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COMPANY NAME: Idaho Power Company

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Report is required by: OAR
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 Other OPUC Staff's Memo (April 14, 2015)

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Lisa D. Nordstrom
Lead Counsel
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November 10, 2016

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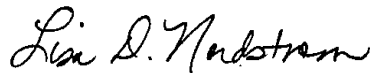
RE: Tariff Advice No. 15-03 – Schedule 76, Flex Peak Program
Flex Peak Program 2016 End-of-Season Annual Report

Attention Filing Center:

Pursuant to the Public Utility Commission of Oregon (“Commission”) Staff’s recommendation which was accepted by the Commission at the public meeting on April 28, 2015, Idaho Power Company hereby submits its Flex Peak Program 2016 End-of-Season Report within 90 days after the end of the season.

If you have any questions regarding this filing, please contact Regulatory Analyst Zach Harris at (208) 388-2305 or zharris@idahopower.com.

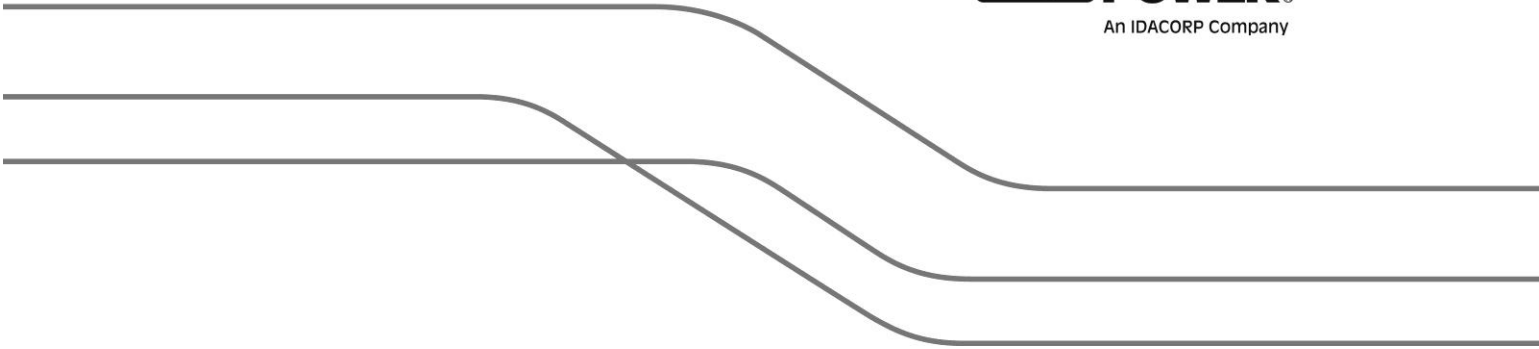
Sincerely,



Lisa D. Nordstrom
Lead Counsel

LDN:kkt

Enclosure



2016 Flex Peak Program End-of-Season Annual Report

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Attachments

CLEAResult Impact Evaluation

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Introduction

The Flex Peak Program (“Program”) has been operated by Idaho Power Company (“Idaho Power” or “Company”) for two years. Prior to 2015, a similar demand response (“DR”) program for commercial and industrial customers was operated by a third-party vendor. The results presented in this report are from the Company’s second year of operating the Program. In its second year, the Program experienced a growth in participation (both in number of participants and size diversity), increased load reduction, high realization rates, and improved customer satisfaction. There were 67 new sites added and the increased participation resulted in the highest hourly load reduction for the season of 41.5 megawatts (“MW”). The average realization rate for the three load reduction events that occurred in the 2016 Program season was 98.8 percent. Customer satisfaction remained high with survey results indicating a satisfaction level of 3.6 out of 4. Enrollment in the Program increased for the season and 97 percent of previous sites re-enrolled in the Program. The total Program costs through October 1, 2016, were \$744,955. The cost of having this resource available was \$17.95 per kilowatt (“kW”) based on (1) the maximum demand reduction achieved on July 26, 2016, of 41.5 MW for the season compared to \$39.48 per kW and (2) the maximum demand reduction of 39.6 MW under the prior commercial and industrial DR program in 2014.

Background

The Program is a voluntary 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’s other DR programs, Irrigation Peak Rewards and the Residential Air Conditioner Cycling Program, has helped to delay the need to build supply-side resources.

As part of Advice No. 15-03, the Public Utility Commission of Oregon (“Commission”) adopted Staff’s recommendation that the Company file an annual end-of-season report that should include the number of participating customers, number of participating sites, number of events called, total load dropped for each event, event duration, total capacity payments made, total energy payments made, number of customers who failed to meet their load, number of Program applications denied due to Program subscription limit, benefits identified with each dispatch of the resource, an assessment of whether the trigger or dispatch price is properly set to utilize the asset most often, any participant attrition, any issues the utility has identified meeting requests to participate in the Program, any changes in baseline methodology taken or anticipated, and what improvements Idaho Power and the Program might benefit from. This report addresses the annual end-of-season reporting requirements.

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. and 8 p.m. on non-holiday weekdays.

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 (“event”) two hours prior to the start of the event, and events last between two to four hours.

The parameters of the Program are in Schedule 76,¹ and include the following:

- A minimum of three load reduction events will occur each program season.
- Events can occur any weekday, excluding July 4, between the hours of 2 p.m. and 8 p.m.
- Events can 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 will provide notification to participants two hours prior to the initiation of an event.
- If prior notice of a load reduction event has been sent, Idaho Power can choose to cancel the event and notify participants of cancellation 30 minutes prior to the start of the event.

Program Incentives

The 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

¹ Idaho Power Company, P.U.C. ORE. No. E-27, Schedule 76

\$0.25 per kW. Incentives are calculated using Idaho Power's interval metering billing data and participants received the incentive checks within 30 days of the end of the Program season. Participants were mailed their incentive checks by September 15 in 2016. The incentive structure offered for the 2016 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 reported throughout this report are at the generation level and system losses have been taken into account. Idaho Power called three load reduction events in 2016. The first event occurred on June 30, the second on July 26, and the third on July 28. The maximum realization rate during the season was 120 percent and the average for all three events combined was 98.8 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 during the July 26 event at 41.5 MW.

Participants had a committed load reduction of 34.2 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 65 customers participating in the Program totaling 137 sites. Out of the total number of sites, 70 sites participated in the 2015 season, and 67 sites were newly added in 2016. There were two sites that did not re-enroll from the 2015 season. One of the sites closed down and the other site felt the program did not fit its business operations. The committed load reduction at the end of the season was 33.9 MW, which was achieved by 137 facility sites.

The first event was called on Thursday, 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 34.2 MW. The average load reduction was 32.8 MW. The highest hourly load reduction was 34.8 MW during hour three. The realization rate for this event was 96 percent.

The second event was called on Tuesday, July 26. Participants were notified at 2 p.m. for a four hour event from 4-8 p.m. The total nomination for this event was 33.5 MW. The average load reduction was 40.3 MW. The highest hourly load reduction was 41.5 MW during hour one. The realization rate for this event was 120 percent.

The third event was called on Thursday, July 28. Participants were notified at 2 p.m. for a four hour event from 4-8 p.m. The total nomination for this event was 33.9 MW. The

average load reduction was 27 MW. The highest hourly load reduction was 27.7 MW during hour one. The realization rate for this event was 80 percent. The lower realization rate for this event was primarily due to some larger sites that underperformed or reduced participation as a result of having two events in one week.

Participation

Idaho Power utilized direct customer mailings to encourage both past participants and new customers to enroll in 2016. Idaho Power launched a marketing campaign early in 2016 using Customer Representatives to recruit new participants. The Company also developed new Program literature, as well as a new Program brochure. Potential commercial and industrial participants were identified early winter with field visits from Idaho Power Customer Representatives and had a follow up communication in early spring. This marketing campaign focused on identifying customer characteristics that make for successful Program participants and also highlighted available incentive amounts based on customers load size.

The Program was jointly marketed along with Idaho Power's energy efficiency programs. In addition, the marketing campaign goals were to increase the number and size diversity (in terms of nominated load reduction) of sites enrolled. By having a larger diversity of customer sizes enrolled, the Program should be less prone to volatility in its realization rate. The Company utilized Customer Representative support for the sites with the largest nominated load reduction with the goal of ensuring all large sites were able to participate when load reduction events were called. The Company also used several advertisements in the *Energy at Work* spring edition of Idaho Power's quarterly newsletter and included an article promoting the Program in its commercial and industrial newsletter, *Energy Insights*.

Idaho Power implemented an educational campaign with both currently enrolled participants and potential new participants to inform them of DR strategies with the goal of refining the amount of nominated load reduction from each site to more realistically align with load reduction potential.

The number of sites enrolled in the Program for 2016 was 137. Of those 137 sites, 67 were newly enrolled during the 2016 season. The total number of sites enrolled in 2016 increased by approximately 90 percent compared to 2015. During the 2016 Program season, there was no attrition from enrolled participants. The Company did not identify any issues related to meeting requests to participate in the Program in 2016 and Idaho Power processed and accepted all customer applications for the 2016 season.

Figure 1 represents Idaho Power's service area divided into five regional areas: Western, Canyon, Capital, Southern, and Eastern.

Figure 1.

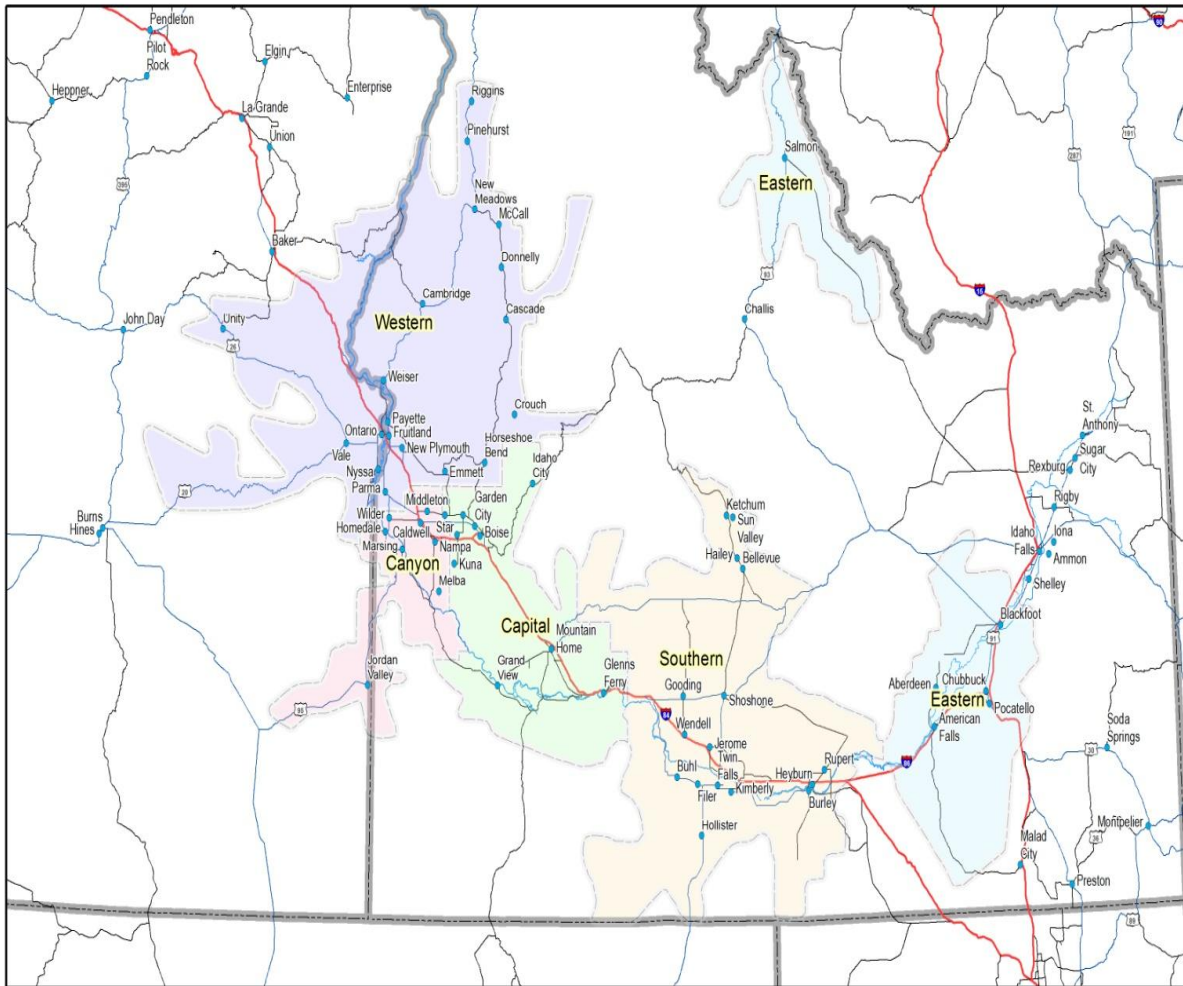


Figure 2 represents the 137 sites that were enrolled in 2016 and their distribution by Idaho Power’s regional service areas.

Figure 2.

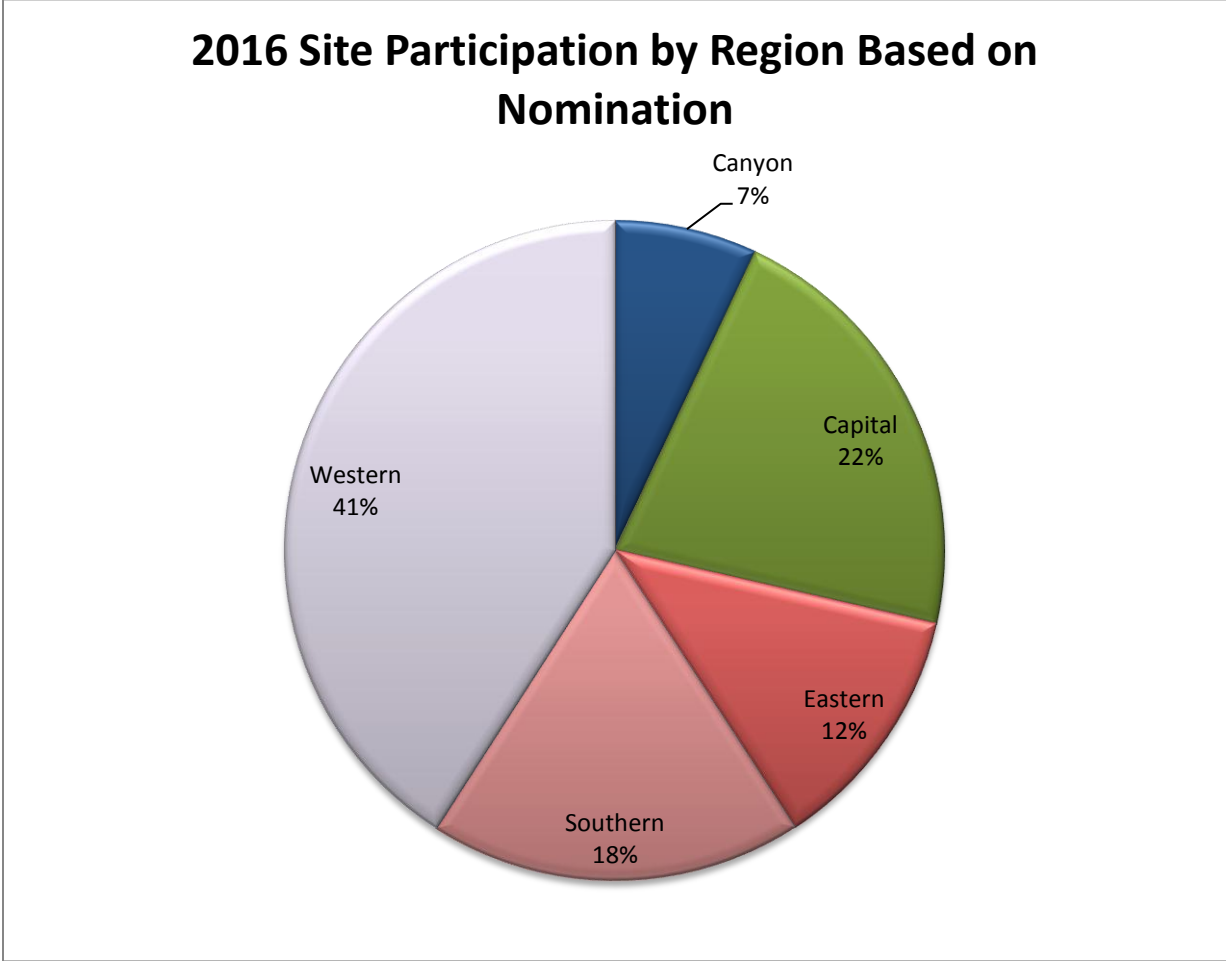
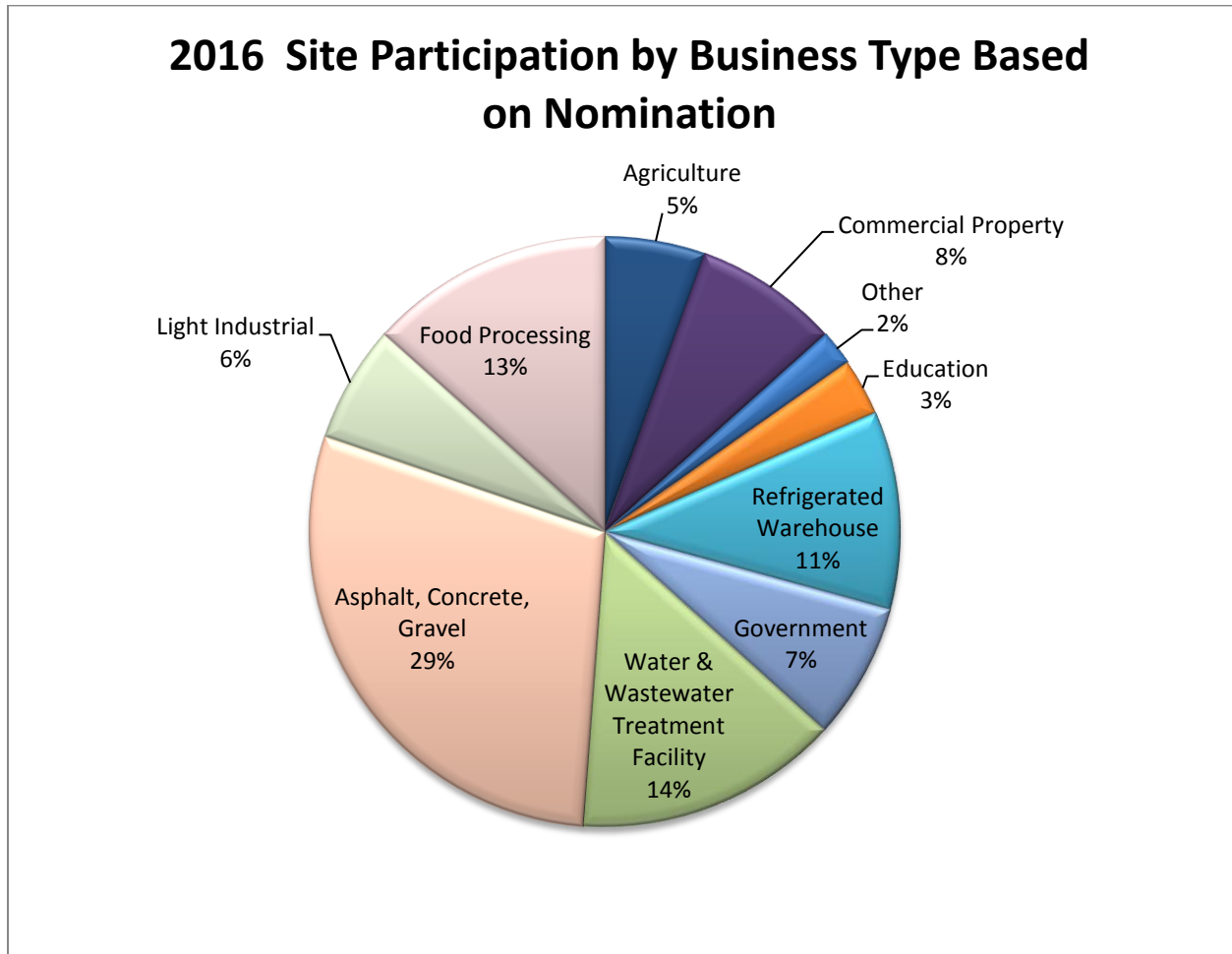


Figure 3 represents the 137 sites that were enrolled in 2016 and their diversity based on business type.

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. The data assisted participants in refining their nomination for future events. This data also provides information useful in determining which participating sites may have opportunity to provide more reduction or change their reduction strategy if nomination amounts were not achieved.

Load Reduction Analysis

Potential load reduction impacts in 2016 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 goal of the impact evaluation was to calculate load reduction in MW under Idaho Power's methodology used for the Program. The evaluation also analyzed and verified load reduction per site and per event.

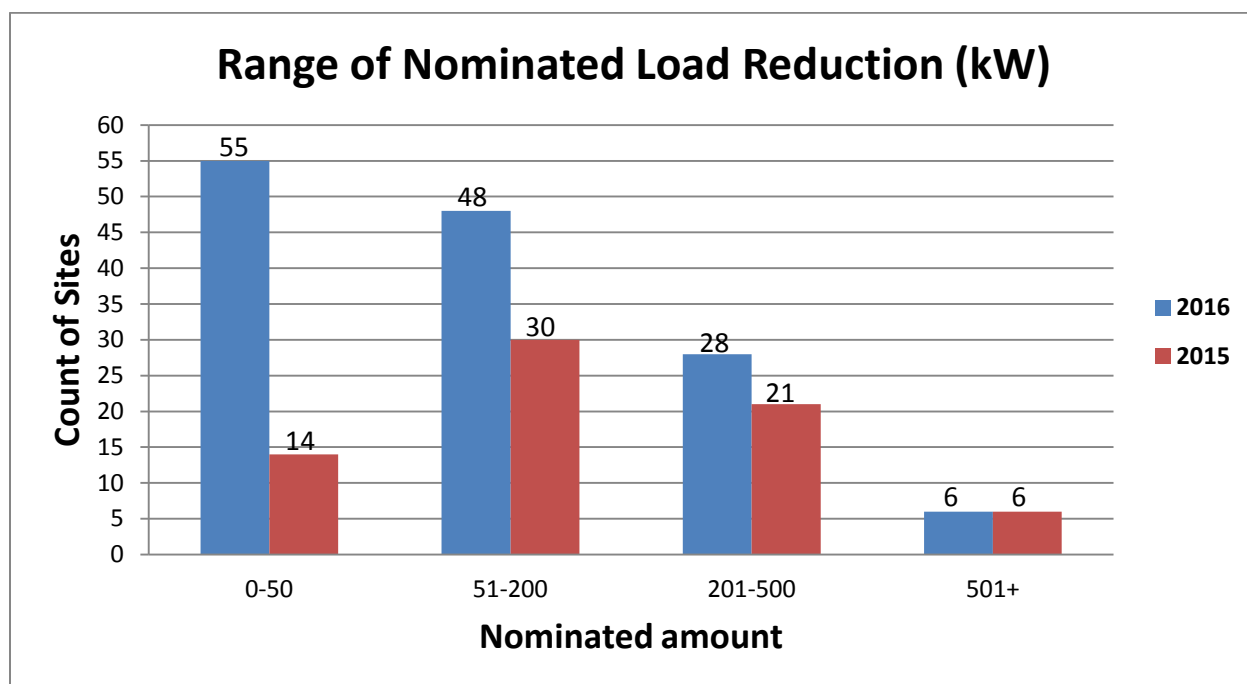
The baseline that load reductions are measured against during load reduction events is calculated using a 10-day period. The baseline is the average kW of the highest energy usage days during the event availability time (2-8 p.m.) from the highest three days out of the last 10 non-event weekdays. Individual 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 2-3 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 percent 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.

The average nominated kW per site was 247 kW, while the average load reduction was 244 kW per site. The 137 enrolled sites nominated an average of 33.8 MW across the three events and included 65 unique participants. The average number of sites enrolled per participant was 2.1. The Company does not expect or anticipate any changes to the baseline methodology for the upcoming season.

As Figure 4 below depicts, the most common nominated load reduction was in the 0-50 kW range, accounting for 40 percent of the sites. The 0-50 kW group accounted for 41 of the 67 new sites, which is 61 percent of the new site participation. These results indicate that expanding the Program availability to smaller customers has been successful.

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 2016 based on average load reduction per event.

Table 2.

Curtailment Event	Event Timeframe	Nominated Demand Reduction	Average Demand Reduction (MW)	Max Demand Reduction (MW)	Realization Rate*
June 30	4-8 pm	34.2	32.8	34.8	95.9%
July 26	4-8 pm	33.5	40.3	41.5	120.3%
July 28	4-8 pm	33.9	27.0	27.7	79.6%
Average		33.8	33.4	34.7	98.8%

* Based on average reduction

Figure 5 below shows both the average and peak demand reduction achieved during each of the three curtailment events. The maximum demand reduction achieved ranged from a low of 27.7 MW for the July 28 event to a high of 41.5 MW for the July 26 event. The July 28 event's 27.7 MW reduction achieved a realization rate of 79.6 percent, while the July 26 event's 41.5 MW reduction achieved a realization rate of 120 percent. When considered together, the three events had an average realization rate of 98.8 percent.

The realization rate analysis shows that maximum load reduction was achieved in the middle of the Program season during the second event.

Figure 5.

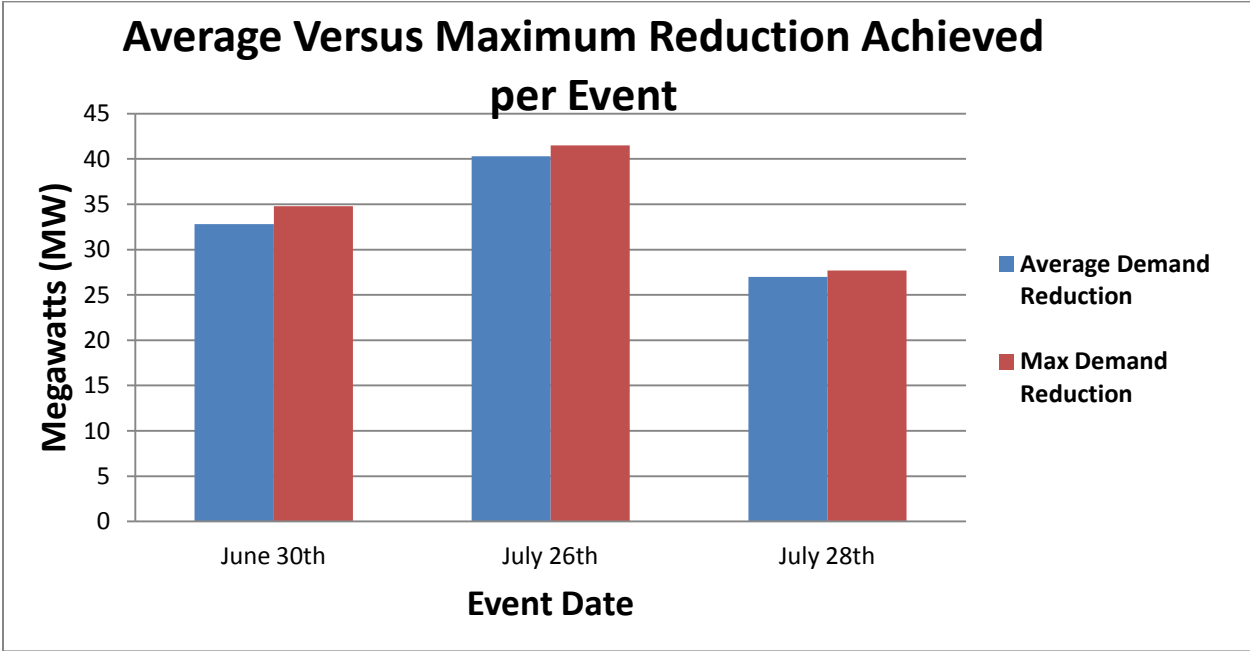


Table 3 shows the realization rate for each participant in the Program for 2016.

Table 3.

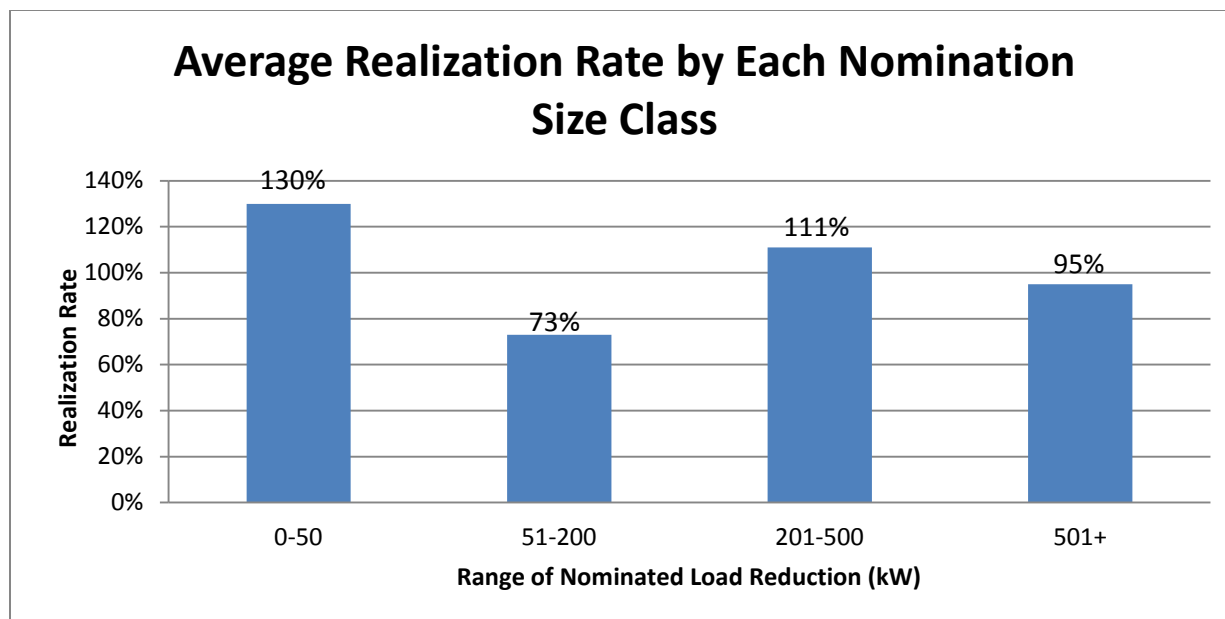
Participant Number	June 30 Event Realization	July 26 Event Realization	July 28 Event Realization	Season Average Realization
1	170%	149%	164%	161%
2	72%	77%	62%	70%
3	8%	64%	67%	46%
4	82%	86%	97%	88%
5	95%	27%	50%	57%
6	118%	100%	74%	97%
7	138%	431%	38%	202%
8	118%	124%	120%	121%
9	34%	92%	158%	95%
10	203%	216%	38%	152%
11	79%	176%	93%	116%
12	27%	0%	0%	9%
13	58%	65%	58%	60%
14	68%	87%	87%	81%
15	96%	71%	93%	87%
16	76%	71%	76%	75%
17	59%	5%	14%	26%
18	92%	47%	44%	61%
19	86%	73%	119%	93%
20	72%	153%	112%	112%
21	231%	153%	150%	178%
22	54%	149%	194%	132%
23	78%	98%	96%	91%
24	138%	93%	101%	111%
25	23%	6%	27%	19%
26	72%	64%	81%	72%
27	173%	212%	182%	189%
28	79%	3%	3%	28%
29	54%	66%	60%	60%
30	2%	60%	89%	50%
31	111%	139%	132%	127%
32	227%	264%	31%	174%
33	19%	228%	229%	158%
34	62%	221%	84%	122%
35	83%	195%	229%	169%
36	100%	107%	123%	110%

37	320%	1955%	195%	823%
38	196%	106%	25%	109%
39	13%	72%	87%	57%
40	83%	88%	100%	90%
41	70%	62%	68%	67%
42	32%	0%	10%	14%
43	224%	30%	170%	141%
44	81%	112%	213%	135%
45	131%	117%	24%	91%
46	25%	104%	99%	76%
47	20%	11%	32%	21%
48	0%	316%	22%	113%
49	320%	298%	420%	346%
50	99%	69%	66%	78%
51	0%	0%	0%	0%
52	91%	68%	51%	70%
53	106%	112%	104%	107%
54	106%	100%	85%	97%
55	25%	11%	2%	13%
56	108%	24%	47%	60%
57	42%	87%	10%	46%
58	72%	58%	68%	66%
59	103%	92%	87%	94%
60	66%	65%	63%	65%
61	174%	135%	192%	167%
62	113%	302%	60%	158%
63	96%	92%	60%	83%
64	133%	74%	88%	98%
65	52%	19%	73%	48%

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 130 percent. The 0-50 kW group had the largest portion of sites enrolled in the Program, totaling 55 sites that accounted for 40 percent of total enrolled sites. The second smallest size class, 51–200 kW, had 48 sites enrolled and achieved the lowest average realization rate at 73 percent. The 201-500 kW group had 28 sites enrolled and achieved a realization rate of 111 percent. The largest size class, 501+ kW, had six sites enrolled and achieved a realization rate of 95 percent. Idaho Power will continue to work with all customer segments to help refine nominations to align closer with realistic reduction opportunities which will increase the realization rate specific to this group.

Figure 6 below represents the realization rate achieved by each nomination group, averaged across all three events. To calculate the results, each site's average load reduction (across three events) was divided by its average nomination across the three events and then grouped by size.

Figure 6.



Program Costs

Program costs totaled \$744,955 through October 1, 2016. Incentive payments were the largest expenditure comprising 86 percent of total costs. The incentive payments were fixed-capacity payments resulting from the three events called during the 2016 Program season. The fixed capacity payments total was \$639,611 and the variable energy payments total was \$0. Variable energy payments were not made during the season because the variable energy payment is implemented starting with the fourth event. Total Program costs for 2016 were \$17.95 per kW based on the maximum demand reduction of 41.5 MW, or \$22.30 per kW, based on average load reduction for the season of 33.4 MW. Table 4 below displays the 2016 Program costs by category.

Table 4.

Item	2016 Program Costs
Materials & Equipment	\$951
Contract Services	\$19,836
Marketing & Administration	\$84,557
Incentive payments	\$639,611
Total	\$744,955

Benefit-Cost Analysis

The Benefit-Cost analysis for the Program is based on a 20-year model that uses financial and demand-side management alternate cost assumptions from the 2015 *Integrated Resource Plan* (“IRP”). As part of the public workshops in UM 1653,² Idaho Power and other stakeholders agreed in a settlement agreement (“Settlement Agreement”) on a new method for valuing DR. The Settlement Agreement, as approved in Commission Order No.13-482, defined the annual cost of operating Idaho Power’s 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 Agreement, to be \$18.5 million.

In 2016, the preliminary cost estimate of operating all three of Idaho Power’s DR programs was \$8.9 million through October 1, 2016. It is estimated that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately \$12.2 million, which is below the total annual costs agreed upon in the Settlement Agreement as revised by the 2015 IRP.

Idaho Power’s cost-effectiveness assessment for DR programs is updated annually. A more comprehensive cost-benefit analysis will be included in the Company’s 2017 Demand-Side Management Annual Report.

Idaho Power believes the purpose of DR is to minimize or delay the need to build new supply-side peaking generation resources and to reduce load during extreme system peaks. DR also serves as a balancing tool for the electric grid and helps with integration of intermittent generation resources. The benefits of having the Program available, and with each load reduction event, provide Idaho Power a supply-side resource to mitigate any system peak deficits.

The Company believes by calling at least three events per season the Program will be more effective in providing consistent and reliable reduction. Having a minimum of three events allows the Company to test processes and software, helps reinforce Program operating procedures for participating customers, and provides opportunity for participants to refine load reduction practices. The Company did not call more than three load reduction events during the 2016 Program season because Idaho Power’s generation resources were sufficient to satisfy system load.

The variable energy price for utilizing the Program after the third event is \$0.16 per kWh and could be considered the dispatch price for calling load reduction events beginning with the fourth event. The price of \$0.16 per kWh is typically higher than the energy market price. The Company believes the variable energy price is appropriate because

² *In the Matter of the Continuation of Idaho Power Company’s A/C Cool Credit, Irrigation Peak Rewards, and Flex Peak Demand Response Programs for 2014 and Beyond*

having a dispatch price below \$0.16 per kWh could cause the Company to call events more frequently, potentially resulting in reduced participant performance and event fatigue. The Company also believes that establishing a lower dispatch price to trigger more load reduction events could send the wrong signal regarding the purpose of the Program and DR.

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 and could be used to improve the Program in future years. Questions were based on a four point rating scale. Idaho Power received feedback from 34 of the 64 (excluding Idaho Power) participants enrolled for a response rate of 53 percent. The results of the survey were favorable and participants were satisfied, as shown below:

- When asked, how satisfied were you with the enrollment process, 4 being “very satisfied,” the average response was 3.8.
- When asked, how satisfied were you with the notification process, 4 being “very satisfied,” the average response was 3.4.
- When asked, how satisfied were you with the program support from Idaho Power, 4 being “very satisfied,” the average response was 3.6.
- When asked, how satisfied were you with the post event performance data, 4 being “very satisfied,” the average response was 3.4.
- When asked, how satisfied were you with the timeliness of receiving the incentive payment, 4 being “very satisfied,” the average response was 3.6.
- When asked, how satisfied were you with the incentive amount, 4 being “very satisfied,” the average response was 3.5.
- When asked, how satisfied were you with the ability to reduce demand in your facility during scheduled events, 4 being “very satisfied,” the average response was 3.4.
- When asked, overall how satisfied are you with Idaho Power’s Flex Peak Program, 4 being “very satisfied,” the average response was 3.8.
- When asked, how likely would you be to re-enroll in the Flex Peak Program in the future, 4 being “very likely,” the average response was 3.9.

Program Activities for 2017

The primary improvement Idaho Power and the Program might benefit from is a more streamlined process for re-enrollment of participants each year. The Company will explore opportunities to improve the re-enrollment process for participants. Recruitment efforts for the 2017 season will begin the first quarter of 2017 to encourage participation. Idaho Power will meet with existing participants during the off-season to discuss past-season performance and upcoming season details.

Similar to 2016, the Program will be jointly marketed along with Idaho Power's applicable energy efficiency programs. The Company will utilize its Customer Representatives to retain the currently enrolled sites and encourage new sites to participate.

For the upcoming season, Idaho Power plans to focus on retaining current enrolled customers and enroll new customers that show interest and are a good fit for the Program. However, the Company does not plan to actively market the program like it did in 2016 because the capacity from this past season remained around 35 MW, which is in line with the desired Program capacity set forth in the Settlement agreement.

Conclusion

The Program is successful in achieving DR load reduction at a lower cost to customers when compared to the former commercial and industrial DR program. When analyzing the Program at the generation level, industrial and commercial customers have made noteworthy contributions to Idaho Power's DR programs. The Program currently contributes approximately 10-12 percent of the Company's overall DR portfolio and can be relied on to provide dispatchable load reduction to the electrical grid. The Program had a total of 137 sites reducing peak demand by 41.5 MW with 67 new sites enrolling in 2016. The Program retained 97 percent of past enrolled sites (70 of 72) from the 2015 season. Load reduction event results showed maximum load reductions of 34.8, 41.5, and 27.7 MW, respectively, for the three events, and an average of 34.7 MW. The events achieved realization rates of 96 percent, 120 percent, and 80 percent, respectively, averaging 98.8 percent. The total Program costs for 2016 through October 1 were \$744,955. The cost of having this resource available was \$22.30 per kW based on average reduction for the season. The Program continues to enjoy high customer satisfaction results among participants with average survey responses at 3.6 on a scale of 1 to 4.



Flex Peak Demand Response Program 2016 Impact Evaluation

October 2016

PREPARED BY CLEARresult

PREPARED FOR Idaho Power Company

REPORTING PERIOD June 15th – August 15th, 2016

CLEAResult

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Executive Summary

Idaho Power Company contracted CLEAResult to complete an impact evaluation of the 2016 Flex Peak Program, a voluntary demand response (DR) program that has been available to Idaho Power's commercial and industrial customers. 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 26th (4-8pm), and July 28th (4-8pm), 2016. The results of the curtailment event analyses showed maximum demand reductions of 31.7, 37.8, and 25.3 MW, respectively, for the three events, and an average of 30.4 MW at the meter level. The events achieved realization rates of 96.0%, 120.8%, and 79.5%, respectively, averaging 98.8%.

The results of the impact evaluation show that Idaho Power's 2016 Flex Peak Program functioned as intended and provided up to 37.8 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, text message 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 2016 Flex Peak Program. This 2016 impact evaluation has two primary goals:

1. Determine and verify the demand reduction (MW) during 2016 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. Throughout this report the event reduction is calculated using

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customers metering data. (meter-level). Actual reductions seen by the Idaho Power system would be larger if distribution/transmission line losses of 9.76% were included.

Data Sources

CLEAResult conducted the 2016 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.

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, and two occurrences were found in the second event, which lead to those sites being excluded from the analysis.

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.

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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. Note that to maintain consistency with the program's methodology for calculating demand reduction estimates, participants' hourly demand reduction estimates that resulted in net load increases were zeroed out. 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 2016 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, unless otherwise indicated.

Participant Characterization

The 2016 Flex Peak Program included 137 enrolled sites, accounting for an average of 30.8 nominated MW across the three events. The 137 sites were accounted for by 65 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 30 th	31.1	137	137	100%
July 26 th	30.5	137	135	98.5%
July 28 th	30.9	137	137	100%
Average	30.8	137	136	100%

When site's nominated kW was averaged across the three events, the average nominated load reduction was 220 kW, while the median reduction was 90 kW.

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Curtailment Event Results

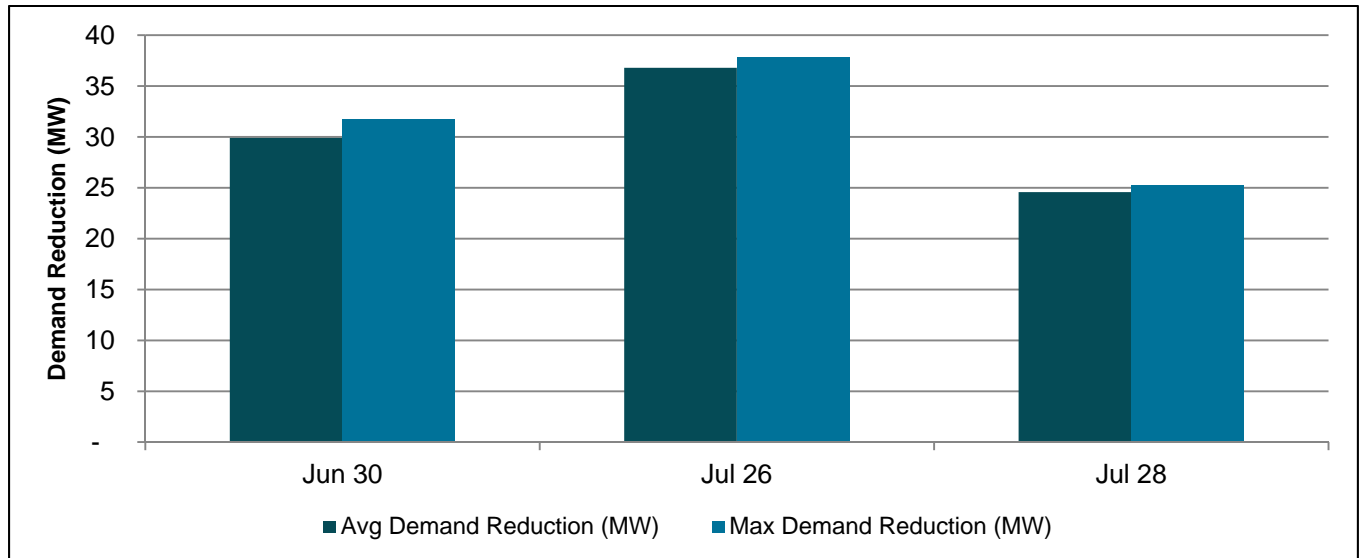
Table 3 and Figure 2 below summarize the estimated demand reduction achieved during each of the three curtailment events and the resulting realization rate. The maximum demand reduction achieved ranged from a low of 25.3 MW for the July 28th event to a high of 37.8 MW for the July 26th event. When considered together, the three events had an average realization rate of 98.8%.

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 30 th	4-8pm	31.1	29.9	31.7	96.0%
July 26 th	4-8pm	30.5	36.8	37.8	120.8%
July 28 th	4-8pm	30.9	24.6	25.3	79.5%
Average		30.8	30.4	31.6	98.8%

* Based on average reduction

Figure 1. Summary of Demand Reduction (MW)



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June 30th Curtailment Event

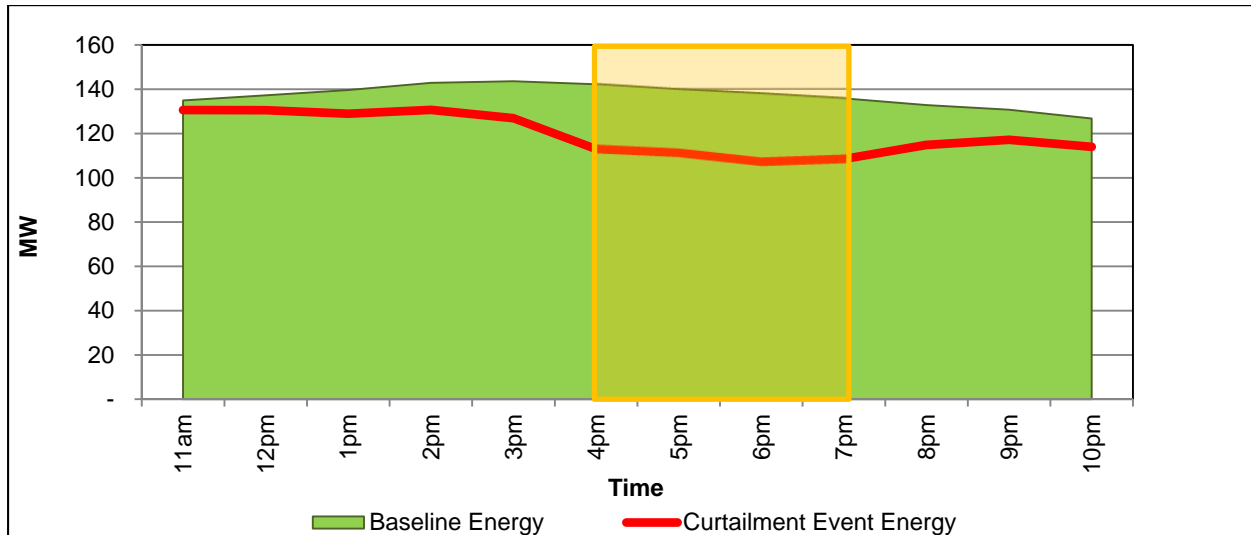
Table 4 below breaks out demand reduction for each hour of the curtailment event. The hour between 6pm and 7pm experienced the largest total reduction (31.7 MW).

Table 4: June 30th Curtailment Event Results by Hour (MW)

Curtailment Event Date	4-5pm	5-6pm	6-7pm	7-8pm	Avg. Reduction	Max. Reduction
June 30 th	29.7	29.6	31.7	28.5	29.9	31.7

Figure 2 below presents the load profile of the June 30th curtailment event and its baseline, graphically depicting the results from Table 4 above.

Figure 2. 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. The DOA's +/-20% cap results in the baseline energy not intersecting with the curtailment event energy during the period the DOA is calculated.

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July 26th Curtailment Event

The second Flex Peak event was called in the last week of July. The July 26th event achieved the highest demand reduction results out of the three events.

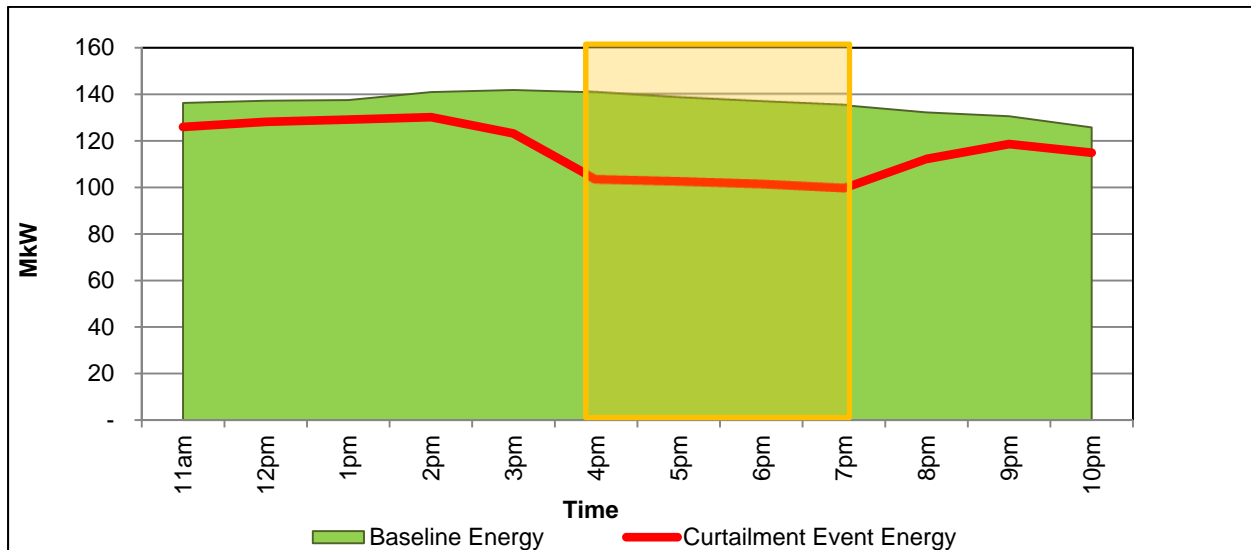
Table 5 below breaks out demand reduction for each hour of the curtailment event. The hour between 4pm and 5pm experienced the largest total reduction (37.8 MW).

Table 5: July 26th Curtailment Event: Baseline Results by Hour (MW)

Curtailment Event Date	4-5pm	5-6pm	6-7pm	7-8pm	Avg. Reduction	Max. Reduction
July 26 th	37.8	36.8	36.3	36.3	36.8	37.8

Figure 3 below presents the load profile of the July 26th curtailment event and its baseline, graphically depicting the results from Table 5 above.

Figure 3. July 26th 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. The DOA's +/-20% cap results in the baseline energy not intersecting with the curtailment event energy during the period the DOA is calculated.

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July 28th Curtailment Event

The third Flex Peak event was called two days after the second event. The July 28th event saw the lowest demand reduction out of the three events.

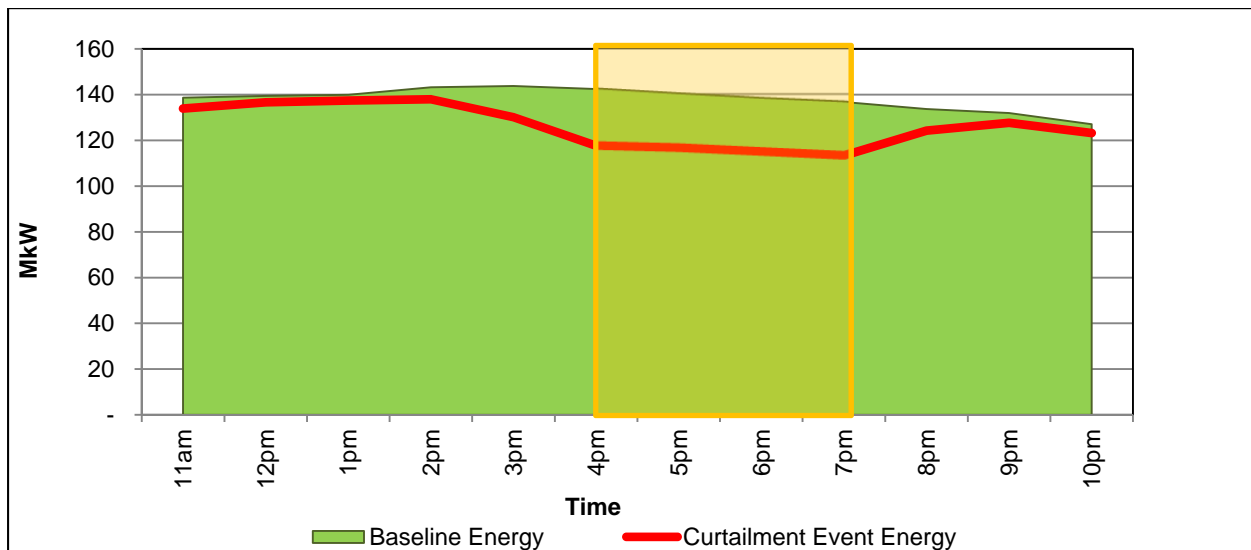
Table 6 below breaks out demand reduction for each hour of the curtailment event. The hour between 4pm and 5pm experienced the largest total reduction (25.3 MW).

Table 6: July 28th Curtailment Event Results by Hour (MW)

Curtailment Event Date	4-5pm	5-6pm	6-7pm	7-8 pm	Avg. Reduction	Max. Reduction
July 28 th	25.3	24.3	24.3	24.5	24.6	25.3

Figure 4 below presents the load profile of the July 28th curtailment event and its baseline, graphically depicting the results from Table 6 above.

Figure 4. July 28th 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. The DOA's +/-20% cap results in the baseline energy not intersecting with the curtailment event energy during the period the DOA is calculated.

When considering the relatively poor performance of the July 28th event compared to the other two events, the reduced realization rate can be attributed to 22 low performing sites (realization rate <10%) and a lack of performance by the site with the largest nominated load reduction in the program. Had the realization rates for these underperforming sites been 100%, the event's realization rate would've increased by 14.9% to 94.4%.

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Conclusions

The goals of the 2016 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 26th (4 – 8pm), and July 28th (4 – 8pm). The events had an average of 136 unique sites, with an average load reduction of 30.4 MW across the three events. The results of the analyses showed maximum demand reductions of 31.8, 37.8, and 25.3 MW, respectively, for the three events, and an average of 31.6 MW. The events achieved realization rates of 96.0%, 120.8%, and 79.5%, respectively, averaging 98.8%.

The results of the impact evaluation show that Idaho Power's 2016 Flex Peak Program functioned as intended and provided up to 38 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.