Peak Program in the "Energy at Work" fall edition of Idaho Power's quarterly newsletter that was sent to all commercial and industrial customers. The article was well received and customers have reached out to the Idaho Power Program Specialist to inquire if the Program is right for them.

Idaho Power plans to launch a marketing campaign early in 2016 with Customer Representatives to recruit new participants. The Company is also developing new Program literature and a new Program brochure. This marketing campaign will focus on identifying customer dynamics that make successful Program participants and will also highlight available incentive amounts based on customers' load size. The Program will be jointly marketed along with Idaho Power's other energy efficiency programs. In addition, the marketing campaign goals are to increase the number and size (in terms of nominated load reduction) diversity of sites enrolled. By having a larger diversity of customer sizes enrolled, the Program would be less prone to volatility in its realization rate. The Company will utilize Customer Representative support for the sites with the largest nominated load reduction with the goal of ensuring all large sites are able to participate when load reduction events are called.

For the upcoming season, Idaho Power plans to complete an educational campaign with both enrolled participants and new customers to inform them of DR strategies with goals of increasing, refining or lowering the amount of nominated load reduction from each site to more realistically align with load reduction potential.

Conclusions

A Company-managed program offers customers several benefits. First, there are significant annual cost savings. The total cost savings this season compared to the prior year was nearly $1 million. These cost savings flow back to customers through the Company's Power Cost Adjustment mechanism. Second, all participants were paid within 30 days of the season ending compared to previous years where the second installment was paid nearly five months after the end of the season. Lastly, because the Program is managed by the Company, Idaho Power could cross-market energy efficiency programs and strengthen the relationship with its participants directly. In addition, the Company concluded the following:

- The Program had a total of 72 sites reducing peak demand by 25.6 MW
- The total Program costs for 2015 through October 1 were $563,292
- There were 15 new sites recruited to enroll in the 2015 season
- The Program shows high customer satisfaction results among participants
- The cost of having this resource available was $22.53 per kW in 2015 based on 25 MW, $26.32 per kW based on average reduction for the season, and $20.01 per kW based on max nomination for the season
- Despite changing to a Company-managed program, a short timeline to implement the Program, and modifications to the load reduction calculation methodology, the Flex Peak Program retained 71% of past participants (34 of 48 participants) from the 2014 season
- When analyzing the Program at the generation level, industrial and commercial customers have made noteworthy contributions to Idaho Power's DR programs. The Flex Peak Program currently contributes approximately 8-10% of the Company's overall DR portfolio and can be relied upon to provide dispatchable load reduction for the electrical grid
- Curtailment event results showed maximum load reductions of 24.1, 25.6, and 14.6 MW, respectively, for the three events, and an average of 21.4 MW. The events achieved realization rates of 86.7%, 96.6%, and 55.4%, respectively, averaging 79.6%

2015 Irrigation Peak Rewards Program Report

March 15, 2015

Idaho Power 2015

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Executive Summary

The Irrigation Peak Rewards program (the program) is a voluntary demand response program that has been available to Idaho Power's agricultural irrigation customers since 2004. The program pays irrigation customers a financial incentive for the ability to turn off participating irrigation pumps at potential high system load periods. The program is designed to minimize or delay the need to build new supply-side resources. The company estimates future capacity shortfalls through the Integrated Resource Plan (IRP) and then plans resources to mitigate these shortfalls. The Irrigation Peak Rewards program is a result of this planning process. The program is measured by the amount of demand reduction, in MW, available to the company during potential system peak periods.

The program continually increased peaking resource capacity to 340 MW's in 2012. Following the 2012 program season, Idaho Power determined through the 2013 IRP load and resource balance, that there would be no capacity shortfalls until 2016. In 2013, Idaho Power filed IPUC Case No. IPC-E-12-29 to temporarily suspend the program to allow time to work with stakeholders and interested parties to determine how the program should operate in the future. These workshops resulted in settlement agreements reached in Case No. IPC-E-13-14 and UM 1653. The Irrigation Peak Rewards program was again offered as a demand response program in 2014, with some modifications. Under the terms of the settlement agreement, the program was only available to service locations that currently had a load-control device installed or that participated in the Manual Incentive Option in 2012. In the most recent 2015 IRP, Demand Response (DR) programs were considered as committed resources as part of the load and resource balance. This new way of considering DR, contributed to a new load and resource balance indicating no capacity shortfalls until 2026. There were no changes to the Program for the 2015 program season. This report provides a review of the program's activities and expenditures for 2015 and is a supplement to the 2015 DSM Annual Report.

Summary of Program Results

The following items summarize the key components of the 2015 Irrigation Peak Rewards program.

- In 2015, the program had an estimated generation level load reduction of 305.3 MW resulting from a load control event, but had a maximum estimated load reduction potential of 323 MW.
- Four hundred forty six (446), or nearly 72% of the 623 eligible customers, chose to participate in 2015.
- Two thousand two hundred fifty nine (2,259), or 81% of the 2,775eligible service points, were enrolled in 2015.

- The program achieved a total billing demand enrollment of 403,176 kilowatts (kW).
- The total program costs for 2015 were $7,258,831.

Program Details

Interruption Options

Idaho Power irrigation customers taking service under Schedule 24 in both Idaho and Oregon, and had service locations that currently had a load-control device installed or that had previously participated in the Manual Dispatch Option, were eligible to participate. The interruption options allowed Idaho Power to initiate load control events that prevented pumps from operating at participating metered service locations. Participants could choose between three Interruption Options:

Automatic Dispatch Options

- Option 1 – A dispatchable one-way communication Load Control Device installed that allowed only Idaho Power to control all the customer's pumps at a single metered service point.
- Option 2 – A dispatchable two-way communication Load Control Device installed that allowed both Idaho Power and the customer to control all the pumps at a single service point.

All metered service points were assigned to participate in Option 1 unless specifically requested by the customer to be assigned Option 2 in order to retain control and monitoring capabilities.

Manual Dispatch Option

- Option 3 (Manual) - Service points with multiple pumps and over 1,000 cumulative Hp were eligible to participate in the Manual Option. Customers under this classification could choose to manually control which pumps were controlled during a load control event. Manual Option participants are required to nominate the amount of kilowatts (kW) available to dispatch during load control events.

The parameters of the Program included the following:

- Idaho Power would initiate control (dispatch) events on a customized EnerNOC Web site and an Idaho Power owned AMI integrated software platform.
- A minimum of three (3) load control events would occur each program season.
- Dispatch load control events could occur any weekday or Saturday, excluding July 4, between the hours of 1 p.m. and 9 p.m.

- Load control events could occur up to 4 hours per day and up to 15 hours per week, but no more than 60 hours per program season.
- Idaho Power would give notification to Manual Dispatch Option participants four hours prior to the initiation of a control event. Idaho Power may not provide prior notification of a load control event for Automatic Dispatch Option participants.
- If prior notice of a load control event had been sent, Idaho Power could choose to cancel the event and notify participants of cancellation.
- Idaho Power would give up to 30 minutes notice prior to start of all actual events and 30 minutes prior to the end of all actual events.
- The provisions for this program did not apply to system emergencies or events outside the control of Idaho Power.

Program Incentives

A customer's incentive appeared as a demand credit and energy credit applied to the monthly bills for the period of June 15th through August 15 th. The demand credit is calculated by multiplying the monthly billing kW by the demand-related incentive amount. The energy credit is calculated by multiplying the monthly billing kilowatt-hour (kWh) usage by the energy-related incentive amount. Credits were prorated for periods when reading/billing cycles did not align with the program season dates from June 15 to August 15. The incentive structure includes a 'Fixed' and 'Variable' payment, with an increased variable credit amount for service points that voluntarily participate in the 'Extended' 9 p.m. late interruption period. All customers' 'Fixed' incentives in the Automatic and Manual Dispatch options are calculated using Idaho Power metered billing data. Idaho Power's Customer Relations and Billing (CR&B) calculates the bill credits and applies it to the bill. Manual Dispatch Option customers' incentives were calculated using billing kW from 2015 metering data and nominated kW. The incentives were calculated through a manual process, and customers received the incentives in the form of a check. Any 'Variable' incentive payments (applied to events occurring after the first three) would be paid by check no more than 45 days after the end of the program season. The incentives offered in 2015 are listed in Table 1.

Table 1. 2015 Incentives.

Option	Fixed Demand Credit ($/billing kW)	Fixed Energy Credit ($/billing kWh)	Variable Energy Credit ($/billing kWh)	Extended hour Variable Energy Credit ($/billing kWh)
Automatic and Manual Options	$5.00	$0.0076	$0.148	$0.198

Program Opt-out

Under the rules of the Dispatch Option, participants had the ability to opt-out of dispatch events up to five times per metered service point. Each opt-out incurred a fee. The opt-out fee was $5.00 per kW for the first three events, and $1.00 per kW for remaining events based on the current month's billing demand (kW). Opt-out penalty fees would never exceed the incentive amount. Manual Dispatch Option metered service locations were charged opt-out penalty fees based on the nominated kW that was not turned off during a load control event.

In 2015, one hundred thirty eight (138) service points opted out 195 times, some service points opting out of multiple events.

Review of Program Results

Participation

Idaho Power presented the program details at irrigation workshops across Idaho Power's service area, and each year Idaho Power staff participates in four agriculture shows. After the Irrigation Peak Program suspension in 2013, Idaho Power has continually made a concerted effort to encourage past participants to re-enroll in the program each year by sponsoring workshops, attending trade shows, and doing direct customer mailings. In 2015, Idaho Power presented the details of the program at six (6) workshops across five regional areas. Additionally, Idaho Power agriculture representatives answered specific customer's questions by phone, email, and face to face contact which helped inform customers about the program details.

In March 2015, program enrollment mailings were sent to all customers that currently had a load-control device installed or past participants in the Manual Dispatch Option. Contents of this mailing included program details, a program application, the program's incentive structure, listing of the customer's eligible service points, and a potential incentive estimate for each program option based on the customer's previous year's usage.

Despite reinstating the program in 2014 with a reduction in incentive amounts, three minimum load control events, and modifications to the event notification, the program increased enrollment in 2015. The number of service points enrolled to participate in the program for 2015 was 2,259. This accounted for approximately 81 percent of the eligible service points

Figure 1 portrays Idaho Power's service area divided into five regional areas; Western, Canyon, Capital, Southern, and Eastern. These areas are used throughout this report in reference to program information.

Figure 1. Idaho Power service areas.

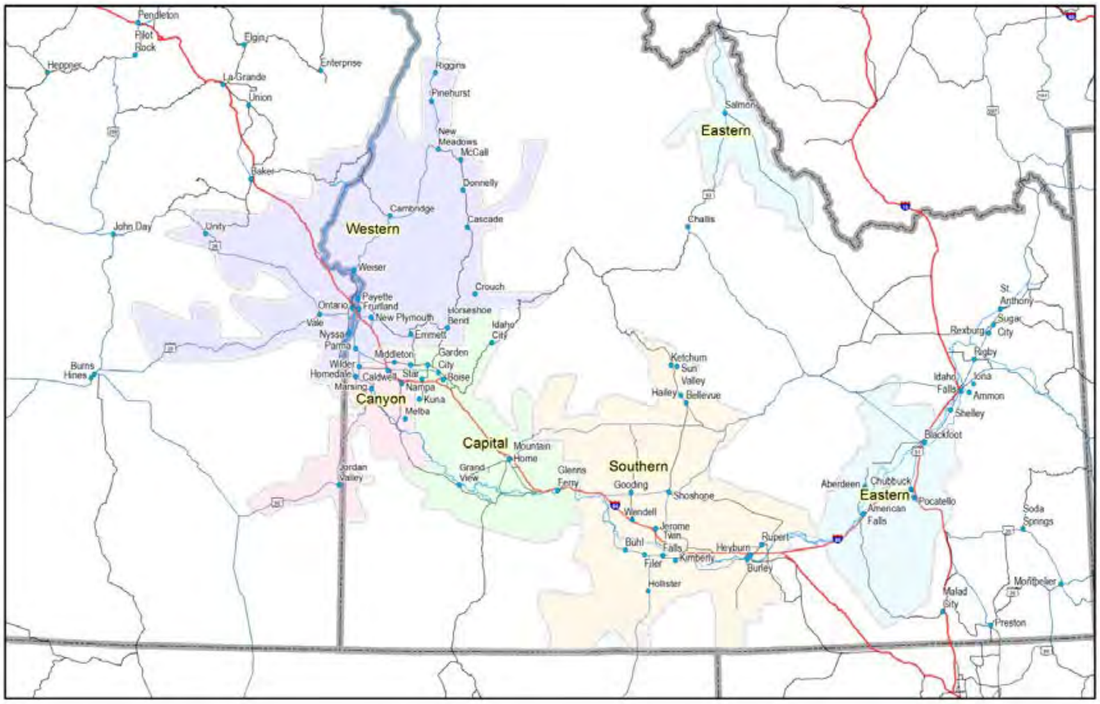


Figure 2 represents the 2,259 irrigation service points that participated in 2015 and their distribution by Idaho Power's regional service areas.

Figure 2. Distribution of participants 2015.

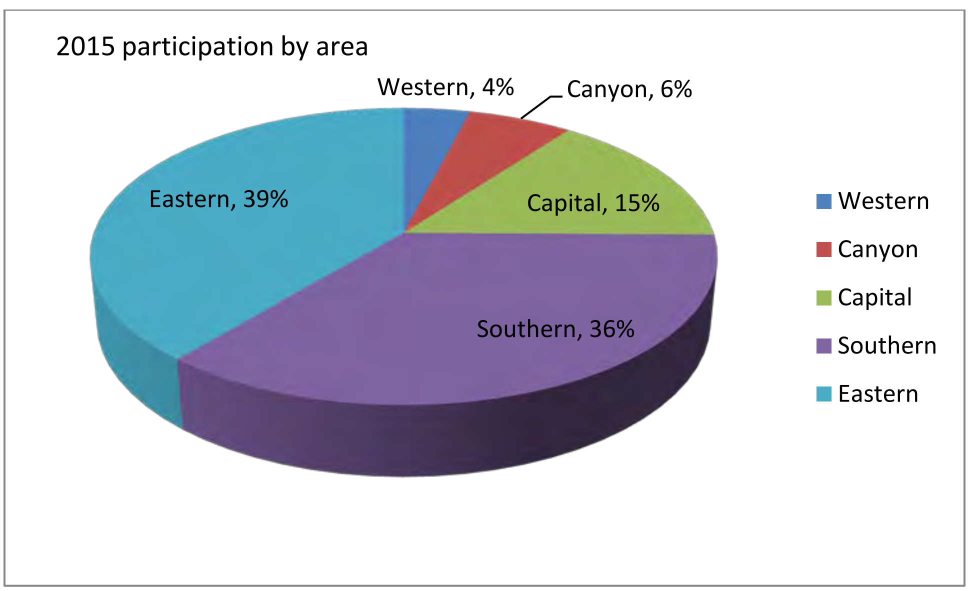


Table 2 lists the total number of eligible service points and the participation levels for each area in 2015.

Table 2. 2015 Eligible service locations and participation levels by area.

2015-Idaho Power Area		Eligible Service Locations	Automatic Device	Manual	Total Enrolled by Area	Percent of eligible enrolled by area
Western	Idaho	60	39	0	39	65%
	Oregon	66	50	3	53	80%
Canyon	Idaho	151	130	8	138	91%
	Oregon	4	3	0	3	75%
Capital		386	309	24	333	86%
Southern	Twin Falls	525	391	3	394	75%
	Mini-Cassia	456	410	0	410	90%
Eastern		1127	889	0	889	79%
	Total Service Points	**2775**	**2221**	**38**	**2259**	

Operations

Equipment and Monitoring

Dispatch Option

At the inception of the Dispatch Option, Idaho Power contracted with Irrigation Load Control, LLC (ILC), who had formed a joint venture between M2M Communications and Spartan Energy Control Systems to provide installation and service for this portion of the program. In the winter of 2010, M2M Communications was purchased by EnerNOC. Idaho Power contracted with EnerNOC to provide equipment, installation, and service for the Irrigation Peak Rewards Dispatch Option. Idaho Power initiates Irrigation Peak Rewards dispatch control events on a customized EnerNOC Web site. The Web-to-wireless remote control system, developed by M2M Communications utilizes the Loadstar® Model M101control device installed in customers' pump motor control circuit to turn off or prevent the pump from running during an interruption event. This equipment provides remote cellular communication or remote satellite communication. The Web service allows Idaho Power to dispatch, schedule and carry-out interruption events. Communication from the device can provide feedback to determine the status of the customers' equipment surrounding an interruption event. Customers also have the option of using the equipment for their own remote control purposes outside of interruption events.

Idaho Power has also been expanding the use of our power line carrier technology used for its automated metering system and air conditioning cycling program for turning off pumps within the Irrigation Peak Rewards program. This technology utilizes an Aclara Demand Response Unit (DRU) Model Y99700, installed in the customers' pump motor control circuit to turn off or prevent the pump from running during a load control event. The DRU receives commands via Idaho Power owned power line carrier technology.

Idaho Power's Automated Metering Infrastructure (AMI) technology allows Idaho Power to monitor the majority of participating irrigation pumps during load control events by supplying hourly usage reports. These reports provide useful information in determining which service locations had devices that either worked or failed to turn off pumps during events.

Program Analysis

Load Reduction Analysis

Estimated load reduction impacts in 2015 were determined in an impact evaluation performed by a third party contractor. In 2015, Idaho Power contracted CLEAResult Consulting Inc., (CLEAResult) to complete an impact evaluation of the 2015 Peak Rewards program. The goals of the impact evaluation were to determine the demand reduction (in MW) during three test events and determine the counterfactual realization rate had an event been called on each business day during the program's June 15 through August 15 season. This information was used to determine and verify realization rates used to estimate load reduction potential.

For the purposes of this report, realization rate is defined as the likelihood an irrigation service point is operating during the interrupt period and includes program equipment failures, and is used to determine program impacts. The realization rate can be characterized as the percentage of monthly billing demand expected to result in an actual load reduction on the system during a given interruption period in a typical summer. This rate is highest at the end of June and the beginning of July when many irrigation pumps are operating nearly 24 hours per day and 7 days per week. The realization rate is lower later in the irrigation season when many irrigation pumps are turned off due to crop maturity. Hourly data used for the evaluation was acquired and analyzed using information from IPC's Automated Metering Infrastructure (AMI) technology.

In 2014, the Company contracted with PECI to complete an impact evaluation of the Program. A complete analysis resulted in an expected maximum realization rate of 71.6 percent occurring during the first two weeks of July. Using AMI data, CLEAResult developed a counterfactual realization rate analysis that demonstrated similar results with what past analysis have shown, that the time period within an irrigation season has a large influence on the expected realization rate.

CLEAResult completed analyses of curtailment events held on June 29, July 2, and August 11, 2015, each containing four dispatch groups that curtailed enrolled irrigation pumps in rolling four-hour increments. The results of the curtailment event analyses showed maximum meter level demand reductions of 278.3, 273.8, and 180.2 MW, respectively, for the three events, and an average of 244.1 MW. The Company has determined that the full value of the demand reductions at the generation level include an average 9.7 percent line loss. When line losses are included, maximum demand reductions are 305.3, 300.3, and 197.7 MW respectively for the three events. The events achieved realization rates of 69.0 percent, 67.9 percent, and 44.7 percent, respectively, averaging 60.5 percent.

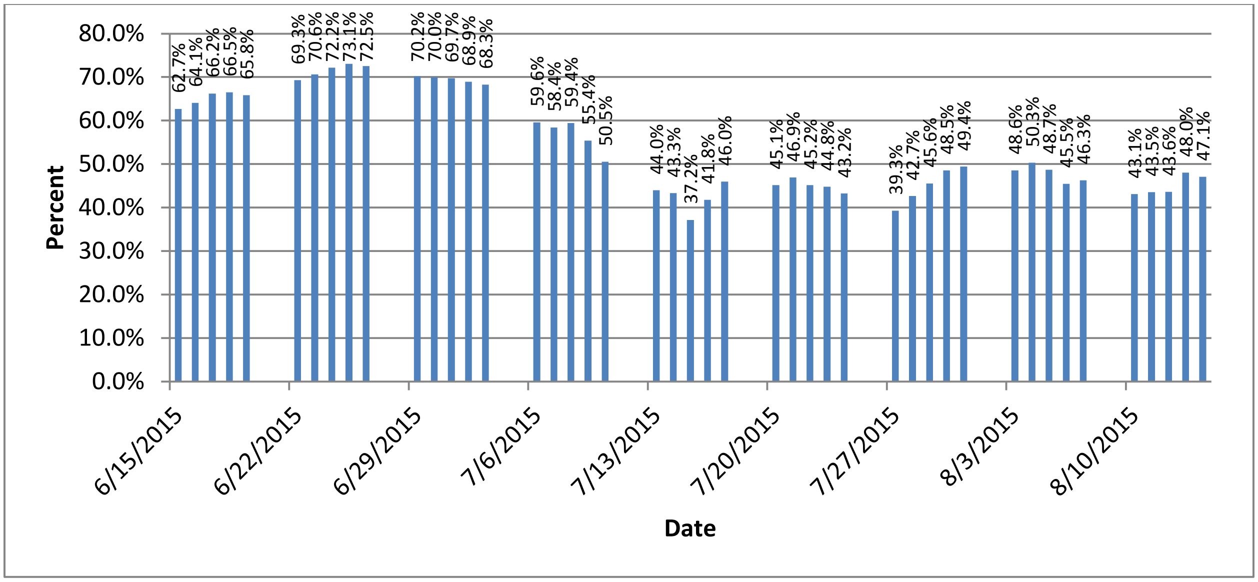
While the first quarter of the program season (June 15–July 30) showed an average expected realization rate of 68.6 percent, the expected realization rate in the last three quarters of the season (July 1–August 15) drops off significantly, to an average of 49.1 percent. This is due to a higher percentage of pumps being shut off during the baseline period in the first two weeks of August. The 2015 counterfactual realization rate peaks in the last two weeks of June, which was two weeks earlier than 2014 due to an earlier start of the growing season. The analysis determined that the highest realization rate of 73.1 percent occurred June 25. Had the program experienced a load control event on that day, it would have resulted in a 295 MW load reduction at the meter level, or a 323 MW maximum load reduction at the utility generation level.

A copy of this evaluation report can be found in *Supplement 2: Evaluation*. Tables 3 and Figure 3 show program realization rates from analysis for 2015.

Table 3: 2015 Program realization rates and the seasonal average percent categorized load expected to not be turned off during a load control event had it occurred during each respective two week period throughout the program season.

Date Range	Average Pump OFF in Baseline Rate	Average Opt-Out Rate	Average Device Failure Rate (options 1&2)	Did not reduce total nominated kW (option 3)	Counterfactual Realization Rate	Total
Jun 15 - 30	22.1%	3.2%	2.9%	3.3%	68.6%	100.0%
Jul 1 - 15	34.8%	3.2%	2.9%	3.3%	55.9%	100.0%
Jul 16 - 31	45.8%	3.2%	2.9%	3.3%	44.9%	100.0%
Aug 1 - 15	44.2%	3.2%	2.9%	3.3%	46.5%	100.0%

Figure 3: Figure three graphically presents the expected realization rate for all non-holiday and non-weekend days of the 2015 program season. The expected realization rate peaks on June 25th at 73.1%.



The results of the 2015 impact evaluation showed Idaho Power's Peak Rewards program functioned as intended, and, if properly maintained, can be relied on to provide dispatchable demand reduction to the electricity grid. These realization rates are used to calculate program performance from total enrolled billing demand and used to forecast load reduction potential in the future.

Program Costs

In 2015, this program had a total cost of $7,258,831 with the incentive credit being the largest expenditure at 85 % of total costs. The program was not marketed to new participants in 2015.

Table 4 displays the annual program costs by category.

Table 4. Annual program costs 2015.

Item	2015 Program Costs
Materials and Equipment	$139,957
Installation and Contract Services	$855,184
Incentive payments	$6,167,226
Marketing and Administration	$96,464
Total	**$7,258,831**

Benefit-Cost Analysis

The methodology used to determine the cost-effectiveness of the demand response programs was updated in 2014. As part of the public workshops in conjunction with Case No. IPC-E-13-14, Idaho Power and other stakeholders agreed on a new methodology for valuing demand-response. The settlement agreement, as approved in IPUC Order No. 32923, defined annual cost of operating the three demand-response programs for the maximum allowable 60 hours must be less than $16.7 million. This $16.7 million value is the levelized annual cost of a 170 MW deferred resource over a 20 year life. In 2015, the cost of operating the three demand response programs was $9 million. It is estimated that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $12.4 million and remain cost-effective.

Conclusions

- The Irrigation Peak Rewards program increased its enrollment from 2014 to include over 81% of eligible service locations in 2015.
- The program had a total of 2,259 service locations reducing peak demand by 305.3 MW's.
- When looking at the program at the generation level, irrigation customers have made significant contributions to Idaho Power's demand response programs. The Irrigation Peak Rewards program currently contributes approximately 83 % of Idaho Powers overall demand response portfolio.
- The cost of having this resource available was $23.77 per kW in 2015

CLEAResult

A/C Cool Credit Program
2015 Impact Evaluation

September 25, 2015

PREPARED BY CLEAResult

PREPARED FOR Idaho Power Company

REPORTING PERIOD July – August 2015

We change the way people use energy™

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Executive Summary

Idaho Power Company contracted CLEAResult to complete an impact evaluation of the 2015 A/C Cool Credit program. The goal of the impact evaluation was to calculate the estimated demand reduction achieved by three A/C Cool Credit curtailment events and update the program's existing predictive model to account for the 2015 curtailment event results.

CLEAResult completed analyses of curtailment events held on June 30th, July 21st, and July 31st, 2015, each with a three hour duration. The results of the analyses showed maximum single hour demand reductions of 1.11, 0.65, and 0.82 kW per participant, respectively, for the three events. The average hourly demand reduction was 1.04, 0.62, and 0.74 kW per participant, respectively, for the three events. Due to the distinct weather patterns between the Boise and Pocatello/Twin Falls regions, each curtailment event analysis includes region-specific results.

The impact evaluation demonstrated that Idaho Power's A/C Cool Credit program functions as intended, and, if properly maintained, can be relied on to provide dispatchable demand reduction to the electricity grid.

Introduction

Background

Summer use of air conditioning (A/C) systems places a burden on Idaho Power Company's power supply, power contracts, and transmission and distribution systems. Demand reduction programs in which customers agree to curtail A/C use in times of high demand have proven to successfully deliver significant and dispatchable demand (kW) reduction.

Idaho Power's A/C Cool Credit is one such program that curtails demand from residential A/C units. After being suspended for the 2013 season, the program has been reinstated since 2014 on a limited basis, completing three curtailment events each year during the June 15th through August 15th program season as required under the provisions of the program. The program's function is to curtail residential A/C demand during periods of peak demand by utilizing direct load control technology to cycle A/C units OFF for a portion of each curtailment event period. A/C Cool Credit program curtailment events are limited to non-holiday weekdays with a maximum of 60 hours per curtailment season (with the exception of a system emergency). In exchange for having their A/C units curtailed, program participants receive a $5 credit on their July, August, and September electric bills.

CLEAResult completed impact evaluations on the A/C Cool Credit program in 2011, 2012 and 2014. The 2012 evaluation also included a research component, investigating how different cycling strategies and temperatures impacted kW reduction results, as well as indoor air temperatures of participating homes. The outcome of that research was used to develop a predictive model (the "IPC Curtailment Calculator") that uses regression formulas to estimate load reductions based on cycling strategy and temperature inputs. The calculator has been updated with every impact evaluation, resulting in the sample size of events informing the calculator's regression formulas, as well as the calculator's accuracy, to increase with each passing season.

The goals of this 2015 impact evaluation were to:

- Determine and verify the demand reduction (MW) during a minimum of three events in 2015
- Utilize data analysis results to update regressions informing the existing predictive model

Analysis Methodology

The demand reduction impact evaluation was conducted through the analysis of hourly Advanced Metering Infrastructure (AMI) data provided by Idaho Power. This approach was supported by the findings of the 2012 impact evaluation, which analyzed both AMI and logger data, and showed both sources to produce similar estimations of energy reduction per curtailment event.

Analysis of the AMI data was conducted using the SAS analytics program. SAS provides a robust platform for analyzing large amounts of data in a consistent manner. The SAS model developed as part of the 2012 and 2014 AC Cool Credit research projects was utilized to complete the analysis for each 2015 curtailment event. The model first imports the relevant AMI data from Comma Separated Values (CSV) files; second, processes the data to configure it in a way suitable for analysis; and third, analyzes the data to produce the desired result metrics.

The sub-sections below describe the project's methodology related to the sampling plan, demand reduction analysis, and updating of the predictive model.

Sampling Plan

The availability of AMI data for all program participants allowed the project's sampling plan to be a census of program participants. Table 1 below details the number of participants included in each of the curtailment event analyses. Participants were not analyzed if their interval meter data included an error code during the curtailment event period of the baseline period. With an average of 99.7% of all participants analyzed, the results calculated from the analyzed participants have been extrapolated to all participants in the results section.

Table 1: Unit Counts by Curtailment Event

Curtailment Event	Count of Total Participants	Count of Participants Analyzed	Percent of Total Participants Analyzed
June 30	29,874	29,758	99.6%
July 21	29,432	29,342	99.7%
July 31	28,288	28,244	99.8%
Average	29,198	29,115	99.7%

Demand Reduction Analysis

A. Baseline Data

The load reduction achieved during curtailment events was calculated by comparing the average load from each curtailment day against the average load developed from non-curtailment days selected for the baseline. The "previous days" approach was used, which utilizes the average load data from the previous 10 non-weekend, non-curtailment days. Baseline kW was calculated as the average of the three days with the greatest demand from these previous ten non-curtailment days, as ranked by the highest hourly demand occurring during the curtailment timeframe. Curtailment days normally occur on hot, high demand days, thus selecting high demand days for the baseline ensures a similar load profile is used for the baseline days as the curtailment days.

B. Offset Factor

In order to effectively compare baseline and curtailment day loads, the baseline load was adjusted using an offset factor, calculated as the difference in kW between the baseline and curtailment event day load during the hour prior to the start of the curtailment. The offset factor was applied to the baseline day to "normalize" the baseline kW to the curtailment day kW. The offset factor mitigates underlying differences in load due to slight differences in outdoor temperature or other external factors.

Predictive Model

The "IPC Curtailment Calculator" was developed using data results from the seven curtailment events from the 2012 AC Cool Credit Research Project with the aim of providing Idaho Power with a tool for estimating demand reduction levels based on temperature and cycling percentage inputs. The calculator was then updated after the 2014 impact evaluation to include regression formulas that accounted for both 2012 and 2014 event results.

The calculator is Excel-based and driven by regression formulas developed in the SAS analytics program. Users can input expected temperature at the start of the curtailment event and percent cycling strategy and the model will provide an estimated kW reduction per unit and total MW for the population of program participants. Alternatively, users can input temperature and a requested MW reduction amount and the model will estimate the percent cycling required to achieve the requested MW reduction.

The model uses a regression formula developed for both regions (Boise and Pocatello/Twin Falls) based on an independent variable representing the interaction of "Temperature at start of curtailment event" and "Percent cycling." This variable was shown in the 2012 Research Project to produce the most statistically significant results.

As part of the 2015 impact evaluation, the predictive model was updated to account for the results of the 2015 curtailment events. This entailed developing new regression formulas that used as inputs results from 2012, 2014, and 2015 curtailment events

Results

Curtailment Events Summary

A total of three curtailment events were completed as part of the 2015 A/C Cool Credit program. Table 2 below details the characteristics of these events, including high temperature, event time period, and cycling percent. All A/C Cool Credit participants were included in each curtailment event that Idaho Power called. The maximum temperature in Boise during event days ranged from 102 degrees on June 30th to 98 degrees on July 21st. The maximum temperature in Pocatello during event days ranged from 94 degrees on June 30th and July 31st to 89 degrees on July 21st.

Table 2: 2015 Curtailment Event Schedule

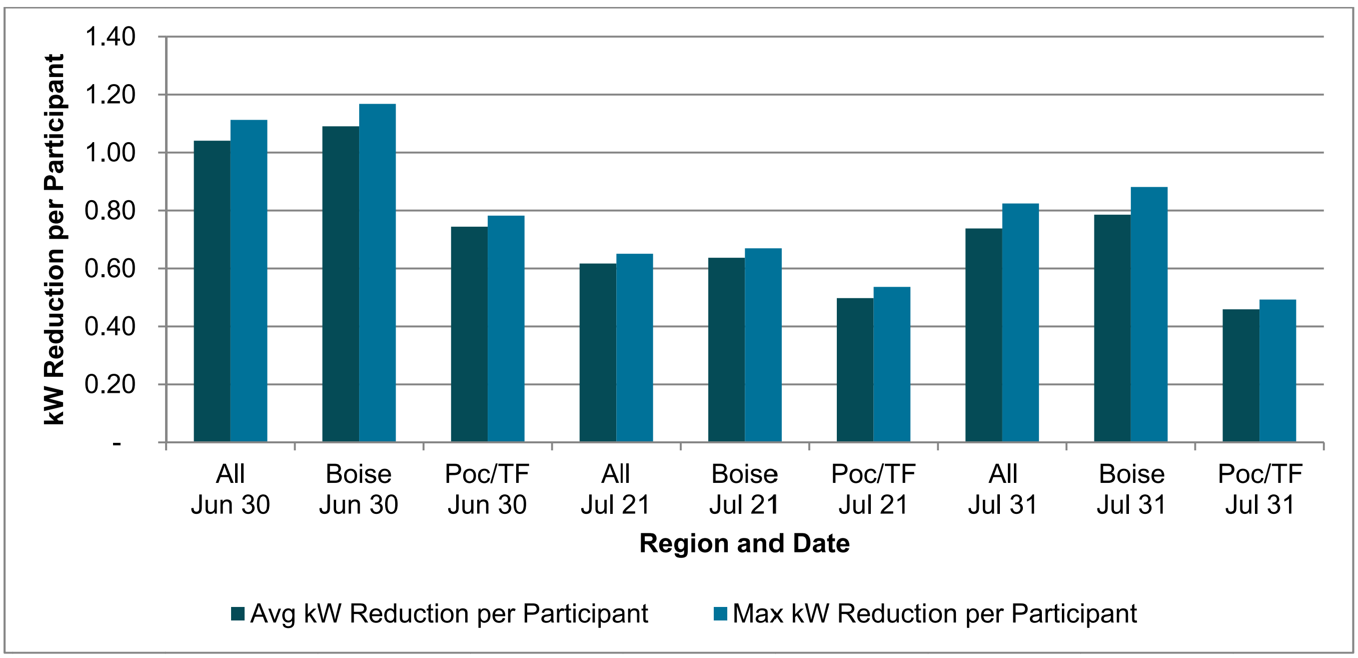
Curtailment Event	Boise Temp (high)	TF/Pocatell Temp (high)	Control Event Start Time	Control Event End Time	Length (hrs)	Cycling Percent
June 30	102	94	4:00pm	7:00pm	3	55%
July 21	94	89	4:00pm	7:00pm	3	55%
July 31	98	94	4:00pm	7:00pm	3	55%

Table 3 summarizes the AMI data analysis results for each curtailment event. Figure 1 also shows an overview of the results for each curtailment event in kilowatt (kW) reduction at the meter level. The meter level results do not include line losses. Because temperatures in Boise differ from the Twin Falls/Pocatello area, they are treated as separate events and results are reported individually. The June 30th event showed the highest maximum and average kW reductions for both Boise and Pocatello/Twin Falls regions.

Table 3: 2015 Summary Results of Executed Control Events

Date and High Temp	Percent Curtailment	Region	Avg. kW Reduction per Participant	Max kW Reduction per Participant	Avg. kW Reduction - Total	Max kW Reduction - Total
June 30 Boise: 102° Poc/TF: 94°	55%	All	1.04	1.11	30,985	33,113
		Boise	1.09	1.16	27,830	29,792
		Poc/TF	0.74	0.78	3,163	3,326
July 21 Boise: 94° Poc/TF: 89°	55%	All	0.62	0.65	18,115	19,093
		Boise	0.64	0.67	16,003	16,820
		Poc/TF	0.50	0.54	2,103	2,267
July 31 Boise: 98° Poc/TF: 94°	55%	All	0.74	0.82	20,845	23,287
		Boise	0.79	0.88	18,890	21,185
		Poc/TF	0.46	0.49	1,933	2,074

Figure 1: Summary of 2015 Events



June 30th Curtailment

The event called on June 30th implemented a 55 percent curtailment strategy and resulted in a system wide average demand reduction of 1.04 kW per participant across the three hours of the event, and a maximum single hour demand reduction of 1.11 kW per participant. In the Boise region, the average demand reduction for the event was 1.09 kW per participant, whereas in Pocatello/Twin Falls it was 0.74 kW per participant. The maximum demand reduction for the Boise area was 1.16 kW per participant and in Pocatello/Twin Falls it was 0.78 kW per participant. Figure 2 and 3 below present the aggregate load profiles for the Boise and Pocatello/Twin Falls participants, respectively, for the June 30th curtailment event.

Figure 2: June 30 Curtailment Event Results - Boise

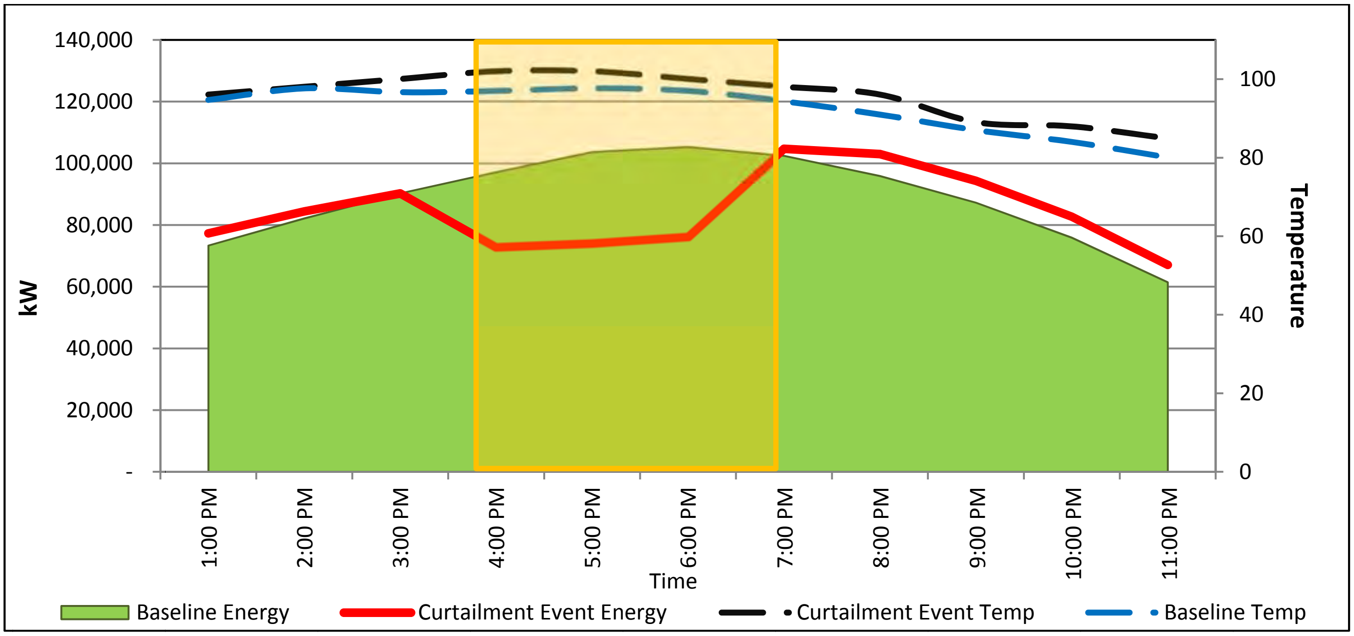
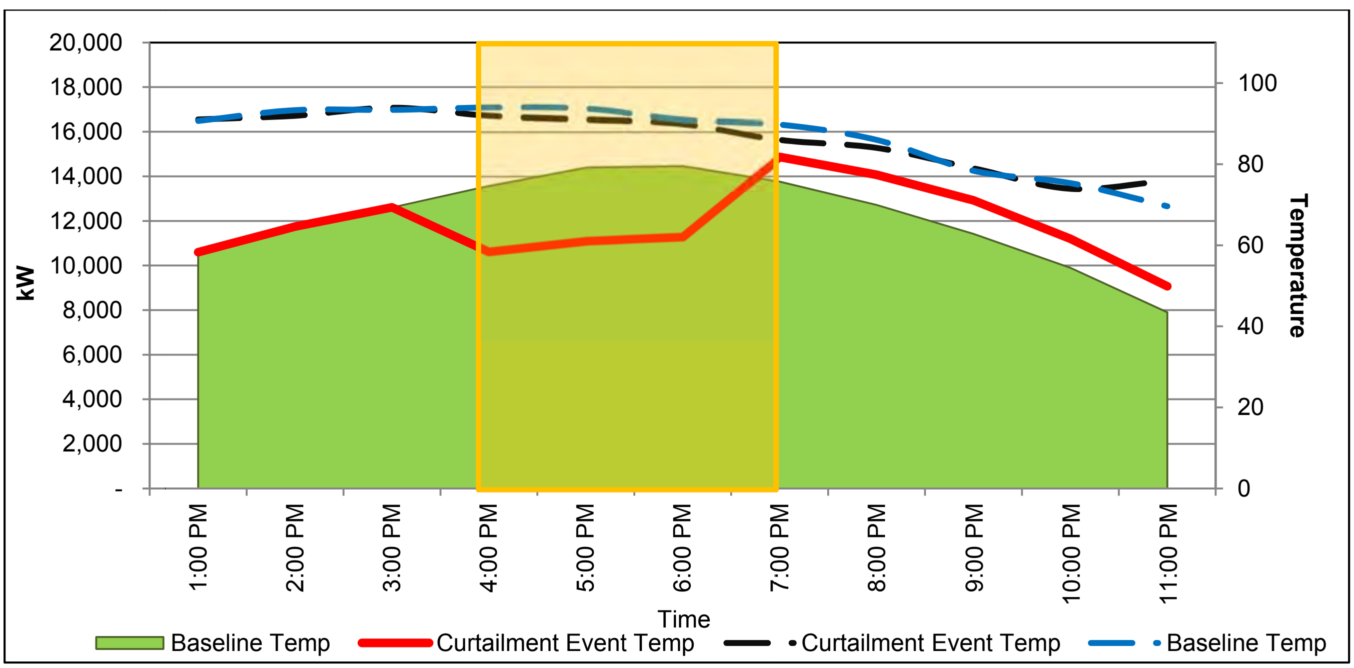


Figure 3: June 30 Curtailment Event Results - Pocatello/Twin Falls



July 21st Curtailment

The event called on July 21st implemented a 55 percent curtailment strategy and resulted in a system wide average demand reduction of 0.62 kW per participant across the three hours of the event, and a maximum single hour demand reduction of 0.65 kW per participant. In the Boise area, the average demand reduction for the event was 0.64 kW per participant, whereas in Pocatello/Twin Falls it was 0.50 kW per participant. The maximum demand reduction for the Boise area was 0.67 kW per participant and in Pocatello/Twin Falls it was 0.54 kW per participant. Figure 4 and 5 below present the aggregate load profiles for the Boise and Pocatello/Twin Falls participants, respectively, for the July 21st curtailment event.

Figure 4: July 21 Curtailment Event Results - Boise

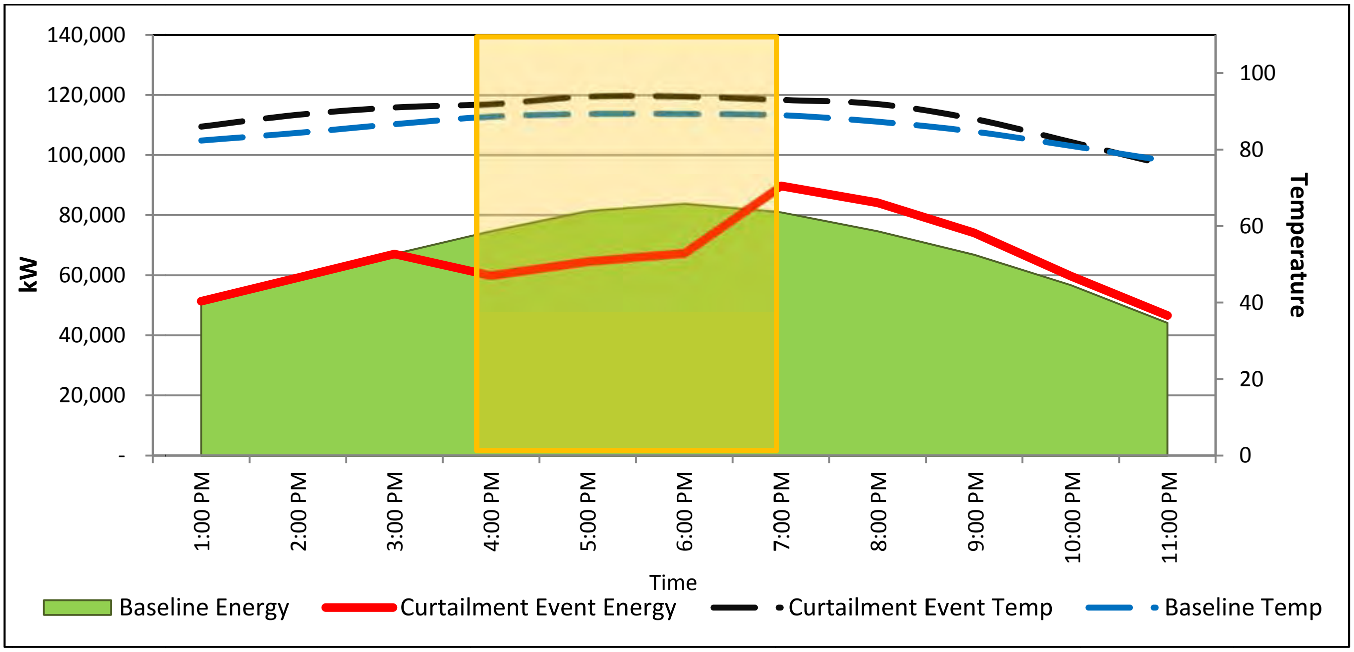
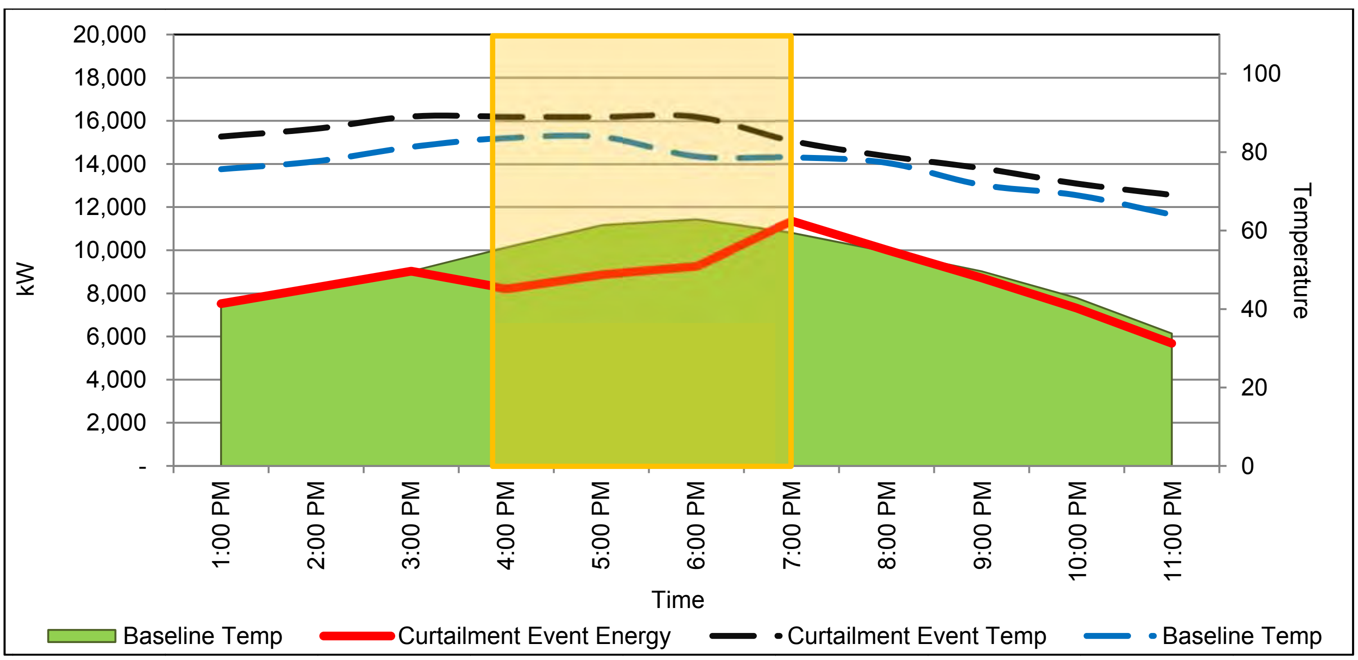


Figure 5: July 21 Curtailment Event Results - Pocatello/Idaho Falls



July 31st Curtailment

The event called on July 31st implemented a 55 percent curtailment strategy and resulted in a system wide average demand reduction of 0.74 kW per participant across the three hours of the event, and a maximum single hour demand reduction of 0.82 kW per participant. In the Boise area, the average demand reduction for the event was 0.79 kW per participant, whereas in Pocatello/Twin Falls it was 0.46 kW per participant. The maximum demand reduction for the Boise area was 0.88 kW per participant and in Pocatello/Twin Falls it was 0.49 kW per participant. Figure 6 and 7 below present the aggregate load profiles for the Boise and Pocatello/Twin Falls participants, respectively, for the July 31st curtailment event.

Figure 6: July 31 Curtailment Event Results - Boise

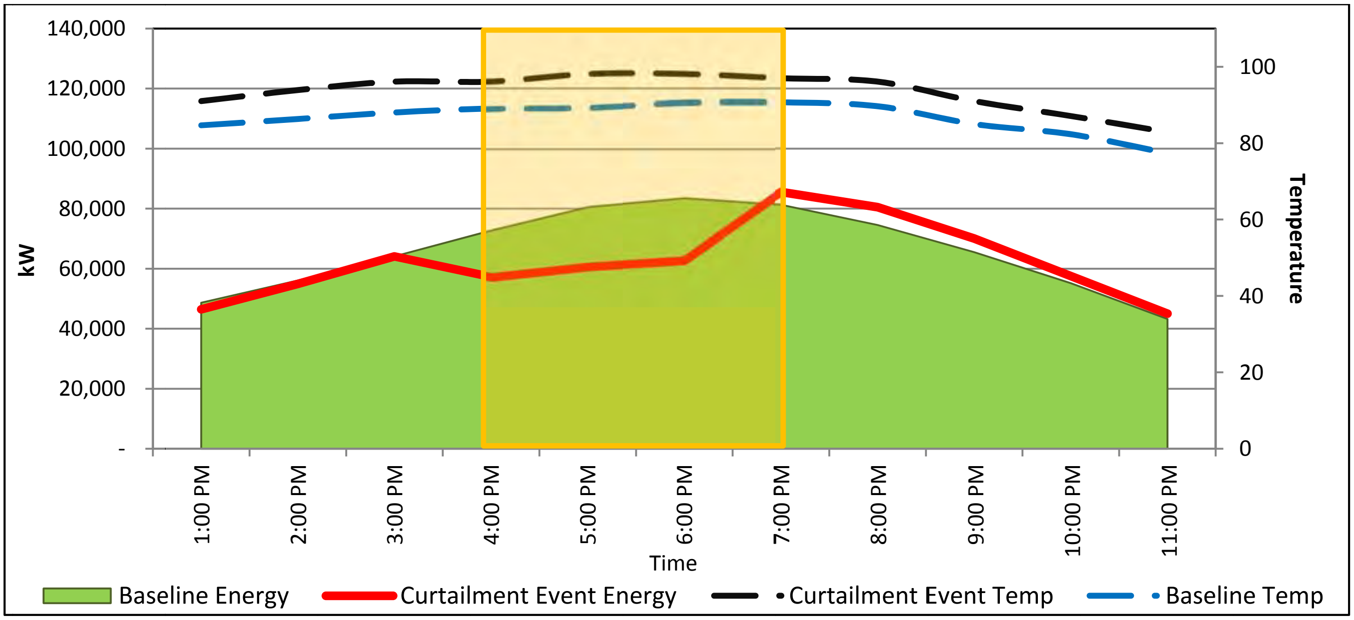
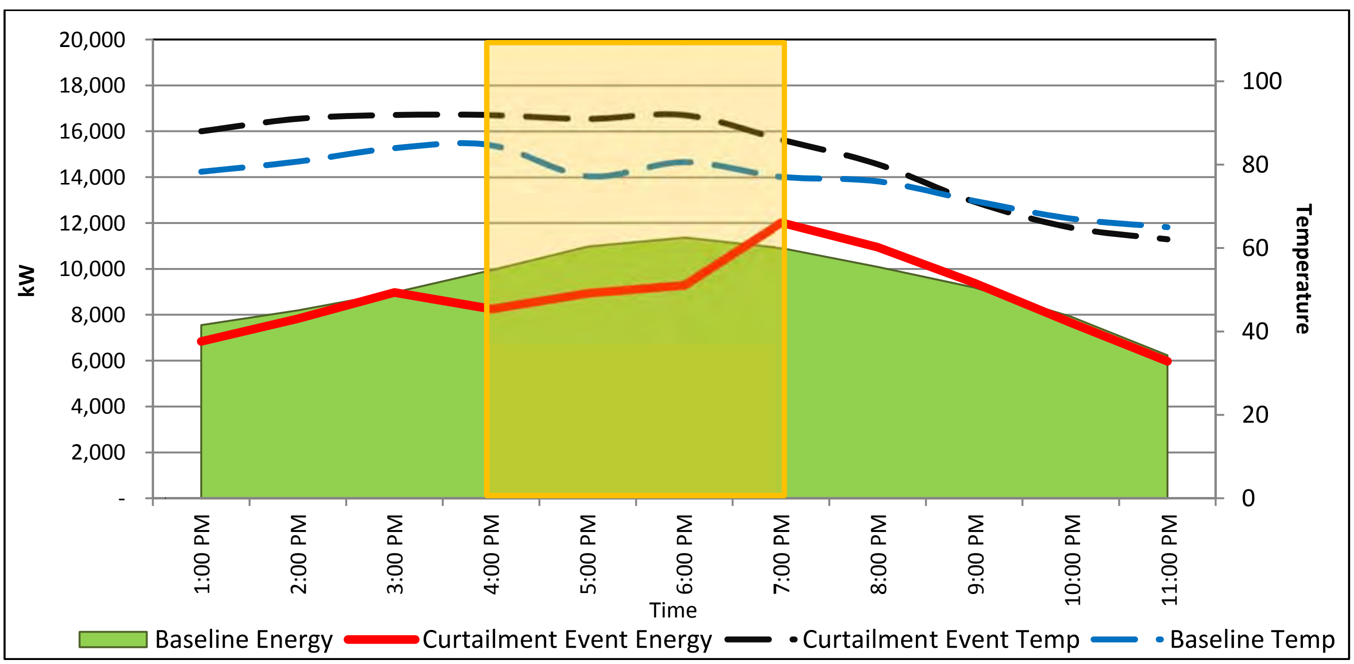


Figure 7: July 31 Curtailment Event Results - Pocatello/Idaho Falls



Predictive Model

As part of the 2012 impact evaluation, a predictive model was developed that estimates load reductions based on cycling strategy and temperature inputs. The model utilizes a regression formula for each region (Boise and Pocatello/Twin Falls) based on an independent variable representing the interaction of "Temperature at start of curtailment event" and "Percent cycling." As discussed in the Methodology section above, the model was updated in 2015 to account for the results of the 2012, 2014, and 2015 curtailment events.

Table 4 and 5 below compare the actual maximum demand reduction results in the 2012, 2014, and 2015 impact evaluations with the estimated maximum demand reductions output by the model. The results of this comparison show a high amount of variability between model outputs and actual results for both regions. For 2014 and 2015 curtailment events, the model predicted lower demand reduction than actual demand reduction for most events. Conversely, for most 2012 curtailment events, the model predicted significantly higher demand reduction than actual demand reduction for most events.

Table 4. Predictive Model Outputs Compared to Actual - Boise

Curtailment Event	Temp at Start of Event	Percent Cycling	Max kW Reduction Predicted by Model	Actual Maximum kW Reduction	Percent Difference
12-Jul-12	105	60%	1.05	1.14	-8.0%
19-Jul-12	104	65%	1.10	0.99	11.3%
31-Jul-12	97	70%	0.99	0.89	11.9%
13-Aug-12	97	50%	0.76	0.40	90.3%
16-Aug-12	93	75%	0.94	0.83	12.8%
20-Aug-12	93	65%	0.84	0.58	44.7%
22-Aug-12	90	100%	1.09	0.86	26.3%
14-Jul-14	100	65%	1.01	1.34	-24.6%
31-Jul-14	93	55%	0.73	0.98	-25.4%
11-Aug-14	101	55%	0.90	1.15	-21.6%
30-Jun-15	102	55%	0.92	1.16	-20.7%
21-Jul-15	92	55%	0.71	0.67	6.0%
31-Jul-15	96	55%	0.80	0.88	-9.1%
Average	97	63%	0.91	0.91	7.2%

Table 5. Predictive Model Outputs Compared to Actual - Pocatello/Twin Falls

Curtailment Event	Temp at Start of Event	Percent Cycling	Max kW Reduction Predicted by Model	Actual Maximum kW Reduction	Percent Difference
12-Jul-12	99	60%	0.73	0.69	5.5%
19-Jul-12	93	65%	0.67	0.66	1.8%
31-Jul-12	94	70%	0.73	0.90	-19.0%
13-Aug-12	93	50%	0.55	0.44	27.4%
16-Aug-12	91	75%	0.70	0.59	19.3%
20-Aug-12	85	65%	0.53	0.52	1.4%
22-Aug-12	87	100%	0.77	0.75	3.0%
31-Jul-14	89	55%	0.53	0.56	-5.3%
11-Aug-14	93	55%	0.59	0.60	-1.3%
30-Jun-15	92	55%	0.58	0.78	-26.0%
21-Jul-15	89	55%	0.53	0.54	-0.7%
31-Jul-15	93	55%	0.59	0.49	20.9%
Average	92	55%	0.63	0.63	2.2%

The discrepancy between the model's output for 2012 events and the 2014 and 2015 events is presumably due to the 2012 program's device communication challenges. When the model's regression formula is updated to include only 2014 and 2015 events, the discrepancy between model-predicted and actual results is minimized. Table 6 below includes the results from a predictive model that does not include 2012 events for the Boise region. Note that only Boise region results are shown due to Pocatello/Twin Falls region results not being statistically significant when 2012 events are removed.

Table 6. Predictive Model Outputs Compared to Actual – Boise (2012 events removed)

Curtailment Event	Temp at Start of Event	Percent Cycling	Max kW Reduction Predicted by Model	Actual Maximum kW Reduction	Percent Difference
14-Jul-14	100	65%	1.34	1.34	-0.1%
31-Jul-14	93	55%	0.81	0.98	-16.9%
11-Aug-14	101	55%	1.13	1.15	-1.8%
30-Jun-15	102	55%	1.17	1.16	0.5%
21-Jul-15	92	55%	0.77	0.67	15.6%
31-Jul-15	96.1	55%	0.93	0.88	6.2%
Average	97	63%	1.03	1.03	0.6%

Conclusions

The 2015 impact evaluation of the A/C Cool Credit program's curtailment events confirmed that the program is operating as intended, and, properly maintained, can be relied on to provide dispatchable demand savings to the electricity grid. The results of the analyses showed maximum single hour demand reductions of 1.11, 0.65, and 0.82 kW per participant, respectively, for the curtailment events held on June 30th, July 21st, and July 31s. The average hourly demand reduction was 1.04, 0.62, and 0.74 kW per participant, respectively, for the three events.

Due to the distinct weather patterns between the Boise and Pocatello/Twin Falls regions, each curtailment event analysis includes region-specific results. Driven by cooler temperatures, the 2015 maximum demand reductions seen in the Pocatello/Twin Falls region were on average 33 percent less than those in the Boise region. For all curtailment events from 2012, 2014, and 2015 seasons, the maximum demand reductions seen in the Pocatello/Twin Falls region were on average 31 percent less than those in the Boise region.

To better understand the program's demand reduction potential, it's recommended to utilize a variety of cycling percentages (other than 55%) during future curtailment events. Doing so will provide a broader set of data points for the program's predictive model, increasing the statistical significance of its regression formulas (i.e. increasing its accuracy), and providing more value to Idaho Power and grid operators when demand response resources are more urgently needed.

CLEAResult

Flex Peak Demand Response Program

2015 Impact Evaluation

October 2015

PREPARED BY CLEAResult

PREPARED FOR Idaho Power Company

REPORTING PERIOD June 15th – August 15th, 2015

We change the way people use energy™

CLEAResult

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Executive Summary

Idaho Power Company contracted CLEAResult to complete an impact evaluation of the 2015 Flex Peak program, a voluntary demand response (DR) program that has been available to Idaho Power's commercial and industrial customers. In 2015, there were 38 customers and a total of 71 sites enrolled in the program. The goals of the impact evaluation were to determine the demand reduction (in MW) and realization rate for at least three curtailment events during the program's June 15th - August 15th season.

CLEAResult completed analyses of curtailment events held on June 30th (4-8pm), July 21st (4-8pm), and August 4th (4-7pm), 2015. The results of the curtailment event analyses showed maximum demand reductions of 21.9, 23.3, and 13.3 MW, respectively, for the three events, and an average of 19.5 MW at the meter level. The events achieved realization rates of 86.7%, 96.6%, and 55.4%, respectively, averaging 79.6%. All three events included 71 unique sites, with the aggregate nominated load reduction averaging 24.5 MW across the three events.

The 71 sites enrolled in the program contributed a median nominated reduction of 175 kW. When broken out across four size classes, the sites with the smallest nominated load reduction, 0-50 kW, achieved the highest average realization rate across the three events at 137%. The second largest size class, 201-500 kW, achieved the lowest average realization rate at 64%.

The results of the impact evaluation show that Idaho Power's 2015 Flex Peak program functioned as intended and provided up to 23 MW to the electricity grid at the meter level. In addition, the Flex Peak program is scalable and with additional participants and more diversity among participants, could contribute more reduction as future capacity requirements dictate.

Introduction

Background

The Flex Peak Program is a voluntary demand response (DR) program available to Idaho Power's commercial and industrial customers. The program's objective is to reduce the demand on Idaho Power's system during periods of extreme peak electricity use. The program is designed to reduce peak load by paying a financial incentive to customers to turn off or reduce electrical system load at their facilities during called events. The program has a fixed payment amount of $3.25/kW per week of nominated load reduction (or actual load reduction if an event was called) during the program season, and a variable payment amount of $0.16/kWh for energy savings achieved during curtailment events after the third event.

The Flex Peak program provides customers with a notification two hours prior to the start of curtailment events via phone and email. Events can be called from June 15th - August 15th anytime from 2 - 8pm and can last from 2 - 4 hours.

Impact Evaluation Goals

Idaho Power contracted CLEAResult to complete an impact evaluation of the 2015 Flex Peak Program. This 2015 impact evaluation has two primary goals:

1. Determine and verify the demand reduction (MW) during 2015 curtailment events
2. Determine realization rate for each event

The results contained in this report will enable Idaho Power to better define the impact of the program on the electricity grid and provide more accurate estimates of the program's load reduction in the future.

Methodology

The section below describes the data used to complete the impact evaluation, the sampling plan, and the methodology for gathering and processing data, determining baseline, calculating the demand reduction, and determining the curtailment event realization rates. Note that the methodology detailed below is aligned with the program's baseline and demand reduction calculation methodology. Two additional baseline methodologies were tested, with results reported in the accompanying memo "Flex Peak Demand Response Program 2015 Impact Evaluation: Alternative Methodologies."

Data Sources

CLEAResult conducted the 2015 Flex Peak impact evaluation through the use of two primary data sources: interval data (hourly kW readings) and an event-specific participant list. The participant list included site ID, nomination kW, and the customer's aggregated option. Some interval meter data included error codes for cases where the source data was missing or estimated. See Table 1 for a list of error codes included in the data. Note that no site IDs needed to be removed from the analyses due to the presence of errors codes because error codes were not present during the curtailment event or baseline periods.

Table 1. Error Code Key

Error Code	Description
1	Power Outage
9	Missing Reading
Q	Estimated Reading

Sampling Plan

The use of hourly interval metering data allowed the impact evaluation's sampling plan to be a census of program participants (i.e. all participants were considered in the analysis).

Data Gathering and Processing

CLEAResult processed all data provided by Idaho Power using the analytics platform SAS®. The use of SAS® created a consistent and appropriate data format for all three curtailment events. The interval metering data was reviewed to identify the presence of error codes during the curtailment event period or in the baseline period, however no occurrences were found.

Determine the Baseline

CLEAResult determined site-specific baselines by first identifying the three days with the greatest demand from the previous ten non-weekend/holiday and non-curtailment days (hereto called comparison days). The greatest demand was determined as the day with the highest average demand during the hours of 2pm - 8pm. CLEAResult then determined each site's unadjusted baseline demand during the event timeframe by averaging the demand for each hour across all three comparison days.

CLEAResult then calculated a day-of-adjustment (DOA) for each site. The DOA was calculated using the average of hours 12pm and 1pm (hours 3 and 4 prior to the beginning of the curtailment period) for both the comparison days and the event day. The DOA was calculated as a flat kW, and was capped at +/- 20% of the value for the same time period during the original baseline window. The DOA was applied to all baseline hours. This was done to avoid the baseline being affected by participant action to prepare for the curtailment event (e.g. pre-cool the building). This DOA approach was applied to each service location and summed to arrive at the program's aggregate baseline.

Calculate Demand Reduction

CLEAResult calculated the demand reduction for each participant by subtracting its load during each hour of the curtailment event from the participant's adjusted baseline load (determined in the previous steps). The hourly demand reductions were then aggregated for all participants. The total event impact (both average and maximum reduction) was calculated by aggregating each participant's results.

Determine Curtailment Event Realization Rate

CLEAResult determined the realization rates for each curtailment event by dividing the aggregate maximum demand reductions calculated in the previous step by the total nominated load for the all participants included in the analysis.

Findings

The section below presents the findings of the 2015 Flex Peak program impact evaluation, beginning with a characterization of the sites enrolled in the program and ending with a presentation of the results of each curtailment event. Note that numbers presented in tables are expressed in MW at meter level, unless otherwise indicated. Idaho Power line losses are 9.7% for demand to convert from meter level to generation level load reduction.

Participant Characterization

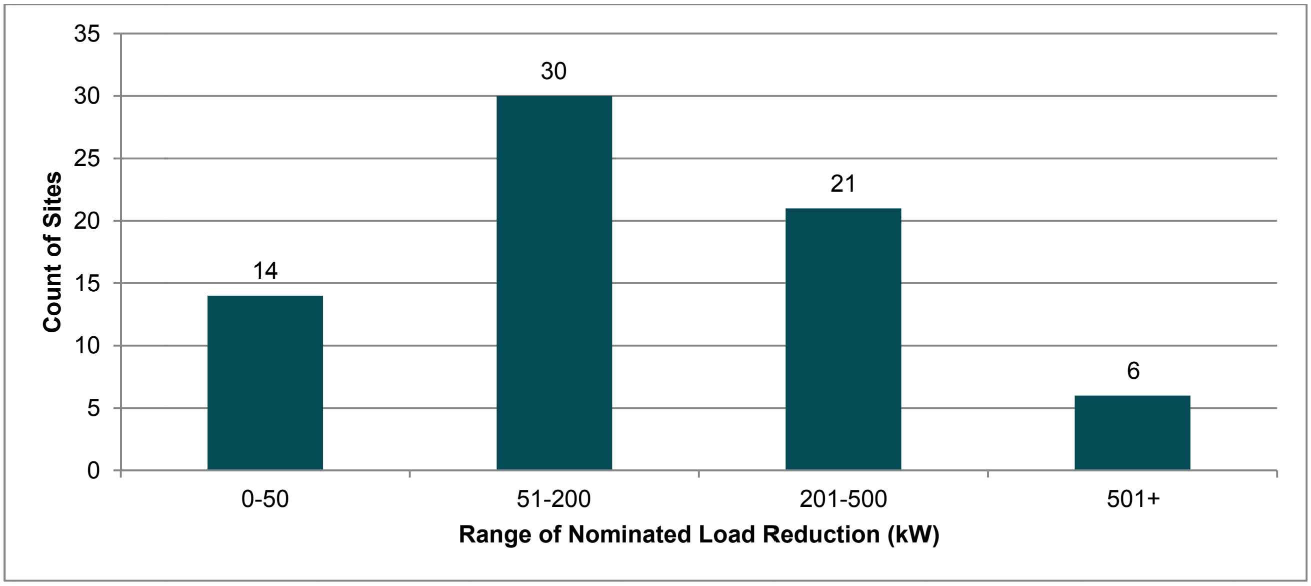
The 2015 Flex Peak program included 71 enrolled sites, accounting for an average of 24.5 nominated MW across the three events. The 71 sites were accounted for by 38 unique customers.

Table 2: Number of Sites by Processing Step

Curtailment Event	Nominated MW	Count of Total Sites	Count of Sites Analyzed	Percent of Total Sites Analyzed
June 30th	25.3	71	71	100%
July 21st	24.1	71	71	100%
August 4th	24.0	71	71	100%
Average	24.5	71	71	100%

When site's nominated kW was averaged across the three events, the average nominated load reduction was 344.4 kW, while the median reduction was 175 kW. As Figure 1 below depicts, the most common nominated load reduction was in the 51-200 kW range, accounting for 42% of the sites.

Figure 1. Count of Sites by Nominated Reduction Group



Curtailment Event Results

Table 3 and Figure 3 below summarize the estimated demand reduction achieved during each of the three curtailment events and the resulting realization rate. The maximum demand reduction achieved ranged from a low of 13.3 MW for the August 4th event to a high of 23.3 MW for the July 21st event. The August 4th event's 13.3 MW reduction resulted in a realization rate of 55.4%, while the July 31st event's 23.3 MW reduction equated to a 96.6% realization rate. When considered together, the three events had an average realization rate of 79.6%.

Table 3: Summary of Demand Reduction and Resulting Realization Rate (MW)

Curtailment Event	Event Timeframe	Nominated Demand Reduction	Avg. Demand Reduction (MW)	Max Demand Reduction (MW)	Realization Rate*
June 30th	4-8pm	25.3	21.5	21.9	86.7%
July 21st	4-8pm	24.1	22.6	23.3	96.6%
August 4th	4-7pm	24.0	12.6	13.3	55.4%
Average		24.5	18.9	19.5	79.6%

** Based on maximum reduction*

Figure 2: Summary of Demand Reduction (MW)

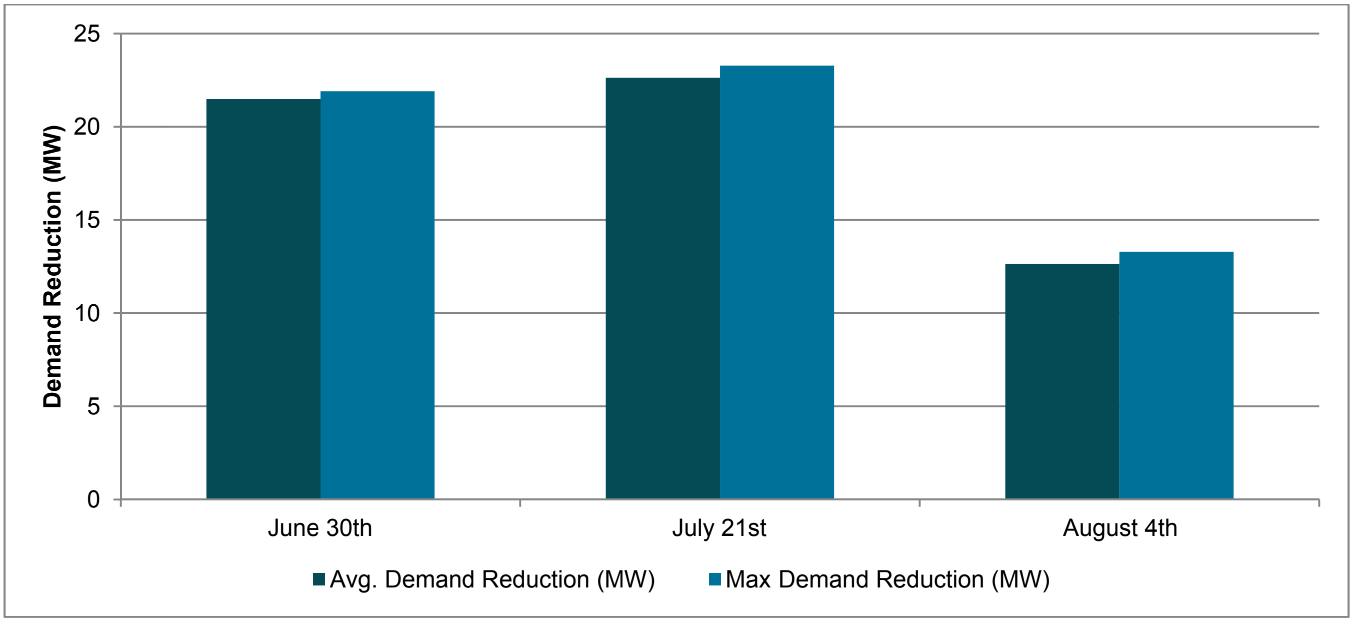
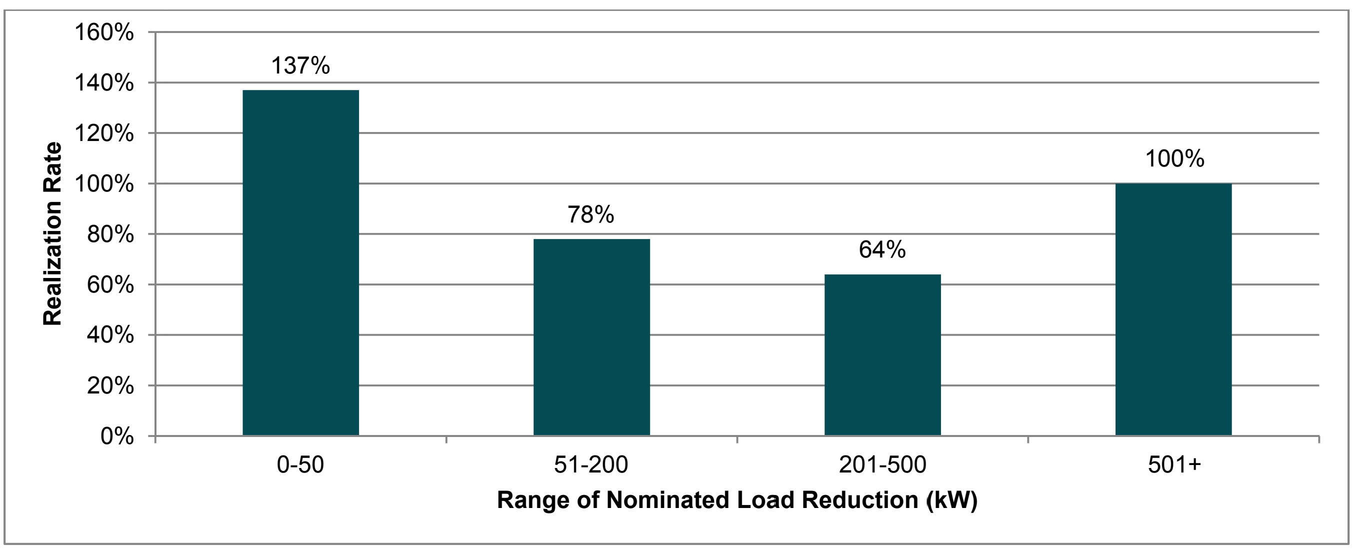


Figure 4 below presents the realization rate achieved by each site group. To calculate the results, each Site IDs average load reduction (across three events) was divided by their average nomination across the three events. Sites in the smallest group (0-50 kW of nominated load reduction) achieved the highest average realization rate (137%), while the second largest group (201-500 kW of nominated reduction) achieved the lowest average realization rate (64%).

Figure 3. Average Realization Rate by Nominated Reduction Group



June 30th Curtailment Event

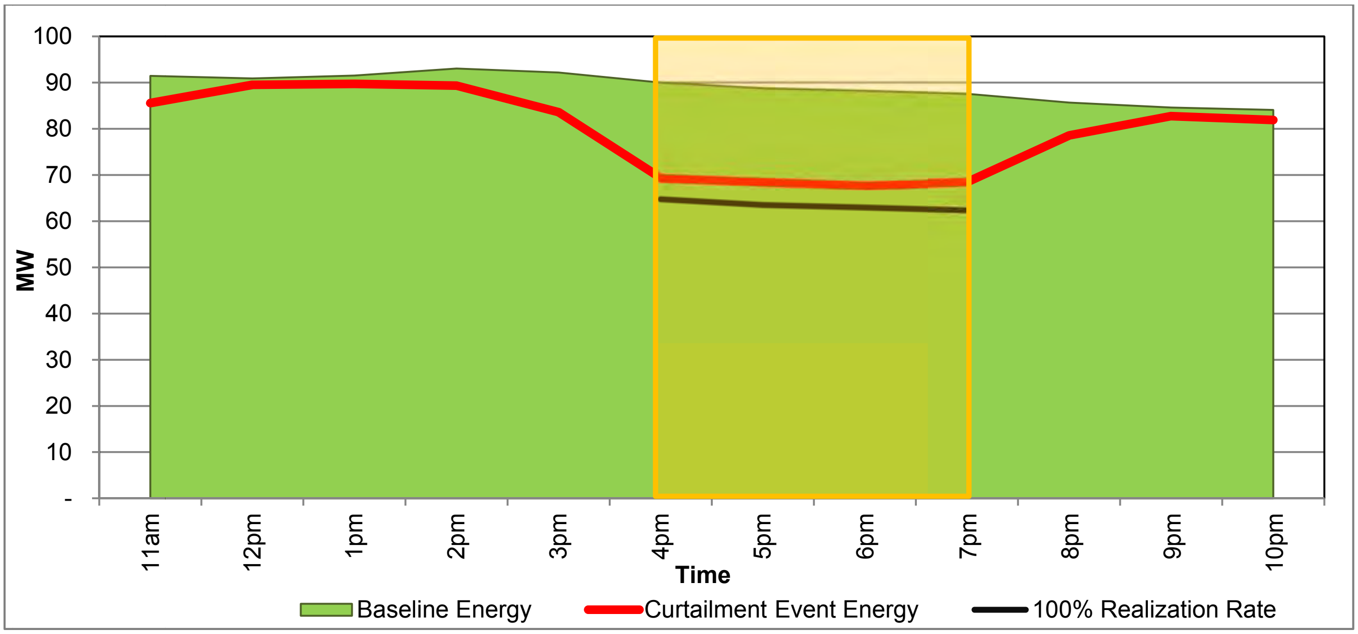
Table 5 below breaks out demand reduction for each hour of the curtailment event. The hour between 6pm and 7pm experienced the largest total reduction (21.9 MW, 86.7% of the total nominated load).

Table 4: June 30th Curtailment Event Results by Hour (MW)

Method	4-5pm	5-6pm	6-7pm	7-8pm	Avg. Reduction	Max. Reduction
June 30th	21.9	21.6	21.9	20.5	21.5	21.9

Figure 5 below presents the load profile of the June 30th curtailment event and its baseline, graphically depicting the results from Table 5 above. The black line during the curtailment event period depicts the level the curtailment event energy load profile would have to reach in order to achieve a 100% realization rate.

Figure 4. June 30th Curtailment Event Load Profile



Notes:

- Energy usage for a given hour is reported in the time reading at the beginning of the hour. For example, energy usage from 4-5pm is depicted in the 4pm reading.

- The Baseline Energy and Curtailment Event Energy lines do not intersect at the beginning of the event due to the Day-of-Adjustment (DOA) being calculated prior to the event start time.

July 21st Curtailment Event

The second Flex Peak event was called in the third week of July. The July 21st event achieved the highest demand reduction results out of the three events.

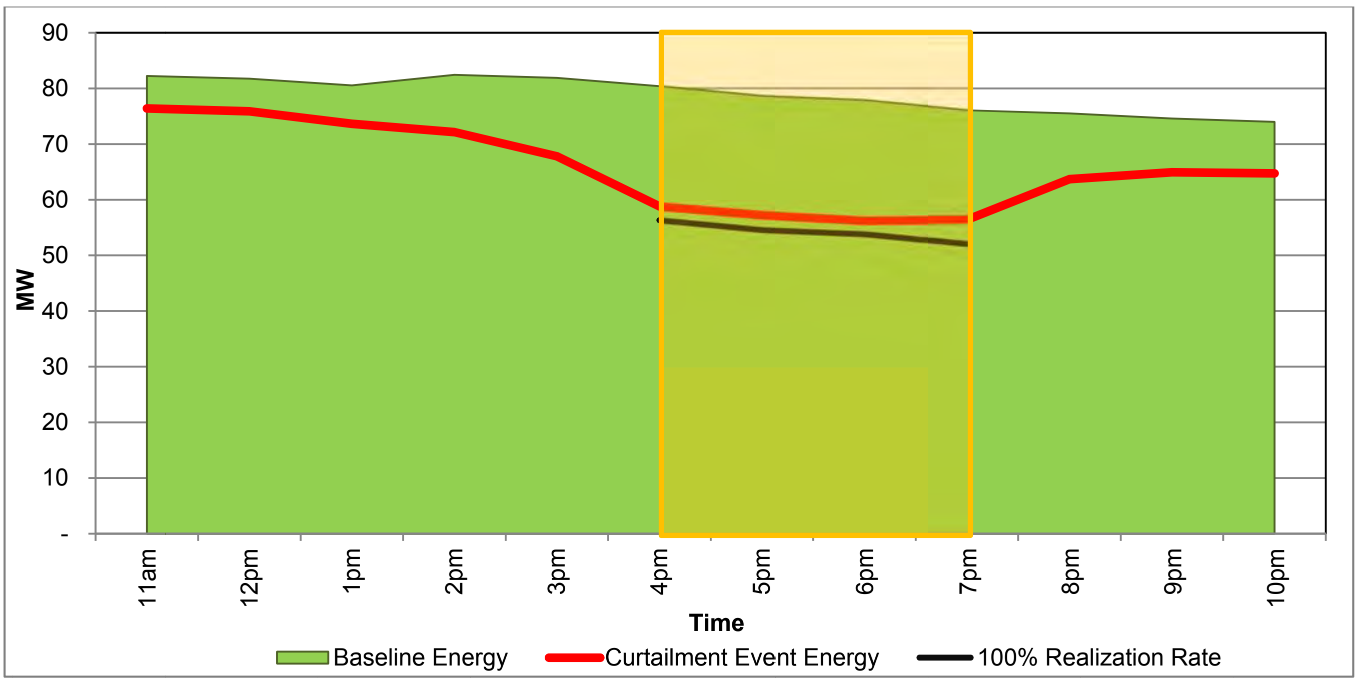
Table 7 below breaks out demand reduction for each hour of the curtailment event by dispatch group. The hour between 4pm and 5pm experienced the largest total reduction (23.3 MW, 96.6% of the total nominated load).

Table 5: July 21st Curtailment Event: Baseline Results by Hour (MW)

Method	4-5pm	5-6pm	6-7pm	7-8pm	Avg. Reduction	Max. Reduction
July 21st	23.3	22.9	22.9	21.5	22.6	23.3

Figure 6 below presents the load profile of the July 21st curtailment event and its baseline, graphically depicting the results from Table 7 above. The black line during the curtailment event period depicts the level the curtailment event energy load profile would have to reach in order to achieve a 100% realization rate.

Figure 5. July 21st Curtailment Event Load Profile



Notes:

- Energy usage for a given hour is reported in the time reading at the beginning of the hour. For example, energy usage from 4-5pm is depicted in the 4pm reading.

- The Baseline Energy and Curtailment Event Energy lines do not intersect at the beginning of the event due to the Day-of-Adjustment (DOA) being calculated prior to the event start time.

August 4th Curtailment Event

The third Flex Peak event was called in the first week of August. The August 4th event saw the lowest demand reduction out of the three events.

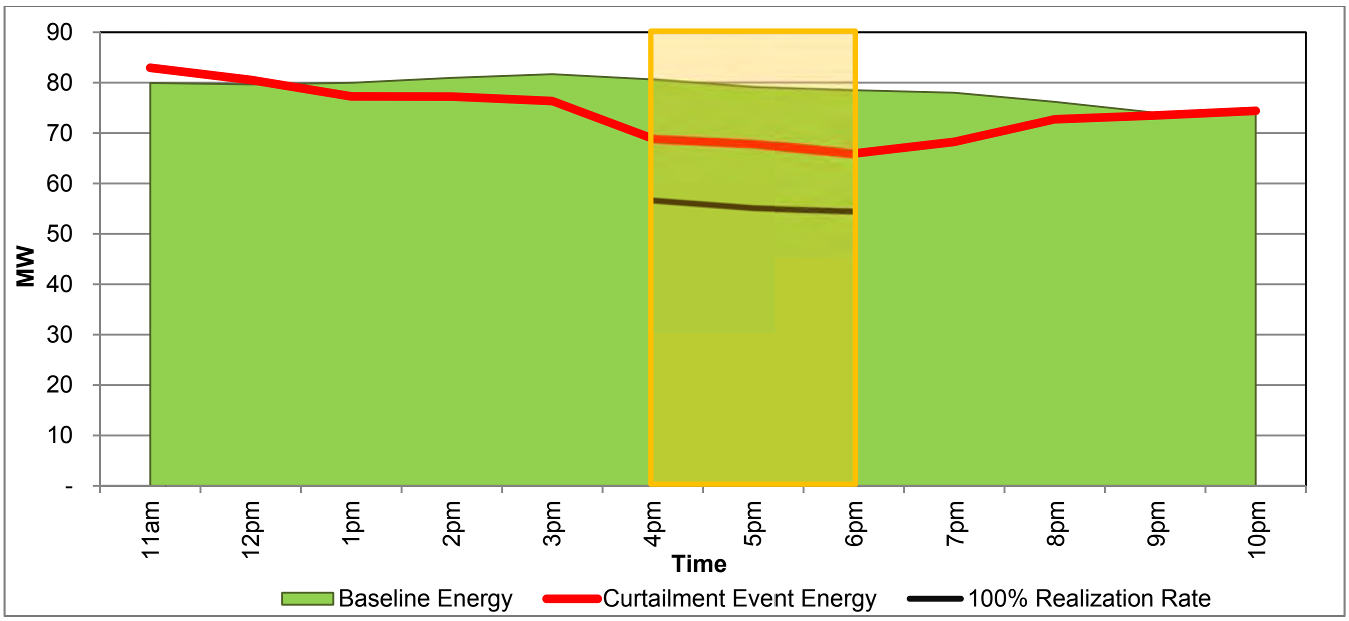
Table 9 below breaks out demand reduction for each hour of the curtailment event by dispatch group. The hour between 6pm and 7pm experienced the largest total reduction (13.3 MW).

Table 6: August 4th Curtailment Event Results by Hour (MW)

Method	4-5pm	5-6pm	6-7pm	Avg. Reduction	Max. Reduction
August 4th	12.2	12.4	13.3	12.6	13.3

Figure 7 below presents the load profile of the August 4th curtailment event and its baseline, graphically depicting the results from Table 9 above. The black line during the curtailment event period depicts the level the curtailment event energy load profile would have to reach in order to achieve a 100% realization rate.

Figure 6. August 4th Curtailment Event Load Profile



Notes:

- Energy usage for a given hour is reported in the time reading at the beginning of the hour. For example, energy usage from 4-5pm is depicted in the 4pm reading.

- The Baseline Energy and Curtailment Event Energy lines do not intersect at the beginning of the event due to the Day-of-Adjustment (DOA) being calculated prior to the event start time.

When considering the poor performance of the August 4th event, compared to the other two events, the reduced realization rate can be singly attributed to a lack of performance by the site with the largest nominated load reduction in the program. That site achieving a realization rate of 8% in the August 4th event, compared to an average of 113% across the first two events. Had the site's realization rate for the August 4th event been the average of its realization rates from the first two events, the event's realization rate would've increased by 39.4% to 94.8%.

Conclusions

The goals of the 2015 Flex Peak impact evaluation were to determine and verify the demand reduction (MW) during curtailment events and determine the realization rate for each event.

CLEAResult completed analyses of curtailment events held on June 30th (4 – 8pm), July 21st (4 – 8pm), and August 4th (4 – 7pm). All three events included 71 unique sites, with the aggregate nominated load reduction averaging 24.5 MW across the three events. The results of the analyses showed maximum demand reductions of 21.9, 23.3, and 13.3 MW, respectively, for the three events, and an average of 19.5 MW. The events achieved realization rates of 86.7%, 96.6%, and 55.4%, respectively, averaging 79.6%.

The results of the impact evaluation show that Idaho Power's 2015 Flex Peak program functioned as intended and provided up to 23 MW to the electricity grid at the meter level. In addition, the Flex Peak program is scalable and with additional participants and more diversity among participants, could contribute more reduction as future capacity requirements dictate.

Impact and Process Evaluation of Idaho Power's Ductless Heat Pump Program

Final Report

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Executive Summary

The Northwest Energy Efficiency Alliance (NEEA) initiated the Northwest Ductless Heat Pump Pilot project (DHP) in 2008 and Idaho Power (IPC) joined the project in 2009, implementing the pilot throughout its service area. The company extended the project as an Idaho Power DHP Pilot through 2014 offering customers a $750 incentive payment to have a qualified DHP installed.

IPC works with a network of participating contractors to deliver the program. Currently there are approximately 75 participating contractors, although that number changes as contractors continue to be added to the program. Honeywell performs on-site verification for the program.

Conclusions

The results of the impact analysis show that the Ductless Heat Pump program saved 451,391 kWh achieving 97.5% of its goal. For non-electric benefits the ex-ante realization rate is 109.2%.

Table ES-1 Ductless Heat Pump Program Results

Metric	Program Goal	Reported	AEG-Evaluated	Overall Realization Rate
Annual Energy Savings (kWh)	460,000	462,747	451,391	97.5%
Non-Electric Benefits (NEBs)	NA	$178,221	$194,605	109.2%

Other key findings from the process and impact evaluations include:

- The program is very well run, has an involved program specialist, and adheres to best practices in the industry.
- The program has high satisfaction among participating contractors and customers, and the technology is well received.
- Contractor/retailers, bill inserts, and word of mouth are the main ways 2014 participants heard about the program.
- The price of the technology has remained steady and the perceived high cost can be a barrier to program participation. The incentive helps address this barrier for some but not all eligible customers.
- Low performing contractors could become more engaged with additional technical training and development.

- According to IPC staff, the contractor portal is rarely being used, but the high- and mid-performing contractors interviewed say they have used the portal and are satisfied with the materials.

1.1 Recommendations

Based on this evaluation, the following recommendations should be considered to enhance program effectiveness and improve the accuracy and transparency of reported savings:

- Consider expanding the target market to new construction and small commercial businesses.
- Conduct more outreach with contractors. Interviews with contractors revealed that they could benefit from more marketing and outreach. The program specialist is very busy and does not have enough time to do the outreach on his own. Customer Representatives (CR) could help the program specialist reach out more frequently to participating contractors. Contacts made by the CR are tracked by the Program Specialist. Visits to contractors could also be coordinated with other HVAC programs to inform them about all the energy efficiency rebates available from IPC.
- Work with ductless heat pump manufacturers to provide training materials and workshops for participating contractors.
- Remind contractors who are not using the portal about the availability of the contractor portal. Data is available on who has logged in to the portal and the frequency of visits. Idaho Power reports that the contractor portal is underutilized, however, the highest performing contractors interviewed said they use the portal. Let all contractors know when new materials are available through the portal.
- When calculating NEBs, make sure that the correct inflator is used to convert to current year values. Also IPC is currently using the Present Value Non-Electric System Benefits $/kWh for calculating NEBs and that is incorrect as this value is not based on site energy savings. The "PV Regional Non-E Value" parameter should be used directly or in conjunction with the site savings.
- When a home's ZIP code is in two counties, use the street address to determine the correct climate and heating zone.

Contents

Introduction

1.1 Program Description

The Northwest Energy Efficiency Alliance (NEEA) initiated the Northwest Ductless Heat Pump Pilot project (DHP) in 2008 and Idaho Power joined the project in 2009, implementing the pilot throughout its service area. The company extended the project as an Idaho Power DHP Pilot through 2014 offering customers a $750 incentive payment to have a qualified DHP installed.

The primary goal of the Northwest DHP Pilot project is to promote DHP technology as an energy-saving alternative for customers who primarily heat their homes with electricity. Other Northwest DHP Pilot goals are to identify DHP energy savings, help inform Regional Technical Forum (RTF) deemed-savings amounts, and obtain customer satisfaction and behavior patterns regarding this technology.

The program targets existing homes heated with electric zonal systems. Typically, these homes do not have air ducting and therefore cannot easily have a forced-air heat pump system installed. The types of electric zonal systems in the targeted homes include baseboard, ceiling cable, and wall-mounted units. Homes heated with fossil fuel forced-air systems or electric forced-air systems do not qualify. Qualifications include having one DHP indoor unit installed in the main living area of the home, since this is where most occupants spend the majority of their time.

IPC works with a network of participating contractors to deliver the program. Currently there are approximately 75 participating contractors, although that number changes as contractors continue to be added to the program. Honeywell performs on-site verification for the program.

In 2014, the Ductless Heat Pump program reported 463 MWh of savings (Table 1-1).

Table 1-1 Ductless Heat Pump Program Reported Savings vs. 2014 Goals

Year		Units	MWh Savings
PY2014	IPC Goals	NA	460
	IPC-Reported	179	463
Percent of IPC-Reported to Goals		**NA**	**101%**

1.2 Purpose of the Evaluation

Idaho Power Company (IPC) contracted with Applied Energy Group (AEG) to conduct a process evaluation of the Ductless Heat Pump program and an impact evaluation for program year 2014. The key objectives addressed in the process evaluation were to:

- Evaluate program design including program mission, logic, and use of best practices.
- Evaluate program implementation including quality control, operational practice, and outreach.
- Evaluate program administration including program oversight, staffing, management, training, documentation, and reporting.
- Evaluate participant and stakeholder response including customer interaction and satisfaction.
- Report findings and observations and provide recommendations that enhance program effectiveness.

The key objectives addressed by the impact evaluation were to:

- Measure and verify the energy (kWh), and non-electric impacts attributable to the 2014 program.
- Provide credible and reliable ex-post program energy savings and realization rates and non-electric impact estimates attributed to the program for the 2014 program year.
- Report findings and observations, and provide recommendations that would enhance the effectiveness of future analysis and the accurate and transparent reporting of program savings.

1.3 Report Structure

Following this introductory chapter are the following chapters:

- Chapter 2 – Methodology: Description of the evaluation methods, sampling design, and data collection and analysis process.
- Chapter 3 – Process Evaluation Findings: Description and discussion of the program processes and best practices review.
- Chapter 4 – Impact Evaluation Findings: Description and discussion of the result of the engineering review including kWh savings estimates, non-electric benefits and realization rates.
- Chapter 5 – Conclusions and Recommendations: Conclusions reached based on the process and impact evaluation including the best practices review and recommendations to improve the program.

Methodology

This section describes the approach AEG used to evaluate the Ductless Heat Pump program.

2.1 Process Evaluation

Process evaluations focus on determining the overall effectiveness of program delivery, identifying opportunities for program improvements, and assessing key program metrics including participation rates, market barriers, and overall program operations. The process evaluation for the Ductless Heat Pump program consisted of the following research activities:

- Interviews with program staff
- A detailed review of the program documentation and tracking database
- Interviews with participating contractors
- A best practices review

Interviews with Program Staff

AEG conducted an in-depth qualitative interview with the IPC Program Specialist. The interview included questions surrounding the goals for the program offering from the interviewee's perspective; policies, processes and procedures surrounding recruitment and delivery of the program; what is working and what is not; and the strengths and weaknesses of the program.

Documentation Review

AEG reviewed several sources of data as metrics to evaluate the program and the program offerings. The data sources included the program implementation plan, strategic marketing plan, application, contractor training slides, marketing copy, database of participating contractors, and example on-site verification forms.

Insight gained from this document review was used to provide a background for conducting the process evaluation and to inform the resulting conclusions and recommendations.

Contractor Interviews

AEG conducted interviews with 10 participating contractors that have attended training for the Ductless Heat Pump program. The goal of these interviews was to explore contractors' knowledge, experience and suggestions for the program. Specific topics addressed during the interviews included:

- Contractor's skills and knowledge about the technology and the program
- Use and satisfaction with IPC's portal
- Program participation
- Possible strategies for getting contractors more involved in the program (e.g., increasing the number of projects they complete for the program)

Participating contractors were stratified by the number of projects completed. Interviews were completed with the three top performers in terms of projects completed (10 – 51 projects), along with three mid-performing contractors (3-9 projects), two low performer contractors (1-2 projects) and two contractors who did not complete any projects. Table 2-1 shows the number of contractor interviews completed in each stratum and the number of projects they represent.

Table 2-1   Ductless Heat Pump Program Contractor Interviews

Stratum	Total Number of Projects	Total Number of Contractors	Contractors Interviewed	Projects Completed by Contractors Interviewed
High Performer (10 or more projects)	77	3	3	77
Mid-Performer (3 – 9 projects)	75	13	3	17
Low Performer (1 – 2 projects)	27	19	2	2
Non-Performer (0 projects)	0	40	2	0
Total	**179**	**75**	**10**	**96**

Best Practices Review

AEG conducted a literature review of industry publications to identify an appropriate set of best practices to compare with IPC's Ductless Heat Pump program. AEG conducted the best practices review as follows:

- Reviewed regulatory filings, evaluation reports, conference presentations, marketing materials and industry publications
- Created a list of best practices/innovations and the rationale behind the best practice/innovation
- Benchmarked IPC's program against each best practice listed

2.2 Impact Evaluation

The main objective of the impact evaluation was to estimate the annual kWh savings achieved by the program. This was accomplished by conducting a detailed engineering review that included a two-step process: a savings replication and a documentation review. Non-electric benefits were also verified for the program.

Engineering Review

For the savings replication, AEG applied the RTF deemed algorithms to the tracked parameters for all program participants to verify that the algorithms were applied correctly, identify errors or issues, and adjust savings estimates at the project level if necessary. This step yielded verified or adjusted savings estimates for all projects in the program. Because this step is done for all program participants, there is no sampling error from this step.

For the documentation review, AEG designed a stratified random sample using reported climate zone as the stratification variable. The Ductless Heat Pump engineering review consisted of a review of 20 of the 179 projects (Table 2-2).

Table 2-2 Ductless Heat Pump Program Sample Design

Stratum	Definition	Population	Sample Size
1	Cooling Zone = 1 Heating Zone = 3 Savings = 292 kWh/yr	25	4
2	Cooling Zone = 1 Heating Zone = 2 Savings = 2,585 kWh/yr	2	2
3	Cooling Zone = 2 Heating Zone = 2 Savings = 2,746 kWh/yr	63	5
4	Cooling Zone = 3 Heating Zone = 2 Savings = 3,016 kWh/yr	12	3
5	Cooling Zone = 3 Heating Zone = 1 Savings = 3,131 kWh/yr	77	6
Total		**179**	**20**

Detailed documentation (rebate applications, invoices, etc.) for each project in the sample was reviewed. Any adjustments needed based on this documentation review would result in an overall adjustment to the savings, along with associated sampling error. However, in this case, based on the findings from those project files, no additional adjustments to savings calculations were necessary for this step. The savings for the sample were expanded to the population using a combined ratio estimate, which leverages the correlation between the replicated savings and the verified savings to create a more precise estimate of the total verified savings for the program. Because there were no adjustments needed, the replicated savings and the verified savings were identical, resulting in a perfect correlation of 1.0 between the two savings estimates. The uncertainty in the ratio estimate is driven by that correlation, and because the correlation is 1.0, the analysis results show no uncertainty. The resulting 90% confidence interval becomes zero, so no confidence intervals are reported here.

Non-Electric Benefits

Non-electric benefits (NEBs) were evaluated for this program according to the values set out in the RTF Unit Energy Savings (UES) workbook (v2.0) and Supplement 1 of the Idaho Power 2014 Annual Report.

Process Evaluation Findings

The process evaluation for the Ductless Heat Pump program focused on conducting interviews with program staff and participating contractors and reviewing program processes to assess the program operations, quality control, staffing, and outreach. The evaluation also included secondary research to determine if the program is currently using established best practices prevalent in the industry. The process evaluation found that the program is well run, adheres to industry best practices, and that the program and the DHP technology is well received by customers and contractors, resulting in high satisfaction.

3.1 Program and Implementation Staff Interviews

AEG conducted an in-depth interview with the program specialist for the Ductless Heat Pump program. The following are some of the key points from the interview.

Program Design and Operations

- Currently, 75 contractors are participating in the program. Number of projects per contractor ranges from 0 – 51 in 2014.
- When people install DHPs, they replace systems that are more expensive to operate. According to the program specialist, these devices “have a way of shaping the market” because they are providing customers lower heating costs.
- The initial cost of DHPs has remained steady and is perceived to be high. The cost has not come down as expected.

Marketing and Outreach

- An algorithm is used to identify IPC customers who have higher energy usage. This algorithm has identified approximately 95,000 customers.
- The eligible customer list is sorted by energy use from highest to lowest. The top 30,000 are the target market and are sent direct mail letters. These are more likely to have electric heat.
- Bill inserts and direct mail have been successful in encouraging participation.
- Awareness of the program and the technology is low. This has been determined by surveys and studies performed by IPC and NEEA.

Program Staffing

- The program specialist is largely responsible for all aspects of administering the program. He is responsible for handling all the data entry of the applications, signing up new contractors, supporting existing contractors in the field, creating and managing the budget, implementing the marketing strategy, developing trade show props to support the program, and handling questions from customers.

- Support is provided by Honeywell to conduct the onsite verification visits. Honeywell also provides some technical support for contractors in the field.

Customer Satisfaction

- The most recent IPC customer survey had a very high response rate and the respondents were very positive about the program.
- The program specialist believes the equipment has performed very well. This can be a concern with new technology, but DHPs have been received favorably by the market.
- The program specialist says he talks to customers routinely who say they are satisfied with the program and the product.

3.2 Program Processes

The program is supported by 75 participating contractors. In order to participate in the program, contractors are required to attend a NEEA webinar, obtain factory brand training, obtain and have a discussion with the program specialist. Participating contractors are listed on the company website.

Customers interested in participating in the program call one or more participating contractors. The contractor determines if the customer qualifies for the program and provides them with a price quotation. The customer approves the price quotation, the equipment is installed, the contractor fills out the paperwork, and the customer receives a check ($750) within 3 - 5 weeks of submission.

Quality Assurance/Quality Control

For quality assurance/control, IPC contracts with Honeywell, who provides on-site verification. According to the QA/QC plan ten percent of installations should be verified each program year. Most projects are selected randomly by IPC, but under certain conditions specific projects must be verified. If, for example, a project is the first project completed by a contractor, it must be included in the verification sample. Also if a contractor fails an earlier verification, the next two projects completed by that contractor must be included in the verification sample. During the on-site visit, Honeywell ensures the proper equipment was installed, is connected correctly, and placed correctly. Honeywell also asks customers (as able) if they are satisfied with the contractor, program and equipment and records their response on the verification form. Contractors and IPC are invited, but not required to attend the verification visit. Honeywell notifies the contractor and IPC of the result of the visit within 2 business days. Hard copies of verification forms are completed by Honeywell and submitted to IPC electronically.

IPC also has an internal research assistant who verifies that the data entered into the program database matches the data provided on the application.

3.3 Program Marketing

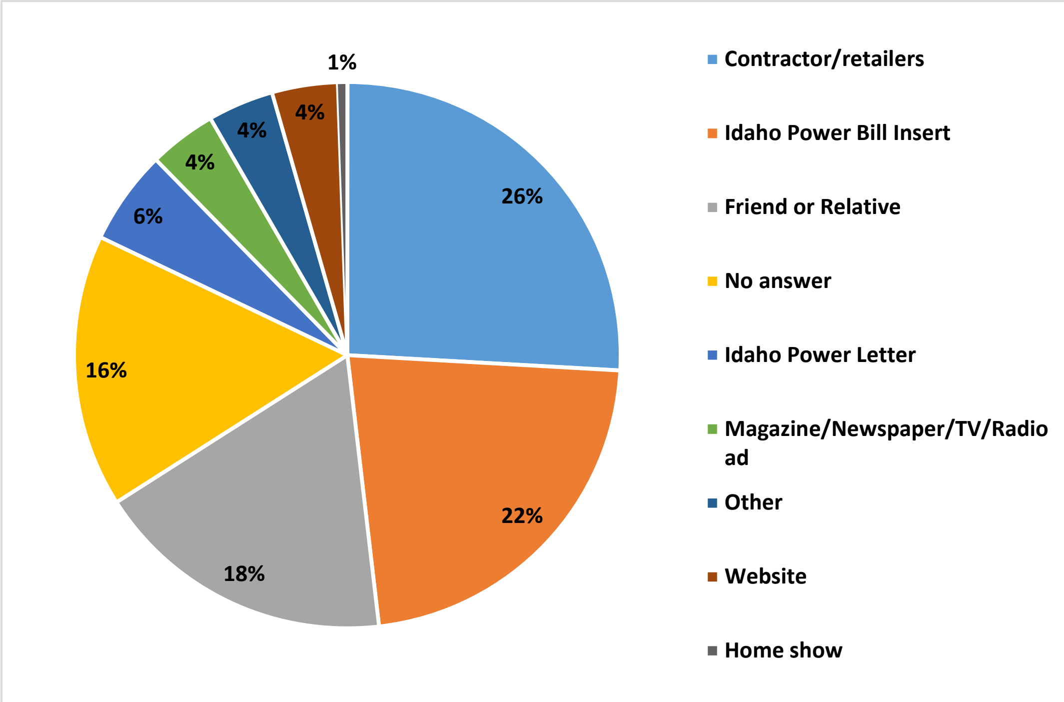
Over the years, the program has been marketed in various ways including advertising in rural newspapers where electric zonal heat is more prevalent, direct mail letters, bill inserts to all residential customers, retail coupon mailers, trade shows, and social media. Table 3-1 shows the marketing methods used in 2014.

Table 3-1 Marketing Methods Used in 2014

Method	Date
Direct mail letters to customers with new homes	February, May & August
Print ads in designated areas more likely to have high electric usage	January, May & September
Online behavioral ads	March thru June
Bill insert	January, May & September
Social media mentions	Spring & Fall
Facebook ads	February, March & April
Energy efficiency campaigns	February & August

Source: IPC Ductless Heat Pump program 2014 Strategic Marketing Plan

During installation, participating customers were asked how they heard about the program. This information is stored in the program tracking database. In 2014, contractors/retailers, bill inserts, and word of mouth were the most frequently mentioned ways customers reporting hearing about the program (Figure 3-1).



Source: IPC Ductless Heat Pump 2014 program tracking database

Figure 3-1 How 2014 Participants Heard about the Ductless Heat Pump Program

IPC also implemented a new contractor portal in 2014 where the participating contractors can download pre-made marketing collateral artwork for advertising – this makes it easy for them to advertise the program.

3.4 Participating Contractor Interviews

During August and September 2015, AEG conducted in-depth interviews with 10 participating contractors in IPC's Ductless Heat Pump Program. (See Appendices for the interview guide.) The main objectives of the interviews were to assess the contractors' skills and knowledge related to the technology and the program, gauge the use of IPC's contractor portal, identify any barriers to program participation, assess customer satisfaction, and identify any strategies to increase contractor involvement in the program.

Contractors' Skills and Knowledge

Most contractors say they are very familiar with the technology and the program requirements. One high performing contractor said his company joined the program because they wanted to start selling DHPs. Most contractors say that projects from the program account for very small percentages of the contractors overall business providing ranges of 2-5% of their total business. Mid-performers, however, seem collectively to have the highest proportion of projects through the program, saying such projects account for of 12-15% of their business. All of the high-performing and one non-performing contractor expect the number of projects they complete through the program to grow in the next 2 years. The other contractors expect the number of projects to stay about the same.

All contractors who have had at least one project through the program, said they have adequate staff trained who are knowledgeable about the program. These employees are able to answer customers' questions and explain the benefits of the technology to the customer.

> *"We take the time to train the customers on the system to ensure that they understand the benefits."*

Non-performing contractors felt that more training would be helpful. Specifically training about proper sizing for certain applications.

High and mid-performing contractors said the program helps them sell more DHPs and gives them an edge over the competition.

> *"The program gives us a chance to sell more ductless heat pumps, increase our business and employ more people. I think it gives us a competitive edge."*

Low performing contractors like the rebate and feel it helps their sales. They do not feel the program gives them a competitive edge because all their competitors participate in the program.

IPC's Contractor Portal

Most of the high and mid-performing contractors interviewed say they have used IPC's contractor portal and are satisfied with the materials.

Low performing contractors do not use IPC's contractor portal, mainly because they didn't feel the need to do more marketing or change their existing marketing.

> *"I get a ton of referrals. I don't need to market a lot."*

> *"I have no need for the IPC materials."*

Non-performing contractors and one mid-performing contractor were not aware of the IPC contractor portal.

Program Participation

Contractors' views on customer awareness of the program are mixed. Some said customers are aware of the program. One non-performing contractor said he is participating in the program because a customer asked him about the rebate. Others say they usually tell customers about the program, and the majority of eligible customers are not aware.

All contractors who had one or more projects in the program say customers who participate are very satisfied with the program and the equipment. The high cost of DHPs is a barrier to installing the technology and participating in the program. The rebate helps some customers, but for others it still isn't enough to overcome the high price of the technology.

"The program is well thought out and executed."

"The customers are generally aware of the program but are often surprised by the high cost of the equipment."

Overall, contractors are very satisfied with the help and support they get from the IPC program specialist.

"It's very helpful to have someone knowledgeable about the program. He came over and talked about the program and the benefits to my company and the customers. He was very influential."

Suggestions for Improvement

Most of the suggestions for improvement centered on increasing marketing/outreach and training:

- One high performing contractor felt that IPC could do a better job getting the word out to people who live in small towns.
- A mid-performing contractor said he would like IPC to reach out to him more and tell him about other HVAC programs that could benefit customers.
- Two contractors (one mid, one low performing) would like to see more advertising from IPC and/or from DHP manufacturers.
- Non-performing contractors felt more training from IPC would be helpful.

  "I would like to have more documentation to take to the site that listed the benefits of ductless heat pumps. We also need more technical education. A forum with manufacturers and contractors would be helpful"

Summary

The following conclusions can be drawn from the information gained in the contractor interviews:

- High and mid-performing contractors are savvy about the program and technology. They have adequate staff, can explain the benefits of the technology to customers, and make use of the contractor portal. They are also more optimistic about the growth of the market.
- Low performers do not complete more projects because they have all the work they need. As a result, little can be done to move these contractors to the mid or high performing categories.
- Non-performing contractors would benefit from more training.
- All contractors interviewed said they were satisfied with the program, the support they receive from IPC, and the technology.

3.5 Best Practices

AEG conducted a literature review of industry publications to identify an appropriate set of best practices to compare with the DHP program. AEG reviewed the following sources to create a list of best practices/innovations in the industry:

- Publicly available best practices reports
- Conference papers and presentation
- Evaluations of other ductless heat pump programs

Table 3-2 below shows each best practice/ innovation and whether IPC currently uses the practice. In all cases, either IPC is already doing the best practice, or it relates to something not eligible in the IPC program.

Table 3-2 Best Practices/Innovation for Ductless Heat Pump Programs

Best Practice/Innovation	Ductless Heat Pump Program: Standard Practice?	Ductless Heat Pump Program: Explanation
Provide contractor training	✓	Training required to be a participating contractor
Provide customer education	✓	Video provided on website. Contractors provide customer education
Target DHPs to replace electric resistance heating	✓	Electric heat is the target market for the program
Consider promoting DHPs to residential new construction	x	New construction is not eligible
Promote improved comfort	✓	Mentioned in marketing plan, website, and in marketing materials
Consider commercial markets	x	Commercial customers are not eligible
Train contractors on proper placement of DHPs	✓	Proper placement required by program and verified through random on-site visits
Target manufactured homes	✓	Although not specifically targeted, manufactured homes are included in the electric heat target market
Promote marketing by contractors/installers	✓	Contractor portal created

Impact Evaluation Findings

The impact evaluation for the Ductless Heat Pump program consisted of a detailed engineering review that included a two-step process: a savings replication and a documentation review. Non-electric benefits were also verified.

4.1 Engineering Review

The Idaho Power Ductless Heat Pump conversion measure refers specifically to conversion from electric zonal (baseboard, ceiling cable, or wall) heating. The Ductless Heat Pump Pilot program used Version 2.0 of the RTF Ductless Heat Pump unit energy savings (UES) workbook for deemed savings in 2014. This version was approved by the RTF on March 18, 2014 and was also used by AEG for savings replication in the 2014 evaluation. This workbook provides annual energy savings for DHP conversions from zonal heating systems by heating zone (HZ) and cooling zone (CZ). Only the "No Screen" options, unscreened for supplemental fuel use, were used for the reported savings and the analysis.

In the savings replication analysis, AEG identified four sites that showed ambiguous mapping between ZIP code, county, and climate zone. There were four homes with a recorded climate zone of HZ1/CZ3 in the tracking database whose county of residence was recorded as Boise County, which would result in a climate zone of HZ3/CZ1 based on the lookups in the RTF Climate Zone file. However, the ZIP code for these homes was 83716, which indicates Ada County and a climate zone of HZ1/CZ3 (according to the climate zone lookup provided by IPC). Through the review of the homes' addresses, it was found that the homes do in fact reside in Boise County and should have a climate zone designation of HZ3/CZ1. AEG applied this change to database in the savings replication analysis resulting in a replicated savings realization rate of 97.5%. No other issues or discrepancies were found in the savings replication analysis.

Twenty homes were sampled for a more thorough documentation review. AEG reviewed application forms and on-site verification reports (if available) to determine if all information in the program tracking database for these projects was correct. There were no issues or errors found in the review sample. Half of the homes in the sample were found to have installed more than one DHP unit; this did not change the deemed savings since these are prescribed on a per-home basis. Because there were no errors or issues found that affected the savings, the realization rate for the documentation review step was 100%. Because of the perfect correlation between the savings that came out of the replication step and the verified savings from the documentation review, the ratio estimate of savings has no uncertainty.

1.2 Non-Electric Benefits

Non-electric benefits (NEBs) were evaluated for this program according to the values set out in the RTF Unit Energy Savings (UES) workbook v2.0 and Supplement 1 of the Idaho Power 2014 Annual Report. During the replication review, AEG determined that non-energy benefits (NEBs) were being incorrectly calculated. The NEBs reported in Supplement 1 of the Idaho Power 2014 Annual Report were based on the “Present Value Non-Electric System Benefits ($/kWh)” values (in 2006 dollars) provided by the RTF, multiplied by the total site savings per measure, and converted from 2006 to 2014 dollars with an incorrect inflator of 1.175023. The correct RTF inflator for converting from 2006 to 2014 dollars is 1.136889 based on the RTF Standard Information Workbook v2.2; the one used by IPC inflated the dollar amounts from 2005 to 2014 dollars. Furthermore, the “Present Value Non-Electric System Benefits ($/kWh)” values (located in Column AJ of the “MeasureTable” sheet in the RTF UES workbook) should not be used for calculating NEBs based on site energy savings. These NEB values are calculated in RTF UES workbooks by dividing the “PV Regional Non-E Value” parameter (Column BV of the “Measure_InputOutput” sheet, output by ProCost) by the “Wholesale Electric Energy (kWh)” parameter (Column L of the “Measure_InputOutput” sheet, output by ProCost). Since the $/kWh PV(NEB) value is based on wholesale electricity savings at the generator busbar, this value should not be multiplied by the deemed site electricity savings to result in the NEB for the measure. Rather, the “PV Regional Non-E Value” parameter should be used directly or in conjunction with the site savings. Even though the corrected dollar year deflator is lower than the one used by IPC, the overall AEG correction resulted in an increase in NEBs due to the higher site-based $/kWh PV(NEB) values. These corrections resulted in an increase in NEBs for the program of about 9%.

1.3 Results

Table 4-1 shows the results of the impact analysis. The program saved 451,391 kWh and achieved $194,605 in non-electric benefits. The realization rates from the replication step are 97.5% for energy savings and 109.2% for NEBs. The realization rates from the documentation review step relative to the replication step are 100% for both energy savings and NEBs. There is no sampling error in AEG’s evaluated impacts since all adjustments were made in the replication step and no additional adjustments were needed as a result of the documentation review step.

Table 4-1 Impact Evaluation Results for the Ductless Heat Pump program

	Reported	AEG Evaluated	Replication RR %	Documentation Review RR % [1]
Savings (kWh)	462,747	451,391	97.5%	100%
NEB (2014$)	$178,221	$194,605	109.2%	100%

[1] The document review realization rate is relative to the replicated savings, not the reported savings.

Conclusions and Recommendations

The results of the impact analysis show that the Ductless Heat Pump program saved 451,391 kWh achieving 97.5% of its goal.

Table 5 1 Ductless Heat Pump Program Results

Metric	Program Goal	Reported	AEG-Evaluated	Overall Realization Rate
Annual Energy Savings (kWh)	460,000	462,747	451,391	97.5%
Non-Electric Benefits (NEBs)	NA	$178,221	$194,605	109.2%

Other key findings from the process and impact evaluations include:

- The program is very well run, has an involved program specialist, and adheres to best practices in the industry.
- The program has high satisfaction among participating contractors and customers, and the technology is well received.
- Contractor/retailers, bill inserts, and word of mouth are the main ways 2014 participants heard about the program.
- The price of the technology has remained steady and the perceived high cost can be a barrier to program participation. The incentive helps address this barrier for some but not all eligible customers.
- Low performing contractors could become more engaged with additional technical training and development.
- According to IPC staff, the contractor portal is rarely being used, but the high- and mid-performing contractors interviewed say they have used the portal and are satisfied with the materials.

5.1 Recommendations

Based on this evaluation, the following recommendations should be considered to enhance program effectiveness and improve the accuracy and transparency of reported savings:

- Consider expanding the target market to new construction and small commercial businesses.
    - ➔ **Rationale:** Growing the target market is an industry best practice and will increase participation and savings if expanding to these new markets are determined to be cost effective.
- Conduct more outreach with contractors. Interviews with contractors revealed that they could benefit from more marketing and outreach. Customer Representatives (CR) could help the program specialist reach out more frequently to participating contractors. Contacts made by the CR are tracked by the Program Specialist. Visits to contractors could also be coordinated with other HVAC programs to inform them about all the energy efficiency rebates available from IPC.
    - ➔ **Rationale**: The program specialist has a large workload supporting this program and little extra time to conduct the outreach with contractors that is required. Outreach to contractors is also an industry best practice.
- Work with ductless heat pump manufacturers to provide training materials and workshops for participating contractors.
    - ➔ **Rationale**: Non-performing contractors identified a need for more training about the technology.
- Remind contractors who are not using the portal about the availability of the contractor portal. Data is available on who has logged in to the portal and the frequency of visits. Let all contractors know when new materials are available through the portal.
    - ➔ **Rationale:** Idaho Power reports that the contractor portal is underutilized, however, the highest performing contractors interviewed said they use the portal. Use of the portal may help lower performing contractors increase their number of projects through the program.
- When calculating NEBs, make sure that the correct inflator is used to convert to current year values. Also do not use the Present Value Non-Electric System Benefits $/kWh for calculating NEBs this value is not based on site energy savings. The “PV Regional Non-E Value” parameter should be used directly or in conjunction with the site savings.
    - ➔ **Rationale:** Calculating the NEBs according to the RTF rules will result in more accurate savings estimates.
- When a home’s ZIP code is in two counties, use the street address to determine the correct climate and heating zone.

➔ **Rationale:** Savings vary greatly by climate and heating zone. Ensuring the correct zones are used will result in more accurate savings estimates. . This was primarily found to be an issue between Boise and Ada counties, in ZIP Code 83706**.**

Program Staff and Implementation Contractor Interview Guides

Program Manager Interview Guide – Final –IPC Residential

NAME

TITLE

PROGRAM

DATE

PHONE

EMAIL

INTERVIEWER

SUMMARY OF FINDINGS

[Once the interview is complete, please complete interview notes within this document. First, provide a high-level summary of findings below. Then, within each section summarize the findings.]

[Some of the answers to these questions will be filled in prior to the interview, based on information learned during the kick off meeting in Boise on June 8, 2015]

BACKGROUND

1. Please provide a brief description of the programs you are directly responsible for?
2. Please describe your job responsibilities related to the program.
3. How long have you been responsible for administration of this program?
4. On average, what percent of your time is spent on the program you are directly responsible for?
5. What other staff work on the program? What is their role regarding the program (i.e. what are the responsible for with regard to the program)? Who, if anyone, provides you with support? What support do they provide?

PROGRAM GOALS

6. What metrics are used to track the success of the program? (Probe for electric savings, participation rates, number of units)?
7. How are goals for this program established?

8. Did the program meet its goals in 2014? If not, what kept the program from meeting its goals?

9. Has the program met its annual goals in previous years? Is it on track to meet its goals for 2015?

PROGRAM IMPLEMENTATION AND MARKETING

10. Do you work with an implementation contractor or trade allies to help deliver the program? Who is/are the implementation contractor and/or trade allies you work with on this program? Do you have any issues or concerns about the implementation contractor or trade allies? If yes, what are your concerns?

11. What is the target market for the program? How are potential customers identified?

12. What are the main barriers to participation? How does the program address these barriers?

13. What has been done to market the program? How successful have these strategies been? Are some marketing strategies or messages more beneficial than others? How is success of the marketing strategies or messages measured?

PROGRAM OPERATIONS

14. What are the participation steps from the customers' perspective? Have these changed over time? If so, why were they changed?

15. Are there any specific aspects of the program that are working very well? Any not working well? (Probe for details) What could be done to improve?

16. What quality control/quality assurance procedures are in place? Are these documented? Is any verification done? What does this entail? Who does the verification?

17. Do the incentive levels seem appropriate? If not, why not? What, if any, changes in the incentive levels do you think may be needed?

18. What is your opinion of free ridership for this program? Meaning do you think customers would pay for the measures on their own, outside of the program. Why do you say that?

19. Do you think the program is changing customers' energy efficiency attitudes and actions? (Probe for specifics)

20. Are customers satisfied with the program overall? With the measures installed? Are they satisfied with the incentive amount? With the savings achieved? How is satisfaction with the program measured? (i.e. is this based on survey information or is it anecdotal?)

PROGRAM IMPACTS

21. Deemed savings from the RTF are used to determine program impacts – correct? Do you know what version of the RTF workbook you are using? If no, who should I ask for that information?

22. We plan to do a review of detailed project documentation for a sample of participants, including cross-checking the project documentation with the tracking spreadsheets. What is the best way to get this data in an electronic form? How is it currently stored?

PROGRAM DATA AND DOCUMENTATION

23. Does the tracking database collect all the information you need? Is there information/data that you wish were available but are not? Is there information in the database that you don't use?

24. What type of documentation is required to support the purchase and installation of the measure?

EVALUATION

25. What do you hope to learn from this evaluation? Are there specific issues you would like the evaluation to address?

Contractor Interview Guide – FINAL–IPC Ductless Heat Pump Program

NAME

TITLE

COMPANY

DATE

PHONE

EMAIL

INTERVIEWER

SUMMARY OF FINDINGS

[Once the interview is complete, please complete interview notes within this document. First, provide a high-level summary of findings below. Then, within each section summarize the findings.]

INTRODUCTION

Hi, my name is ___ and I am calling from Applied Energy Group on behalf of Idaho Power Company. We are working with Idaho Power to evaluate their Ductless Heat Pump Pilot Program. I'm calling to ask you a few questions about your participation as a contractor in that program to help determine what is working and what might be improved. Are you familiar with your company's participation in the Ductless Heat Pump Pilot Program? If not, who would be the best person to speak with at your company about this subject?

All of your answers will be confidential. For our analysis your responses will be anonymously aggregated with those from other companies that participated in the program.

[IF THEY DON'T WANT TO TALK NOW, TRY TO GET A GOOD TIME TO CALL THEM BACK.]

[IF RESPONDENT PROPOSES AN ALTERNATE CONTACT, OBTAIN NAME, BEST NUMBER AT WHICH TO REACH THE CONTACT, AND ANY INFO REGARDING BEST TIME TO CALL]

[IF THEY HAVE QUESTIONS ABOUT OUR LEGITIMACY, THEY CAN CONTACT:]

Gary Grayson at 208-388-2395

[NOTE THAT TODD GREENWELL IS THE PROGRAM SPECIALIST AND HE IS THE PERSON THEY ARE MOST FAMILIAR WITH. GARY IS THE MANAGER IN CHARGE OF EVALUATIONS]

[IF THEY ASK ABOUT TIME LENGTH OF SURVEY, SAY BETWEEN 15 AND 30__ MINUTES]

[IF THEY AGREE TO TALK SAY: THANKS FOR TAKING THE TIME TO SPEAK WITH US. LET'S GET STARTED.]

ABOUT THE CONTRACTOR

Let me start by getting a little information about you and your company.

1. What is your job title or role?

2. What are your company's main products and/or services?

3. When did your company begin participating in IPC's Ductless Heat Pump (DHP) program?

4. Why did you or your company decide to participate in the program?

5. Had your company installed DHPs before participating in the program? [IF YES] How long have you been installing DHPs?

6. What percentage of your business comes from installing DHPs? Have all these projects completed in 2014 received a rebate from Idaho Power? [IF NO] Why not?

    In 2014? _____% 999. DK

7. Do you expect that percentage to grow, stay the same or decrease in the next 2 years (2015 2016)?

CONTRACTOR SKILLS AND KNOWLEDGE

8. How many employees at your company have been trained/ are knowledgeable about the Ductless Heat Pump program?

9. Is the number of employees you have trained enough to meet your customer demand for ductless heat pumps? If you had more employees knowledgeable about ductless heat pump installations and/or the Idaho Power program would you be able to complete more projects?

10. How well would you say you and your employees understand and are able to communicate the benefits of DHPs? If don't understand well, what additional knowledge/training is needed?

11. Do you feel the customers you installed DHPs for understand the benefits of the system you installed? If not, what was not clear?

12. Did customers adequately understand the Idaho Power program eligibility requirements, enrollment process, and the amount of the incentive? If not, what was not clear?

PROGRAM PARTICIPATION

13. Please describe your company's process for marketing DHPs to customers. Do you tell your customers about DHPs and the IPC program? Or do they typically come to you requesting DHPs?

14. Do you think eligible customers (those with electric zonal heat) are generally aware of the program? If not, what else could be done to inform eligible customers about the program?

15. If anything, what things about the program make it difficult for customers to participate (e.g., paperwork, measures, incentives too low, etc.)?

16. Have you received any complaints from customers who feel the equipment doesn't meet their expectations? [IF YES] What specifically were they disappointed in? How did you address their concerns?

17. How influential was the Idaho Power DHP program manager in your decision to participate? How helpful is the program manager if you have questions or concerns? Does having access to a knowledgeable program manager increase the value of your participation in the program?

18. Does the program make it easier for you to sell DHPs and/or identify prospects?

19. Do you use Idaho Power's contractor portal to access marketing materials?

    a. [IF NO] Why not? How could it be made more valuable/useful to you?
    b. [IF YES] Has it been helpful to your business? Are you satisfied with the materials available through the portal?

20. What, if anything, do you think is particularly good about the IPC program?

21. Do you have any suggestions for improvement to the program?

PROGRAM EFFECTIVENESS

22. What are the benefits to your company to participate in the program? Do you think the program helps your business? Does it give you a competitive advantage over other contractors in your area? [Probe for reasons?]

23. If the program was no longer available would you continue to install the DHPs in homes? Why or why not?

24. Is there anything else Idaho Power could do to help you increase the number of DHPs you install in their service territory?

CONCLUSION

25. Is there anything else that you think Idaho Power should think about as they continue to offer and improve this program?

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Impact and Process Evaluation of Idaho Power's Home Improvement Program

Final Report

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October 5, 2015

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Executive Summary

The Home Improvement Program offers incentives to homeowners for upgrading insulation and windows in electrically heated homes. To qualify for an incentive under this program, the home must be a single-family home, a multifamily structure three stories or under, or a manufactured home in Idaho Power's service area in Idaho. The home must have an electric heating system serving at least 80 percent of the home's conditioned floor area. The heating system can be a permanently installed electric furnace, heat pump, or electric zonal heating system. Insulation must be professionally installed between conditioned and unconditioned space by an insulation contractor.

Conclusions

The results of the impact analysis show that in 2014, the Home Improvement program more than doubled its savings goal, achieving 845 MWh of savings with a realization rate of 100.7%.

Table ES-1 Home Improvement Program 2014 Results

Metric	Program Goal	Reported	AEG Evaluation	Realization Rate
Annual Energy Savings (kWh)	370,000	838,929	845,085	100.7%

Other key findings from the process and impact evaluations include:

- Contractors and the program specialist report that participants are satisfied with the program, the savings achieved and the improved comfort of their homes.
- The network of installation contractors are engaged in the program.
- The target market is small and eligibility criteria (e.g., existing insulation levels) is strict, which may make achieving future participation and savings goals more challenging, although this has not been a problem to date.
- Marketing is effective and most contractors would like to see these efforts increased.

Recommendations

Based on this evaluation, the following recommendations should be considered to enhance program effectiveness and improve the transparency and accuracy of reported savings:

- Increase consistency/clarity between supporting documentation and the program database. Require more standardized documentation to prevent errors in the estimations of savings. More consistent documentation should be required in the project application and submitted materials to clearly identify all variables necessary for the calculation of savings. The submitted documentation was often disorganized and sometimes incomplete. Recently IPC improved their application, adding a checklist for customers on the application itemizing the documentation required. IPC should have a standardized documentation package for each project that includes a similar checklist completed by IPC that verifies that all required information has been submitted. The information should then be carefully and completely input in the tracking database.

- Use the current versions of the RTF Unit Energy Savings (UES) workbooks to discern between different residential segments, to estimate Non-Electric Benefits (NEBs), and to improve the overall accuracy of impact estimates. The project application discerns between standard single family, manufactured, and multifamily homes. These entries should be emphasized, recorded in the tracking database, and used to determine the correct savings for the respective residential building segment. In addition, adopting the current versions of the Single Family and Manufactured Home Weatherization workbooks would allow IPC to estimate NEBs for the Home Improvement program.
- Add sliding glass doors to the measure description on the application. Since sliding glass doors are specifically included in the RTF UES workbook for the window upgrade weatherization measures, "sliding glass doors" should be also included in the measure description in the project application.
- Require that contractors match U-factors (taken from the NFRC window stickers) to each window on the invoice. Since the RTF only prescribes savings for U-30 and U-22 window upgrades, consider a cutoff (e.g. U-25) where windows with lower than U-25 would be evaluated with savings for U-22 window upgrades. This would require calculating an average U-value weighted by window area.
- Increase marketing. Or if that's not possible due to cost effectiveness issues, focus marketing dollars on the more proven strategies: contractor outreach and bill inserts.

Contents

Introduction

1.1 Program Description

The Home Improvement Program (HIP) offers incentives to homeowners for upgrading insulation and windows in electrically heated homes. To qualify for an incentive under this program, the home must be a single-family home, a multifamily structure three stories or under, or a manufactured home in Idaho Power's service area in Idaho. The home must have an electric heating system serving at least 80 percent of the home's conditioned floor area. The heating system can be a permanently installed electric furnace, heat pump, or electric zonal heating system. Insulation must be professionally installed between conditioned and unconditioned space by an insulation contractor.

Customers must use a participating contractor to qualify for the Idaho Power incentive. Incentives are processed by Idaho Power. Two third-party contractors perform on-site verification for the program.

In 2014, the Home Improvement program exceeded its unit goal and more than doubled its savings goal, reporting 839 MWh of savings across 555 projects (Table 1-1).

Table 1-1 Home Improvement Program Reported Savings vs. 2014 Goals

Year		Projects	MWh Savings
PY2014	IPC Goals	400	370
	IPC-Reported	555	839
Percent of IPC-Reported to Goals		**139%**	**227%**

1.2 Purpose of the Evaluation

Idaho Power Company (IPC) contracted with Applied Energy Group (AEG) to conduct a process evaluation of the Home Improvement program and an impact evaluation for program year 2014. The key objectives addressed in the process evaluation were to:

- Evaluate program design including program mission, logic, and use of best practices.
- Evaluate program implementation including quality control, operational practice, and outreach.

- Evaluate program administration including program oversight, staffing, management, training, documentation, and reporting.
- Evaluate participant and stakeholder response including customer interaction and satisfaction.
- Report findings and observations and provide recommendations that enhance program effectiveness.

The key objectives addressed by the impact evaluation were to:

- Measure and verify the energy (kWh) and non-electric impacts attributable to the 2014 program.
- Provide credible and reliable ex-post program energy savings and realization rates for the 2014 program year.
- Report findings and observations, and provide recommendations that would enhance the effectiveness of future analysis and the accurate and transparent reporting of program savings.

1.3 Report Structure

Following this introductory chapter are the following chapters:

- Chapter 2 – Methodology: Description of the evaluation methods, sampling design, and data collection and analysis process.
- Chapter 3 – Process Evaluation Findings: Description and discussion of the program processes and best practices review.
- Chapter 4 – Impact Evaluation Findings: Description and discussion of the result of the engineering review including kWh savings estimates, non-electric benefits and realization rates.
- Chapter 5 – Conclusions and Recommendations: Conclusions reached based on the process and impact evaluation including the best practices review and recommendations to improve the program.

Methodology

This section describes the approach AEG used to evaluate the Home Improvement program.

2.1 Process Evaluation

Process evaluations focus on determining the overall effectiveness of program delivery, identifying opportunities for program improvements, and assessing key program metrics including participation rates, market barriers, and overall program operations. The process evaluation for the Home Improvement program consisted of the following research activities:

- Interviews with program staff
- A detailed review of the program documentation and tracking database
- Interviews with participating contractors
- A best practices review

Interviews with Program Staff

AEG conducted an in-depth qualitative interview with the IPC Program Specialist. The interview included questions surrounding the goals for the program offering from the interviewee's perspective; policies, processes and procedures surrounding recruitment and delivery of the program; what is working and what is not; and the strengths and weaknesses of the program.

Documentation Review

AEG reviewed several sources of data as metrics to evaluate the program and the program offerings. The data sources included the program tracking database, application, marketing plan, marketing copy, example QA forms, and the program history. Insight gained from this document review was used to provide a background for conducting the process evaluation and to inform the resulting conclusions and recommendations.

Contractor Interviews

AEG conducted interviews with 8 participating contractors, including 5 insulation contractors and 3 window contractors. The goal of these interviews was to qualitatively explore contractors' knowledge and experience with the program. Specific topics addressed during the interviews included:

- Contractor's skills and knowledge about the program and the measures

- Program participation; barriers and satisfaction
- Suggestions for improvement

Best Practices Review

AEG conducted a literature review of industry publications to identify an appropriate set of best practices to compare with IPC's Home Improvement program. AEG conducted the best practices review as follows:

- Reviewed regulatory filings, evaluation reports, conference presentations, marketing materials and industry publications
- Created a list of best practices/innovations and the rationale behind the best practice/innovation
- Benchmarked IPC's program against each best practice listed

2.2 Impact Evaluation

The main objective of the impact evaluation was to estimate the annual kWh savings achieved by the program. This was accomplished by conducting a detailed engineering review that included a two-step process: a savings replication and a documentation review.

Engineering Review

For the savings replication step, AEG applied the RTF deemed algorithms to the tracked parameters for all program participants to verify that the algorithms were applied correctly, identify errors or issues, and adjust savings estimates at the project level if necessary. This step yielded replicated savings estimates for all projects in the program. Because this step is done for all program participants, there is no sampling error from this step.

AEG designed a stratified random sample to select projects for the documentation review. While a simple random sample selects sample points at random from the entire population, a stratified random sample selects sample points at random from the population within mutually exclusive groups called strata. In this analysis, the reported kWh savings was used as the stratification variable. As long as the stratification variable is correlated with the variable of interest, in this case the final verified savings that is not yet known, then using a stratified design increases the precision of the estimates holding sample size constant, or decreases sample size holding precision constant.

The first step was to specify the sample frame, which consisted of the 555 projects in program year 2014. The next step was to determine the stratification variable and number of strata. The magnitude of kWh savings was used for stratification resulting in 4 strata for the original sample design: 1) low savings; 2) medium savings; 3) high savings; and 4) highest savings (which was a census stratum comprising the three projects with highest kWh savings). The Delanius-Hodges method was applied to determine the stratum boundaries. Sample sizes by stratum were calculated using a Neyman Allocation, which assigns sampling points to each stratum based on a combination of the weights and standard deviation for each stratum. Finally, sample points were randomly selected for Strata 1, 2 and 3 (Strata 4 was a census strata with all projects included).

During the data collection process, AEG requested project files by customer ID number. Several customers in the sample had more than one project. AEG reviewed all projects for those customers and placed the additional projects in a fifth census stratum called “additional projects.” In addition, one extra project file was inadvertently provided to AEG. AEG reviewed that file as well and grouped the findings in the additional projects stratum. Adding these projects as part of the random sample could introduce bias, since they were not part of the original sample selected and would not necessarily be representative of other projects. However, rather than discarding the results, we included them as another census stratum, where each of these additional projects represents only themselves, thereby eliminating the bias from including them. This served to increase the overall precision of the results slightly with minimal incremental effort.

The sample for the Home Improvement review consisted of 30 projects from the original sample selection process plus the six additional projects. Therefore, 36 of the 555 projects were reviewed (Table 2-2).

Table 2-1 Home Improvement Program Sample Design

Stratum	Reported Savings (kWh/yr)	# in Population	# in Sample
1. Low Savings	<1100	251	7
2. Medium Savings	≥1100 and <2400	201	9
3. High Savings	≥2400 and <7000	94	11
4. Highest Savings (Census)	≥7000	3	3
5. Additional Projects (Census)	NA	6	6
	Total	**555**	**36**

Detailed documentation (rebate applications, invoices, etc.) for each project in the sample was reviewed. Any adjustments needed based on this documentation review would result in an overall adjustment to the savings, along with associated sampling error. The resulting savings are referred to here as “verified savings.”

Estimating Total Program Impacts

AEG expanded the verified savings results from the sample to estimate the savings for the population of projects in program year 2014 using a combined ratio estimate according to the steps below.

1. Calculated the per-project average replicated savings (from the first engineering review step) by stratum for the sample. Calculated the per-

project average verified savings (second engineering review step) by stratum for the sample.

2. Calculated a weighted average replicated savings and a weighted average verified savings for 2014 using weights that reflect the proportion of projects in each stratum in the population.
3. Calculated the ratio of the sample verified weighted average for 2014 to the sample replicated weighted average.
4. Applied this combined ratio to the program's total replicated population savings to estimate the evaluated gross savings for the program in 2014.
5. Determined the overall realization rate for the 2014 program by dividing the estimated evaluated gross savings from step 4 by the reported population savings.

The combined ratio estimate results in a more precise estimate of savings because it leverages the correlation between the replicated savings, known for all customers, and the verified savings, known only for the sample.

Non-Electric Benefits

IPC did not claim non-electric benefits (NEBs) for the Home Improvement program in 2014. The RTF workbook used by IPC for 2014 savings is version 2.5. That version does not include NEBs. NEBs are calculated only in v3.0 and later, and these are heavily dependent on the savings analysis methodology that changed significantly since v2.5. Therefore, AEG used the latest RTF workbook (version 3.3) to estimate non-electric benefits associated with supplemental non-electric heating energy use. To make those estimates, electric energy savings were calculated using the version 3.3 workbook because the non-electric benefits are based on the version 3.3 electric savings. Since it is not appropriate to use the version 3.3 non-electric benefits in the evaluated impacts without also using the version 3.3 electric savings, AEG only provides the version 3.3 electric savings and non-electric benefits to IPC for comparison with the electric-only savings from version 2.5. The non-electric benefits are not included in our final evaluated impacts.

Process Evaluation Findings

The process evaluation for the Home Improvement program focused on conducting interviews with program staff and participating contractors and reviewing program processes to assess the program operations, quality control, staffing, and outreach. The evaluation also included secondary research to determine if the program is currently using established best practices prevalent in the industry. The process evaluation found that customers and contractors are very satisfied with the program, the marketing is very effective, but the target market of eligible customers is small and often hard to reach.

3.1 Program Staff Interview

AEG conducted an in-depth interview with the program specialist for the Home Improvement program. The following are some of the key points from the interview.

Program Design and Operations

- Although the program has consistently met its goals, it is currently running a little behind in program year 2015.
- According to the program specialist, the biggest challenge for the program is "beating the bushes" to find the all-electric customers and make them aware of the program and its benefits. Most IPC customers are not eligible for the program because they have natural gas heat.
- There are 18 participating insulation contractors and 115 participating window contractors in the program.

Marketing and Outreach

- An algorithm is used to identify IPC customers who are likely to have electric heat. These customers are targeted through direct mail.
- Customers who participate in the audit program and have electric heat are also the target market for the program.
- Marketing for the program includes bill inserts, Facebook ads, direct mail letters and ads in rural newspapers where residents are more likely to have electric heat.

Program Staffing

- The program specialist is responsible for all aspects of administering the program. The program takes about 80% of her time.
- The program specialist has an internal marketing partner who helps with the marketing of the program.

Customer Satisfaction

- The QA contractor asks customers about satisfaction with the program and the results have consistently been positive.
- According to the program specialist, customers are generally happy with the energy savings and the improved comfort achieved from the increased insulation.

3.2 Program Processes

The program is delivered by the participating contractors. In order to participate in the program, contractors are required to attend a two-day training. Participating contractors are listed on the company website.

Customers interested in participating in the program call one or more participating contractors. The contractor determines if the customer qualifies for the program and provides them with a bid. The program application must be sent to IPC within 90 days of installation. Rebate checks are required to be mailed within 6-8 weeks of receipt of application.

Quality Assurance/Quality Control

For quality assurance/control, IPC works with two independent contractors to do inspections. The QA/QC plan requires contractors to inspect 5% of all projects completed. The participants to be inspected are randomly selected by the QA/QC contractor. During the visit, the inspectors measure the insulation installed to make sure it matches the contractor's invoice, verify that the windows are installed correctly and the window measurements match the invoice, and ask the participants some customer satisfaction questions.

3.3 Program Marketing

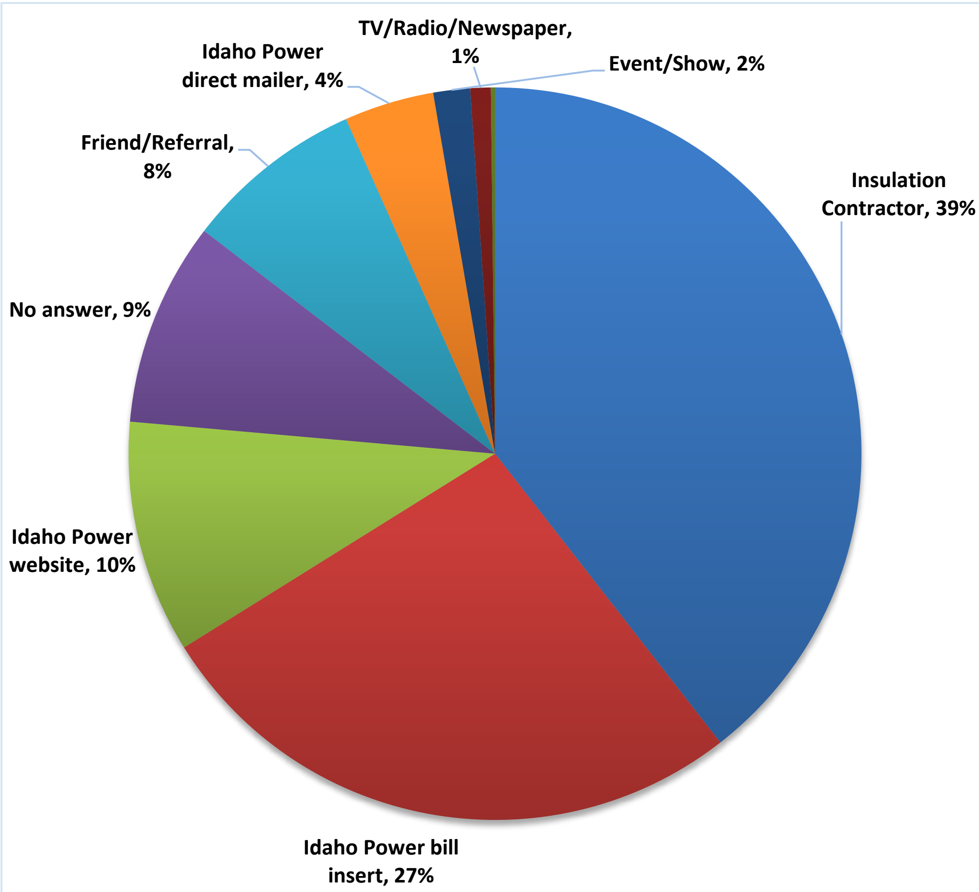
Table 3-1 shows the marketing methods used in 2014 to promote the Home Improvement program.

Table 3-1 Marketing Methods Used in 2014

Method	Date
Bill insert	Jan, Apr, Sep
Print ads in select rural newspapers	Feb, May, Oct
Direct mail letter	Feb, Sep
Facebook ads	Jun - Aug
Ad network digital ads	Mar – May
Social media	Ongoing

Source: 2014 HIP Marketing Plan

During installation, participating customers were asked how they heard about the program. This information is stored in the program tracking database. In 2014, insulation contractors and bill inserts were the most frequently mentioned ways customers reported hearing about the program (Figure 3-1).



Source: 2014 HIP Marketing Plan

Figure 3-1 How Participants Heard about the Home Improvement Program

IPC also implemented a new contractor portal in 2014 where the participating contractors can download artwork for advertising – this was designed to make it easy for contractors to customize advertising about the program.

3.4 Participating Contractor Interviews

During August and September 2015, AEG conducted in-depth interviews with 8 participating contractors in IPC's Home Improvement Program: 5 insulation contractors and 3 window contractors. (See Appendices for the interview guide.) The main objectives of the interviews were to qualitatively assess the contractors' skills and knowledge related to the program, gauge the use of IPC's contractor portal, identify any barriers to program participation, assess customer satisfaction, and identify any strategies to improve the program.

Contractors' Skills and Knowledge

Most contractors feel they are knowledgeable about the program and are able to explain the benefits to customers. No contractors reported any problems with employee turnover or getting new employees trained on the program.

> *"The program is very easy to explain to customers, especially those with electric heat."*
>
> *"One of the services my company offers is to explain all the program details to customers. Our first question is -- what is their heat source? If they say electric we tell them about IPC."*

One contractor said he had a very large project and the IPC program specialist sent a person on-site to train the seven person crew.

IPC's Contractor Portal

Most contractors are not aware of the portal or do not use it. One contractor said he had no need to advertise. Another contractor said that IPC sends him boxes of marketing materials whenever he runs low and therefore has no need for the portal.

One contractor said that when he went to the website it said he could not use the IPC logo. The materials available through the portal were not useful to him without the IPC logo.

Program Participation

Contractors say customers experience substantial savings from participating in the program. The feedback they get from customers about the program and the measures is positive.

> *"It's a great program. Customers love it. Contractors love it."*

Contractors say awareness of the program is split. Some customers come to them asking about the program, while in other instances the contractor informs customers that they might be eligible for rebates. One contractor said about 40% of the customers who are eligible for the program were not aware before he told them. Another contractor said that most customers come to him asking about the program.

> *"They've got a great marketing campaign. I see it on Facebook, radio and TV. They do a great job. A lot of our calls come from bill stuffers. They are doing a good job getting the word out."*

Contractors generally complete the paperwork for the customers. Contractors described the process as straightforward and easy.

Contractors were very positive about their interaction with the program specialist. They said she is knowledgeable and able to answer any questions that they have.

> *"I do interact with Becky regularly. She is very helpful. Does a great job."*

Contractors believe the rebate is very influential in convincing all-electric customers to add insulation. Some contractors are able to convince customers to add wall or floor insulation when they come in asking about increasing insulation in their attic. The rebate is very helpful in up selling these customers.

> *"80% of people add floor insulation to the job. It's a decent incentive."*
>
> *"The rebate makes the sale so easy for all-electric homes. All bids are basically the same. The IPC rebate gives us an edge."*

The existing insulation levels and electric-heat only requirements are seen as unnecessarily strict by some contractors. Other, savvier contractors understand that cost effectiveness is an issue with rebate programs.

> *"The program is too narrow. R19 or less really cuts the amount of people that are eligible. Homes that were built in the 70's – 40 years ago – you put in at least an R30. I can't believe that anyone would put in less than that. When I first started doing this R30 was the standard for the attic. R19 is not something you see very often."*
>
> *"It's hard to explain to gas customers why they don't qualify. I wish they could qualify if they have AC."*
>
> *"I would love it if they would allow existing insulation levels of R25 or R26, but I know they have to deal with cost effectiveness."*

Window contractors appreciated the fact that sliding glass doors are eligible[1] and that customers don't have to do all their windows at once. They can spread the upgrades out over several years.

Suggestions for Improvement

Most of the suggestions for improvement centered on expanding the program and increasing marketing. Specific suggestions included the following:

- Expand the program to make customers with higher existing insulation levels and/or central air conditioning eligible.
- Increase marketing. The marketing that IPC does is effective but there are still customers who are not aware of the program and the benefits.
- Provide contractors with lists of customers who have all-electric homes so they could market directly to them.

Summary

The following conclusions can be drawn from the information gained in the contractor interviews:

[1] Sliding glass doors are allowed by the program, but are not individually specified on the program application form.

- Satisfaction with the program is high. The contractors interviewed and the customers they serve are very satisfied with the program, the program specialist, and the measures installed.
- The limited target market is a barrier to program participation. Given the all-electric and existing insulation requirements, only a small percentage of customers are eligible to participate.
- Marketing is very effective and should be increased if possible.
- The contractor portal is not being used by the contractors interviewed.
- The incentive is very helpful in influencing people to add insulation. It also makes it easier to up sell customers who are interested in attic insulation to also add floor and/or wall insulation.

3.5 Best Practices

AEG conducted a literature review of industry publications to identify an appropriate set of best practices to compare with the Home Improvement program. AEG reviewed the following sources to create a list of best practices/innovations in the industry:

- Publicly available best practices reports
- Conference papers and presentation
- Evaluations of other weatherization programs

Table 3-2 below shows each best practice/ innovation and whether IPC currently uses the practice. In all cases, either IPC is already doing the best practice, or it relates to something that is covered by a different IPC program.

Table 3-2 Best Practices/Innovation for Weatherization Programs

Best Practice/Innovation	Home Improvement Program	
	Standard Practice?	Explanation
Emphasize non-energy benefits such as improved comfort and home improvement	✓	Improved comfort emphasized in promotional ads
Conduct tests to pinpoint where homes are losing energy	X	Not required; likely covered in IPC's audit program
Cross promote with HVAC rebate programs	✓	Cross promotion with heat pumps listed in marketing plan
Cross promote with audit programs	✓	Project specialist says she uses audit participants as one of the target markets
Develop a network of local installers	✓	Participating contractors deliver the program
Provide contractor training	✓	2-day training required
Require third party verification of installations	✓	Verification of 5% of projects conducted by third party
Process rebates in 8 weeks or less	✓	Rebate check required to be sent within 6-8 weeks. Most actually sent in less than 2 weeks.
Emphasize affordability of measures	✓	Cited as a strength in the marketing plan

Impact Evaluation Findings

The impact evaluation for the Home Improvement program consisted of a detailed engineering review that included a two-step process: a savings replication and a documentation review.

4.1 Engineering Review

The Home Improvement Program used Version 2.5 of the RTF Single Family Weatherization Unit Energy Saving (UES) workbook that was specifically developed with separate cooling zones for Idaho Power for deemed savings in program year 2014. This version was provided as a program specific measure workbook by the RTF on December 31, 2011 and was used by AEG for savings replication in this evaluation. This RTF UES workbook provides annual heating and cooling energy savings per square foot of installed measure for multiple types of weatherization measures, multiple levels of upgrade, multiple heating and cooling zone combinations, and multiple heating systems. Cooling savings were only reported for those homes that had a central AC or heat pump system. Of the measures covered by the RTF UES workbook, wall insulation, attic insulation, floor insulation, and window upgrades were among the measures installed in the Home Improvement Program. During the savings replication effort, all deemed savings from the RTF were rounded to two decimal points for significant figure consistency with the IPC analysis. Every record in the database was checked and savings were replicated.

The AEG-replicated energy savings for this program were 839,124 kWh/yr. The realization rate was 100.02%, and the replicated energy savings exceeded the reported savings by 195 kWh/year. There were a number of minor discrepancies found through the tracking database review and replication effort. The most significant discrepancy was found for wall insulation in HZ1 with zonal heat; the RTF deemed heating savings for this measure were 1.60 kWh/square foot (sqft), while the HIP savings logic file provided by IPC reported savings of 1.56 kWh/sqft. This discrepancy was found in 13 measures and accounted for a total difference of 284.8 kWh/year between the reported and replicated savings for these measures. Other small discrepancies included floor insulation (R-0 to R-30) with an electric furnace heating system in HZ2/CZ3 and attic insulation (R-19 to R-49) with an electric furnace heating system in HZ1/CZ3. These were due to 0.01 kWh/sqft differences in deemed savings values between the RTF deemed values and the reported IPC values, most likely attributable to rounding error. The following table is the replication summary for measures in the 2014 Home Improvement Program.

Table 4-1 ***Replication Summary for IPC PY 2014 Home Improvement Program***

Measure	Count	Reported Savings (kWh/yr)	Replicated Savings (kWh/yr)
Attic Insulation	133	179,877	179,633
Floor Insulation	64	88,755	88,823
Wall Insulation	29	32,386	32,670
Window Replacement	329	537,912	537,998
Total	**555**	**838,929**	**839,124**

For step two of the engineering review, AEG reviewed a statistically representative sample of 36 out of 555 total projects through the Home Improvement Program. Customer background documents (invoices and rebate forms) were requested from IPC and reviewed. The "per-sqft" heating and cooling savings for these projects are deemed by the RTF on a climate zone basis in the UES workbook v2_5.

AEG verified that each customer address and ZIP code matched the appropriate climate zone and checked that variables such as heating and cooling type, square footage of the measure in question, baseline weatherization level, and proposed weatherization level were reported and used correctly in the IPC tracking database. The Heating Zone/Cooling Zone (HZ/CZ) match was checked for each site with ZIP codes and counties in the "ZoneLookup" sheet of the "IPC home improvement savings logic.xlsx" workbook provided by IPC as well as the "PNWClimateZones.xlsx" workbook from the RTF. No issues with the climate zone assignments were found in the sample. AEG found the following issues in the sample through the documentation review:

- Four instances where the reported HVAC system type had to be changed based on evidence in the submitted documentation;
- Two instances where the reported window area had to be changed based on evidence in the submitted documentation;
- One instance where the final R-value had to be changed based on evidence in the submitted documentation;
- Two instances where the HVAC system type was not reported or unclear in the documentation;
- Three instances where the home in question was a multifamily apartment;
- One instance where the home in question was a manufactured home;
- Two instances where the final wall insulation level was much greater than the R-11 level specified by the RTF;
- Two instances where the existing window type was not provided in the documentation.

Table 4-2 shows the results of the document review by project.

Table 4-2 Project Level Results of HIP Document Review

Site ID	Sample Point	Stratum	# of Projects	Reported Savings (kWh/yr)	Replicated Savings (kWh/yr)	Verified Savings (kWh/yr)	Realization Rate (%)
10730	1	1	1	933.6	933.6	933.6	100.0%
11047	2	1	1	313.5	313.5	313.5	100.0%
10847	3	1	1	252.7	252.7	252.7	100.0%
	Add’l Census	5	2	3,886.3	3,886.3	3,886.3	100.0%
11110	4	1	1	292.1	292.1	292.1	100.0%
	Add’l Census	5	1	614.64	630.4	630.4	102.6%
10942	5	1	1	432.8	432.8	432.8	100.0%
10934	6	1	1	432.8	432.8	432.8	100.0%
11118	7	1	1	231.0	231.0	231.0	100.0%
	Add’l Census	5	1	1,110.7	1,139.2	1,139.2	102.6%
11144	8	2	1	1,674.0	1,676.8	1,676.8	100.2%
10701	9	2	1	2,278.0	2,278.0	2,278.0	100.0%
11077	10	2	1	1,926.0	1,929.2	2,253.8	117.0%
10806	11	2	1	1,120.1	1,121.8	792.3	70.7%
10759	12	2	1	1,420.8	1,420.8	1,142.4	80.4%
10666	13	2	1	1,584	1,584	1,392	87.9%
10793	14	2	1	1,796.8	1,796.8	1,796.8	100.0%
	Add’l Census	5	1	209.04	214.4	214.4	102.6%
11059	15	2	1	1,626.3	1,626.3	1,626.3	100.0%
10867	16	2	1	1,690.6	1,690.6	1,690.6	100.0%
11171	17	3	1	2,515.9	2,515.9	2,867.0	114.0%
10842	18	3	1	4,445.2	4,445.2	4,445.2	100.0%
10801	19	3	1	2,907.7	2,907.7	4,601.9	158.3%
11061	20	3	1	2,910	2,925	2,925	100.5%
11096	21	3	1	2,524.0	2,524.0	2,524.0	100.0%
10989	22	3	1	2,870.3	2,870.3	2,870.3	100.0%
10981	23	3	1	4,523.5	4,523.5	4,523.5	100.0%
10854	24	3	1	6,121.6	6,121.6	6,121.6	100.0%
10727	25	3	1	2,641.7	2,643.4	2,643.4	100.1%
11135	26	3	1	4,087.2	4,093.4	4,093.4	100.2%
10902	27	3	1	4,241.2	4,234.7	4,234.7	99.8%
10869	28	4	1	7,330.4	7,319.2	7,293.1	99.5%
10692	29	4	1	8,450.2	8,450.2	7,396.6	87.5%
11153	30	4	1	10,795.0	10,795.0	10,795.0	100.0%
10728	Add’l Census	5	1	198.5	198.6	198.6	100.1%

4.2 Non-Electric Benefits

AEG analyzed the "SFWx_v3_3.xlsm" (Version 3.3) UES workbook to determine the latest savings values for the measures and evaluate Non-Electric Benefits (NEBs) for the program. Since this UES workbook did not separate cooling savings by cooling zone, AEG accessed the cooling zone-specific savings from the "SEEM_SingleFamilyExistingHVACandWeatherization_May2015.xlsm" (SEEM) file available on the RTF website. The cooling savings in the SEEM file were weighted by central air conditioning and room air conditioning saturation values from a Northwest Power Conservation Council forecast of Residential Building Stock Assessment (RBSA) data. Central air conditioning savings were assumed by the RTF to be identical to heat pump cooling savings, while zonal cooling system savings were assumed to be 50% of the heat pump cooling savings based on RTF best judgment. AEG separated the cooling savings by "Central Cooling", "Zonal Cooling", and "Unknown" system savings. The savings per cooling zone were then applied to each corresponding measure in each heating zone to result in unique HZ/CZ mappings with heating systems and three different types of cooling savings. While for 2014, the Home Improvement Program only included cooling savings for homes with central cooling systems, AEG also applied "Zonal Cooling" system savings from Version 3.3 for homes with room air conditioning and evaporative coolers and applied "Unknown" system savings to projects that had blank or "Other" entries for the cooling system in the tracking database[2]. Non-Electric Benefits (NEBs) were also evaluated based on the RTF Phase II Non-Electric Heat Adjustment in the SEEM file and the Idaho Wood Fuel Credit of $0.078/kWh (2006 dollars) from the RTF Standard Information Workbook v2.2; the NEB was then converted to 2014 dollars[3].

Table 4-3 ***Home Improvement Program Non-Electric Benefits (using Workbook v3.3)***

Measure	Count	Reported Savings (kWh/yr)	Savings Replicated with v2.5 (kWh/yr)	Savings Replicated with v3.3 (kWh/yr)	Non-Electric Benefits with v3.3 ($2014)
Attic Insulation	133	179,877	179,633	106,035	$1,354.28
Floor Insulation	64	88,755	88,823	45,726	$739.68
Wall Insulation	29	32,386	32,670	32,179	$474.87
Window Replacement	329	537,912	537,998	235,677	$2,910.53
Total	**555**	**838,929**	**839,124**	**419,618**	**$5,479.36**

[2] Two attic insulation projects that were reported as R-0 to R-19 upgrades had to be evaluated with savings for the R-0 to R-38 upgrade because the current version of the workbook does not include R-19 as an efficient case for attic insulation level.
[3] This wood fuel credit is lower than the regional average of $0.081/kWh as listed in the RTF Standard Information Workbook

4.3 Results

Table 4-3 shows the results of the impact analysis. The program saved 845,085 kWh in 2014 with a realization rate of 100.7%. The evaluated savings relative precision is 3.63% at the 90% confidence interval.

Table 4-4 *Home Improvement Program Impact Evaluation Results*

Reported Savings (kWh/yr)	Replicated Savings (kWh/yr)	Combined Ratio	Evaluated Savings* (kWh/yr)	Realization Rate** (%)
838,929	839,124	1.007	845,085	100.7%

*Evaluated savings equal replicated savings multiplied by combined ratio

**Ratio of evaluated savings to reported savings, expressed as a percentage

CHAPTER | 5

Conclusions and Recommendations

The results of the impact analysis show that the Home Improvement program saved 845,085 kWh in 2014, more than doubling its goal, with a realization rate of 100.7%.

Table 5-1 Home Improvement Program Results

Metric	Program Goal	Reported	AEG-Evaluated	Overall Realization Rate
Annual Energy Savings (kWh)	370,000	838,929	845,085	100.7%

Other key findings from the process and impact evaluations include:

- Participants are satisfied with the program, the savings achieved and the improved comfort of their homes.
- The network of installation contractors are engaged in the program.
- The target market is small and eligibility criteria (e.g., existing insulation levels) is strict, which may make achieving future participation and savings goals more challenging, although this has not been a problem to date.
- Marketing is effective and most contractors would like to see these efforts increased.

Recommendations

Based on this evaluation, the following recommendations should be considered to enhance program effectiveness and improve the transparency and accuracy of reported savings:

- Increase consistency/clarity between supporting documentation and the program database. Require more standardized documentation to prevent errors in the estimations of savings. More consistent documentation should be required in the project application and submitted materials to clearly identify all variables necessary for the calculation of savings. The submitted documentation was often disorganized and sometimes incomplete. Recently IPC improved their application, adding a checklist for customers on the application itemizing the documentation required. IPC should have a standardized documentation package for each project that includes a similar checklist completed by IPC that verifies that all required information has been submitted. The information should then be carefully and completely input in the tracking database.

➔ **Rationale:** Helps ensure the correct variables are used to look up deemed savings, which ensures more defensible results and a more accurate impact analysis.

- Use the current versions of the RTF UES workbooks to discern between different residential segments, to estimate NEBs, and to improve the overall accuracy of impact estimates. The project application discerns between standard single family, manufactured, and multifamily homes. These entries should be emphasized, recorded in the tracking database, and used to determine the correct savings for the respective residential building segment. In addition, adopting the current versions of the Single Family and Manufactured Home Weatherization workbooks would allow IPC to estimate NEBs for the Home Improvement program[4].

  ➔ **Rationale:** Although the energy savings associated with the Single Family Version 3.3 weatherization workbook are smaller than those associated with Version 2.5, the impacts in Version 3.3 are more accurate and defensible than those in Version 2.5. The current weatherization workbook represents RTF's best estimate of savings, uses "Option 3" to take measure interactions into account, and uses two phases of calibration to more accurately represent savings for homes in the Pacific Northwest and incorporate non-electric benefits. One shortcoming, however, is that the UES workbooks do not separate savings by cooling zone. These savings can be separated by cooling zone using data from the underlying SEEM model workbook, as RTF has previously done for IPC in Version 2.5 and AEG has demonstrated for Version 3.3.

- Add sliding doors to measure description on the application. Since sliding glass doors are specifically included in the RTF UES workbook for the window upgrade weatherization measures, "sliding glass doors" should be also included in the measure description in the project application.

  ➔ **Rationale**: Avoids confusion during evaluation.

- Require that contractors match U-factors (taken from the NFRC window stickers) to each window on the invoice. Since the RTF only prescribes

[4] AEG acknowledges that the UES workbook for multifamily weatherization is currently out of compliance with a sunset date of 12/31/2015, and that the newly approved UES workbook for manufactured homes has not been QCed as of the date of this report. However, AEG encourages IPC to differentiate between residential building segments for the Home Improvement Program.

savings for U-30 and U-22 window upgrades, consider a cutoff (e.g. U-25) where windows with lower than U-25 would be evaluated with savings for U-22 window upgrades. This would require calculating an average U-value weighted by window area.

➔ **Rationale:** Though window upgrade savings were evaluated with a final rating of U-30, many of the projects had installed windows with U-factors below 0.30. Making this change would result in more accurate savings estimates.

- Increase marketing. Or if that's not possible due to cost effectiveness issues, focus marketing dollars on the more proven strategies: contractor outreach and bill inserts.

  ➔ **Rationale:** These two methods were cited by 2/3 of participants when asked how they heard about the program. Contractors said marketing is effective and would like to see more.

Program Staff and Implementation Contractor Interview Guides

Program Manager Interview Guide – Final –IPC Residential

NAME

TITLE

PROGRAM

DATE

PHONE

EMAIL

INTERVIEWER

SUMMARY OF FINDINGS

[Once the interview is complete, please complete interview notes within this document. First, provide a high-level summary of findings below. Then, within each section summarize the findings.]

[Some of the answers to these questions will be filled in prior to the interview, based on information learned during the kick off meeting in Boise on June 8, 2015]

BACKGROUND

1. Please provide a brief description of the programs you are directly responsible for?
2. Please describe your job responsibilities related to the program.
3. How long have you been responsible for administration of this program?
4. On average, what percent of your time is spent on the program you are directly responsible for?
5. What other staff work on the program? What is their role regarding the program (i.e. what are the responsible for with regard to the program)? Who, if anyone, provides you with support? What support do they provide?

PROGRAM GOALS

6. What metrics are used to track the success of the program? (Probe for electric savings, participation rates, number of units)?
7. How are goals for this program established?

8. Did the program meet its goals in 2014? If not, what kept the program from meeting its goals?

9. Has the program met its annual goals in previous years? Is it on track to meet its goals for 2015?

PROGRAM IMPLEMENTATION AND MARKETING

10. Do you work with an implementation contractor or trade allies to help deliver the program? Who is/are the implementation contractor and/or trade allies you work with on this program? Do you have any issues or concerns about the implementation contractor or trade allies? If yes, what are your concerns?

11. What is the target market for the program? How are potential customers identified?

12. What are the main barriers to participation? How does the program address these barriers?

13. What has been done to market the program? How successful have these strategies been? Are some marketing strategies or messages more beneficial than others? How is success of the marketing strategies or messages measured?

PROGRAM OPERATIONS

14. What are the participation steps from the customers' perspective? Have these changed over time? If so, why were they changed?

15. Are there any specific aspects of the program that are working very well? Any not working well? (Probe for details) What could be done to improve?

16. What quality control/quality assurance procedures are in place? Are these documented? Is any verification done? What does this entail? Who does the verification?

17. Do the incentive levels seem appropriate? If not, why not? What, if any, changes in the incentive levels do you think may be needed?

18. What is your opinion of free ridership for this program? Meaning do you think customers would pay for the measures on their own, outside of the program. Why do you say that?

19. Do you think the program is changing customers' energy efficiency attitudes and actions? (Probe for specifics)

20. Are customers satisfied with the program overall? With the measures installed? Are they satisfied with the incentive amount? With the savings achieved? How is satisfaction with the program measured? (i.e. is this based on survey information or is it anecdotal?)

PROGRAM IMPACTS

21. Deemed savings from the RTF are used to determine program impacts – correct? Do you know what version of the RTF workbook you are using? If no, who should I ask for that information?

22. We plan to do a review of detailed project documentation for a sample of participants, including cross-checking the project documentation with the tracking spreadsheets. What is the best way to get this data in an electronic form? How is it currently stored?

PROGRAM DATA AND DOCUMENTATION

23. Does the tracking database collect all the information you need? Is there information/data that you wish were available but are not? Is there information in the database that you don't use?

24. What type of documentation is required to support the purchase and installation of the measure?

EVALUATION

25. What do you hope to learn from this evaluation? Are there specific issues you would like the evaluation to address?

Contractor Interview Guide – FINAL–IPC Home Improvement Program

NAME

TITLE

COMPANY

DATE

PHONE

EMAIL

INTERVIEWER

SUMMARY OF FINDINGS

[Once the interview is complete, please complete interview notes within this document. First, provide a high-level summary of findings below. Then, within each section summarize the findings.]

INTRODUCTION

Hi, my name is ___ and I am calling from Applied Energy Group on behalf of Idaho Power Company. We are working with Idaho Power to evaluate their Home Improvement Program. I'm calling to ask you a few questions about your participation as a contractor in that program to help determine what is working and what might be improved. Are you familiar with your company's participation in the program? If not, who would be the best person to speak with at your company about this subject?

All of your answers will be confidential. For our analysis your responses will be anonymously aggregated with those from other companies that participated in the program.

[IF THEY DON'T WANT TO TALK NOW, TRY TO GET A GOOD TIME TO CALL THEM BACK.]

[IF RESPONDENT PROPOSES AN ALTERNATE CONTACT, OBTAIN NAME, BEST NUMBER AT WHICH TO REACH THE CONTACT, AND ANY INFO REGARDING BEST TIME TO CALL]

[IF THEY HAVE QUESTIONS ABOUT OUR LEGITIMACY, THEY CAN CONTACT:]

Gary Grayson at 208-388-2395

[NOTE THAT BECKY ARTE HOWELL IS THE PROGRAM SPECIALIST AND SHE IS THE PERSON THEY ARE MOST FAMILIAR WITH. GARY IS THE MANAGER IN CHARGE OF EVALUATIONS]

[IF THEY ASK ABOUT TIME LENGTH OF SURVEY, SAY BETWEEN 15 AND 30__ MINUTES]

[IF THEY AGREE TO TALK SAY: THANKS FOR TAKING THE TIME TO SPEAK WITH US. LET'S GET STARTED.]

ABOUT THE CONTRACTOR

Let me start by getting a little information about you and your company.

1. What is your job title or role?

2. What are your company's main products and/or services?

3. When did your company begin participating in IPC's Home Improvement program?

4. Why did you or your company decide to participate in the program?

5. What percentage of your business comes from projects through the program? Have all these projects completed in 2014 received a rebate from Idaho Power? [IF NO] Why not?

   In 2014? _____% 999. DK

7. Do you expect that percentage to grow, stay the same or decrease in the next 2 years (2015 2016)?

CONTRACTOR SKILLS AND KNOWLEDGE

8. How many employees at your company have been trained/ are knowledgeable about the Home Improvement program?

9. Is the number of employees you have trained enough to meet your customer demand for insulation/windows? If you had more employees knowledgeable about the Idaho Power program would you be able to complete more projects?

10. How well would you say you and your employees understand and are able to communicate the benefits of increased insulation/window upgrades? If don't understand well, what additional knowledge/training is needed?

11. Do you feel the customers understand the benefits of the measures you installed? If not, what was not clear?

12. Did customers adequately understand the Idaho Power program eligibility requirements, enrollment process, and the amount of the incentive? If not, what was not clear?

PROGRAM PARTICIPATION

13. Please describe your company's process for marketing to customers. Do you tell your customers about the IPC program? Or do they typically come to you requesting the rebate?

14. Do you think eligible customers (those with electric zonal heat) are generally aware of the program? If not, what else could be done to inform eligible customers about the program?

15. If anything, what things about the program make it difficult for customers to participate (e.g., paperwork, measures, incentives too low, etc.)?

16. Have you received any complaints from customers who feel the measures don't meet their expectations? [IF YES] What specifically were they disappointed in? How did you address their concerns?

17. How influential was the Idaho Power program manager in your decision to participate? How helpful is the program manager if you have questions or concerns? Does having access to a knowledgeable program manager increase the value of your participation in the program?

18. Does the program make it easier for you to sell projects and/or identify prospects?

19. Do you use Idaho Power's contractor portal to access marketing materials?

    a. [IF NO] Why not? How could it be made more valuable/useful to you?
    b. [IF YES] Has it been helpful to your business? Are you satisfied with the materials available through the portal?

20. What, if anything, do you think is particularly good about the IPC program?

21. Do you have any suggestions for improvement to the program?

PROGRAM EFFECTIVENESS

22. What are the benefits to your company to participate in the program? Do you think the program helps your business? Does it give you a competitive advantage over other contractors in your area? [Probe for reasons?]

24. Is there anything else Idaho Power could do to help you increase the number of projects in their service territory?

CONCLUSION

25. Is there anything else that you think Idaho Power should think about as they continue to offer and improve this program?

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Impact and Process Evaluation of Idaho Power's See Ya Later, Refrigerator Program

Final Report

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Prepared for:
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September 23, 2015

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Executive Summary

Idaho Power's See Ya Later, Refrigerator® program acquires energy savings through the removal of qualified refrigerators and stand-alone freezers in residential homes throughout Idaho Power's service area. The goal of the program is to reduce the number of old, inefficient refrigerators and freezers that customers have moved to their garages or other locations such as basements and patios. The program makes a concerted effort to maximize savings by focusing on secondary/spare units and minimizing free riders (customers who will replace the unit with another, or would have removed the unit anyway through another service).

Idaho Power Company (IPC) contracted with Applied Energy Group (AEG) to conduct a process evaluation of the See Ya Later, Refrigerator program and an impact evaluation for program year 2014.

Conclusions

The results of the impact analysis show that the See Ya Later, Refrigerator program surpassed its goals, achieving 1,390,760 kWh in savings in 2014 with a 100% realization rate.

Table ES-1 See Ya Later, Refrigerator 2014 ResultsMetric	Program Goal	Reported	Realization Rate	AEG-Evaluated	Non-Electric Benefits
Annual Energy Savings (kWh)	837,000	1,390,760	100%	1,390,760	$137,560.39

Other key findings from the process and impact evaluations include:

- The program is very well run and complies with most of the best practices in the industry.
- The program has adequate staffing and a very competent and engaged implementation contractor.
- The program has high customer satisfaction.
- The program has the necessary quality control procedures in place and is extremely well documented.
- The wealth of data captured by the program is exemplary and is analyzed by IPC staff to continuously provide insight and improve the program.

Recommendations

Based on this evaluation, the following recommendations should be considered to enhance program effectiveness and improve the transparency of reported savings:

- If no savings are associated with a measure, explain why in the program tracking database.
- Decrease the time between scheduling and pick up to 7 days or less.
- Experiment with different promotional offerings to see if they increase program participation. An example would be to offer an incentive for a limited time (e.g., one month) for secondary refrigerators only.
- Use the updated RTF workbook (v.3.2) in the future and include non-electric benefits in the cost effectiveness analysis.

Contents

Introduction

1.1 Program Description

Idaho Power's See Ya Later, Refrigerator® program acquires energy savings through the removal of qualified refrigerators and stand-alone freezers in residential homes throughout Idaho Power's service area. The goal of the program is to reduce the number of old, inefficient refrigerators and freezers that customers have moved to their garages or other locations such as basements and patios. The program makes a concerted effort to maximize savings by focusing on secondary/spare units and minimizing free riders (customers who will replace the unit with another, or would have removed the unit anyway through another service).

IPC contracts with JACO Environmental (JACO) to provide turnkey services for the See Ya Later, Refrigerator program including customer service and scheduling, unit pickup, unit recycling, reporting, marketing assistance, and incentive payments. Marketing assistance is provided by JACO, through Runyon Saltzman Einhorn, a marketing company that assists utility appliance recycling programs throughout the country. IPC provides participant confirmation, additional marketing, and internal program administration.

In 2014, the See Ya Later, Refrigerator program reported 1,391 MWh of savings by recycling 3,194 refrigerators/freezers (Table 1-1), exceeding the program goals by over 50%.

Table 1-1 See Ya Later, Refrigerator Program Reported Savings vs. 2014 Goals

Year		Units	MWh Savings
PY2014	IPC Goals	2,100	837
	IPC-Reported	3,194	1,391
Percent of IPC-Reported to Goals		**152%**	**166%**

1.2 Purpose of the Evaluation

Idaho Power Company (IPC) contracted with Applied Energy Group (AEG) to conduct a process evaluation of the See Ya Later, Refrigerator program and an impact evaluation for program year 2014. The key objectives addressed in the process evaluation were to:

- Evaluate program design including program mission, logic, and use of best practices.

- Evaluate program implementation including quality control, operational practice, and outreach.
- Evaluate program administration including program oversight, staffing, management, training, documentation, and reporting.
- Evaluate participant and stakeholder response including customer interaction and satisfaction.
- Report findings and observations and provide recommendations that enhance program effectiveness.

The key objectives addressed by the impact evaluation were to:

- Measure and verify the energy (kWh) and non-electric impacts attributable to the 2014 program.
- Provide credible and reliable ex-post program energy savings and realization rates and non-electric impact estimates attributed to the program for the 2014 program year.
- Report findings and observations, and provide recommendations that would enhance the effectiveness of future analysis and the accurate and transparent reporting of program savings.

1.3 Report Structure

Following this introductory chapter are the following chapters:

- Chapter 2 – Methodology: Description of the evaluation methods, sampling design, and data collection and analysis process.
- Chapter 3 – Process Evaluation Findings: Description and discussion of the program processes and best practices review.
- Chapter 4 – Impact Evaluation Findings: Description and discussion of the result of the engineering review including kWh savings estimates, non-electric benefits and realization rates.
- Chapter 5 – Conclusions and Recommendations: Conclusions reached based on the process and impact evaluation including results of the best practices review and recommendations to improve the program.

Methodology

This section describes the approach AEG used to evaluate the See Ya Later, Refrigerator program.

2.1 Process Evaluation

Process evaluations focus on determining the overall effectiveness of program delivery, identifying opportunities for program improvements, and assessing key program metrics including participation rates, market barriers, and overall program operations. The process evaluation for the See Ya Later, Refrigerator program consisted of the following research activities:

- Interviews with program and implementation staff.
- A detailed review of the program documentation and tracking database.
- A best practices review.

Interviews with Program and Implementation Staff

AEG conducted in-depth qualitative interviews with the IPC Program Specialists for the program. This included the outgoing program specialist and her replacement. The interview included questions surrounding the goals for the program offering from the interviewee's perspective; policies, processes and procedures surrounding recruitment and delivery of the program; what is working and what is not; and the strengths and weaknesses of the program.

AEG also conducted an interview with the program manager for the implementation contractor, JACO. The interview included questions about program operations and marketing, program implementation, the relationship with IPC staff, how the See Ya Later, Refrigerator program compares to other appliance recycling programs implemented by JACO, and strategies to overcome barriers to program participation.

Documentation Review

AEG reviewed several sources of data as metrics to evaluate the program and the program offerings. The data sources included the program implementation plan, quality control plan, past evaluation reports, the program tracking database, program application, marketing materials and marketing results from 2009 - 2014. Insight gained from this document review was used to provide a background for conducting the process evaluation and to inform the resulting conclusions and recommendations.

Best Practices Review

AEG conducted a literature review of industry publications to identify an appropriate set of best practices to compare with the IPC programs. AEG conducted the best practices review as follows:

- Reviewed regulatory filings, evaluation reports, conference presentations, marketing materials and industry publications.
- Created a list of best practices/innovations and the rationale behind the best practice/innovation.
- Benchmarked IPC's program against each best practice listed.

2.2 Impact Evaluation

The main objective of the impact evaluation was to estimate the annual kWh savings achieved by the program. This was accomplished by conducting an engineering review and replicating the savings for all of the projects in the 2014 program tracking database using the RTF-approved deemed savings algorithms for program year 2014. AEG also estimated non-electric benefits for the program.

Engineering Review

The See Ya Later, Refrigerator program used Version 2.5 of the Regional Technical Forum (RTF) Refrigerator and Freezer Decommissioning Unit Energy Savings (UES) workbook for deemed savings in program year 2014. This version was approved by the RTF on December 11, 2012 and was used by AEG for savings replication in this evaluation. This workbook provides annual energy savings of 424 kWh/year for refrigerators and 478 kWh/year for freezers.

AEG applied the deemed algorithms to the tracked parameters for all program participants to verify that the algorithms were applied correctly, identify errors or issues, and adjust savings estimates at the project level if necessary. While impact evaluations normally also include the selection of a sample for a more detailed further review, that was not necessary here, since all the information needed to calculate the RTF-approved deemed savings was included in the tracking database. As a result, there is no sampling error or associated confidence interval to report.

Non-Electric Benefits

IPC did not report non-electric benefits for the See Ya Later, Refrigerator program because the RTF workbook version used for program year 2014 ("ResFridgeFreezeDecommissiong_v2_5") does not specify deemed values for non-electric benefits. As a result, AEG used the latest RTF workbook (version 3.2) to estimate non-electric benefits associated with greenhouse gas emission reduction and avoided mercury and oil contamination. The resulting non-electric benefits are included in the evaluated impacts along with the electric savings evaluated using the version 2.5 workbook.

Process Evaluation Findings

The process evaluation for the See Ya Later, Refrigerator program focused on conducting interviews with program and implementation staff and reviewing program processes to assess the program operations, quality control, staffing, and outreach. The evaluation also included secondary research to determine if the program is currently using established best practices prevalent in the industry. The process evaluation found that the program is very well run, has adequate staffing, a very competent and engaged implementation contractor, and high customer satisfaction.

3.1 Program and Implementation Staff Interviews

AEG conducted in-depth interviews with the program specialists (outgoing and recent replacement) and the implementation contractor for the See Ya Later, Refrigerator program. The following are some of the key points from the interviews with the program specialists and the implementation contractor.

Program Design and Operations

- A major challenge of the program is cost effectiveness. In order to stay cost effective, IPC had to eliminate the incentive and reduce their marketing budget in 2015.
- Beginning in the summer of 2015, IPC began offering 2 free LED bulbs to customers. The results of that effort are unknown at the time of this report. JACO feels this won't convince someone to recycle their appliance, but for customers who have been considering getting rid of an extra appliance, it may help motivate them to enroll in the program.
- JACO upgraded some of their systems and as a result, both IPC and JACO experienced some technical/IT problems during the transition. These problems have been addressed and the upgrades should lead to improved processes.

Marketing and Outreach

- IPC sends targeted mailings to a segment of customers with "empty nester" characteristics to encourage recycling secondary or extra units.
- IPC has found that bill inserts are the most effective means of marketing – in terms of convincing customers to participate. JACO confirmed that bill inserts are the most effective marketing approach for other appliance recycling programs around the country as well.

- IPC sends bill inserts to all customers, not just the defined "empty nester" target market. Bill inserts are inexpensive and limiting the number sent would not save much money in the marketing budget.
- Customers in rural areas are a more challenging market. Many are hunters and fisherman who need freezers and second refrigerators to store their meat and fish. They also tend to stock up at warehouse stores like Costco. Winter road conditions can also present a challenge for scheduling pickups in rural areas.
- Rocky Mountain Power has a similar program that also uses JACO as the implementer. Similar marketing messages are used by the two programs, providing each other with some marketing lift.
- JACO is only aware of one other utility that discontinued their incentive. This utility attempted to boost participation rates by offering product giveaways such as cooler bags.

Program Staffing

- The outgoing program specialist had limited time in recent years to devote to the program. The new program specialist should be able to devote more time to the program.
- The working relationship between IPC and JACO is excellent. The two companies work well together and provide support in an effort to continuously improve the program and meet participation goals.

Customer Satisfaction

- Surveys conducted in the past by JACO and IPC show very high customer satisfaction with the program.
- This program is one of the few programs that is offered to all residential customers (not just all-electric customers) providing additional value to IPC's portfolio.

Program Life Cycle

- JACO feels that there is plenty of secondary refrigerator and freezer stock in Idaho Power's service territory to be able to support the program for another decade or more.
- According to JACO, 25% of households in the northwest have second refrigerators or freezers. Only about 1% are of those are recycled through the program each year.

3.2 Program Processes

Applicants may enroll online or by phone. In 2014, 70% of participants enrolled by phone. IPC screens each applicant to confirm eligibility (i.e., verifying the applicant is an IPC residential customer). JACO screens each applicant to confirm the refrigerator or freezer unit under consideration meets all program eligibility requirements, including the requirement that a unit be of residential-grade, a minimum of 10 cubic feet as measured using inside dimensions, no larger than 30 cubic feet, and in working condition. In 2014, customers received a $30 incentive check mailed after the removal of the unit, but that incentive has been discontinued in 2015 in order to make the program cost effective. In July 2015, the program began offering 2 free LED light bulbs to participants and began targeting older, secondary units for maximum savings.

JACO uses a sophisticated scheduling system to optimize collection routes. Participants are given a choice of one or more days for pickup based on the scheduling routes. In 2014, pick up occurred an average of 13 days after the customer called. Participants are required to be present during the pickup and must sign an appliance turn-in form.

Quality Assurance/Quality Control

IPC may only accept units from active residential accounts and must verify the energy savings at the account level. IPC performs daily checks to verify participants signed up for the program through JACO. This requires a daily data transfer between JACO and IPC. If a participant can't immediately be verified as either a confirmed customer or not a customer, it is marked as pending. IPC works to resolve issues with pending files each day.

IPC also performs monthly quality control reconciling the invoices with the tracking database.

In October, 2012 the program specialists toured the JACO recycling facility in Salt Lake City and determined that the facility was well organized and appliances were being recycled in compliance with IPC's requirements.

3.3 Program Marketing

Since the program began in 2009, a variety of marketing methods have been used to promote the program. Table 3-1 below shows the various methods used each program year. In 2015 the program decreased the overall marketing budget for the program due to cost effectiveness concerns. As a result, fewer marketing activities are scheduled for 2015.

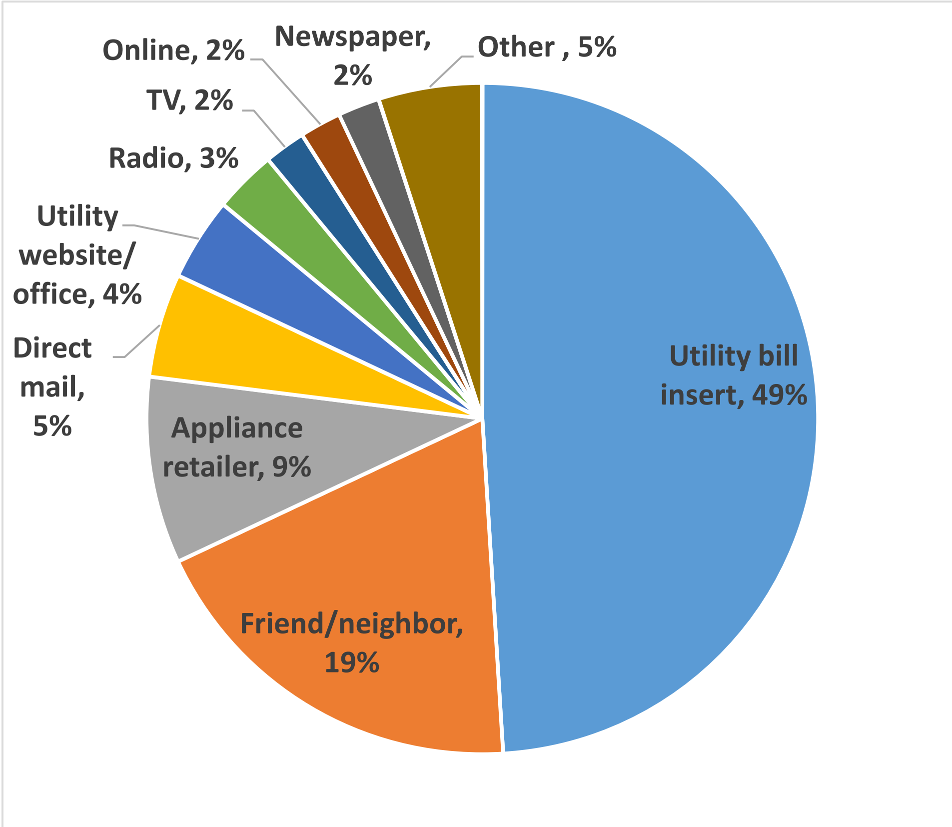
Table 3-1 Marketing Methods Used Each Year

Method	2009	2010	2011	2012	2013	2014	2015
Bill inserts	1	3	4	4	5	7	6
Newspaper ads	X	X	X	X	X	X	
Google Ad Words	X	X	X	X	X	X	X
Direct Mail			2	3	1	1	
Web Site	X	X	X	X	X	X	X
Events	X	X	X	X	X	X	X
Radio		X			X	X	
ValPak		X	X	X	X		
Customer Connections	X	X	X	X	X		
PR Event	X		X	X	X	X	
Cross Marketing	X	X	X	X		X	X
Craigslist		X					
Truck Wrap	X	X	X	X	X	X	X
Fair Fans		X	X	X	X	X	
Uhaul		X					
Movie Trailer				X			
Brochures	X	X	X	X	X	X	X

Source: See Ya Later, Refrigerator Marketing Results 2009 – 2014 DSM Reporting Years

IPC tracks the marketing effectiveness for the program in several ways. Participants are asked how they heard about the program when they enroll, and the date of customer enrollment is tracked and can be attributed to specific marketing activities. Acquisition costs are also tracked by marketing method.

Figure 3-1 below shows that almost half of 2014 participants heard about the program from the utility bill insert.



Source: See Ya Later, Refrigerator Marketing Results 2009 – 2014 DSM Reporting Years

Figure 3-1 How 2014 Participants Heard about the See Ya Later, Refrigerator Program

Table 3-2 below provides the estimated acquisition cost per participant for several marketing efforts. Although direct mail has the highest response rate, it's almost 3 times as costly as bill inserts. Bill inserts has the overall lowest average cost per participant.

Table 3-2 2014 Marketing Response Rates and Costs

Activity	Average Response Rate	Average Acquisition Cost ($/participant)
Bill inserts	.35%	$11.93
Direct Mail	.88%	$37.74
Newspaper	.06%	$265.08
Radio	NA	$275.76

Source: See Ya Later, Refrigerator Marketing Results 2009 – 2014 DSM Reporting Years

3.4 Best Practices

AEG conducted a literature review of industry publications to identify an appropriate set of best practices to compare with the IPC programs. AEG reviewed the following sources to create a list of best practices/innovations in the industry:

- Publicly available best practices reports
- Conference papers and presentation
- Evaluations of other appliance recycling programs

Using these resources, AEG created a list of best practices/innovations that applied to the See Ya Later, Refrigerator program. Table 3-3 below shows each best practice/ innovation and whether IPC currently uses the practice.

Table 3-3 Best Practices/Innovation for Appliance Recycling Programs

Best Practice/Innovation	See Ya Later, Refrigerator Program	
	Standard Practice?	Explanation
Offer on-line scheduling	✓	Available; 30% of participants use this method
Pick up units within one week of request	X	Average pick up in 2014 was 13 days
Provide pick up on Saturdays	✓	Saturdays are included
Use bill inserts to market the program	✓	Several each year
Show cost savings from removing second refrigerator	✓	"Can save up to $100 a year"
Contact people a couple of days prior to appointment as reminder	✓	Called one to two days before and 30 minutes before
Program staff should visit recycling center and see how it works	✓	Completed in 2012
Prioritize removal of secondary refrigerator	✓	Targets empty nesters; marketing messages focus on secondary or extra units
Provide a financial incentive	X	Incentive discontinued in 2015
Provide an energy savings kit as an additional incentive	✓	2 LED bulbs are provided to participants beginning in summer of 2015
Stress free removal and safe disposal	✓	Marketing materials highlight free pick up. Facebook and local news showed how refrigerators are recycled
Stress convenience	✓	"Let us do the heavy lifting"

Impact Evaluation Findings

The impact evaluation for the See Ya Later, Refrigerator program consisted of an engineering review that replicated the savings estimates for all of the projects in the 2014 program tracking database.

4.1 Engineering Review

The AEG-replicated energy savings for this program were 1,390,760 kWh/yr, with a realization rate of 100%. Only one issue was found through the tracking database review and replication effort. There was one decommissioned freezer measure in the program year 2014 population for which the "Count Savings" parameter in the tracking database was listed as "N". Savings for this entry were not reported and were not replicated. More information was requested and the IPC program specialist said the unit was in a mobile home park that was classified as a commercial rate and therefore not eligible for the program. In order to preserve customer satisfaction, however, IPC allowed the unit to be picked up but did not count the savings. While impact evaluations normally also include the selection of a sample for a more detailed further review, that was not necessary here, since all the information needed to calculate the RTF-approved deemed savings was included in the tracking database. Since sufficient information was in available in the database, the savings for all units were recalculated and verified. As a result, since no sample was used, there is no sampling error or associated confidence interval to report.

The following table depicts the summary for refrigerators and freezers in the 2014 See Ya Later, Refrigerator Program.

Table 4-1 Replicated Savings Results for See Ya Later, Refrigerator Program

Measure	Measure Count	Reported Savings (kWh/yr)	Replicated Savings (kWh/yr)	Realization Rate (%)
Refrigerator	2,518	1,067,632	1,067,632	100%
Freezer	676	323,128	323,128	100%
Freezer*	1	0	0	--
Total	**3,195**	**1,390,760**	**1,390,760**	**100%**

* Not eligible because customer was on a commercial rate.

1.2 Non-Electric Benefits

IPC did not report non-electric benefits for the See Ya Later, Refrigerator program because the RTF workbook version used for program year 2014 ("ResFridgeFreezeDecommissiong_v2_5") does not specify deemed values for non-electric benefits. As a result AEG used the latest RTF workbook (version 3.2) to estimate non-electric benefits associated with greenhouse gas emission reduction and avoided mercury and oil contamination. The resulting non-electric benefits are included in the evaluated impacts along with the electric savings evaluated using the version 2.5 workbook.

The non-energy benefits (NEBs) in the RTF workbook (v3.2) are $7.12/yr and $8.74/yr for refrigerator and freezer decommissioning, respectively. The reason for the difference is the expected useful lifetime (EUL) of the measures (6 years for refrigerators, 5 years for freezers) by which the overall incremental benefit ($45.58) is divided. This incremental non-energy benefit is a total net value of benefits attributable to the program from the monetization of greenhouse gas (GHG) emission reduction as well as avoided mercury and oil contamination. Reclaimed materials such as aluminum, copper, ferrous metal, foam, oil, and plastic were monetized in the RTF analysis but were not included in the final net NEB value.

These NEB values are the net environmental benefits as the difference between the gross benefits (sum of all benefits realized under the program) and the average benefits that would have been realized in the program's absence. The GHG emissions were calculated for each environmental benefit/raw material using specified conversion factors. These materials and their conversion to metric tons of CO_2 equivalents ($MTCO_2eq$) can be seen in the Table 4-2 below.

Table 4-2 ***Environmental Benefit CO_2 Conversion Table***

Raw Material	Disposal Type	Units	Conversion to $MTCO_2eq$
CFC-12	All	lbs.	3.67
HFC-134a	All	lbs.	0.59
HCFC-22	All	lbs.	0.68
CFC-11	All	lbs.	1.72
HCFC-141b	All	lbs.	1.02
HFC-134a	All	lbs.	0.59
Used Oil	All	lbs.	0.010
Ferrous Metal	Recycled	lbs.	0.00027
Non-Ferrous Metal	Recycled	lbs.	0.00027
Rubber	Recycled	lbs.	0.00027
Plastic	Recycled	lbs.	0.00027
Glass	Recycled	lbs.	0.00027
Mercury-Containing Components	All	(components)	0
PCB-Containing Capacitors	All	(components)	0.00027
Non PCB-Containing Capacitors	Recycled	(components)	1.7E-05
Non PCB-Containing Capacitors	Disposed	(components)	0.063
Foam	Recycled	lbs.	0.00027
Fiberglass	Recycled	lbs.	0.00027

These conversion factors were multiplied by values for each of five scenarios seen in Table 4-3 and then further analyzed to produce the GHG emissions totals seen in Table 4-4 below.

Table 4-3 *Environmental Benefit CO_2 Conversion Table*

Scenario	Description	Distributio n w/o Program	Distributio n w/ Program
1	Unit destroyed in an environmentally irresponsible way, disposed of in a way such that no materials would be recovered	15%	0%
2	Unit destroyed in an environmentally irresponsible way, disposed of in a way such that materials with retail value would be recovered	23%	0%
3	Taken to dump	23%	0%
4	Recycled, non-RAD, non-utility	39%	0%
5	Current program	0%	100%

Table 4-4 *Final RTF Non-Electric Benefits, Gross and Net (2006 Dollars)*

Material	Gross (2006 costs)	Ratio	Net	Included in the NEB Value?
GHG Emissions	$50.77	74%	$37.38	Yes
Avoided Mercury Contamination	$4.28	49%	$2.10	Yes
Avoided Oil Contamination	$16.21	38%	$6.10	Yes
Reclaimed aluminum	$4.52	11%	$0.49	No
Reclaimed copper	$15.46	12%	$1.82	No
Reclaimed ferrous metal	$15.39	11%	$1.68	No
Reclaimed foam	$1.33	100%	$1.33	No
Reclaimed oil	$0.92	38%	$0.35	No
Reclaimed plastic	$4.01	55%	$2.20	No

Non-electric benefits for the See Ya Later, Refrigerator program were calculated using the "Present Value (PV) Regional Non-E Value" from Version 3.2 of the RTF UES Workbook. Since these values were in 2006 dollars, they were inflated to 2014 dollars using a factor of 1.136889 from the RTF Standard Information Workbook v3.2. Thus, each recycled refrigerator was assigned a present value of non-electric benefits (PV(NEB)) of $41.08 and each recycled freezer was assigned a PV(NEB) of a $50.46.

Table 4-5 *See Ya Later, Refrigerator Program PV NEBs*

Measure	Measure Count	Reported Savings (kWh/yr)	Replicated Savings (kWh/yr)	Realization Rate (%)	Total PV(NEB)
Refrigerator	2,518	1,067,632	1,067,632	100%	$103,450.83
Freezer	676	323,128	323,128	100%	$34,109.56
Total	**3,195**	**1,390,760**	**1,390,760**	**100%**	**$137,560.39**

Conclusions and Recommendations

The results of the impact analysis show that the See Ya Later, Refrigerator program surpassed its goals, achieving 1,390,760 kWh in savings in 2014 with a 100% realization rate.

Table 5-1 *See Ya Later, Refrigerator Program 2014 Results*

Metric	Program Goal	Reported	Realization Rate	AEG-Evaluated	Non-Electric Benefits
Annual Energy Savings (kWh)	837,000	1,390,760	100%	1,390,760	$137,560.39

Other key findings from the process and impact evaluations include:

- The program is very well run and complies with most of the best practices in the industry.
- The program has adequate staffing and a very competent and engaged implementation contractor.
- The program has high customer satisfaction.
- The program has the necessary quality control procedures in place and is extremely well documented.
- The wealth of data captured by the program is exemplary and is analyzed by IPC staff to continuously provide insight and improve the program.

5.1 Recommendations

Based on this evaluation, the following recommendations should be considered to enhance program effectiveness and improve the transparency of reported savings:

- If no savings are associated with a measure, explain why in the program tracking database.
  - ➔ **Rationale:** This is a very minor issue for IPC but including an explanation would improve the transparency of the data and provide necessary information for the evaluator without requiring follow up.
- Decrease the time between scheduling and pick up to 7 days or less.
  - ➔ **Rationale**: Best practices in the industry call for pick up within 7 days of scheduling appointment. This change may also improve participation rates.

- Experiment with different promotional offerings to see if they increase program participation. An example would be to offer an incentive for a limited time (one month) for secondary fridges only.
    - ➔ **Rationale**: Creativity is necessary to overcome the discontinuation of the incentive. This is unchartered territory for the program, as very few other programs are not offering an incentive. Several other programs have offered limited time increases in incentives to "bump" participation rates. A limited time incentive may provide IPC with the necessary lift in participation to meet annual goals. The incentive could replace the free LEDs to help cover the cost.
- In the future, use the RTF Workbook 3.2 and include non-electric benefits in the cost effectiveness analysis.
    - ➔ **Rationale:** Including non-electric benefits in the analysis should improve the cost effectiveness. As a result IPC may be able to bring back an incentive and/or increase the marketing to its former levels.

Program Staff and Implementation Contractor Interview Guides

Program Manager Interview Guide – Final – IPC Residential

NAME

TITLE

PROGRAM

DATE

PHONE

EMAIL

INTERVIEWER

SUMMARY OF FINDINGS

[Once the interview is complete, please complete interview notes within this document. First, provide a high-level summary of findings below. Then, within each section summarize the findings.]

[Some of the answers to these questions will be filled in prior to the interview, based on information learned during the kick off meeting in Boise on June 8, 2015]

BACKGROUND

1. Please provide a brief description of the programs you are directly responsible for?
2. Please describe your job responsibilities related to the program.
3. How long have you been responsible for administration of this program?
4. On average, what percent of your time is spent on the program you are directly responsible for?
5. What other staff work on the program? What is their role regarding the program (i.e. what are the responsible for with regard to the program)? Who, if anyone, provides you with support? What support do they provide?

PROGRAM GOALS

6. What metrics are used to track the success of the program? (Probe for electric savings, participation rates, number of units)?
7. How are goals for this program established?

8. Did the program meet its goals in 2014? If not, what kept the program from meeting its goals?

9. Has the program met its annual goals in previous years? Is it on track to meet its goals for 2015?

PROGRAM IMPLEMENTATION AND MARKETING

10. Do you work with an implementation contractor or trade allies to help deliver the program? Who is/are the implementation contractor and/or trade allies you work with on this program? Do you have any issues or concerns about the implementation contractor or trade allies? If yes, what are your concerns?

11. What is the target market for the program? How are potential customers identified?

12. What are the main barriers to participation? How does the program address these barriers?

13. What has been done to market the program? How successful have these strategies been? Are some marketing strategies or messages more beneficial than others? How is success of the marketing strategies or messages measured?

PROGRAM OPERATIONS

14. What are the participation steps from the customers' perspective? Have these changed over time? If so, why were they changed?

15. Are there any specific aspects of the program that are working very well? Any not working well? (Probe for details) What could be done to improve?

16. What quality control/quality assurance procedures are in place? Are these documented? Is any verification done? What does this entail? Who does the verification?

17. Do the incentive levels seem appropriate? If not, why not? What, if any, changes in the incentive levels do you think may be needed?

18. What is your opinion of free ridership for this program? Meaning do you think customers would pay for the measures on their own, outside of the program. Why do you say that?

19. Do you think the program is changing customers' energy efficiency attitudes and actions? (Probe for specifics)

20. Are customers satisfied with the program overall? With the measures installed? Are they satisfied with the incentive amount? With the savings achieved? How is satisfaction with the program measured? (i.e. is this based on survey information or is it anecdotal?)

PROGRAM IMPACTS

21. Deemed savings from the RTF are used to determine program impacts – correct? Do you know what version of the RTF workbook you are using? If no, who should I ask for that information?

22. We plan to do a review of detailed project documentation for a sample of participants, including cross-checking the project documentation with the tracking spreadsheets. What is the best way to get this data in an electronic form? How is it currently stored?

PROGRAM DATA AND DOCUMENTATION

23. Does the tracking database collect all the information you need? Is there information/data that you wish were available but are not? Is there information in the database that you don't use?

24. What type of documentation is required to support the purchase and installation of the measure?

EVALUATION

25. What do you hope to learn from this evaluation? Are there specific issues you would like the evaluation to address?

Implementation Contractor Interview Guide – FINAL–See Ya Later, Refrigerator program

NAME

TITLE

PROGRAM

DATE

PHONE

EMAIL

INTERVIEWER

SUMMARY OF FINDINGS

[Include highlights of interview here]

INTRODUCTION

Hi, my name is ___ and I am calling from Applied Energy Group on behalf of Idaho Power Company. We are working with Idaho Power to evaluate their See Ya Later, Refrigerator program. I'm calling to ask you a few questions about the implementation of the program to help determine what is working and what might be improved.

- [IF THEY DON'T WANT TO TALK NOW, TRY TO GET A GOOD TIME TO CALL THEM BACK.]
- [IF RESPONDENT PROPOSES AN ALTERNATE CONTACT, OBTAIN NAME, BEST NUMBER AT WHICH TO REACH THE CONTACT, AND ANY INFO REGARDING BEST TIME TO CALL]

BACKGROUND

1. Please provide a brief description of the services you provide for Idaho Power's See Ya Later, Refrigerator Program.
2. Please describe your job responsibilities related to the program.
3. What other staff at your company work on the program? What is their role regarding the program (i.e. what are the responsible for with regard to the program)? Who, if anyone, provides you with support? What support do they provide?

PROGRAM GOALS

4. What metrics do you use to track your success implementing this program? (e.g. participation rates, number of units)?
5. How is the program performing in regards to these metrics?

PROGRAM IMPLEMENTATION AND MARKETING

6. Describe your communications and working relationship with Idaho Power? Are there areas that could be improved?
7. What is the target market for the program? How are potential customers identified?

8. What are the main barriers to participation? What is being done to address these barriers?

9. What has been done to market the program? How successful have these strategies been?

PROGRAM OPERATIONS

10. Please briefly describe how the program operates? What is the sequence of steps for the implementation?

11. Are there any specific aspects of the program that are working very well? Any not working well? (Probe for details) What could be done to improve the program?

12. How has the elimination of the incentive affected the program? What strategies could be implemented to help overcome any negative effectives of eliminating the incentive?

13. How does this program compare to other programs appliance cycling programs you implement? Any lessons learned or take-a-ways from other programs that could benefit Idaho Power?

14. Are customers satisfied with the program overall? Have you heard any feedback about eliminating the incentive?

15. What is the typical program life cycle for appliance recycling programs? Is there a predictable ebb and flow in terms of participation? What strategies do other utilities use to reach their participation goals?

16. What do you see as future challenges to the program?

CONCLUSION

17. Is there anything else about the program that you feel is important, that I haven't discussed in this interview? Do you have any other suggestions for improvements or changes to the program?

CLEAResult

Irrigation Peak Rewards Program

2015 Impact Evaluation

December 23, 2015

PREPARED BY CLEAResult

PREPARED FOR Idaho Power Company

REPORTING PERIOD July 15 – August 15 2015

We change the way people use energy™

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Executive Summary

Idaho Power Company contracted CLEAResult to complete an impact evaluation of the 2015 Irrigation Peak Rewards program, a voluntary demand response (DR) program that has been available to Idaho Power's agricultural irrigation customers since 2004. There were approximately 2,250 irrigation service locations enrolled in the program in 2015. The goals of the impact evaluation were to determine the demand reduction (in MW) during three curtailment events and determine the counterfactual realization rate had an event been called on each business day during the program's June 15th - August 15th season.

CLEAResult completed analyses of curtailment events held on June 29th, July 2nd, and August 11th, 2015, each containing four dispatch groups that curtailed enrolled irrigation pumps in rolling four-hour increments. The results of the curtailment event analyses showed maximum demand reductions of 278.3, 273.8, and 180.2 MW, respectively, for the three events, and an average of 244.1 MW measured at the meter. These results do not include line losses which according to Idaho Power, average 9.7 percent. When line losses are included, maximum demand reductions are 305.3, 300.3, and 197.7 MW respectively. Analysis and tables contained in this report do not include line losses. The events achieved realization rates of 69.0%, 67.9%, and 44.7%, respectively, averaging 60.5%.

The results of the counterfactual realization rate analysis demonstrated that date has a large influence on the expected realization rate. While the first quarter of the program season (June 15 - July 30) showed an average expected realization rate of 68.6%, the expected realization rate in the last three quarters of the season (July 1 – August 15) drops off significantly, to an average of 49.1%. This is due to a higher percentage of pumps being shut off during the baseline period in the first two weeks of August. The counterfactual realization rate peaks in the last two weeks of June, which is a shift of two weeks from 2014 peak counterfactual realization timeframe. This corresponds to a shift to an earlier growing season in 2015.

Idaho Power may maximize the program's realization rate by choosing to hold curtailment events on days when the percent of pumps that are shut off during the baseline period is minimized. This time period generally equates to the last week of June and first week of July, however it is dependent on weather and the timing of the launch of the growing season.

The results of the impact evaluation show that Idaho Power's Irrigation Peak Rewards Program functions as intended, and, if properly maintained, can be relied on to provide dispatchable demand reduction to the electricity grid.

Introduction

Background

The Irrigation Peak Rewards Program is a voluntary DR program which has been available to Idaho Power's agricultural irrigation customers since 2004. The program is designed to reduce peak load by turning off participating irrigation pumps during summer peak demand hours in return for a financial incentive. Through this program, Idaho Power has been successful in reducing load during the summer afternoon and early evening hours, the hours driving Idaho Power's potential future need for new generation resources.

After the 2012 Peak Rewards program season, Idaho Power elected to suspend the program for the 2013 season due to the 2013 Integrated Resource Plan (IRP) not showing a need for DR resources until 2016. After holding a series of stakeholder engagement sessions in 2013, Idaho Power and the Idaho Public Utilities Commission agreed to reinstate the program in 2014 on a limited basis for the purpose of maintaining the program infrastructure. In 2014, and again in 2015, the program completed three curtailment events during the June 15 - August 15 program season.

Impact Evaluation Goals

Idaho Power contracted CLEAResult to complete an impact evaluation of the 2015 Irrigation Peak Rewards Program. This 2015 impact evaluation had two primary goals:

1. Determine and verify the demand reduction (MW) during a minimum of three test events
2. Determine counterfactual realization rate had an event been called on each business day during the season

The results contained in this report will enable Idaho Power to better define the impact of the program on the electricity grid and provide more accurate estimates of the program's load reduction to future IRP processes and inform as to which days during the program season could be expected to provide the highest realization rate and load reduction impact.

Methodology

The section below describes the data used to complete the impact evaluation, the sampling plan, the methodology for gathering and processing data, determining the baseline, calculating the demand reduction, and determining the curtailment event and counterfactual realization rates.

Data Sources

CLEAResult conducted the 2015 Irrigation Peak Rewards impact evaluation through the use of three primary data sources provided by Idaho Power: Automated Meter Infrastructure (AMI) interval data (hourly kW readings), MV-90 meter interval data (hourly kW readings), and a program participant list. The participant list included dispatch group, pump number, nominated kW, meter number, and opt-out status for each enrolled pump and curtailment event day. All interval meter data included error codes for cases where the source data was missing or estimated. See Table 1 for a list of error codes included in the data.

Table 1. Error Code Key

Error Code	Description
1	Power Outage
9	Missing Reading
Q	Estimated Reading

Sampling Plan

The use of AMI and MV-90 data allowed the impact evaluation's sampling plan to be a census of program participants (i.e. all participants were considered in the analysis).

Data Gathering and Processing

CLEAResult processed all data provided by Idaho Power using the analytics platform SAS®. The use of SAS® created a consistent and appropriate data format for all three curtailment events. CLEAResult's processing (i.e. cleaning) of the data involved identifying and addressing error codes in the source AMI data. To address the presence of error codes, all AMI data with one or more error code in the interval readings during the curtailment period or in the baseline period were removed from the analysis. In the 2014 Peak Rewards impact evaluation, the results of this method showed statistically significant results compared to an alternative method tested whereby missing values were estimated using linear interpolation.

Finally, before completing the following steps below, two distinct datasets were created: one including options 1 and 2 pumps (which have direct load control devices installed), and the other including option 3 pumps (which are typically larger and manually controlled). This was done to account for different device failure rates between the two groups, and the fact that the results from pumps analyzed were extrapolated to pumps that did not have sufficient data to analyze (see the beginning of the Findings section for details). Extrapolating the device failure rate from option 1 and 2 pumps in the analysis dataset to option 3 pumps not in the analysis dataset would lead to misleading results.

Determine Baseline

CLEAResult determined the baseline kW load separately for each pump by averaging the interval readings in the fourth, third, and second hours preceding the beginning of each pumps' curtailment event. The first hour preceding the curtailment event was not included in the baseline determination due to the frequent practice of pump operators manually shutting off the pump prior to the start of the curtailment event. CLEAResult then summed each pump's baseline by dispatch group to arrive at a unique baseline for each dispatch group.

Calculate Demand Reduction

CLEAResult calculated the demand reduction for each pump by subtracting its kW load during each hour of the curtailment event from the pump's baseline load (determined in the previous step). CLEAResult then aggregated the hourly demand reductions for all pumps within a dispatch group to yield a total hourly reduction for each dispatch group. The total program impact (both average and maximum reduction) was calculated by aggregating the dispatch group results.

Note that the demand reduction results presented in this report represent the estimated reduction for all pumps in the program, not just those analyzed. As discussed above, some pumps were removed from the analysis due to the presence of error codes during the curtailment event and/or baseline period. CLEAResult applied the realization rate (see section below) to the nominated kW of pumps removed as part of the data cleaning process in order to estimate the total demand reduction achieved during each curtailment event.

Determine Curtailment Event Realization Rate

CLEAResult determined the realization rates for each dispatch group by dividing the demand reductions calculated in the previous step (both maximum and average reduction) by the total nominated kW for the pumps included in the analysis.

Determine Counterfactual Realization Rate

In order to inform future program planning, CLEAResult used AMI data to estimate the counterfactual realization rate for each non-weekend and non-holiday day during the program season (Jun 15 - Aug 15). The counterfactual realization rate is the realization rate that Idaho Power likely would have achieved had an event been called on that date. Starting with a realization rate of 100%, CLEAResult subtracted the percent of nominated load that was not present during each pump's baseline period. From that total, CLEAResult subtracted the average opt-out, device failure, and "did not reduce total nominated kW" rates during the three 2015 curtailment events to arrive at the estimated counterfactual realization rate for each day.

Findings

The 2015 impact evaluation of the Peak Rewards program includes two primary sets of results: demand reduction and realization rates for the three test events completed, and the counterfactual realization rates. The sections below first compare the results from the two analysis approaches discussed in the Methodology section, and then present the results of the curtailment events' demand reduction and realization rate analyses as well as the counterfactual realization rate analysis.

Table 2 below details the number of pumps included in the participant list for each curtailment event and the number of pumps removed during the Data Gathering and Processing step.

Table 2. Number of Pumps by Processing Step

Processing Step	June 29	July 2	August 11
Included in Participant List	2,259	2,259	2,259
No AMI data available	295	295	295
Removed due to 'estimated reading' error code Q	112	50	177
Removed due to 'missing reading' error code 9	3	1	1
Removed due to 'power outage' error code 1	4	3	71
Removed due to unreasonable AMI data	5	7	6
Included in final analysis dataset	1,840	1,903	1,780

Curtailment Event Results

Table 3 below summarizes the estimated demand reduction achieved during each of the three curtailment events and the resulting realization rate. The maximum demand reduction achieved ranged from a low of 180.2 MW (realization rate of 44.7%) for the August 11th event to a high of 278.3 MW (realization rate of 69.0%) for the June 29th event.

Of the factors that drove down the realization rate, pumps being shut off during the baseline period had the highest impact (average of 29.8% of the load), followed by load remaining (6.5% of the load), and opt-outs (3.2% of the load).

Table 3: Estimated Demand Reduction and the Resulting Realization Rate

Curtailment Event	Nominated Demand Reduction (MW)	Max Demand Reduction (MW)	Realization Rate	Opt-Out Rate	Load Remaining Rate	Pump OFF in Baseline Rate	Total
June 29	403.2	278.3	69.0%	2.8%	7.6%	20.5%	100.0%
July 2	403.2	273.8	67.9%	3.7%	6.8%	21.7%	100.0%
August 11	403.2	180.2	44.7%	3.0%	5.2%	47.1%	100.0%
Average	403.2	244.1	60.5%	3.2%	6.5%	29.8%	100.0%

Load Remaining Investigation

In the 2014 Peak Rewards program impact evaluation, the "Load Remaining Rate" was included in the "Device Failure Rate." In this evaluation, the project team did further analysis to identify the reasons for load not being curtailed, with the aim of determining to what extent it was due to device failures. In order to do so, the project team completed a "ground up" analysis that categorized each pump into one of the following categories: reduced load (i.e. contributed to the realization rate), opt-out, load remaining, or off in the baseline. This approach differed from the methodology of the primary analysis, which employed a "top down" approach, where the load in all categories was considered on an aggregate-basis.

After considering the load on a pump-by-pumps basis, it became clear that the 6.5% of total nominated load in the load remaining category could not be entirely considered "device failures." This is due to the fact that ~50% of the load that contributed to the load remaining rate was tied to option three pumps, which unlike option one and two pumps, are larger and manually turned off by their operators (i.e. there is no device to fail). While the option three pumps cannot technically have device failures, they can fail to reduce the full amount of load that they nominated. To make this distinction clear, the pump-by-pump analysis created two new categories to better characterize the load originally in the load remaining category: "Device Failure (option 1 and 2 pumps)" and "Did Not Reduce Total Nominated kW." Table 4 below shows the pump-by-pumps analysis's results for these two categories.

Table 4. Load Remaining Rate Investigation Results

Curtailment Event	Device Failure (option 1 & 2 pumps)	Did Not Reduce Total Nominated kW (option 3 pumps)	Total
June 29	3.5%	5.2%	8.7%
July 2	3.6%	2.2%	5.8%
August 11	1.6%	2.4%	4.0%
Average	2.9%	3.3%	6.2%

Note that the sum of the two new categories do not equate exactly to the primary analysis's load remaining rate (6.2% compared to 6.5%). This is due to the primary analysis considering the load remaining rate on an aggregate approach (i.e. a single pump's load may be contributing to multiple categories); whereas, the pump-by-pump approach categorizes 100% of each pump's load into a single category. Because of this discrepancy, the event-specific results below do not separate the load remaining category into the two new categories.

June 29th Curtailment Event

The results of the individual curtailment event analyses include estimated demand reductions and realization rates, with both metrics reported by dispatch group, as well as the cumulative impact of all dispatch groups combined. Table 5 below presents the maximum and average demand reductions achieved and resulting realization rates for the June 29th event.

As seen in the table, each dispatch group's contribution to the total demand reduction is not equal. The maximum demand reduction ranged from 98.0 MW for the 5-9 p.m. dispatch group to 45.5 MW for the 4-8 p.m. dispatch group. The 3-7 p.m. dispatch group achieved the highest realization rate of all groups (81.0%), while the 4-8 p.m. dispatch group had the lowest realization rate at 60.3%. The overall realization rate for all dispatch groups was 69.0%., which was the highest of the three curtailment events called in 2015.

Table 5: June 29th Curtailment Event Results

Dispatch Group	Nominated MW	Baseline MW	Max Demand Reduction (MW)	Avg. Demand Reduction (MW)	Realization Rate
2 - 6 p.m.	87.6	73.1	64.0	58.3	73.1%
3 - 7 p.m.	91.2	70.5	73.9	56.1	81.0%
4 - 8 p.m.	75.4	54.4	45.5	20.2	60.3%
5 - 9 p.m.	149.0	111.1	98.0	88.6	65.7%
Total (2 - 9 p.m.)	403.2	309.1	278.3	223.2	69.0%

Notes:

- Realization rate is calculated using maximum demand reduction, not average demand reduction.

- Dispatch group realization rates were calculated using only pumps in the analysis dataset.

- Each dispatch group's baseline, maximum demand reduction, and average reduction values are estimated for the entire pump population (not only the pumps in the analysis dataset), and were scaled up using the "Total 2-9 p.m." realization rate.

- The estimated maximum demand reduction within each dispatch group is limited to each dispatch group's event time period. Because the maximum demand reductions occur at different hours for each dispatch group, the sum of the dispatch groups' maximum demand reductions do not equal the "Total (2-9 p.m.)" maximum demand reduction.

In order to investigate demand reduction on a more granular level, Table 6 below breaks out demand reduction for each hour of the curtailment event by dispatch group. As expected, the 5-6pm hour experienced the largest total reduction (278.3 MW) as this is the single hour when all dispatch groups are actively curtailing.

Table 6: June 29th Curtailment Event Results by Hour

Metric	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm	7-8pm	8-9pm
Baseline (MW)	309.1	309.1	309.1	309.1	309.1	309.1	309.1
Total Load (MW)	239.9	164.8	119.7	30.8	68.3	130.3	182.3
Total Reduction from Baseline (MW)	69.2	144.3	189.4	278.3	240.8	178.8	126.8
2-6pm DG Reduction from Baseline (MW)	63.0	63.9	63.8	64.0	24.5	5.9	4.8
3-7pm DG Reduction from Baseline (MW)	6.5	73.4	73.9	73.5	72.8	30.9	8.7
4-8pm DG Reduction from Baseline (MW)	0.0	6.6	44.7	45.5	45.4	44.5	16.8
5-9pm DG Reduction from Baseline (MW)	(0.4)	0.4	7.1	95.3	98.0	97.6	96.5

Figure 1 below presents the load profile of the June 29th curtailment event and its baseline, graphically depicting the results from Table 6 above. The overall demand reduction peaks in the 5-6pm hour and gradually decreases as the various dispatch groups' curtailment periods come to an end.

Figure 1: June 29th Curtailment Event Load Profile (All Dispatch Groups)

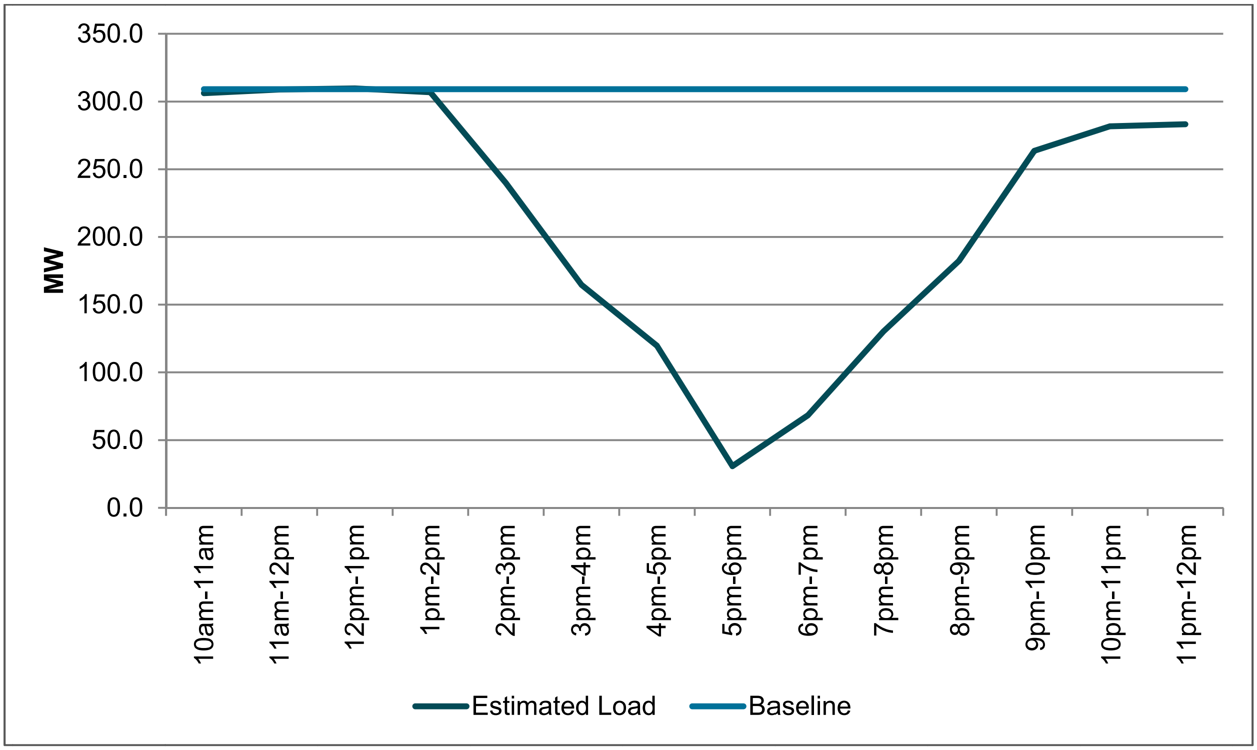
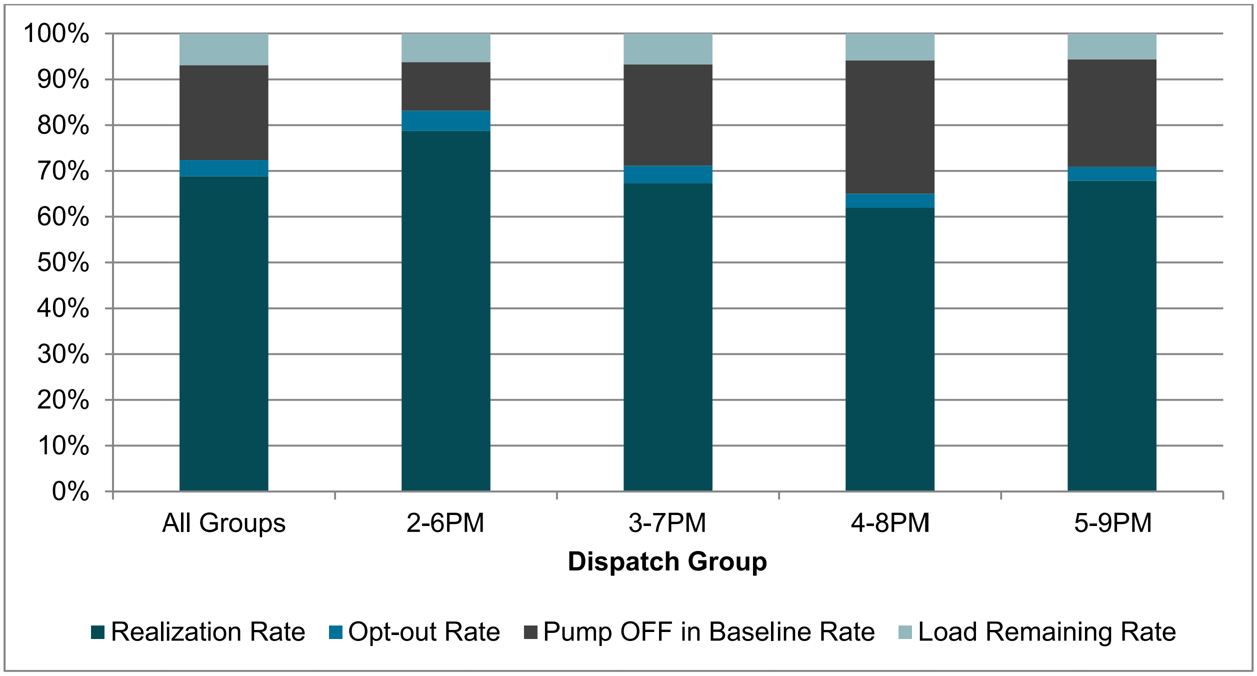


Figure 2 below depicts each dispatch group's realization rate, which is the percent of nominated load that was successfully curtailed, as well as the components that make up the remainder of the load that was not curtailed. The reasons for load not being successfully curtailed include customers opting out of the curtailment event, pumps being shut off during the baseline period (and thus not contributing to load reduction), device failures (option 1 and 2 pumps), and pumps not curtailing to total nominated kW (option 3 pumps). The latter two categories are combined into the load remaining category.

The 4-8 p.m. dispatch group experienced the highest rate of the pumps being shut off during the baseline period (29.1% of the group's nominated load). All of the dispatch groups had a moderate opt-out rate, ranging from 3.0% to 4.4%. Realization rate variability between the dispatch groups was highest during the June 29th event.

Figure 2: June 29th Curtailment Event Realization Rate



July 2nd Curtailment Event

The July 2nd curtailment event was the second event called of the 2015 program season. As in the June 29th event, the 2-6p.m. dispatch group achieved the highest realization rate (77.3%) of all dispatch groups. The overall realization rate for all dispatch groups was 67.9%, which was the second highest of the three curtailment events called in 2015.

Table 7: July 2nd Curtailment Event Results

Dispatch Group	Nominated MW	Baseline MW	Max Demand Reduction (MW)	Avg. Demand Reduction (MW)	Realization Rate
2 - 6pm	87.6	73.9	67.7	65.0	77.3%
3 - 7pm	91.2	64.7	66.1	66.1	72.5%
4 - 8pm	75.4	55.4	49.3	48.9	65.5%
5 - 9pm	149.0	107.1	93.2	92.1	62.5%
Total (2 - 9PM)	403.2	301.1	273.8	272.1	67.9%

Notes:

- Realization rate is calculated using maximum demand reduction, not average demand reduction.

- Dispatch group realization rates were calculated using only pumps in the analysis dataset.

- Each dispatch group's baseline, maximum demand reduction, and average reduction values are estimated for the entire pump population (not only the pumps in the analysis dataset), and were scaled up using the "Total 2-9 p.m." realization rate.
- The estimated maximum demand reduction within each dispatch group is limited to each dispatch group's event time period. Because the maximum demand reductions occur at different hours for each dispatch group, the sum of the dispatch groups' maximum demand reductions do not equal the "Total (2-9 p.m.)" maximum demand reduction.

In order to investigate demand reduction on a more granular level, Table 8 below breaks out demand reduction for each hour of the curtailment event by dispatch group. As expected, the hour between 5 and 6 p.m. experienced the largest total reduction (273.8 MW), as this is the single hour when all dispatch groups are actively curtailing.

Table 8: July 2nd Curtailment Event: Baseline Results by Hour

Metric	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm	7-8pm	8-9pm
Baseline (MW)	301.1	301.1	301.1	301.1	301.1	301.1	301.1
Total Load (MW)	234.2	162.4	113.9	27.2	65.6	129.5	185.3
Total Reduction from Baseline (MW)	66.8	138.6	187.2	273.8	235.5	171.6	115.7
2-6pm DG Reduction from Baseline (MW)	63.3	63.4	65.6	67.6	27.0	7.8	4.7
3-7pm DG Reduction from Baseline (MW)	4.3	66.1	66.1	66.1	66.1	22.6	4.4
4-8pm DG Reduction from Baseline (MW)	0.2	8.3	49.1	49.3	49.3	48.1	15.2
5-9pm DG Reduction from Baseline (MW)	(0.9)	0.9	6.4	90.7	93.2	93.1	91.5

Figure 3 below presents the load profile of the July 2nd curtailment event and its baseline, graphically depicting the results from Table 8 above. The overall demand reduction peaks in the 5-6pm hour and gradually decreases as the various dispatch groups' curtailment periods come to an end.

Figure 3: July 2nd Curtailment Event Load Profile (All Dispatch Groups)

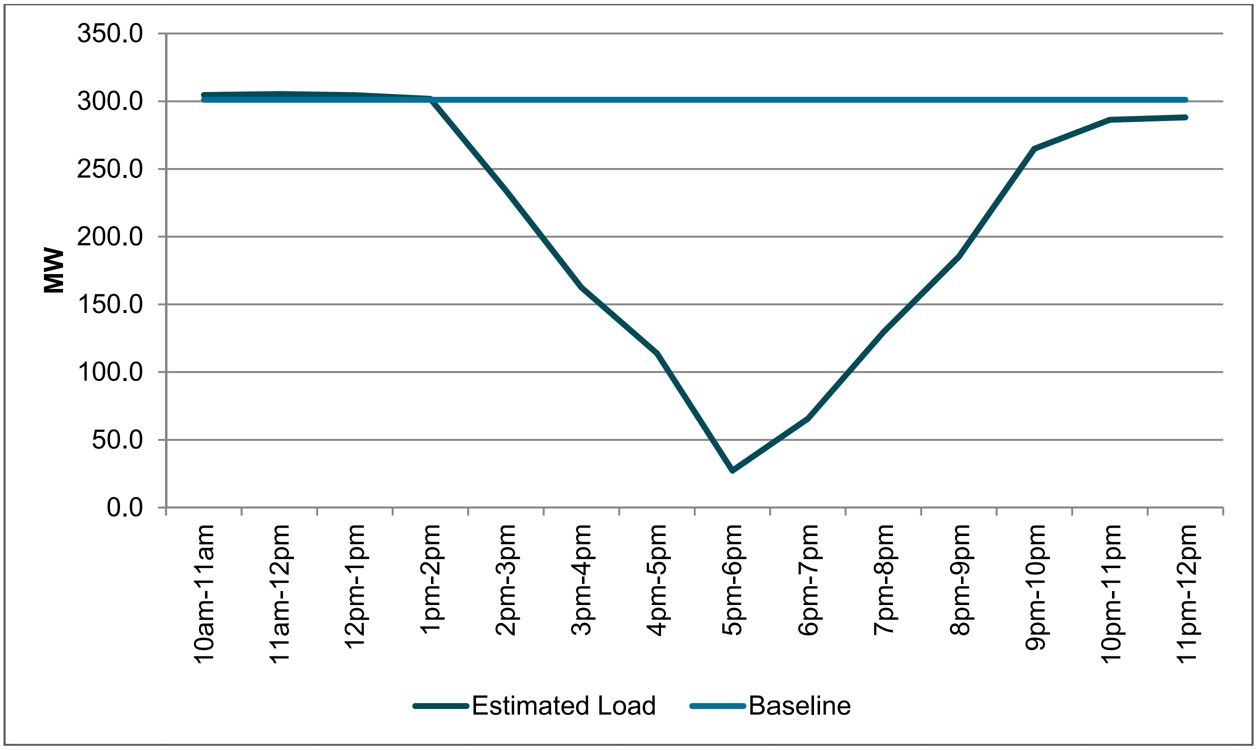
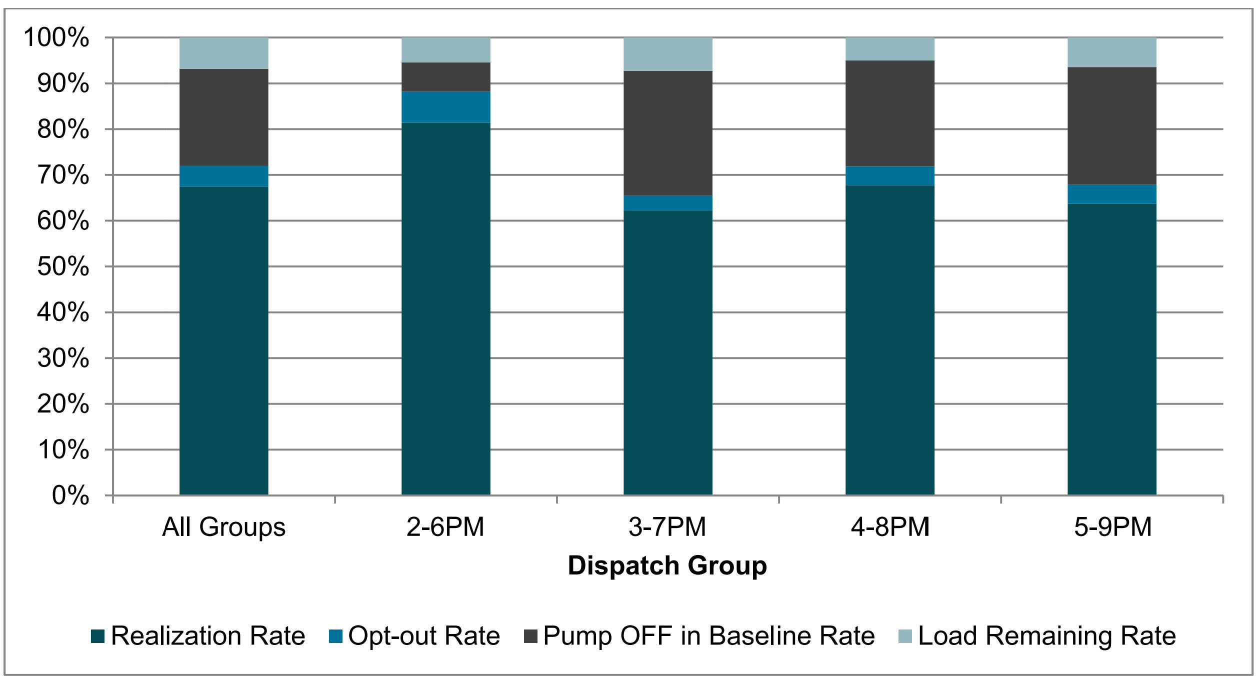


Figure 4 below depicts each dispatch group's realization rate for the July 2nd event. The 3-7 p.m. dispatch group experienced the highest rate of the pumps being shut off during the baseline period (27.2% of the group's nominated load), while the 3-7 p.m. dispatch group had the highest load remaining rate (7.3%). The 2-6p.m. dispatch group's rate of pumps being shut off during the baseline was 6.4%, compared to the other three dispatch groups having a rate of 23-27%.

Figure 4: July 2nd Curtailment Event Realization Rate



August 11th Curtailment Event

The third curtailment event of the 2015 program season was held on August 11th, which is the latest date an event has been called in the 2014 and 2015 seasons. With the irrigation season nearly finished, the event achieved the lowest realization rate (44.7%) of all three events, driven by a high rate of pumps off in the baseline period (49.2%). The realization rates were fairly consistent across all dispatch groups, with a high of 48.5% for the 3-7 p.m. dispatch group and a low of 42.4% for the 5-9 p.m. dispatch group.

Table 9: August 11th Curtailment Event Results

Dispatch Group	Nominated MW	Baseline MW	Max Demand Reduction (MW)	Avg. Demand Reduction (MW)	Realization Rate
2 - 6pm	87.6	43.6	40.4	39.9	46.1%
3 - 7pm	91.2	45.4	44.2	43.6	48.5%
4 - 8pm	75.4	41.1	35.4	35.1	46.9%
5 - 9pm	149.0	71.0	63.1	62.5	42.4%
Total (2 - 9PM)	403.2	201.0	180.2	181.1	44.7%

Notes:
- Realization rate is calculated using maximum demand reduction, not average demand reduction.
- Dispatch group realization rates were calculated using only pumps in the analysis dataset.
- Each dispatch group's baseline, maximum demand reduction, and average reduction values are estimated for the entire pump population (not only the pumps in the analysis dataset), and were scaled up using the "Total 2-9 p.m." realization rate.
- The estimated maximum demand reduction within each dispatch group is limited to each dispatch group's event time period. Because the maximum demand reductions occur at different hours for each dispatch group, the sum of the dispatch groups' maximum demand reductions do not equal the "Total (2-9 p.m.)" maximum demand reduction.

In order to investigate demand reduction on a more granular level, Table 10 below breaks out demand reduction for each hour of the curtailment event by dispatch group. As expected, the hour between 5 and 6 p.m. experienced the largest total reduction (180.2 MW), as this is the single hour when all dispatch groups are actively curtailing.

Table 10: August 11th Curtailment Event Results by Hour

Metric	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm	7-8pm	8-9pm
Baseline (MW)	201.0	201.0	201.0	201.0	201.0	201.0	201.0
Total Load (MW)	156.8	114.1	78.4	20.8	44.9	79.6	114.9
Total Reduction from Baseline (MW)	44.2	86.9	122.6	180.2	156.2	121.4	86.1
2-6pm DG Reduction from Baseline (MW)	40.1	39.5	39.5	40.3	15.0	4.1	1.1
3-7pm DG Reduction from Baseline (MW)	4.3	44.2	44.1	43.2	42.9	18.8	10.4
4-8pm DG Reduction from Baseline (MW)	(0.3)	3.4	34.7	35.1	35.3	35.4	12.3
5-9pm DG Reduction from Baseline (MW)	0.2	(0.2)	4.4	61.6	63.1	63.1	62.3

Figure 5 below presents the load profile of the August 11th curtailment event and its baseline, graphically depicting the results from Table 10 above. The overall demand reduction peaks in the 5-6p.m. hour and gradually decreases as the various dispatch groups' curtailment periods come to an end. Interestingly, unlike the other two events, the estimated load does not come close to regaining its pre-event level after the event ends. This is likely due to the tapering off of the irrigation season and irrigators turning off their pumps permanently during this time period.

Figure 5: August 11th Curtailment Event Load Profile (All Dispatch Groups)

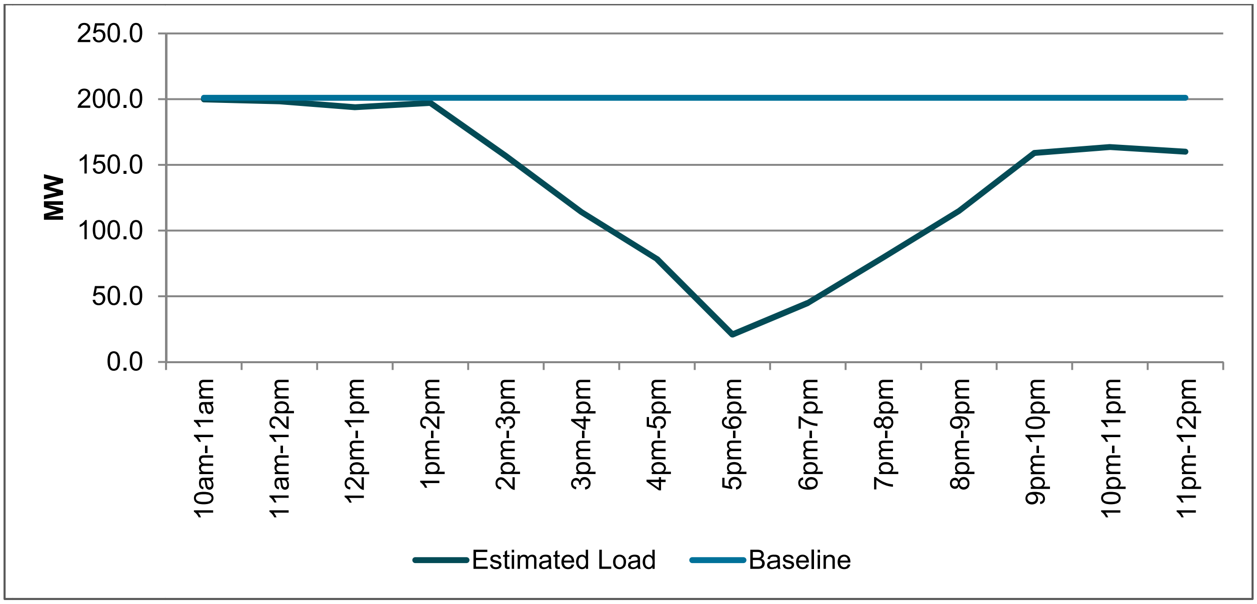
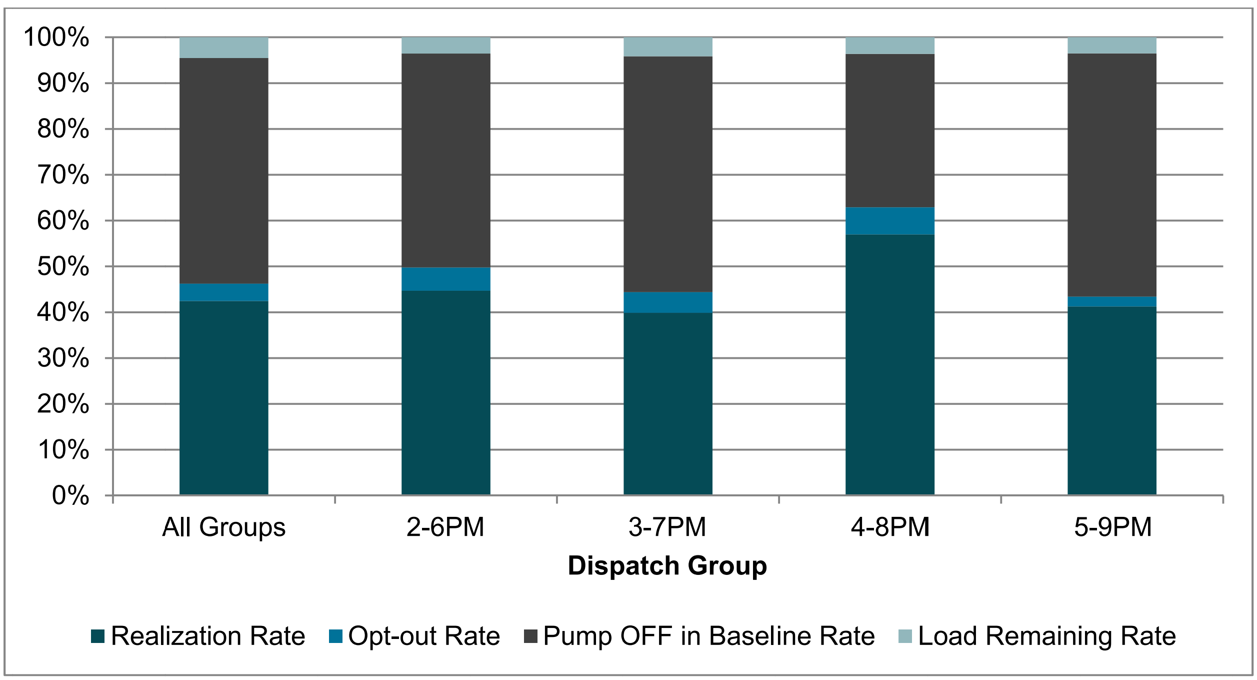


Figure 6 below depicts each dispatch group's realization rate for the August 11th event. The 4-8 p.m. dispatch group experienced the highest realization rate of all the dispatch groups at 57.0%. Realization rate variability between the dispatch groups was lowest in the August 11th event of all three 2015 events.

Figure 6: August 11th Curtailment Event Realization Rate



Counterfactual Realization Rate Results

The 2015 impact evaluation also included an investigation into the counterfactual realization rate, or the realization rate that would have been achieved had an event been called on each business day of the program season. The results of the counterfactual realization rate analysis will inform Idaho Power on how date impacts expected realization rate, leading to more informed decisions on when to call curtailment events.

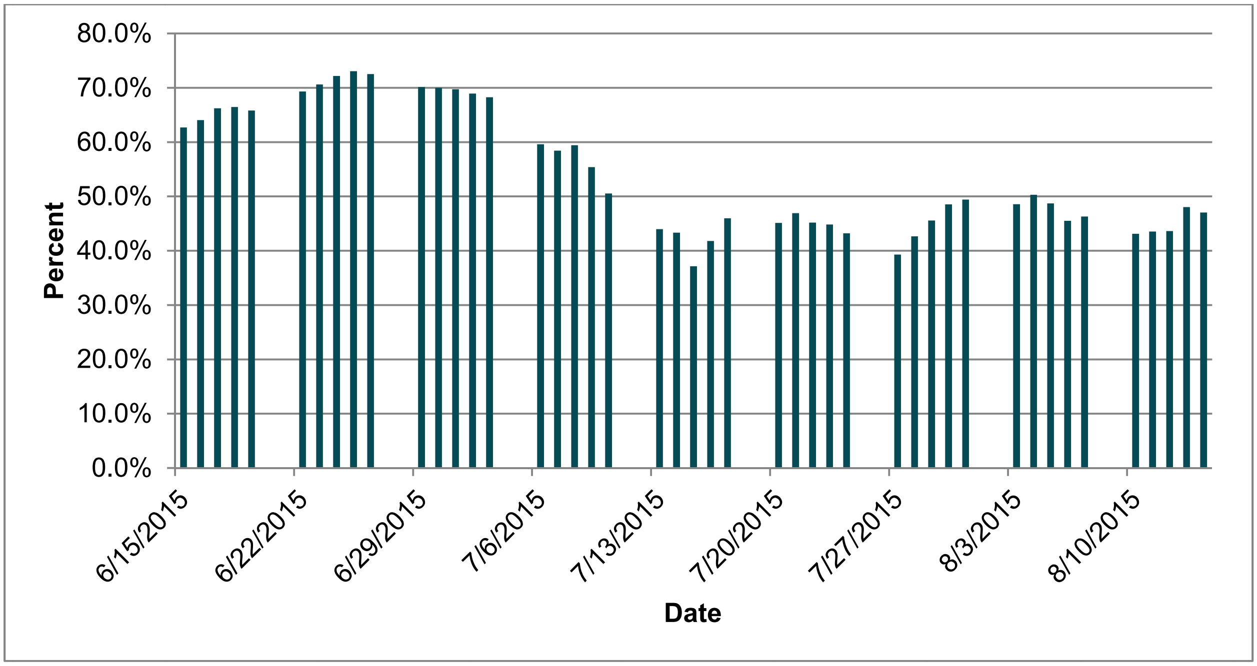
Table 11 below demonstrates that date has a large influence on the expected realization rate. While the first 25% of the program season averages an expected realization rate of 68.6%, the expected realization rate in the last 75% of the season drops off significantly, to an average of 49.1%. This is due to the percentage of pumps being shut off during the baseline period increasing as the season progresses.

Table 11. Counterfactual realization rates for 15-day summer periods in 2015

Date Range	Average Pump OFF in Baseline Rate	Average Opt-Out Rate	Average Device Failure Rate (option 1 & 2 pumps)	Average Did Not Reduce Total Nominated kW Rate (option 3 pumps)	Counterfactual Realization Rate	Total
Jun 15 - 30	22.1%	3.2%	2.9%	3.3%	68.6%	100.0%
Jul 1 - 15	34.8%	3.2%	2.9%	3.3%	55.9%	100.0%
Jul 16 - 31	45.8%	3.2%	2.9%	3.3%	44.9%	100.0%
Aug 1 - 15	44.2%	3.2%	2.9%	3.3%	46.5%	100.0%

Figure 7 below graphically presents the expected realization rate for all non-holiday and non-weekend days of the 2015 program season. The expected realization rate peaks on June 25th at 73.1%. Interestingly, the 2014 program season's counterfactual realization rate peaked on July 10th (at 71.6%). This shift in realization rates peaking earlier in the program season is likely due to southern Idaho having an early spring in 2015, and the irrigation season beginning earlier than in 2014.

Figure 7: Counterfactual Realization Rate by Date



Conclusions

The goals of the 2015 Peak Rewards impact evaluation were to determine the demand reduction (MW) during three events and determine the counterfactual realization rate had an event been called on each business day during the program's June 15th - August 15th season.

CLEAResult completed analyses of curtailment events held on June 29th, July 2nd, and August 11th, 2015, each containing four dispatch groups that curtailed enrolled irrigation pumps in rolling four-hour increments. The results of the curtailment event analyses showed maximum demand reductions of 278.3, 273.8, and 180.2 MW, respectively for the three events, and an average of 244.1 MW without line losses and 305.3, 300.3, and 197.7 respectively with line losses. The events achieved realization rates of 69.0%, 67.9%, and 44.7%, respectively, averaging 60.5%.

The results of the counterfactual realization rate analysis demonstrated that date has a large influence on the expected realization rate. While the first quarter of the program season (June 15 - July 30) showed an average expected realization rate of 68.6%, the expected realization rate in the last three quarters of the season (July 1 – August 15) drops off significantly, to an average of 49.1%. This is due to a higher percentage of pumps being shut off during the baseline period as the season progresses. The counterfactual realization rate peaks in the last week of June and the first week of July, which is a shift of two weeks earlier compared to the 2014 peak counterfactual realization rates. Idaho Power may maximize the program's realization rate by choosing to hold curtailment events on days when the percent of pumps that are shut off during the baseline period is minimized. Typically, this time period generally equates to the last week of June and first week of July, however it is dependent on weather and the timing of the launch of the irrigation season. Based on the counterfactual realization rate analysis, the maximum evaluated potential capacity would have occurred on June 25th with 294.5 MW without line losses and 323.3 MW with line losses.

The results of the impact evaluation show that Idaho Power's Peak Rewards program functions as intended, and, if properly maintained, can be relied on to provide dispatchable demand reduction to the electricity grid.

Success Stories

SUCCESS STORIES

Table 5. 2015 Success Stories

Title	Program	Author*
Idaho Power Incentives Help Turn Wastewater into Useable Water	Custom Efficiency	Idaho Power
What was Dark is Now Light at Meyers Alignment	Easy Upgrades	Idaho Power

*All success stories written under contract with Writers, Ink. LLC.

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Custom Efficiency

For Complex Projects

Idaho Power incentives help turn wastewater into useable water

To modernize and streamline its potato processing operation, the J.R. Simplot Company announced in 2012 that it would consolidate three of its older french fry plants into one state-of-the-art facility at its Food Group campus in Caldwell, Idaho.

"This new, larger factory uses much less water than the previous plants but uses more water than the old factory that was here before," said Don Strickler, Simplot's energy efficiency engineer, "so we knew we had to upgrade our wastewater treatment plant."

Wastewater that's not wasted

Simplot uses water throughout the potato product manufacturing process and looks for opportunities to reduce its water use wherever possible. "We use water to wash the potatoes when they come in off the field," Don explained, "move them from one station to the other, push them through the cutters and carry off the potato waste." And every drop of water goes through the treatment plant at the end of a shift.

"We don't discharge to municipalities or the river," said John Prigge, a Simplot environmental manager. "The water we don't recycle back to the plant, we use to irrigate our own fields."

What's more, the water produced from the treatment plant meets drinking-water standards. "You could drink the water from that plant," John noted.

ENERGY STAR® certification for french fry plant

There is a specific ENERGY STAR program for frozen fried-potato factories in the US," Don said, "and we have to qualify every year." To meet its strict standards, Simplot evaluates each potato plant for how many pounds of potato products it makes and how much energy—including electricity, natural gas and hydrogen—it uses.

"Then we enter it into an ENERGY STAR model, and it gives us a score," he explained. "A score 75 or above and you're certified for that year. Our two factories in Washington and the one in Aberdeen that's been consolidated into this one have all been certified by ENERGY STAR."

IDAHO POWER®
An IDACORP Company

"While Idaho Power incentives help, Simplot invests in saving energy because it's the right thing to do for the environment."

—Don Strickland, Energy Efficiency Engineer, J.R. Simplot Company

The savings

Idaho Power incentives helped upgrade multiple components in the plant. Two components of the upgrade included the following:

1. High-efficiency turbo blowers aerate the water in the holding ponds saving the company over 700,000 kilowatt-hours (kWh) per year.
2. Variable-frequency drives (VFD) allow Simplot to control flows by adjusting the speed of its reverse osmosis feed pumps and return water pumps. Annual estimated power savings compared to fixed-speed pumps are close to 1,000,000 kWh for this portion of the project.

"While we spent more money up front," Don said, "we knew the incentive would offset a lot of that cost."

Estimated savings from Idaho Power's Easy Upgrade projects for J.R. Simplot Caldwell French Fry Plant

Savings (kWh/year)	Project Cost	Savings ($/year)	Idaho Power Incentive	Customer Out of Pocket	Payback in Years
1,711,599	$980,700	$94,138	$205,392	$775,308	8

Uncommon savings are quite common

Saving energy has always been a smart business decision. Now, Idaho Power makes it attainable. Our complete suite of energy efficiency programs provides attractive incentives to commercial and industrial customers who want to use energy wisely and reduce their utility costs.

- The **Custom Efficiency** program offers incentives to large commercial and industrial customers who invest in energy-saving improvements in their facilities.
- **Easy Upgrades** provides financial incentives to commercial and industrial customers who implement qualified energy-saving measures in their facilities.
- The **Building Efficiency** program helps offset the additional capital costs when a company upgrades its planned lighting, cooling, controls, and building shell designs in favor of more efficient components.

The above success story was produced in cooperation with, and approval from, the J.R. Simplot Company.

How much can your company save?

For more information about Idaho Power's energy efficiency incentive programs, go to idahopower.com/business or call us at 208-388-2323 within the Treasure Valley or 1-800-488-6151 outside of the Treasure Valley. We'll show you how you can save energy like the J.R. Simplot Company.

IDAHO POWER®
An IDACORP Company

Easy Upgrades
For Simple Retrofits

What was dark is now light at Myers Alignment

“It used to be like a cave in here,” said Richie Myers as he stood in the middle of his shop at Myers Alignment on the western edge of Ontario, Oregon. “We do a lot of restoration work on classic cars. It’s mostly custom alignments, suspensions and frame work, but it’s fun to see these old classics look like new again.”

Richie bought the business two years ago and immediately noticed the building’s most glaring need. “The lighting was horrible. There was one row of eight-foot-long strips down the middle,” he said, pointing up to the ceiling. “Some lights over near the west wall, but no lights at all on the east wall.”

“We had to depend on drop lights that came down from the ceiling to do our work.” Idaho Power’s Easy Upgrades program helped change all that.

The project

“We put in two rows of new four-foot fixtures up top,” he explained, “then a row of fixtures around the walls about midway up.”

While the shop needed the most help, Richie overhauled lighting on the entire building. Twenty-two T12 fixtures in the office and customer lounge were upgraded to 20 T8 fixtures. Nine 400-watt, metal halide bulbs in the shop were replaced with 16 T5s. Incandescent lamps in the restrooms became four high-efficiency LED lamps. And finally, a high-efficiency LED lighting package replaced the mercury vapor wall pack to light the parking lot.

“We haven’t had a winter with the new lights yet,” Richie said with a smile, “but we’re looking forward to shutting the doors and still being able to see.”

Enjoying the classics

On Myers Alignment’s website is a photo of a beautifully restored 1967 Pontiac Firebird.

“We do a lot of restoration work on classic cars,” Richie said. “It’s mostly custom alignments, suspensions and frame work, but it’s fun to see these old classics look like new again.”

Richie’s reputation for his work on oldies-but-goodies is growing. “People just keep rolling them in,” he said, “so it’s helping out.”

IDAHO POWER®
An IDACORP Company

"More light. Less money. It works out great for us."

– Richie Myers, Owner
Myers Alignment

The savings

The primary goal of the lighting upgrade was improving working conditions, but it also reduced the shop's energy use and, in the process, its power bill. "It's not a huge amount, because we added extra lights," Richie pointed out, "but the power bill has definitely gone down."

Even with the additional lights, Richie's annual energy usage dropped by 5,786 kilowatt-hours (kWh), saving him $328 a year. Richie realized additional savings when Idaho Power's Easy Upgrades incentive paid more than a third ($2,504) of the project's $7,394 cost.

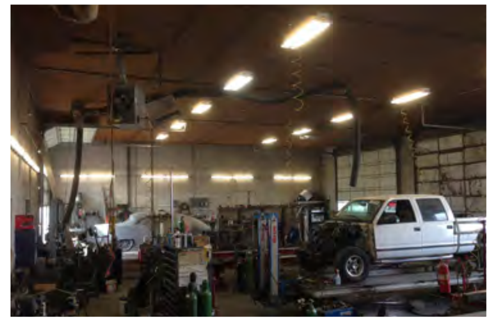
Estimated savings from Idaho Power's Easy Upgrade projects for Myers Alighment

Savings (kWh/year)	Project Cost	Savings ($/year)	Idaho Power Incentive	Customer Out of Pocket	Payback in Years
5,786	$7,394	$328	$2,504	$4,890	14.9

Uncommon savings are quite common

Saving energy has always been a smart business decision. Now, Idaho Power makes it attainable. Our complete suite of energy efficiency programs provides attractive incentives to commercial and industrial customers who want to use energy wisely and reduce their utility costs.

- The **Custom Efficiency** program offers incentives to large commercial and industrial customers who invest in energy-saving improvements in their facilities.
- **Easy Upgrades** provides financial incentives to commercial and industrial customers who implement qualified energy-saving measures in their facilities.
- The **Building Efficiency** program helps offset the additional capital costs when a company upgrades its planned lighting, cooling, controls, and building shell designs in favor of more efficient components.



How much can your company save?

For more information about Idaho Power's energy efficiency incentive programs, go to idahopower.com/business or call us at 208-388-2323 within the Treasure Valley or 1-800-488-6151 outside of the Treasure Valley. We'll show you how you can save energy like Myers Alignment.

IDAHO POWER®
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The above success story was produced in cooperation with, and approval from, Myers Alignment.

WEATHERIZATION ASSISTANCE FOR QUALIFIED CUSTOMERS 2014 ANNUAL REPORT

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IDAHO POWER®
An IDACORP Company

Weatherization Assistance
for Qualified Customers

2014 Annual Report
April 1, 2015

2014

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Description

The Weatherization Assistance for Qualified Customers (WAQC) program provides financial assistance to regional Community Action Partnership (CAP) agencies in Idaho Power's service area. This assistance helps fund weatherization costs of electrically heated homes occupied by qualified customers who have limited incomes. The WAQC program also provides a limited pool of funds for the weatherization of buildings occupied by non-profit organizations serving primarily special-needs populations, regardless of heating source, with priority given to buildings with electric heat. Weatherization improvements enable residents to maintain a more comfortable, safe, and energy-efficient home while reducing their monthly electricity consumption. Improvements are available at no cost to qualified customers who own or rent their homes. Weatherization customers also receive educational materials and efficiency ideas on using energy wisely in their homes. Local CAP agencies determine participant eligibility according to federal and state guidelines.

Background

In 1989, Idaho Power began offering weatherization assistance in conjunction with the State of Idaho Weatherization Assistance Program (WAP). Through the WAQC program, Idaho Power provides supplemental funding to state-designated CAP agencies for the weatherization of electrically heated homes occupied by qualified customers and buildings occupied by non-profit organizations that serve special-needs populations. This allows CAP agencies to leverage their federal Low Income Home Energy Assistance Program (LIHEAP) weatherization funds and serve more people with special needs.

Idaho Power oversees the program in Idaho through five regional CAP agencies. The company has an agreement with each CAP agency that specifies the funding allotment, billing requirements, and program guidelines. The five regional CAP agencies include CCOA—Aging, Weatherization and Human Services (CCOA), Eastern Idaho Community Action Partnership (EICAP), EL ADA Community Action Partnership (EL ADA), South Central Community Action Partnership (SCCAP), and Southeastern Idaho Community Action Agency (SEICAA). In Oregon, Community Connection of Northeast Oregon, Inc. (CCNO) and Community in Action (CINA) provide weatherization services for qualified customers in Idaho Power's service area.

Idaho Power submits this *Weatherization Assistance for Qualified Customers 2014 Annual Report* in compliance with the Idaho Public Utilities Commission's (IPUC) Order No. 29505. This report includes the following topics:

- Review of weatherized homes and non-profit buildings by county
- Review of measures installed
- Overall cost-effectiveness
- Customer education and satisfaction
- Plans for 2015

REVIEW OF WEATHERIZED HOMES AND NON-PROFIT BUILDINGS BY COUNTY

In 2014, Idaho Power made $1,302,609 available to Idaho CAP agencies. Of the funds provided, $1,190,073 were paid in 2014, while $112,536 were accrued for future funding. Of the funds paid in 2014, $1,019,463 directly funded audits, energy efficiency measures, and health and safety measures for qualified customers' homes (production costs) in Idaho, and $101,946 funded administration costs to Idaho CAP agencies for those homes weatherized. Idaho Power funding provided for the weatherization of 239 Idaho homes and 5 Idaho non-profit buildings in 2014. The production cost of the non-profit building weatherization measures was $62,422, while $6,242 in administrative costs were paid for the Idaho non-profit building weatherization jobs. In Oregon, Idaho Power paid $45,475 in production costs for 11 qualified homes and $4,547 in CAP agency administrative costs for homes in Malheur and Baker counties. Table 1 shows each CAP agency, the number of homes weatherized, production costs, average cost per home, administration payments, and total payments per county made by Idaho Power.

Table 1
2014 WAQC activities and Idaho Power expenditures by agency and county

Agency	County	Number of Homes	Production Cost	Average Cost[1]	Administration Payment to Agency	Total Payment
Idaho						
CCOA	Boise	2	$ 15,022	$ 7,511	$ 1,502	$ 16,524
	Canyon	64	247,625	3,869	24,762	272,387
	Gem	1	3,534	3,534	353	3,887
	Payette	1	7,566	7,566	757	8,323
	Agency Total	**68**	**$ 273,747**	**$ 4,026**	**$ 27,374**	**$ 301,121**
EICAP	Lemhi	3	11,625	3,875	1,163	12,788
	Agency Total	**3**	**$ 11,625**	**$ 3,875**	**$ 1,163**	**$ 12,788**
EL ADA	Ada	85	427,110	5,025	42,711	469,821
	Elmore	6	36,683	6,114	3,668	40,351
	Owyhee	10	53,007	5,301	5,301	58,308
	Agency Total	**101**	**$ 516,799**	**$ 5,117**	**$ 51,680**	**$ 568,479**
SCCAP	Cassia	1	1,831	1,831	183	2,014
	Gooding	2	8,752	4,376	875	9,627
	Jerome	1	2,883	2,883	288	3,172
	Lincoln	3	9,835	3,278	984	10,819
	Twin Falls	15	77,607	5,174	7,761	85,368
	Agency Total	**22**	**$ 100,908**	**$ 4,587**	**$ 10,091**	**$ 110,999**
SEICAA	Bannock	24	63,459	2,644	6,346	69,805
	Bingham	8	15,747	1,968	1,575	17,321
	Power	13	37,178	2,860	3,718	40,895
	Agency Total	**45**	**$ 116,383**	**$ 2,586**	**$ 11,638**	**$ 128,022**
Total Idaho Homes		**239**	**$ 1,019,463**	**$ 4,266**	**$ 101,946**	**$ 1,121,409**
Idaho Non-Profit Buildings	Lemhi	1	5,834	–	583	6,418
	Ada	1	15,360	–	1,536	16,896
	Twin Falls	2	38,526	–	3,853	42,378
	Blaine	1	2,702	–	270	2,972
Total Idaho Non-Profit Buildings		**5**	**$ 62,422**	**–**	**$ 6,242**	**$ 68,664**
Total Idaho		**244**	**$ 1,081,884**	**–**	**$ 108,188**	**$ 1,190,073**
Oregon						
CCNO	Baker	2	7,487	3,744	749	8236
	Agency Total	**2**	**$ 7,487**	**3,744**	**$ 749**	**$ 8,236**
CINA	Malheur	9	37,987	4,221	3,799	41,786
	Agency Total	**9**	**$ 37,987**	**4,221**	**$ 3,799**	**$ 41,786**
Total Oregon homes		**11**	**$ 45,475**	**4,134**	**$ 4,547**	**$ 50,022**
Total Program		**255**	**$ 1,127,359**	**–**	**$ 112,736**	**$ 1,240,094**

[1] Agency average cost total is equal to the production cost divided by the number of jobs.
Note: Dollars are rounded.

The base funding for Idaho CAP agencies is $1,212,534 annually, which does not include any carryover from the previous year. Idaho Power's agreements with CAP agencies include the provision allowing a maximum annual average cost per home of up to a dollar amount specified in the agreement between the CAP agency and Idaho Power. The intent of the maximum annual average cost is to provide the CAP agency flexibility to service some homes with greater or fewer weatherization needs. It also provides a monitoring tool for Idaho Power to forecast year-end outcomes. The average cost per home served is calculated by dividing the total annual Idaho Power production cost of homes weatherized per CAP agency by the total number of homes weatherized that the CAP agency billed to Idaho Power during the year. The maximum annual average cost per home each CAP agency was allowed under the 2014 agreement was $6,000. In 2014, Idaho CAP agencies had a combined average cost per home served of $4,266, and Oregon CAP agencies averaged $4,134 per home. No CAP agency exceeded their maximum average cost.

CAP agency administration fees are equal to 10 percent of Idaho Power's per-job production costs. The average administration cost paid to agencies per Idaho home weatherized in 2014 was $427, and the average administration cost paid to Oregon agencies per Oregon home weatherized during the same period was $413. Not included in the dollar totals reflected in Table 1 are additional Idaho Power staff labor, marketing, evaluation, home verification, and support costs for the WAQC program totaling $57,556 for 2014. These expenses were in addition to the WAQC program funding requirements in Idaho specified in IPUC Order No. 29505.

In compliance with IPUC Order No. 29505, WAQC program funds are tracked separately, with unspent funds carried over and made available to CAP agencies in the following year. In 2014, $90,075 in unspent funds from 2013 were made available for expenditures in Idaho.

Table 2 details the base funding and unspent funds from 2013 that were available in 2014 and the total amount of 2014 spending.

Table 2
2014 Idaho WAQC base funding and unspent funds made available

Agency	2014 Base Funding	Available Funds from 2013	Total 2014 Allotment	Total 2014 Spending
Idaho				
CCOA	$ 302,259	–	$ 302,259	$ 301,120
EICAP	12,788	–	12,788	12,788
EL ADA	568,479	–	568,479	568,479
SCCAP	167,405	–	167,405	110,999
SEICAA	111,603	$ 38,211	149,814	128,022
Non-profit buildings	50,000	51,864	101,864	68,664
Idaho Total	**$ 1,212,534**	**$ 90,075**	**$ 1,302,609**	**$ 1,190,073**

Note: Dollars are rounded.

REVIEW OF MEASURES INSTALLED

Table 3 details home counts for which Idaho Power paid all or a portion of the measure costs during 2014. The Home Counts column represents the number of times any percentage of that measure was billed to Idaho Power during the year. If totaled, measure counts would be higher than the total homes weatherized because the number of measures installed in each home varies. For example, Table 3 shows 72 homes received a compact fluorescent lamp/light (CFL) measure. Each home received more than one bulb. Consistent with the Idaho WAP, the WAQC program offers several measures that have costs but do not necessarily save energy or for which the savings cannot be measured. Included in this category are health and safety measures, vents, furnace repairs, other, and home energy audits. Health and safety measures are necessary to ensure weatherization activities do not cause unsafe situations in a customer’s home or compromise a home’s existing indoor air quality. Other non-energy saving measures are allowed under this program because of their interaction with the energy-saving measures. Examples of items included in the “other” measure category include vapor barriers, dryer vent hoods, and necessary electrical upgrades. The EA5 energy audit program (EA5) is a software program approved for use by the U.S. Department of Energy (DOE) and chosen by the Idaho Department of Health and Welfare (IDHW) for use in the Idaho state WAP and, therefore, it is used by Idaho CAP agency weatherization managers. The EA5 includes material costs, labor costs for installation, agency and contractor support costs, and estimated savings for individual measures.

Table 3
2014 WAQC review of measures installed

	Home Counts	Production Costs
Idaho Home and Non-Profit Measures		
Windows	126	$ 176,377
Doors	113	75,717
Wall insulation	11	10,323
Ceiling insulation	99	72,536
Vents	12	1,262
Floor insulation	85	68,982
Infiltration	133	29,888
Ducts	45	26,385
Health and safety	33	13,662
Other	22	7,336
Water heater	4	3,868
Pipes	32	1,688
Refrigerator*	6	19,384
Furnace tune	3	688
Furnace repair	9	9,100
Furnace replace	164	550,279
CFL	72	2,311
Audit	143	12,098
Total Idaho Homes and Non-Profit Measures		**$ 1,081,884**

Continued on next page.

Table 3 (continued)

	Home Counts	Production Costs
Oregon Home Measures		
Windows	4	$ 10,359
Ceiling insulation	7	11,056
Floor insulation	5	15,438
Infiltration	4	3,530
Ducts	1	468
Health and safety	5	4,302
Pipes	2	322
Total Oregon Homes Measures		**$ 45,475**

*One Idaho refrigerator replacement was a commercial refrigerator for a non-profit food bank.
Note: Dollars are rounded.

Annually, Idaho Power physically verifies approximately 10 percent of the homes weatherized under the WAQC program. This is done through two methods. The first method includes the Idaho Power program specialist participating in Idaho's and Oregon's state monitoring process that reviews weatherized homes. The process involves utility representatives; weatherization personnel from CAP agencies; Community Action Partnership Association of Idaho, Inc. (CAPAI); and the IDHW or Oregon Housing and Community Services (OHCS) reviewing homes weatherized by each of the CAP agencies. CAP agency weatherization departments weatherize homes in accordance with federal guidelines.

The second method involves Idaho Power contracting with two companies—The Energy Auditor, Inc., and Momentum, LLC—that employ certified building performance specialists to verify installed measures in customer homes. The Energy Auditor verifies homes weatherized for the WAQC program in Idaho Power's eastern and southern Idaho regions. The owner of Energy Auditor is certified by Performance Tested Comfort Systems and is an ENERGY STAR® home performance specialist. Momentum verifies weatherization services provided through the WAQC program in the Capital and Canyon regions of Idaho and in Idaho Power's Oregon service area.

The owner of Momentum is a Residential Energy Services Network (RESNET®) certified home energy rater. After these companies verify installed measures, any required follow-up is done by the CAP agency personnel.

Overall Cost-Effectiveness

Prior to 2012, reported annual savings and individual project screening for the WAQC program were determined solely using annual savings estimates from the Idaho WAP EA4 energy audit tool (EA4). In 2012, the Idaho WAP, and therefore the WAQC program, upgraded to the EA5. The EA5 is used for the WAQC program in conjunction with the Idaho WAP for leveraging funds by weatherization managers who are billing the State of Idaho and Idaho Power for each completed home weatherization job. In the field, the weatherization auditor uses the EA5 to conduct the initial audit of potential energy savings for a home. The EA5 compares the efficiency of measures prior to weatherization to the efficiency after the proposed improvement and translates that change into savings-to-investment ratio (SIR). The output of the EA5 SIR is similar to the participant cost test (PCT) ratio. If the EA5 computes an SIR of 1.0 or higher, the CAP agency is authorized to complete the proposed measures. In addition to the individual measure SIR, the entire job is required to show an SIR of 1.0 or higher.

In 2014, the total utility cost (UC) benefit/cost (B/C) ratio for the WAQC program was 0.51, while the B/C ratio from the total resource cost (TRC) perspective was 0.42. In 2014, the B/C ratios declined compared to 2013 due to the downward change in the DSM alternative costs from the *2013 Integrated Resource Plan* (IRP) that Idaho Power uses to value energy efficiency. In 2013, the UC B/C ratio was 0.95, while the TRC B/C ratio was 0.74. Based on 2014 savings and costs, the WAQC program continued to not be a cost-effective program in 2014.

In 2012, Idaho Power contracted with D&R International, Ltd., to conduct an impact evaluation of 2011 WAQC activities. The impact evaluation was completed and provided to Idaho Power in February 2013. Results indicated significantly lower realized energy savings for the WAQC program compared with initial EA4 savings estimates from 2011. The average per-home savings reported in the impact evaluation were 2,684 kilowatt-hours (kWh). As a result of the evaluation results and recommendations by the evaluator, the EA5 was no longer deemed an accurate source for annual savings estimates for WAQC projects. For reported savings in 2012 and 2013, the evaluated average per-home savings of 2,684 kWh were used.

In 2014, Idaho Power conducted a billing analysis on participants' billing data from 2012, and the results were used to report savings for 2014. The additional billing data analysis was done to increase Idaho Power's understanding of savings resulting from the program and to incorporate one of the recommendations from D&R International—to use a control group. This would account for non-weather related changes in energy use not attributable to the program's weatherization measures. Homes where WAQC weatherization projects were completed during 2010 were used as a control group to eliminate change in energy consumption due to factors other than program weatherization. For the updated billing analysis, Idaho Power also wanted to explore whether savings could be further differentiated between housing type (single-family versus manufactured home), heating footprint of the home, and number of occupants in the home. In contrast, the D&R International 2012 analysis only compared customer's billing data before and after weatherization.

All updated billing analysis and data preparation was done in accordance with the *Whole-building Retrofit with Consumption Data Analysis Evaluation Protocol* document published in April 2013 by the DOE at energy.gov/eere/about-us/ump-protocols.

Similar methods of consumption analysis of billing data were also used in recent regional studies, including the *Final Summary Report for the Ductless Heat Pump Impact and Process Evaluation* prepared by Ecotope, Inc., and published by the Northwest Energy Efficiency Alliance (NEEA) in February 2014 at neea.org/docs/default-source/reports/e14-274-dhp-final-summary-report-(final).pdf?sfvrsn=8 and *SEEM Calibration, Phase 1*, published by the Regional Technical Forum (RTF) in May 2014 at rtf.nwcouncil.org/measures/support/SEEM/Default.asp.

Total claimed estimated savings for 2014 projects were 533,800 kWh, with 184,587 kWh from single-family homes and 336,401 kWh from manufactured homes. An additional 12,812 kWh resulted from weatherization projects at non-profit sites. Idaho Power's analysis results showed differences between average savings in manufactured and single-family type homes. Manufactured home savings per home were similar to the findings of the previous D&R International analysis evaluation results, with savings of 2,568 kWh per year. Single-family homes, when analyzed independently from manufactured homes, revealed fewer savings than the 2012 evaluation results provided to Idaho Power in 2013, with an updated estimate of 1,551 kWh per year per home. The effects of further segregating savings analyses by the heating footprint of the home, number of occupants, and climate were not statistically significant across all housing types and therefore were not factored into saving estimates. Idaho Power plans to continue monitoring savings from WAQC through further billing analyses. Additionally, the RTF is analyzing manufactured-home audit data from 2011 to 2012 to validate regional savings models used for manufactured-home savings estimates for heat pumps and weatherization. The resulting collaboration with the RTF will provide insights into how to potentially enhance analysis methods and techniques of the program.

For the five WAQC non-profit projects in 2014, Idaho Power used the savings estimated at 1.03 kWh per square foot of weatherized heated space. This was based on the average decrease in annual energy intensity from the billing analysis of single-family homes resulting in an annual savings for non-profits of 1.03 kWh/heated square foot. The small number of projects and the lack of homogeneity among non-profit projects did not allow for a billing analysis based on previous projects. Non-profit projects were excluded from the D&R International impact evaluation. Idaho Power continues to look for methods to best estimate savings for non-profit-type projects.

In 2013, Idaho Power administered a process evaluation of the WAQC program through the third-party contractor Johnson Consulting Group. The contractor gathered data from a variety of sources, including reviews of program materials, the program database, and in-depth interviews with key agency and Idaho Power staff and stakeholders from May through August 2013. In addition, Johnson Consulting Group conducted a literature review about low-income program non-energy benefits (NEB) and cost-effectiveness policies used in other areas.

The recommendations from the IPUC staff's report and IPUC Order No. 32788 were used for a cost-effectiveness analysis for 2014. These recommendations include the following:

- Applying a 100-percent net-to-gross (NTG) value to reflect the likelihood that WAQC weatherization projects would not be initiated without the presence of a program
- Claiming 100 percent of project savings
- Including an allocated portion of the indirect overhead costs
- Applying the 10-percent conservation preference adder

- Claiming one dollar of benefits for each dollar invested in health, safety, and repair measures
- Amortizing evaluation expenses over a three-year period

A contract was signed with Kearns ENTerprises™ to develop a home audit tool to be used in Idaho Power's Weatherization Solutions for Eligible Customers program starting in 2015. The updated tool was designed to capture key data and more details regarding measures installed for health and safety. Updated calculations for estimates of energy savings and measure information to more accurately report program effectiveness were built into the program. The new Home Audit Tool (HAT 14.1) was distributed in January 2015 to contractors participating in the Weatherization Solutions for Eligible Customers program and will be tested throughout 2015 in that program. The WAQC program will use the tool if the Idaho state WAP adopts it.

Updates to the energy audit tool included the following:

- Heating degree days and lives of measures to be used in calculating SIRs and estimated energy savings were updated.
- Data-entry points were programmed into the tool as checkboxes to better categorize items installed under the Health and Safety category. This will allow consistency between agencies and will add quantitative capabilities for future reporting of NEBs.
- Data-entry points were added to the tool to more easily calculate SIRs and estimated savings for refrigerator replacements.

- Housing-type data-entry points were added to clarify housing types and increase the capability of estimating savings by housing type.

- A support cost was hard-coded into the new program to calculate a maximum percentage of support cost per measure. Sub-contracted labor no longer receives this financial support.

- A data-entry point calculating a minimum percent of Idaho Power costs required to be paid by the landlord for participation when a home is not owner-occupied was hard-coded into the program.

- Data-entry points were added to count the number of CFL and light-emitting diode (LED) installations to better estimate savings.

- All necessary items to ensure information is transmitted into an Idaho Power database through proper file transfer protocol were included for the security of customer information.

In addition, the University of Idaho Integrated Design Laboratory (IDL) developed a weatherization heat pump calculator to check estimated energy savings reported by the new HAT 14.1 when a heating system has been replaced as a part of weatherization in a home. HAT 14.1 will be used for jobs submitted through Idaho Power's Weatherization Solutions for Eligible Customers program in 2015.

Customer Education and Satisfaction

Idaho Power provides materials to each CAP agency to help educate qualified customers who receive weatherization assistance on using energy efficiently. Included in the materials are copies of the Idaho Power booklets *30 Simple Things You Can Do to Save Energy* and *Energy Saving Tips*, which describe energy conservation tips for the heating and cooling seasons, and a pamphlet that describes the energy-saving benefits of using CFLs, LEDs, and other tips for choosing the right bulb. Idaho Power actively informs customers about WAQC through energy and resource fairs and other customer contacts. Idaho Power's Customer Service Center regularly informs customers about the program.

To stay current with new programs and services, Idaho Power attends state and federal energy assistance/weatherization meetings and other weatherization-specific conferences, such as the Affordable Comfort Conference by the Building Performance Institute. Idaho Power is also active in the Policy Advisory Council, helping advise and direct Idaho's state weatherization application for funding to the DOE.

As described in the Review of Measures Installed section above, Idaho Power used independent, third-party verification companies across its service area to randomly check approximately 10 percent of the weatherization jobs submitted for payment by the program. These home verifiers ensure the stated measures are installed in the homes of participating customers and discuss the program with these customers. Home verifiers visited 44 homes, requesting feedback about the program in 2014. When asked how much customers learned about saving electricity, 35 customers answered they learned "a lot" or "some." When asked how many ways they tried to save electricity, 39 customers responded "a lot" or "some."

As recommended by Johnson Consulting Group in the 2013 process evaluation, a customer survey was developed to assess major indicators of customers' satisfaction and program operations consistently throughout the service area. The 2014 Weatherization Programs Customer Survey was provided to all program participants in all regions upon completion of weatherization in their homes. Survey questions gathered information about how customers learned about the program, reasons for participating, how much customers learned about saving energy in their homes, and the likelihood of household members changing behaviors to use energy wisely.

Idaho Power received survey results from 237 of the 250 households weatherized by the program in 2014. Of the 237 surveys received back from customers, 228 were from Idaho customers and 9 from Oregon customers. Some key highlights include the following:

- Over 47 percent of respondents learned of the program from a friend or relative, and another almost 15 percent learned of the program from an agency flyer. Nearly 6 percent learned about the weatherization program by receiving a letter in the mail.

- Almost 90 percent of the respondents reported that their primary reason for participating in the weatherization program was to reduce utility bills, and over 45 percent wanted to improve the comfort of their home.

- Almost 74 percent reported they learned how air leaks affect energy usage, and just over 65 percent indicated they learned how insulation affects energy usage during the weatherization process. Another almost 57 percent of respondents said they learned how to use energy wisely.

- Over 79 percent reported they were very likely to change habits to save energy, and almost 80 percent reported they have shared all of the information about energy use with members of their household.

- Over 86 percent of the respondents reported that they think the weatherization they received will significantly affect the comfort of their home, and nearly 94 percent said they were very satisfied with the program.

- Over 86 percent of the respondents reported that the habits they were most likely to change was turning off lights when not in use, and over 61 percent said that washing full loads of clothes was a habit they were likely to change to save energy. Turning the thermostat up in the summer was reported by nearly 51 percent, and turning the thermostat down in the winter was reported by almost 58 percent as a habit they and members of the household were most likely to change to save energy.

A summary of the above survey is included in the *Demand-Side Management 2014 Annual Report's Supplement 2: Evaluation* available online at idahopower.com/EnergyEfficiency/reports.cfm.

Also recommended in the Johnson Consulting Group 2013 process evaluation was that Idaho Power begin developing a new energy audit tool. The tool was completed in 2014 for Idaho Power's Weatherization Solutions for Eligible Customers program and may be accepted by the Idaho state WAP.

In Oregon, Idaho Power filed an updated tariff for the program. The tariff removed funding for the non-profit pooled funds. This change allowed Idaho Power to increase funds used to weatherize homes. This funding shift occurred in 2014 and allowed additional funds to be spent on efficiency improvements in qualified customers’ homes in Oregon.

PLANS FOR 2015

As in previous years, unless directed otherwise, Idaho Power will continue to provide financial assistance to CAP agencies while exploring changes to improve program delivery and continue to provide the most benefit possible to special needs customers while working with Idaho and Oregon state WAP personnel. Unless the IPUC directs otherwise, Idaho Power will continue its efforts to improve this program while at the same time offering it to the company’s customers on an ongoing basis.

Idaho Power will continue to participate in the Idaho and the Oregon state monitoring process of weatherized homes and will continue to verify approximately 10 percent of the homes weatherized under the WAQC program via certified home-verification companies.

Idaho Power will continue its involvement with the State of Idaho’s Policy Advisory Council that serves as an oversight group for weatherization activities in Idaho as well as review state grant applications for federal funding.

Idaho Power plans to selectively market the WAQC program throughout 2015. The program will be promoted at resource fairs, community special-needs populations’ service-provider meetings, and CAP agency functions to reach customers who may benefit from the program. Additional marketing for this program will be conducted in cooperation with weatherization managers.

Idaho Power will continue working in partnership with the IDHW, OHCS, CAPAI, and individual CAP agency personnel to maintain the targets and guidelines and improve the overall WAQC program.

In 2015, Idaho Power will support the whole-house philosophy of the WAQC program and the Idaho and Oregon WAP by continuing to contract a $6,000 annual maximum average per-home cost. Based on the required funding, Idaho Power estimates 195 homes in Idaho and Oregon and approximately 6 non-profit buildings in Idaho will be weatherized in 2015. In Idaho during 2015, Idaho Power expects to fund the base amount plus available funds from 2014 to total $1,325,070 in weatherization measures and agency administration fees. Of this amount, $83,200 will be provided to the non-profit pooled fund to weatherize buildings housing non-profit agencies that primarily serve qualified customers in Idaho.

Service-area wide, Idaho Power will provide the WAQC program $1,375,642 in funding in 2015 for the weatherization of homes and buildings of non-profit agencies serving qualified customers.

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