PACIFIC POWER.
A DIVISION OF PACIFICORP

825 NE Multnomah Street, Suite 2000
Portland, Oregon 97232

October 21, 2022

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street SE, Suite 100
Salem, OR 97301-3398

Re: UM 1857—PacifiCorp's Compliance Filing – Energy Storage Pilot and Evaluation Plan Update

PacifiCorp d/b/a Pacific Power (PacifiCorp or the Company) submits for filing in compliance with Public Utility Commission of Oregon (Commission) Order No. 18-327, and modified by Order Nos. 19-242 and 19-333, updated estimated benefits and costs associated with the Company's energy storage pilot programs. Confidential information in this filing is provided in accordance with General Protective Order No. 17-274.

Pilot Project 1—Energy Storage Solution

On April 2, 2018, PacifiCorp selected for Commission approval in this docket the two megawatt/six megawatt-hour (MWh) base case energy storage solution as the preliminary sizing for the proposal, as described in Section 4.0 of the Final Oregon Energy Storage Project Proposal document (Pilot Project 1). This sizing met the minimum threshold of five MWh as set forth by House Bill 2193, accommodates the historic outage characterization on the feeder, and presented the lowest risk option given the information available to PacifiCorp at the time. PacifiCorp now provides an additional update on the current status of this project.

The Company originally planned to construct this project on land near the Hillview Substation in Corvallis, Oregon. After an exhaustive search of available property with willing property owners, it was determined that the only viable land would result in the removal of at least one residence and displacement of the occupant. Following consultation with Commission staff, PacifiCorp restarted the search for available property looking at other locations both in Corvallis and across PacifiCorp's Oregon service territory. One location that is fed from the Lakeport Substation located in Klamath Falls, was identified as a good candidate that allows for all of the high-level use cases. The Company engaged in negotiations for the use of a portion of a vacant parcel of land on which the Company intends to acquire a termed exclusive easement. The property has been secured through an option to execute an exclusive easement with the property owner in Klamath Falls and which will be executed in parallel with the release of the final engineering designs in Q4 2022.

The Owner's engineering is being provided by an external engineering firm and was procured through competitive bid and awarded at the end of 2018. The Owner's Engineer was selected based on lowest bid. The winning bid was for **[Begin Confidential]** [redacted] **[End Confidential]**. This cost is in addition to the internal engineering reviews and project management. The combined costs were originally estimated to be approximately $60,000; however, based on current estimates and awarded contracts, this portion of the project is now estimated to be $255,000. The Owner's Engineers have completed the conceptual design, interconnection application, and permitting review.

The engineering, procurement, and construction (EPC) request for proposals issued in 2019 did not receive any qualified bid responses. As a result the EPC contract has been split into three contracts. The Engineering contract was awarded in December of 2019 for **[Begin Confidential]** [redacted] **[End Confidential]**, which was in line with the updated total project estimates. The equipment vendor has been selected and the agreement executed in 2020 for approximately **[Begin Confidential]** [redacted] **[End Confidential]**. The Construction contract will be competitively bid in Q4 of 2022 once design is complete and the generation interconnection approval is granted. Based on the Q4 2022 construction bid, physical construction of the facility is expected to occur starting in December 2022 through March 2023. The project is planned to go into service by mid-2023.

This project is subject to the generation interconnection process. This review and acceptance process requires the project to apply for a position in the interconnection queue once property rights have been obtained. The Company submitted this project for generation interconnection review in 2020 and it was placed in the spring 2021 queue. Project approval and construction is expected to start in fall 2022 for commercial operation in spring 2023.

Finally, the cost of interconnecting the battery system to the distribution system was originally estimated at $550,000, but is now estimated at $805,000 based on the current design. **[Begin Confidential]** [redacted] **[End Confidential]**.[1]

<u>Pilot Project 2—Community Resiliency Pilot</u>

In the stipulation filed in docket UM 1857 by PacifiCorp on July 18, 2018, and adopted by the Commission in Order No. 18-327 (September 4, 2018), PacifiCorp committed to developing a Community Resiliency Pilot (Pilot Project 2) to provide technical and financial assistance to study and deploy energy storage resources to facilities critical to emergency response or disaster

[1] PacifiCorp's 2019 IRP is available online at the following link: https://www.pacificorp.com/energy/integrated-resource-plan.html.

recovery. The stipulation laid out a phased approach for Pilot Project 2, beginning with a consultant-led technical assistance concept resulting in a limited number of initial studies (Phase I), followed by financial assistance for the installation of energy storage resources for up to four critical facilities (Phase II).

In Order No. 18-327, the Commission authorized PacifiCorp to recover up to $200,000 in Phase I of Pilot Project 2. Upon completion, PacifiCorp agreed to file a final Phase I report and a revised plan estimating the costs and identifying the anticipated benefits of expanding the Pilot Project 2 into Phase II.

On December 18, 2020, PacifiCorp filed its final Phase I report for the Pilot Project 2. That report contained several notable learnings:

1) Battery energy storage can reduce critical facility dependency on fuel deliveries and infrastructure corridors that provide relief services during disaster events, contributing to a more resilient back-up system than a standard back-up generator alone may provide.

2) There are limited funding opportunities to develop battery energy storage resources, and current rates do not incentivize energy storage. In the absence of an economic case to support battery energy storage adoption, the Pilot Project 2 suffered lower-than-expected participation and follow-through from initial conversations with many potential program participants.

3) Commercial facilities' adoption rates of battery energy storage systems in Oregon remain low, in part because the economics of battery energy storage are not competitive with the alternative fossil fuel back-up power options. Appropriately designed policy mechanisms—including incentives, grant funding programs, and beneficial tariff design—can encourage battery energy storage adoption and promote widespread resiliency benefits throughout Oregon.

4) As adoption of commercial-scale battery energy storage resources increases, PacifiCorp will need to develop its capabilities to effectively manage battery energy storage resources in order to harness the associated grid services benefits for its ratepayers.

Based on those learnings, PacifiCorp believed that an expanded community resiliency offering had the potential to offer an array of benefits to its critical facility customers and the communities they serve, its ratepayers, and the Oregon battery energy storage industry.

On August 26, 2021, Order No. 21-270 approved Phase II of PacifiCorp's Pilot Project 2. Outlined in the proposal were the intentions of the Company to provide up to 10 technical feasibility studies to leadership of critical facilities interested in learning more about how battery storage might increase resiliency at their site. Additionally, PacifiCorp was approved to make battery storage project development funding available during two competitive solicitation periods. Criteria would consider likelihood of project success, amount of funding requested, and diversity of project location and facility type. Applicants would be allowed to request grant funding of up to 100 percent of project cost. In exchange for grant funding, the customer would allow PacifiCorp to actively manage a portion of the battery system during normal facility operations. Approval of up to $200,000 was given for technical feasibility studies, as well as up to $1,300,000 for the funding of on-site battery storage systems.

The first of two grant application submission windows was opened on October 11, 2021. The window was scheduled to close on January 14, 2022, but the Energy Trust of Oregon, speaking on behalf of facilities working to complete applications, requested the window remain open for an additional month. With Commission Staff approval, the application submission window remained open until February 18, 2022.

PacifiCorp received one application for grant funding during this first window. That application request was later rescinded, as the applicant had later determined the need for reallotment of internal funding sources.

The second grant application submission window opened on August 1, 2022, and is set to close on October 28, 2022. At the time of this update, no grant applications have been submitted. PacifiCorp intends to review all submissions at the close of the window and notify applicants of award decisions by January 6, 2023.

Technical feasibility studies have been provided on a "rolling" basis, beginning at the commencement of the initial grant application submission window. To date, one study has been provided to a customer and three additional studies are in progress. At least two other facility managers have expressed interest in studies but have not yet submitted interest forms.

Additional Items

Since Pilot Project 1 is not yet in service, the Company is unable to provide a "a narrative of EIM benefits that have been achieved," or a "quantitative evaluation of the costs and benefits of the ESS in Project #1 relative to all other ESSs operated by PacifiCorp, and a narrative discussion on whether any learnings from PacifiCorp's other storage projects can be applied in Oregon" at this time.

The Company filed its final annual Sustainable Transportation and Energy Plan Project Status Report (STEP Report) with the Utah Public Service Commission on April 29, 2022. A copy of the final STEP Report is included in this annual update as Attachment 2.

Please direct any informal correspondence and questions regarding this filing to Cathie Allen Regulatory Affairs Manager, at (503) 813-5934.

Sincerely,

Shelley McCoy

Shelley McCoy
Director, Regulation

Enclosures

CONFIDENTIAL

Attachment 1

REDACTED

Battery Cost Analysis Assumptions

CAPITAL UP FRONT

Cost Parameter/ Technology	Description/ What does this value include?	Source (where did I get this number?)	Project #1 Specific - LOW	Project #1 Specific - MID	Project #1 Specific - HIGH	Project #1 October 2019
Energy storage equipment cost ($/kWh)	DC battery system including - The costs of the energy storage medium (Li-Ion battery cells or flow battery electrolyte) - Asociated costs of assembling these components into a DC battery system	Cost update to the Battery Energy Storgae Study for the IRP, Appendix D of the Oregon Energy Storage Project Proposal	$553,500	$922,500	$1,291,500	[redacted]
Balance of system ($/kW)	Balance of Systen Costs include - Power conversion equipment (inverter, packaging, container, and controls) - The control system - Other supporting equipment, such as thermal management, wiring and interconnection equipment, and protection of various components	Cost update to the Battery Energy Storgae Study for the IRP, Appendix D of the Oregon Energy Storage Project Proposal	$514,720	$619,280	$723,840	[redacted]
EPC Cost ($/kWh)	All direct costs for development and project management, and costs associated with a fixed price, turn-key, EPC contract	Cost update to the Battery Energy Storgae Study for the IRP, Appendix D of the Oregon Energy Storage Project Proposal	$900,000	$1,350,000	$1,800,000	[redacted]

UP FRONT SUBTOTAL	$1,968,220	$2,891,780	$3,815,340	$3,147,638
$/kW equivalent	$984	$1,446	$1,908	$1,574
$/W equivalent	$0.98	$1.45	$1.91	$1.57

OWNER's COSTS

Sales tax ($)	State & local sales tax	https //www.taxrates.com/state-rates/oregon/	$0	$0	$0	$0
Interconnection application ($)	Interconnection studies costs owed to the transmission provider	http //www.pacificorp.com/tran/ts/gip/qf/oregon.html	$3,300	$7,300	$11,300	[redacted]
Interconnection (upgrades) ($)	Laydown area improvements and addition of distribution equipment	Grandview Energy Storage Detailed Integration Estimate	$446,000	$549,000	$652,000	[redacted]
Communications upgrade ($)	Portland Service Center and a Local Service Center comms modifications	Grandview Energy Storage Detailed Integration Estimate	$17,000	$17,000	$17,000	$17,000
Owner's project management ($)	Owner's direct engineering & project management	Grandview Energy Storage Detailed Integration Estimate	$54,000	$57,000	$60,000	[redacted]
AFUDC ($)	7%	RMP Capital Reporting	$174,196	$246,546	$318,895	$287,142
Cap surcharge ($)	7 - 12%	RMP Capital Reporting	$186,390	$358,019	$584,944	$416,971

OWNER's COST SUBTOTAL	$880,887	$1,234,865	$1,644,139	$1,658,498
$/kW equivalent	$440	$617	$822	$829
$/W equivalent	$0.44	$0.62	$0.82	$0.83
CAPITAL TOTAL	$2,849,107	$4,126,645	$5,459,479	$4,806,136
$/kW equivalent	$1,425	$2,063	$2,730	$2,403
$/W equivalent	**$1.42**	**$2.06**	**$2.73**	**$2.40**

O&M SUMMARY

Cost Parameter/ Technology	Description/ What does this value include?	Source (where did I get this number?)	Project #1 Specific - LOW	Project #1 Specific - MID	Project #1 Specific - HIGH	Project #1 Specific - High Confidence
Fixed O&M cost ($/kW-yr)	Maintenance of HVAC system, tightening of mechanical and electrical connections, cabinet touch up painting and cleaning, and landscaping maintenance, power stack and pump replacements, tightening of plumbing fixtures, tightening of mechanical and electrical connections, as well as semi-annual chemistry refresh and full discharge cycles to refresh capacity. **Does not include capacity maintenance or augmentation.**	Cost update to the Battery Energy Storgae Study for the IRP, Appendix D of the Oregon Energy Storage Project Proposal	$12,000	$17,000	$22,000	$17,000
Addition Inspection O&M ($/yr)	Monthly inspection	Range of values for Current Transmission and Distribution Substation Inspection Costs in the Albany District	$2,280	$2,778	$3,276	$2,778.00
Land Lease Costs ($/yr)			$3,525	$6,010.00	$9,018	$0.00

O&M $/yr Equivalent	$17,805	$25,788	$34,294	$19,778
O&M $/kW-year	**$9**	**$13**	**$17**	**$9.89**
Equivalent O&M $/kW	$89.03	$128.94	$171.47	$98.89
Equivalent O&M $/Watt	$0.09	$0.13	$0.17	$0.10
TOTAL $/Watt Equivalent	**$1.51**	**$2.19**	**$2.90**	**$2.50**

Attachment 2

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

1407 W North Temple, Suite 330
Salt Lake City, Utah 84114

April 29, 2022

VIA ELECTRONIC FILING

Utah Public Service Commission
Heber M. Wells Building, 4th Floor
160 East 300 South
Salt Lake City, UT 84114

Attention: Gary Widerburg
Commission Administrator

RE: **Docket No. 22-035-13 - Rocky Mountain Power's Fifth Annual Sustainable Transportation and Energy Plan Act ("STEP") Program Status Report**

In accordance with Docket No. 16-035-36, Rocky Mountain Power (the "Company") hereby submits for filing its fifth and final Annual Sustainable Transportation and Energy Plan Act ("STEP") Program Status Report ("STEP Report"). The STEP Report contains the overall calendar year 2021 monthly accounting detail for the STEP program as well as information on the individual STEP programs, using the reporting template that was approved in a letter from the Utah Public Service Commission ("the Commission") dated October 12, 2017 ("Reporting Template").

Per Utah Code 54-20-102(2), calendar year 2021 was the final year of the five year pilot program period. The Company reports that all STEP projects have been completed, pending a few final program activities such as final invoice payment and other close out activities. Final project reports that were not previously provided in prior annual STEP reports are also included with this filing for the individual STEP projects as applicable.

The Company intends to convene one or more stakeholder input meetings to discuss the final close out of the STEP pilot program. Topics anticipated to be discussed, at a minimum, include:

- Identification of STEP projects with final invoicing and payment activity in calendar year 2022;
- Appropriate use of surplus STEP funds and Utah Solar Incentive Program ("USIP") funds;
- Treatment of any ongoing costs associated with STEP projects;
- Timing of tariff filings for tariffs that are specific to STEP projects (such as Electric Service Regulation No. 13 – Commercial Line Extension Pilot Program); and,
- Any regulatory filings necessary to implement and inform the Commission of the final close out plans discussed.

The Company respectfully requests the Commission issue a public notice at its earliest convenience of the Company's intent for this stakeholder input meeting with instructions to contact Jana Saba via email at jana.saba@pacificorp.com by June 15, 2022, so that the Company may identify and include all parties who are interested in participating.

Informal inquiries regarding this report may be directed to Jana Saba at (801) 220-2823.

Sincerely,

Joelle Steward
Senior Vice President, Regulation & Customer and Community Solutions

CERTIFICATE OF SERVICE

Docket No. 22-035-13

I hereby certify that on April 29, 2022, a true and correct copy of the foregoing was served by electronic mail to the following:

Utah Office of Consumer Services

Michele Beck	mbeck@utah.gov
ocs@utah.gov	

Division of Public Utilities

dpudatarequest@utah.gov

Assistant Attorney General

Patricia Schmid	pschmid@agutah.gov
Justin Jetter	jjetter@agutah.gov
Robert Moore	rmoore@agutah.gov

Rocky Mountain Power

Data Request Response Center	datarequest@pacificorp.com
Jana Saba	jana.saba@pacificorp.com utahdockets@pacificorp.com
Emily Wegener	emily.wegener@pacificorp.com

Mary Penfield
Adviser, Regulatory Operations

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

STEP PROGRAM STATUS REPORT

For Period Ended
December 31, 2021

FIFTH ANNUAL STEP STATUS REPORT
CALENDAR YEAR 2021
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Overall STEP Program Information:

STEP Project Reports:

Utah Solar Incentive Program:

2022 Annual STEP Status Report
STEP and USIP Accounting
CY 2021

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Page No.		**CY 2017**	**CY 2018**	**CY 2019**	**CY 2020**	**Jan-21**	**Feb-21**	**Mar-21**	**Apr-21**	**May-21**	**Jun-21**	**Jul-21**	**Aug-21**	**Sep-21**	**Oct-21**	**Nov-21**	**Dec-21**	**CY 2021 Total**	**2017-2021 Cummulative Total***
	STEP Account Beginning Balance	(15,850,031)	(19,861,068)	(23,946,249)	(21,486,154)	(19,443,913)	(19,766,148)	(20,356,139)	(20,246,778)	(20,057,218)	(19,940,969)	(19,904,858)	(19,171,619)	(18,785,071)	(17,128,886)	(15,030,673)	(14,779,912)	(19,443,913)	(15,850,031)
	Spending by Project:																		
2.0	EV Charge Infrastructure	487,502	1,881,703	1,824,139	2,505,456	144,823	41,339	164,083	42,630	48,753	246,830	117,974	83,319	110,889	233,391	121,535	1,086,881	2,442,447	9,141,247
3.0	Woody-waste Co-Fire Biomass at Hunter Unit 3	-	262,837	588,943	79,307	-	-	-	-	-	-	3,411	8,533	97,821	7,600	-	156,929	274,294	1,205,381
4.0	NOx Neural Network Implementation	457,767	207,616	231,621	14,527	-	-	-	-	-	32,000	-	-	-	-	-	-	32,000	943,531
5.0	Alternative NOx Reduction	131,405	26,010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157,415
6.0	CO2 Enhanced Coal Bed Methane (CO2 Reduction)	-	73,041	42,133	64,696	19,250	0	5,500	0	(0)	23,375	12,375	13,750	-	-	-	-	74,250	254,120
7.0	Cryogenic Carbon Capture (Emerging CO2 Capture)	160,451	530,289	711,750	192,809	-	-	-	(970)	-	-	-	-	-	-	-	-	(970)	1,594,329
8.0	CARBONsafe (CO2 Sequestration Site Characterization)	150,239	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	150,239
9.0	Solar Thermal Assessment (Grid Performance)	-	-	83,057	103,781	76	302	13,500	217	-	(49)	-	-	-	-	-	-	14,046	200,884
10.0	Circuit Performance Meters (Substation Metering)	13,676	427,349	451,777	118,262	-	241	-	-	-	-	-	-	-	-	-	-	241	1,011,305
11.0	Commercial Line Extension	-	69,340	81,743	110,645	12,014		-	-	55,063	-	-	16,035	-	56,756	-	-	139,868	401,596
12.0	Gadsby Emissions Curtailment	-	-	7,067	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,067
13.0	Panguitch Solar and Energy Storage Project	331,995	75,474	6,373,549	182,138	1,658	-	-	-	-	-	-	-	-	-	-	-	1,658	6,964,814
14.0	Microgrid Project	-	90,713	77,717	28,393	-	-	-	-	-	-	-	-	-	-	-	55	55	196,877
15.0	Smart Inverter Project	-	383,859	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	383,859
16.0	Battery Demand Response	-	-	4,270	1,731,293	204,318	(115,768)	244,411	42,234	(34,992)	153,128	17,175	3,304	22,568	3,460	6,726	506,854	1,053,418	2,788,981
17.0	Intermodal Hub	-	-	802,510	890,953	-	-	-	-	-	-	-	-	-	-	-	215,320	215,320	1,908,784
18.0	Advance Resiliency Management System	-	-	39,931	2,874,624	313,300	323,357	384,533	691,301	806,839	611,333	1,858,704	1,518,610	2,282,136	2,666,329	590,452	1,445,970	13,492,864	16,407,420
19.0	Utah Solar Incentive Program	4,762,182	3,486,811	2,173,740	1,589,659	51,447	-	109,873	169,740	14,049	15,617	67,241	54,369	260,251	-	282,406	-	1,024,994	13,037,386
20.0	Uinta Basin Study	-	-	-	-	-	-	-	-	-	-	-	-	-	26,132	44,283	35,655	106,070	106,070
	Total Spending	6,495,218	7,515,042	13,493,946	10,486,543	746,886	249,471	921,900	945,152	889,712	1,082,234	2,076,880	1,697,920	2,773,666	2,993,668	1,045,401	3,447,664	18,870,554	56,861,303
	Surcharge Collections	(9,756,984)	(10,725,962)	(10,007,474)	(7,601,627)	(998,246)	(781,603)	(739,511)	(711,840)	(722,671)	(995,724)	(1,294,207)	(1,263,353)	(1,072,048)	(854,739)	(756,805)	(838,260)	(11,029,007)	(49,121,055)
	Ending Monthly Balance before Carrying Charge	(19,111,798)	(23,071,989)	(20,459,778)	(18,601,238)	(19,695,273)	(20,298,280)	(20,173,750)	(20,013,466)	(19,890,177)	(19,854,459)	(19,122,185)	(18,737,053)	(17,083,452)	(14,989,957)	(14,742,078)	(12,170,508)	(11,602,366)	(8,109,783)
	Carrying Charge	(749,270)	(874,261)	(1,026,377)	(842,675)	(70,874)	(57,860)	(73,028)	(43,752)	(50,792)	(50,399)	(49,434)	(48,018)	(45,433)	(40,717)	(37,834)	(34,361)	(602,503)	(4,095,085)
	Ending Monthly Balance	(19,861,068)	(23,946,249)	(21,486,154)	(19,443,913)	(19,766,148)	(20,356,139)	(20,246,778)	(20,057,218)	(19,940,969)	(19,904,858)	(19,171,619)	(18,785,071)	(17,128,886)	(15,030,673)	(14,779,912)	(12,204,869)	(12,204,869)	(12,204,868)

*the STEP Account Begninning Balance of ($15,850,031) is the begninng balance as of January 2017

2022 Annual STEP Status Report
STEP/DSM Assets/Liabilities
(Based on STEP Legislation)

CY 2017

	Program Expenditures	Accrued Program Expenditures	Amortization of Expense (over 10 years)	Unused DSM Revenue Collections	Carrying Charge (10.65%)	End Balance	Cash Basic Accumulated Balance
FY16	-	2,693,388	-	(7,097,889)		(4,404,501)	(7,097,889)
1	2,648,142	262,689	(11,010)	(5,596,470)	(76,126)	(7,177,276)	(10,133,354)
2	3,754,612	348,093	(37,611)	(5,851,627)	(99,406)	(9,063,215)	(12,367,385)
3	3,478,015	(117,206)	(67,973)	(4,670,909)	(115,356)	(10,556,644)	(13,743,608)
4	4,355,254	586,848	(100,399)	(4,668,416)	(123,810)	(10,507,168)	(14,280,980)
5	3,686,017	(291,172)	(134,079)	(4,563,595)	(131,233)	(11,941,231)	(15,423,870)
6	3,848,077	669,594	(164,408)	(5,989,272)	(147,118)	(13,724,357)	(17,876,590)
7	3,924,229	1,047,010	(197,648)	(7,728,712)	(176,414)	(16,855,892)	(22,055,136)
8	4,036,553	(195,749)	(231,059)	(4,577,217)	(199,164)	(18,022,529)	(23,026,024)
9	2,972,860	924,940	(260,144)	269,800	(191,121)	(14,306,194)	(20,234,629)
10	4,678,938	39,552	(292,027)	269,150	(158,921)	(9,769,503)	(15,737,489)
11	6,803,166	(694,191)	(339,869)	345,359	(109,457)	(3,764,495)	(9,038,290)
12	9,380,581	(1,204,040)	(407,301)	407,396	(38,588)	4,373,553	303,797
Estimate	-	-	-	4,322	(8,859)	4,369,016	299,260
Total	53,566,445	4,069,756	(2,243,529)	(49,448,082)	(1,566,714)		
			55,392,672 Total Asset		(51,014,796) Total Liabilities	4,377,875	

CY 2018

	Program Expenditures	Accrued Program Expenditures	Amortization of Expense (over 10 years)	Unused DSM Revenue Collections	Carrying Charge (9.21%)	End Balance	Cash Basic Accumulated Balance
FY17	-	4,069,756	-	299,260		4,369,016	299,260
1	3,568,395	522,546	(461,232)	(2,054,799)	6,335	5,950,261	1,357,959
2	3,374,756	(255,983)	(490,143)	(4,171,129)	5,485	4,413,248	76,929
3	4,020,585	(809,314)	(521,052)	(4,312,160)	(2,528)	2,788,779	(738,226)
4	3,506,710	(239,128)	(552,362)	(4,393,042)	(11,187)	1,099,771	(2,188,106)
5	3,627,311	581,878	(582,102)	(4,227,927)	(21,332)	477,599	(3,392,156)
6	4,220,629	699,578	(614,788)	(5,526,489)	(33,405)	(776,876)	(5,346,209)
7	5,022,885	384,297	(653,261)	(7,346,126)	(52,454)	(3,421,535)	(8,375,165)
8	4,164,510	868,008	(691,624)	(7,635,830)	(80,255)	(6,796,726)	(12,618,364)
9	2,671,925	454,900	(720,025)	(6,662,806)	(114,924)	(11,167,655)	(17,444,193)
10	4,757,938	(305,047)	(751,069)	(4,673,096)	(136,441)	(12,275,370)	(18,246,861)
11	6,769,886	(2,282,310)	(799,057)	(4,176,547)	(133,159)	(12,896,557)	(16,585,738)
12	5,518,134	134,805	(850,260)	(4,836,366)	(127,942)	(13,058,187)	(16,882,172)
Estimate	-	-	-		877	(13,057,310)	(16,881,295)
Total	51,223,665	3,823,986	(7,686,975)	(59,717,055)	(700,930)		
			47,360,676 Total Asset	-	(60,417,985) Total Liabilities	(13,057,310)	

CY 2019

	Program Expenditures	Accrued Program Expenditures	Amortization of Expense (over 10 years)	Unused DSM Revenue Collections	Carrying Charge (9.21%)	End Balance	Cash Basic Accumulated Balance
FY18	-	3,823,986	-	(16,881,295)		(13,057,310)	(16,881,295)
1	2,226,187	409,558	(882,851)	(4,647,371)	(142,243)	(16,094,030)	(20,327,574)
2	3,125,236	(851,191)	(905,431)	9,742,037	(110,111)	(5,093,489)	(8,475,842)
3	3,363,644	929,979	(932,571)	(3,986,014)	(71,019)	(5,789,470)	(10,101,802)
4	4,141,721	(298,685)	(963,923)	(3,566,324)	(79,022)	(6,555,703)	(10,569,350)
5	3,750,564	(389,337)	(996,702)	(3,546,409)	(84,161)	(7,821,747)	(11,446,057)
6	3,030,543	1,099,368	(1,025,077)	(4,533,002)	(97,548)	(9,347,465)	(14,071,142)
7	4,107,773	377,100	(1,055,307)	(5,916,482)	(118,987)	(11,953,367)	(17,054,144)
8	4,296,799	101,144	(1,090,082)	(6,793,244)	(144,654)	(15,583,403)	(20,785,325)
9	5,468,058	(705,972)	(1,130,583)	(6,211,505)	(166,719)	(18,330,125)	(22,826,074)
10	4,265,394	757,369	(1,171,487)	(3,787,195)	(177,851)	(18,443,895)	(23,697,214)
11	5,000,367	360,815	(1,209,461)	(3,584,184)	(181,083)	(18,057,442)	(23,671,575)
12	8,872,512	276,491	(1,267,099)	(4,176,107)	(168,519)	(14,520,163)	(20,410,787)
Estimate	-	-	-		9,874	(14,510,289)	(20,400,913)
Total	51,648,796	5,890,625	(12,630,573)	(57,887,094)	(1,532,043)		
			44,908,848 Total Asset	-	(59,419,137) Total Liabilities	(14,510,289)	

CY 2020

	Program Expenditures	Accrued Program Expenditures	Amortization of Expense (over 10 years)	Unused DSM Revenue Collections	Carrying Charge (9.21%)	End Balance	Cash Basic Accumulated Balance
FY19	-	5,890,625	-	(20,400,913)		(14,520,163)	(20,400,913)
1	5,050,648	(416,692)	(1,324,631)	(4,163,485)	(158,256)	(15,532,580)	(20,996,638)
2	3,830,604	(1,569,622)	(1,361,505)	17,305,963	(85,262)	2,587,598	(1,306,838)
3	3,302,574	187,720	(1,391,316)	(3,417,988)	(15,812)	1,252,775	(2,829,381)
4	5,425,669	(1,610,843)	(1,427,677)	(2,883,294)	(17,438)	739,193	(1,732,121)
5	3,598,514	(270,598)	(1,465,269)	(3,237,527)	(17,532)	(653,219)	(2,853,934)
6	4,440,689	878,389	(1,498,725)	(4,417,827)	(27,568)	(1,278,262)	(4,357,366)
7	3,151,498	363,235	(1,530,324)	(5,562,804)	(48,569)	(4,905,226)	(8,347,565)
8	4,700,877	1,155,026	(1,562,971)	(6,857,008)	(78,340)	(7,547,643)	(12,145,008)
9	9,597,929	(1,239,796)	(1,622,690)	(5,928,274)	(85,358)	(6,825,832)	(10,183,401)
10	5,435,204	749,559	(1,685,325)	(3,810,913)	(78,392)	(6,215,700)	(10,322,828)
11	5,955,573	361,160	(1,732,629)	(3,239,331)	(75,453)	(4,946,379)	(9,414,667)
12	9,600,549	573,155	(1,797,725)	(3,787,584)	(56,849)	(414,834)	(5,456,276)
Estimate	-	-	-		(1,233)	(416,067)	(5,457,509)
Total	64,090,327	5,051,317	(18,400,788)	(50,400,986)	(746,062)		
			50,740,855 Total Asset	-	(51,147,048) Total Liabilities	(406,193)	

CY 2021

	Program Expenditures	Accrued Program Expenditures	Amortization of Expense (over 10 years)	Unused DSM Revenue Collections	Carrying Charge (8.99%)	End Balance	Cash Basic Accumulated Balance
FY20	-	5,051,317	-	(20,400,913)		(414,834)	(5,457,509)
1	5,050,648	(416,692)	(1,324,631)	(4,163,485)	(42,525)	(1,311,519)	(5,937,503)
2	3,830,604	(1,569,622)	(1,361,505)	17,305,963	29,592	16,923,513	13,867,151
3	3,302,574	187,720	(1,391,316)	(3,417,988)	98,244	15,702,745	12,458,664
4	5,425,669	(1,610,843)	(1,427,677)	(2,883,294)	97,512	15,304,113	13,670,874
5	3,598,514	(270,598)	(1,465,269)	(3,237,527)	98,281	14,027,514	12,664,874
6	4,440,689	878,389	(1,498,725)	(4,417,827)	89,353	13,519,393	11,278,363
7	3,151,498	363,235	(1,530,324)	(5,562,804)	69,729	10,010,726	7,406,462
8	4,700,877	1,155,026	(1,562,971)	(6,857,008)	41,556	7,488,205	3,728,915
9	9,597,929	(1,239,796)	(1,622,690)	(5,928,274)	35,603	8,330,977	5,811,483
10	5,435,204	749,559	(1,685,325)	(3,810,913)	43,309	9,062,811	5,793,757
11	5,955,573	361,160	(1,732,629)	(3,239,331)	47,089	10,454,673	6,824,460
12	9,600,549	573,155	(1,797,725)	(3,787,584)	66,167	15,109,235	10,905,867
Estimate	-	-	-		(1,233)	15,108,002	10,904,634
Total	64,090,327	4,212,009	(18,400,788)	(50,400,986)	672,677		
			49,901,548 Total Asset	-	(49,728,309) Total Liabilities	173,239	

STEP Project Report

Period Ending December 31, 2021

STEP Project Name:

Electric Vehicle ("EV") Charging Infrastructure:

1. EV Time of Use ("TOU") Pilot – Schedule 2E;
2. Plug-in EV Pilot Incentive Program – Schedule 120; and
3. Plug-in EV Load Research Study Program – Schedule 121.

Project Objectives:

- Offer a time of use rate schedule option for residential customers who own a plug-in electric vehicle;
- Promote plug-in electric vehicle charging infrastructure and time of use rates; and
- To study the load profiles of customers who have plug-in electric vehicles.

2021 EV PROGRAM BUDGET ACCOUNTING

Table 1 below is an accounting of how the $2 million 2021 EV Program budget was allocated. Prescriptive incentives represent measures that follow a program fiscal year of October 1st through September 30th, while custom incentives for committed funds follow the calendar year. Prescriptive incentives in Table 1 were completed during the EV Program's fiscal year. For purposes of this final report, the EV Program's final fiscal year went from October 1, 2020 through December 31, 2021. Custom incentives in Table 1 were committed to custom projects that the Company approved through the customer application process. Incentives for custom projects will be paid to customers upon the actual completion of their projects. Additional details and support for Table 1 prescriptive incentives can be found in Exhibit 2-A.

Table 1 – 2021 EV Program Budget Accounting

2021 EV Program Budget Costs/Commitments				
Category	**Prescriptive Incentives**	**Committed Custom Incentives**	**Program Management**	**Total**
Time of Use Rate Sign-up	$11,000	-	-	$11,000
Time of Use Load Research Study	$0	-	-	$0
Time of Use Meters	-	-	$450.16	$450.16
Residential AC Level 2 Chargers	$101,048.39	-	-	$101,048.39
Non-Residential AC Level 2 Chargers – Single Port	$159,584.73	-	-	$159,584.73
Non-Residential AC Level 2 Chargers – Multi-Port	$488,482.61	-	-	$488,482.61
Non-Residential & Multi-Family DC Fast Chargers	$337,389.80	-	-	$337,389.80
Custom Projects	-	$320,160.12	-	$320,160.12
Administrative Costs	-	-	$208,313.22	$208,313.22
Outreach & Awareness	-	-	$234,365.66	$234,365.66
Total	$1,097,505.53	$320,123	$443,129.04	**$1,860,794.69**

2021 PRESCRIPTIVE INCENTIVE LOCATIONS

Exhibit 2-A provides a breakout by city for prescriptive incentive equipment installations and TOU sign-ups from the 2021 EV Program fiscal year occurred (October 1, 2020 through December 31, 2021). There was a total of 1,668 charging ports installed, of which 511 were Residential AC Level 2 charging ports, 1,140 were Non-Residential AC Level 2 charging ports, and 17 were DC Fast charging ports. A total of 1,017 ports were installed for public and/or workplace use. With respect to the 1,017 Non-Residential ports installed, 932 ports were installed across 115 employers and 85 ports were installed across 6 multi-family properties.

CUSTOM PROJECTS

Custom Projects 19 through 22 are listed in Table 3 below, which includes a description, incentive amount, and equipment installed from customer applications that were approved by the Company and committed from the 2021 EV Program budget during the 2021 calendar year. A summary of the 2021 EV Program budget committed funds for custom projects can be found in Exhibit 2-B. Incentives for custom projects were paid to customers after the completion of their projects.

Custom Projects 1 through 9 were reported in the 2017 Annual STEP report representing $1,359,874 of committed funds from the 2017 EV Program budget. Custom Projects 10 through 13 were reported in the 2018 Annual STEP report representing $998,500 of committed funds from the 2018 EV Program budget. Custom Projects 14 through 16 were reported in the 2019 Annual STEP report respresenting $669,439 of committed funds from the 2019 EV Program budget. Custom Projects 17 and 18 were reported in the 2020 Annual STEP report representing $604,418.79 of committed funds from the 2020 EV Program budget. Exhibits 2-B and 2-C provide updated information on committed custom projects. There were a total of 143 AC Level 2 and 37 DC Fast charging ports installed for workplace/public use from completed custom projects in 2021.

Table 2 – 2021 EV Program Budget Custom Project Commitments

Custom Projects	Incentive	Description	Equipment Type
Project 19 Accepted and completed in 2021	$91,500	Installation of DC Fast Chargers and Level 2 chargers at grocery stores along the Wasatch Front. Project also included installing level 2 chargers at their corporate office.	10 AC Level 2 Chargers, 4 DC Fast Chargers
Project 20 Accepted and completed in 2021	$97,535	Healthcare provider to install EV chargers at medical clinics and hospital throughout Utah.	24 AC Level 2 Chargers
Project 21 Accepted and completed in 2021	$40,000	School District EV chargers for student busses.	4 DC Fast Chargers
Project 22 Accepted and completed in 2021	$91,125.12	Installation of EV chargers at various county government locations. Electric vehicle chargers will be used for fleet vehicles, employees, visitors, and public.	48 EV Chargers
Total 2021 EV Budget Commitments	**$320,160.12**	**---**	**82 AC Level 2 Chargers, 14 DC Fast Chargers**

2021 CALENDAR YEAR ACCOUNTING

Table 4 below provides an accounting of how the EV Program costs for calendar year 2021 are posted to SAP (the Company's accounting system), and reconciles to the STEP accounting. The amount of funds that actually post to SAP in a calendar year is dependent upon when projects complete. For example, if custom projects that were committed in 2020 from the 2020 EV Program budget completed in 2021, the funds associated with those custom projects posted to SAP in 2021. So while SAP accounting reflects those costs in 2021, they were, in fact, counted towards the $2 million 2020 EV Program budget. Additionally, while prescriptive incentives have followed a fiscal year of October 1st through September 30th, for purposes of this final report, the 2021 fiscal year also included October 1, 2021 through December 31, 2021. As such, prescriptive incentives for the 2021 EV Program budget include the timeframe of October 1, 2020 through December 31, 2021. Note that the prescriptive incentive costs during the timeframe of October 1, 2020, through December 31, 2020, are captured in SAP for that calendar year, but were counted towards the $2 million 2021 EV Program budget, consistent with the fiscal year of the EV Program for prescriptive incentives and previous reports. Exhibit 2-D provides SAP year over year accounting for each calendar year, which reconciles to the STEP accounting, and Exhibit 2-E provides a year over year accounting for how each $2 million EV Program year budget was allocated.

Table 4 – 2021 Calendar Year Actual SAP Postings

EV Program Actual Postings in SAP by Calendar Year	
Category	**CY 2021**
Time of Use Rate Sign-up	$3,200
Time of Use Load Research Study	$0
Time of Use Meters	$450.16
Residential AC Level 2 Chargers	$88,798.94
Non-Residential AC Level 2 Chargers – Single Port	$152,770.67
Non-Residential AC Level 2 Chargers – Multi-Port	$317,645.96
Non-Residential & Multi-Family DC Fast Chargers	$279,472.31
Custom Projects	$1,157,429.62
Administrative Costs	$208,313.22
Outreach & Awareness	$234,365.66
Total	**$2,442,446.54**

2021 ELECTRIC VEHICLE INCENTIVE PROGRAM KEY FINDINGS

EV Education Outreach

Beginning in 2021, the Company contracted with the National Energy Foundation to administer a secondary school teacher-directed interactive program to educate students on EVs. The program, called "rEV," provided 60 minutes secondary-level (grades 7-12) appropriate ecucational content aligning with Utah's standards around electrical education and EV concepts.

The rEV program was available to students in the spring and fall of 2021, which resulted in both teachers and students becoming more EV literate, particularly in the understanding of EV technology, cost savings, and environmental benefits. Additional information on the rEV program is provided in Exhibits 2-F and 2-G.

Attachments:

- Exhibit 2-A: 2020 EV Program Budget Prescriptive Incentives
- Exhibit 2-B: EV Program Custom Project Committed Funds and Expenditures
- Exhibit 2-C: EV Program Custom Project Details Year Over Year
- Exhibit 2-D: EV Program Actual SAP Postings by Calendar Year
- Exhibit 2-E: EV Program Budget Allocations Year Over Year
- Exhibit 2-F: rEV Program Spring 2021 Report
- Exhibit 2-G: rEV Program Fall 2021 Report

Exhibit 2-A

2021 EV Program Budget Prescriptive Incentives

EV Program Prescriptive Incentives (2021 Budget Funds)

Project Name	Measure_Name	Quantity	Number of Ports	Customer Incentive	Measure Cost	Creation Date	Payment Creation Date	Site City	Site Postal Code
EVUT_365831	EV DC Fast Charger (multi port)	1	2	$ 30,414.07	$ 80,466.00	Apr 27, 2021	Nov 23, 2021	VERNAL	84078
EVUT_315947	EV DC Fast Charger (single port)	2	2	$ 26,158.49	$ 34,877.99	Mar 12, 2020	Nov 16, 2020	SALT LAKE CITY	84111
EVUT_314214	EV DC Fast Charger (single port)	1	1	$ 17,500.00	$ 34,995.00	Feb 20, 2020	Dec 10, 2020	CLEARFIELD	84015
EVUT_354289	EV DC Fast Charger (single port)	1	1	$ 23,504.74	$ 31,339.65	Jan 11, 2021	Jul 27, 2021	OREM	84058
EVUT_361319	EV DC Fast Charger (single port)	1	1	$ 30,000.00	$ 66,357.92	Apr 7, 2021	Sep 20, 2021	WEST VALLEY CITY	84119
EVUT_363304	EV DC Fast Charger (single port)	2	2	$ 60,000.00	$ 364,636.00	Apr 16, 2021	Oct 13, 2021	DRAPER	84020
EVUT_367105	EV DC Fast Charger (single port)	1	1	$ 12,105.00	$ 54,213.00	May 7, 2021	Oct 13, 2021	SALT LAKE CITY	84115
EVUT_386328	EV DC Fast Charger (single port)	2	2	$ 60,000.00	$ 214,000.00	Oct 5, 2021	Oct 15, 2021	GARDEN CITY	84028
EVUT_365134	EV DC Fast Charger (single port)	2	2	$ 24,924.00	$ 33,232.00	Apr 26, 2021	Nov 16, 2021	LAYTON	84041
EVUT_398138	EV DC Fast Charger (single port)	1	1	$ 14,259.00	$ 57,039.00	Dec 16, 2021	Dec 20, 2021	SALT LAKE CITY	84115
EVUT_398142	EV DC Fast Charger (single port)	1	1	$ 16,117.00	$ 64,471.00	Dec 16, 2021	Dec 20, 2021	SOUTH JORDAN	84095
EVUT_398145	EV DC Fast Charger (single port)	1	1	$ 22,407.50	$ 77,632.00	Dec 16, 2021	Dec 20, 2021	West Valley City	84044
EVUT_334909	EV Level 2 Charger (multi port)	8	16	$ 12,000.00	$ 40,000.00	Sep 2, 2020	Oct 1, 2020	DRAPER	84020
EVUT_335774	EV Level 2 Charger (multi port)	2	4	$ 1,003.05	$ 1,337.40	Sep 10, 2020	Oct 1, 2020	PARK CITY	84098
EVUT_337820	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 11,996.00	Sep 24, 2020	Oct 1, 2020	SALT LAKE CITY	84111
EVUT_337570	EV Level 2 Charger (multi port)	1	2	$ 1,500.00	$ 5,408.00	Sep 30, 2020	Oct 1, 2020	South Jordan	84095
EVUT_332094	EV Level 2 Charger (multi port)	17	34	$ 25,500.00	$ 110,092.00	Aug 24, 2020	Oct 16, 2020	DRAPER	84020
EVUT_340312	EV Level 2 Charger (multi port)	2	4	$ 2,078.85	$ 2,771.80	Oct 1, 2020	Oct 16, 2020	OGDEN	84404
EVUT_340897	EV Level 2 Charger (multi port)	5	10	$ 5,197.13	$ 6,929.50	Oct 6, 2020	Oct 16, 2020	OGDEN	84401
EVUT_342706	EV Level 2 Charger (multi port)	5	10	$ 7,500.00	$ 13,389.50	Oct 12, 2020	Oct 16, 2020	SALT LAKE CITY	84116
EVUT_343327	EV Level 2 Charger (multi port)	1	2	$ 1,500.00	$ 5,325.00	Oct 20, 2020	Oct 30, 2020	LAYTON	84040
EVUT_343330	EV Level 2 Charger (multi port)	4	8	$ 6,000.00	$ 21,300.00	Oct 20, 2020	Oct 30, 2020	CLEARFIELD	84015
EVUT_345473	EV Level 2 Charger (multi port)	5	10	$ 7,500.00	$ 13,389.50	Nov 4, 2020	Nov 20, 2020	SALT LAKE CITY	84116
EVUT_345507	EV Level 2 Charger (multi port)	4	8	$ 1,281.00	$ 1,708.00	Nov 5, 2020	Nov 20, 2020	SALT LAKE CITY	84101
EVUT_346357	EV Level 2 Charger (multi port)	1	2	$ 910.57	$ 1,214.10	Nov 16, 2020	Nov 20, 2020	SALT LAKE CITY	84101
EVUT_343320	EV Level 2 Charger (multi port)	1	2	$ 910.57	$ 1,214.10	Oct 20, 2020	Dec 21, 2020	WEST JORDAN	84088
EVUT_346607	EV Level 2 Charger (multi port)	4	8	$ 3,642.30	$ 4,856.40	Nov 19, 2020	Jan 13, 2021	OREM	84058
EVUT_347999	EV Level 2 Charger (multi port)	2	4	$ 2,078.85	$ 2,771.80	Dec 1, 2020	Jan 13, 2021	SALT LAKE CITY	84119
EVUT_349393	EV Level 2 Charger (multi port)	1	2	$ 1,039.43	$ 1,385.90	Dec 11, 2020	Jan 13, 2021	SOUTH JORDAN	84095
EVUT_349088	EV Level 2 Charger (multi port)	4	8	$ 6,000.00	$ 21,340.00	Dec 17, 2020	Jan 13, 2021	SOUTH SALT LAKE	84115
EVUT_352535	EV Level 2 Charger (multi port)	4	8	$ 4,157.70	$ 5,543.60	Dec 29, 2020	Jan 13, 2021	Midvale	84047
EVUT_352546	EV Level 2 Charger (multi port)	2	4	$ 2,078.85	$ 2,771.80	Dec 29, 2020	Jan 13, 2021	SALT LAKE CITY	84109
EVUT_355450	EV Level 2 Charger (multi port)	2	4	$ 2,289.45	$ 3,052.60	Jan 21, 2021	Feb 1, 2021	WEST JORDAN	84088
EVUT_355537	EV Level 2 Charger (multi port)	3	6	$ 4,500.00	$ 19,800.00	Jan 26, 2021	Feb 1, 2021	SALT LAKE CITY	84116
EVUT_356339	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 9,998.00	Jan 29, 2021	Feb 11, 2021	WEST VALLEY CITY	84119
EVUT_356340	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 9,998.00	Jan 29, 2021	Feb 11, 2021	WEST VALLEY CITY	84120
EVUT_357031	EV Level 2 Charger (multi port)	2	4	$ 2,289.45	$ 3,052.60	Feb 5, 2021	Feb 19, 2021	WEST VALLEY CITY	84119
EVUT_357866	EV Level 2 Charger (multi port)	2	4	$ 2,078.85	$ 2,771.80	Feb 17, 2021	Mar 8, 2021	WEST JORDAN	84081
EVUT_358419	EV Level 2 Charger (multi port)	1	2	$ 910.57	$ 1,214.10	Feb 24, 2021	Mar 12, 2021	MAGNA	84044
EVUT_359524	EV Level 2 Charger (multi port)	2	4	$ 2,078.85	$ 2,771.80	Mar 9, 2021	Mar 12, 2021	LINDON	84042
EVUT_358406	EV Level 2 Charger (multi port)	1	2	$ 910.57	$ 1,214.10	Feb 24, 2021	Mar 23, 2021	CEDAR CITY	84720
EVUT_359792	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 5,636.60	Mar 10, 2021	Mar 23, 2021	PLEASANT GROVE	84062
EVUT_359766	EV Level 2 Charger (multi port)	1	2	$ 1,500.00	$ 10,578.00	Mar 10, 2021	Apr 2, 2021	PARK CITY	84060
EVUT_359767	EV Level 2 Charger (multi port)	2	4	$ 2,091.15	$ 2,788.20	Mar 10, 2021	Apr 2, 2021	WEST JORDAN	84088
EVUT_358405	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 10,526.00	Mar 12, 2021	Apr 2, 2021	SOUTH JORDAN	84095
EVUT_360757	EV Level 2 Charger (multi port)	1	2	$ 1,161.75	$ 1,549.00	Mar 22, 2021	Apr 2, 2021	SALT LAKE CITY	84103
EVUT_359961	EV Level 2 Charger (multi port)	10	20	$ 9,105.75	$ 12,141.00	Mar 16, 2021	Apr 22, 2021	SALT LAKE CITY	84116
EVUT_359961	EV Level 2 Charger (multi port)	1	2	$ 1,470.94	$ 1,961.25	Mar 16, 2021	Apr 22, 2021	SALT LAKE CITY	84116
EVUT_362488	EV Level 2 Charger (multi port)	5	10	$ 5,055.75	$ 6,741.00	Apr 13, 2021	Apr 28, 2021	SALT LAKE CITY	84116
EVUT_365135	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 14,420.00	Apr 26, 2021	May 11, 2021	WEST VALLEY CITY	84120
EVUT_366394	EV Level 2 Charger (multi port)	2	4	$ 1,821.15	$ 2,428.20	May 4, 2021	May 28, 2021	SALT LAKE CITY	84104
EVUT_367339	EV Level 2 Charger (multi port)	1	2	$ 1,500.00	$ 6,128.50	May 10, 2021	May 28, 2021	DRAPER	84020
EVUT_368097	EV Level 2 Charger (multi port)	2	4	$ 750.00	$ 1,000.00	May 17, 2021	Jun 3, 2021	LA VERKIN	84745
EVUT_369010	EV Level 2 Charger (multi port)	5	10	$ 4,751.63	$ 6,335.50	May 20, 2021	Jun 3, 2021	SUNSET	84015
EVUT_368098	EV Level 2 Charger (multi port)	2	4	$ 2,078.85	$ 2,771.80	May 17, 2021	Jun 14, 2021	OREM	84097
EVUT_371353	EV Level 2 Charger (multi port)	10	20	$ 9,105.75	$ 12,141.00	Jun 8, 2021	Jun 28, 2021	PARK CITY	84098
EVUT_373528	EV Level 2 Charger (multi port)	4	8	$ 6,000.00	$ 11,500.00	Jul 7, 2021	Jul 27, 2021	MONA	84645
EVUT_361313	EV Level 2 Charger (multi port)	14	28	$ 21,000.00	$ 75,264.00	Mar 25, 2021	Jul 27, 2021	SALT LAKE CITY	84102
EVUT_361314	EV Level 2 Charger (multi port)	3	6	$ 4,500.00	$ 16,128.00	Mar 25, 2021	Jul 27, 2021	WEST JORDAN	84088
EVUT_367220	EV Level 2 Charger (multi port)	2	4	$ 2,786.25	$ 3,715.00	May 10, 2021	Jul 27, 2021	WEST VALLEY CITY	84120
EVUT_367116	EV Level 2 Charger (multi port)	8	16	$ 12,000.00	$ 22,082.00	May 7, 2021	Aug 19, 2021	SALT LAKE CITY	84108
EVUT_379905	EV Level 2 Charger (multi port)	4	8	$ 4,578.90	$ 6,105.20	Aug 17, 2021	Sep 3, 2021	Park City	84098
EVUT_375805	EV Level 2 Charger (multi port)	1	2	$ 1,500.00	$ 11,356.00	Jul 27, 2021	Sep 13, 2021	PARK CITY	84060
EVUT_380444	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 7,010.00	Sep 7, 2021	Sep 17, 2021	CENTERVILLE	84014
EVUT_382761	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 14,610.00	Sep 15, 2021	Sep 23, 2021	SALT LAKE CITY	84115
EVUT_384473	EV Level 2 Charger (multi port)	7	14	$ 10,500.00	$ 37,093.00	Sep 17, 2021	Sep 27, 2021	SALT LAKE CITY	84115
EVUT_385210	EV Level 2 Charger (multi port)	2	4	$ 1,821.15	$ 2,428.20	Sep 23, 2021	Oct 4, 2021	SALT LAKE CITY	84101
EVUT_385213	EV Level 2 Charger (multi port)	6	12	$ 5,463.45	$ 7,284.60	Sep 23, 2021	Oct 4, 2021	Park City	84098
EVUT_385359	EV Level 2 Charger (multi port)	90	180	$ 94,955.48	$ 126,607.30	Sep 27, 2021	Oct 4, 2021	MIDVALE	84047
EVUT_385950	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 11,494.00	Sep 30, 2021	Oct 19, 2021	WEST VALLEY CITY	84119
EVUT_380259	EV Level 2 Charger (multi port)	2	4	$ 2,785.95	$ 3,714.60	Aug 20, 2021	Oct 25, 2021	SALT LAKE CITY	84115
EVUT_387830	EV Level 2 Charger (multi port)	1	2	$ 910.57	$ 1,214.10	Oct 13, 2021	Oct 25, 2021	HOLLADAY	84124
EVUT_388778	EV Level 2 Charger (multi port)	12	24	$ 10,926.90	$ 14,569.20	Oct 22, 2021	Nov 17, 2021	SALT LAKE CITY	84116
EVUT_392414	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 4,258.80	Nov 4, 2021	Nov 18, 2021	ALTA	84092
EVUT_393857	EV Level 2 Charger (multi port)	3	6	$ 1,820.48	$ 2,427.30	Nov 15, 2021	Nov 23, 2021	SALT LAKE CITY	84111
EVUT_394791	EV Level 2 Charger (multi port)	4	8	$ 4,157.70	$ 5,543.60	Nov 23, 2021	Nov 29, 2021	SALT LAKE CITY	84116
EVUT_394766	EV Level 2 Charger (multi port)	6	12	$ 9,000.00	$ 34,608.00	Nov 23, 2021	Dec 8, 2021	SALT LAKE CITY	84111
EVUT_394793	EV Level 2 Charger (multi port)	3	6	$ 4,500.00	$ 12,980.01	Nov 23, 2021	Dec 8, 2021	PARK CITY	84098
EVUT_380706	EV Level 2 Charger (multi port)	2	4	$ 3,000.00	$ 14,000.00	Aug 25, 2021	Dec 20, 2021	West Valley	84044

EV Program Prescriptive Incentives (2021 Budget Funds)

Project Name	Measure_Name	Quantity	Number of Ports	Customer Incentive	Measure Cost	Creation Date	Payment Creation Date	Site City	Site Postal Code
EVUT_393856	EV Level 2 Charger (multi port)	4	8	$ 4,157.70	$ 5,543.60	Nov 15, 2021	Dec 20, 2021	WOODS CROSS	84087
EVUT_395445	EV Level 2 Charger (multi port)	4	8	$ 4,499.40	$ 5,999.20	Nov 30, 2021	Dec 20, 2021	SALT LAKE CITY	84108
EVUT_395447	EV Level 2 Charger (multi port)	2	4	$ 2,249.70	$ 2,999.60	Nov 30, 2021	Dec 20, 2021	Garden City	84028
EVUT_397280	EV Level 2 Charger (multi port)	1	2	$ 1,071.22	$ 1,428.30	Dec 8, 2021	Dec 20, 2021	PARK CITY	84060
EVUT_397282	EV Level 2 Charger (multi port)	1	2	$ 910.57	$ 1,214.10	Dec 8, 2021	Dec 20, 2021	MILLVILLE	84326
EVUT_397342	EV Level 2 Charger (multi port)	47	94	$ 55,800.75	$ 74,401.00	Dec 10, 2021	Dec 20, 2021	MIDVALE	84047
EVUT_397342	EV Level 2 Charger (multi port)	43	86	$ 40,257.68	$ 53,676.90	Dec 10, 2021	Dec 20, 2021	MIDVALE	84047
EVUT_337337	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,002.30	Sep 21, 2020	Oct 1, 2020	COTTONWOOD HEIGHTS	84121
EVUT_337330	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 387.45	Sep 21, 2020	Oct 1, 2020	SALT LAKE CITY	84105
EVUT_337756	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 24, 2020	Oct 1, 2020	MILLCREEK	84124
EVUT_339293	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Sep 30, 2020	Oct 1, 2020	FARMINGTON	84025
EVUT_337279	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 21, 2020	Oct 16, 2020	HOLLADAY	84117
EVUT_340377	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 2, 2020	Oct 16, 2020	MOUNTAIN GREEN	84050
EVUT_339469	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Oct 2, 2020	Oct 16, 2020	COTTONWOOD HEIGHTS	84121
EVUT_340420	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 659.00	Oct 2, 2020	Oct 16, 2020	American Fork	84003
EVUT_340818	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 6, 2020	Oct 16, 2020	SOUTH JORDAN	84009
EVUT_340859	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 528,528.00	Oct 6, 2020	Oct 16, 2020	HYDE PARK	84318
EVUT_342597	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,100.00	Oct 12, 2020	Oct 16, 2020	HOLLADAY	84124
EVUT_342576	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 450.00	Oct 12, 2020	Oct 16, 2020	SOUTH JORDAN	84009
EVUT_342559	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 12, 2020	Oct 16, 2020	CLEARFIELD	84015
EVUT_334939	EV Level 2 Charger (Residential)	1	1	$ 180.00	$ 240.00	Sep 4, 2020	Oct 23, 2020	MILLCREEK	84109
EVUT_342813	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 319.99	Oct 14, 2020	Oct 23, 2020	WEST JORDAN	84081
EVUT_343301	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 589.00	Oct 19, 2020	Oct 23, 2020	MOAB	84532
EVUT_335217	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Sep 8, 2020	Oct 30, 2020	PARK CITY	84060
EVUT_343278	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 525.00	Oct 19, 2020	Oct 30, 2020	COTTONWOOD HEIGHTS	84047
EVUT_343703	EV Level 2 Charger (Residential)	1	1	$ 149.25	$ 199.00	Oct 22, 2020	Oct 30, 2020	HOLLADAY	84117
EVUT_343321	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 920.00	Oct 22, 2020	Oct 30, 2020	PARK CITY	84098
EVUT_343958	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 26, 2020	Oct 30, 2020	SOUTH JORDAN	84009
EVUT_339206	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 565.00	Sep 28, 2020	Nov 16, 2020	WOODS CROSS	84087
EVUT_341972	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 950.00	Oct 9, 2020	Nov 16, 2020	OGDEN	84401
EVUT_343528	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Oct 22, 2020	Nov 16, 2020	COTTONWOOD HEIGHTS	84121
EVUT_343938	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 369.00	Oct 26, 2020	Nov 16, 2020	HIGHLAND	84003
EVUT_344841	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 346.45	Oct 30, 2020	Nov 16, 2020	PROVIDENCE	84332
EVUT_344013	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 2, 2020	Nov 16, 2020	SANDY	84070
EVUT_345031	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 332.00	Nov 2, 2020	Nov 16, 2020	PROVIDENCE	84321
EVUT_344339	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 419.00	Nov 2, 2020	Nov 16, 2020	MOUNTAIN GREEN	84050
EVUT_345653	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 349.00	Nov 9, 2020	Nov 16, 2020	SANDY	84070
EVUT_345630	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 9, 2020	Nov 16, 2020	SALT LAKE CITY	84108
EVUT_340895	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Oct 6, 2020	Nov 20, 2020	WEST JORDAN	84088
EVUT_342789	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 350.00	Oct 13, 2020	Nov 20, 2020	MURRAY	84121
EVUT_342804	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 559.53	Oct 14, 2020	Nov 20, 2020	SYRACUSE	84075
EVUT_342890	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 643.08	Oct 16, 2020	Nov 20, 2020	DRAPER	84020
EVUT_343335	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 395.00	Oct 22, 2020	Nov 20, 2020	WEST VALLEY CITY	84128
EVUT_344015	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,514.00	Nov 2, 2020	Nov 20, 2020	MILLCREEK	84106
EVUT_345171	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 284.53	Nov 4, 2020	Nov 20, 2020	SARATOGA SPRINGS	84045
EVUT_345088	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.99	Nov 4, 2020	Nov 20, 2020	MOUNTAIN GREEN	84050
EVUT_345051	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 579.00	Nov 4, 2020	Nov 20, 2020	MIDVALE	84070
EVUT_345664	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Nov 9, 2020	Nov 20, 2020	ALPINE	84004
EVUT_345673	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 575.00	Nov 10, 2020	Nov 20, 2020	FARMINGTON	84025
EVUT_346342	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 16, 2020	Nov 20, 2020	PARK CITY	84060
EVUT_346386	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Nov 17, 2020	Nov 20, 2020	PARK CITY	84060
EVUT_346570	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 19, 2020	Nov 20, 2020	SANDY	84093
EVUT_346605	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 800.00	Nov 19, 2020	Nov 20, 2020	OREM	84058
EVUT_342587	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 12, 2020	Dec 3, 2020	LAYTON	84041
EVUT_347022	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 23, 2020	Dec 3, 2020	NORTH SALT LAKE	84054
EVUT_347025	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 23, 2020	Dec 3, 2020	MILLCREEK	84124
EVUT_347119	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Nov 30, 2020	Dec 3, 2020	SALT LAKE CITY	84115
EVUT_347628	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 894.00	Nov 30, 2020	Dec 3, 2020	MILLCREEK	84109
EVUT_347614	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 387.45	Nov 30, 2020	Dec 3, 2020	MOUNTAIN GREEN	84050
EVUT_347120	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Nov 30, 2020	Dec 3, 2020	EAGLE MOUNTAIN	84005
EVUT_348074	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Dec 2, 2020	Dec 3, 2020	PARK CITY	84098
EVUT_341640	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 300.00	Oct 8, 2020	Dec 10, 2020	SOUTH SALT LAKE	84106
EVUT_347618	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 30, 2020	Dec 10, 2020	PARK CITY	84098
EVUT_348711	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 4, 2020	Dec 10, 2020	LAYTON	84041
EVUT_348676	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 4, 2020	Dec 10, 2020	CENTERVILLE	84014
EVUT_349155	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Dec 9, 2020	Dec 10, 2020	HEBER CITY	84032
EVUT_349110	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Dec 9, 2020	Dec 10, 2020	SANDY	84092
EVUT_349102	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 9, 2020	Dec 10, 2020	SOUTH OGDEN	84405
EVUT_347024	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.99	Nov 23, 2020	Dec 21, 2020	TAYLORSVILLE	84123
EVUT_347616	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 30, 2020	Dec 21, 2020	COTTONWOOD HEIGHTS	84121
EVUT_349363	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 10, 2020	Dec 21, 2020	SALT LAKE CITY	84103
EVUT_349388	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 569.00	Dec 11, 2020	Dec 21, 2020	MILLCREEK	84109
EVUT_349923	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 15, 2020	Dec 21, 2020	BLUFFDALE	84065
EVUT_349935	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 15, 2020	Dec 21, 2020	LAYTON	84041
EVUT_349939	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Dec 16, 2020	Dec 21, 2020	TOOELE	84074
EVUT_350722	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 619.00	Dec 17, 2020	Dec 21, 2020	Park City	84060
EVUT_343932	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Oct 26, 2020	Jan 4, 2021	MILLCREEK	84106
EVUT_343974	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 850.00	Oct 26, 2020	Jan 4, 2021	ROY	84067
EVUT_345040	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 589.00	Nov 4, 2020	Jan 4, 2021	SALT LAKE CITY	84116

EV Program Prescriptive Incentives (2021 Budget Funds)

Project Name	Measure_Name	Quantity	Number of Ports	Customer Incentive	Measure Cost	Creation Date	Payment Creation Date	Site City	Site Postal Code
EVUT_345799	EV Level 2 Charger (Residential)	1	1	$ 178.12	$ 237.49	Nov 12, 2020	Jan 4, 2021	COTTONWOOD HEIGHTS	84121
EVUT_349366	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Dec 10, 2020	Jan 4, 2021	SOUTH JORDAN	84009
EVUT_350936	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 399.99	Dec 21, 2020	Jan 4, 2021	SALT LAKE CITY	84106
EVUT_350935	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 21, 2020	Jan 4, 2021	SANDY	84092
EVUT_350887	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 477.00	Dec 21, 2020	Jan 4, 2021	FARMINGTON	84025
EVUT_352001	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 538.75	Dec 22, 2020	Jan 4, 2021	SALT LAKE CITY	84108
EVUT_352117	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Dec 24, 2020	Jan 4, 2021	PARK CITY	84098
EVUT_352307	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Dec 24, 2020	Jan 4, 2021	MIDVALE	84070
EVUT_352402	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 329.00	Dec 28, 2020	Jan 4, 2021	DRAPER	84020
EVUT_352405	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Dec 29, 2020	Jan 4, 2021	WEST BOUNTIFUL	84087
EVUT_352505	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 589.00	Dec 29, 2020	Jan 4, 2021	SANDY	84092
EVUT_352543	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 29, 2020	Jan 4, 2021	SALT LAKE CITY	84109
EVUT_348748	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 400.00	Dec 7, 2020	Jan 15, 2021	HOLLADAY	84117
EVUT_349378	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 10, 2020	Jan 15, 2021	WEST JORDAN	84088
EVUT_352304	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 24, 2020	Jan 15, 2021	NORTH LOGAN	84341
EVUT_353613	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 609.00	Dec 31, 2020	Jan 15, 2021	SALT LAKE CITY	84115
EVUT_353621	EV Level 2 Charger (Residential)	1	1	$ 149.99	$ 199.99	Jan 4, 2021	Jan 15, 2021	STANSBURY PARK	84074
EVUT_353620	EV Level 2 Charger (Residential)	1	1	$ 154.81	$ 206.41	Jan 4, 2021	Jan 15, 2021	OGDEN	84404
EVUT_353619	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jan 4, 2021	Jan 15, 2021	MILLCREEK	84109
EVUT_353731	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Jan 5, 2021	Jan 15, 2021	MIDVALE	84047
EVUT_353741	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 299.99	Jan 6, 2021	Jan 15, 2021	OAKLEY	84060
EVUT_353751	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Jan 6, 2021	Jan 15, 2021	OREM	84097
EVUT_354275	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 350.00	Jan 11, 2021	Jan 15, 2021	SOUTH JORDAN	84009
EVUT_354283	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 469.00	Jan 11, 2021	Jan 15, 2021	IVINS	84738
EVUT_349270	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 374.00	Dec 9, 2020	Jan 19, 2021	TAYLORSVILLE	84129
EVUT_349940	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 399.99	Dec 16, 2020	Jan 19, 2021	HERRIMAN	84096
EVUT_352411	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 29, 2020	Jan 19, 2021	COTTONWOOD HEIGHTS	84121
EVUT_353618	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Jan 4, 2021	Jan 19, 2021	COTTONWOOD HEIGHTS	84121
EVUT_353728	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jan 4, 2021	Jan 19, 2021	SOUTH JORDAN	84009
EVUT_353742	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 542.00	Jan 6, 2021	Jan 19, 2021	SALT LAKE CITY	84102
EVUT_354299	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jan 12, 2021	Jan 19, 2021	BLUFFDALE	84065
EVUT_354420	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 419.00	Jan 14, 2021	Jan 19, 2021	WEST HAVEN	84401
EVUT_354504	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 284.99	Jan 14, 2021	Jan 19, 2021	AMERICAN FORK	84003
EVUT_354503	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jan 14, 2021	Jan 19, 2021	FARMINGTON	84025
EVUT_355092	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 405.00	Jan 19, 2021	Jan 25, 2021	SARATOGA SPRINGS	84045
EVUT_355094	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 359.00	Jan 19, 2021	Jan 25, 2021	EAGLE MOUNTAIN	84005
EVUT_355106	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Jan 19, 2021	Jan 25, 2021	SANDY	84094
EVUT_352102	EV Level 2 Charger (Residential)	1	1	$ 149.99	$ 199.99	Dec 22, 2020	Feb 8, 2021	AMERICAN FORK	84003
EVUT_353542	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 450.00	Dec 31, 2020	Feb 8, 2021	OREM	84059
EVUT_355473	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Jan 25, 2021	Feb 8, 2021	MILLCREEK	84109
EVUT_355110	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 533.75	Jan 25, 2021	Feb 8, 2021	IVINS	84738
EVUT_355525	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jan 26, 2021	Feb 8, 2021	LAYTON	84040
EVUT_355928	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 489.00	Jan 27, 2021	Feb 8, 2021	PERRY	84302
EVUT_355931	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jan 27, 2021	Feb 8, 2021	IVINS	84738
EVUT_356315	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jan 28, 2021	Feb 8, 2021	TAYLORSVILLE	84123
EVUT_356356	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 624.00	Feb 1, 2021	Feb 8, 2021	COTTONWOOD HEIGHTS	84121
EVUT_356349	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 533.38	Feb 1, 2021	Feb 8, 2021	WEST JORDAN	84081
EVUT_357019	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Feb 5, 2021	Feb 8, 2021	WEST JORDAN	84088
EVUT_356944	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Feb 5, 2021	Feb 8, 2021	WEST VALLEY CITY	84119
EVUT_356805	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Feb 5, 2021	Feb 8, 2021	DRAPER	84020
EVUT_356713	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 368.50	Feb 5, 2021	Feb 8, 2021	SOUTH SALT LAKE	84106
EVUT_356343	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 329.99	Feb 1, 2021	Feb 8, 2021	SARATOGA SPRINGS	84045
EVUT_355102	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jan 19, 2021	Feb 11, 2021	FRUIT HEIGHTS	84025
EVUT_356710	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 300.00	Feb 2, 2021	Feb 11, 2021	TOOELE	84074
EVUT_357076	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,423.00	Feb 8, 2021	Feb 11, 2021	NIBLEY	84321
EVUT_357072	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 619.00	Feb 8, 2021	Feb 11, 2021	MILLCREEK	84109
EVUT_357071	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Feb 8, 2021	Feb 11, 2021	SOUTH WEBER	84405
EVUT_357126	EV Level 2 Charger (Residential)	1	1	$ 127.49	$ 169.99	Feb 10, 2021	Feb 11, 2021	SYRACUSE	84075
EVUT_357344	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Feb 10, 2021	Feb 11, 2021	DRAPER	84020
EVUT_345646	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 349.00	Nov 9, 2020	Feb 19, 2021	SARATOGA SPRINGS	84045
EVUT_354284	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 565.00	Jan 11, 2021	Feb 19, 2021	RIVERTON	84065
EVUT_355114	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 400.00	Jan 25, 2021	Feb 19, 2021	HOLLADAY	84117
EVUT_356234	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 710.00	Jan 28, 2021	Feb 19, 2021	SOUTH JORDAN	84009
EVUT_356353	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Feb 1, 2021	Feb 19, 2021	MILLCREEK	84124
EVUT_356942	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Feb 5, 2021	Feb 19, 2021	SANDY	84070
EVUT_357519	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 387.45	Feb 18, 2021	Feb 19, 2021	SOUTH JORDAN	84009
EVUT_357902	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Feb 18, 2021	Feb 19, 2021	OGDEN	84404
EVUT_357697	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Feb 18, 2021	Feb 19, 2021	WEST POINT	84015
EVUT_357696	EV Level 2 Charger (Residential)	1	1	$ 134.04	$ 178.72	Feb 18, 2021	Feb 19, 2021	EAGLE MOUNTAIN	84005
EVUT_357612	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Feb 18, 2021	Feb 19, 2021	MILLCREEK	84109
EVUT_357609	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 624.00	Feb 18, 2021	Feb 19, 2021	SALT LAKE CITY	84105
EVUT_358012	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Feb 19, 2021	Feb 19, 2021	ROY	84067
EVUT_357397	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Feb 11, 2021	Mar 1, 2021	NORTH OGDEN	84414
EVUT_358008	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 539.00	Feb 22, 2021	Mar 1, 2021	ALPINE	84004
EVUT_357024	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 536.25	Feb 5, 2021	Mar 12, 2021	SANDY	84092
EVUT_357082	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 965.00	Feb 8, 2021	Mar 12, 2021	LAYTON	84040
EVUT_357117	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 559.00	Feb 10, 2021	Mar 12, 2021	EAGLE MOUNTAIN	84005
EVUT_357611	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Feb 18, 2021	Mar 12, 2021	LIBERTY	84310
EVUT_358020	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Feb 22, 2021	Mar 12, 2021	SANDY	84093

EV Program Prescriptive Incentives (2021 Budget Funds)

Project Name	Measure_Name	Quantity	Number of Ports	Customer Incentive	Measure Cost	Creation Date	Payment Creation Date	Site City	Site Postal Code
EVUT_358510	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 680.00	Feb 25, 2021	Mar 12, 2021	LAYTON	84041
EVUT_358508	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Feb 25, 2021	Mar 12, 2021	MILLCREEK	84124
EVUT_358625	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 1, 2021	Mar 12, 2021	RIVERDALE	84405
EVUT_358622	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 1, 2021	Mar 12, 2021	LAYTON	84041
EVUT_358401	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 1, 2021	Mar 12, 2021	RIVERTON	84065
EVUT_358029	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 1, 2021	Mar 12, 2021	OREM	84058
EVUT_358756	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 536.25	Mar 3, 2021	Mar 12, 2021	DRAPER	84020
EVUT_358755	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 3, 2021	Mar 12, 2021	FARMINGTON	84025
EVUT_358633	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Mar 3, 2021	Mar 12, 2021	STANSBURY PARK	84074
EVUT_358630	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 760.00	Mar 3, 2021	Mar 12, 2021	SARATOGA SPRINGS	84045
EVUT_358875	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 624.00	Mar 3, 2021	Mar 12, 2021	SALT LAKE CITY	84105
EVUT_359309	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 8, 2021	Mar 12, 2021	SOUTH JORDAN	84009
EVUT_359521	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Mar 10, 2021	Mar 12, 2021	AMERICAN FORK	84003
EVUT_358047	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 550.00	Mar 1, 2021	Mar 12, 2021	HIGHLAND	84003
EVUT_359765	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 820.00	Mar 10, 2021	Mar 23, 2021	SUMMIT COUNTY	84060
EVUT_359943	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 15, 2021	Mar 23, 2021	SOUTH JORDAN	84095
EVUT_359944	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 15, 2021	Mar 23, 2021	MILLCREEK	84109
EVUT_357204	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 850.00	Feb 10, 2021	Apr 1, 2021	SOUTH JORDAN	84095
EVUT_359312	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 8, 2021	Apr 1, 2021	ALPINE	84004
EVUT_360746	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 22, 2021	Apr 1, 2021	COTTONWOOD HEIGHTS	84121
EVUT_360725	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 538.75	Mar 22, 2021	Apr 1, 2021	SALT LAKE CITY	84108
EVUT_360604	EV Level 2 Charger (Residential)	1	1	$ 130.50	$ 174.00	Mar 22, 2021	Apr 1, 2021	SANDY	84092
EVUT_361333	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 26, 2021	Apr 1, 2021	CEDAR HILLS	84062
EVUT_360810	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 26, 2021	Apr 1, 2021	DRAPER	84020
EVUT_360795	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 26, 2021	Apr 1, 2021	SARATOGA SPRINGS	84045
EVUT_361342	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Mar 29, 2021	Apr 1, 2021	BLUFFDALE	84065
EVUT_361340	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 275.00	Mar 29, 2021	Apr 1, 2021	MIDVALE	84070
EVUT_361340	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 275.00	Mar 29, 2021	Apr 1, 2021	MIDVALE	84070
EVUT_361406	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 399.99	Mar 31, 2021	Apr 1, 2021	HONEYVILLE	84314
EVUT_361423	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,000.00	Mar 31, 2021	Apr 1, 2021	WEST JORDAN	84088
EVUT_361321	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,095.00	Mar 26, 2021	Apr 9, 2021	HIDEOUT	84036
EVUT_360816	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 650.00	Mar 26, 2021	Apr 9, 2021	SYRACUSE	84075
EVUT_361898	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Apr 5, 2021	Apr 9, 2021	PARK CITY	84098
EVUT_361894	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 591.50	Apr 5, 2021	Apr 9, 2021	SNYDERVILLE	84098
EVUT_361879	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Apr 5, 2021	Apr 9, 2021	MILLCREEK	84124
EVUT_361877	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Apr 5, 2021	Apr 9, 2021	SYRACUSE	84075
EVUT_361531	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,213.00	Apr 5, 2021	Apr 9, 2021	SALT LAKE CITY	84111
EVUT_361523	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,000.00	Apr 5, 2021	Apr 9, 2021	KEARNS	84118
EVUT_361903	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Apr 6, 2021	Apr 9, 2021	SYRACUSE	84075
EVUT_361905	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 329.00	Apr 6, 2021	Apr 9, 2021	SOUTH OGDEN	84405
EVUT_361913	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 395.00	Apr 6, 2021	Apr 9, 2021	SANDY	84092
EVUT_361426	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 31, 2021	Apr 19, 2021	COTTONWOOD HEIGHTS	84093
EVUT_362350	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 305.99	Apr 12, 2021	Apr 19, 2021	FRUIT HEIGHTS	84037
EVUT_362344	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Apr 12, 2021	Apr 19, 2021	WEST JORDAN	84088
EVUT_362339	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Apr 12, 2021	Apr 19, 2021	SALT LAKE CITY	84103
EVUT_362097	EV Level 2 Charger (Residential)	1	1	$ 149.99	$ 199.99	Apr 12, 2021	Apr 19, 2021	LAYTON	84040
EVUT_360710	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 533.25	Mar 22, 2021	Apr 23, 2021	DEWEYVILLE	84309
EVUT_361061	EV Level 2 Charger (Residential)	1	1	$ 171.75	$ 229.00	Mar 26, 2021	Apr 23, 2021	DRAPER	84020
EVUT_360906	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 26, 2021	Apr 23, 2021	PARK CITY	84098
EVUT_361392	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 284.94	Mar 31, 2021	Apr 23, 2021	FARMINGTON	84025
EVUT_361870	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,100.00	Apr 5, 2021	Apr 23, 2021	PLAIN CITY	84404
EVUT_362496	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 346.00	Apr 14, 2021	Apr 23, 2021	CEDAR CITY	84721
EVUT_362495	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 634.00	Apr 14, 2021	Apr 23, 2021	BLUFFDALE	84065
EVUT_360722	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Mar 22, 2021	May 4, 2021	WEST JORDAN	84081
EVUT_361312	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 26, 2021	May 4, 2021	NORTH SALT LAKE	84054
EVUT_361347	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Mar 29, 2021	May 4, 2021	VINEYARD	84059
EVUT_361433	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.99	Apr 5, 2021	May 4, 2021	WEST VALLEY CITY	84119
EVUT_361908	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 350.00	Apr 6, 2021	May 4, 2021	SANTAQUIN	84655
EVUT_361919	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 340.30	Apr 7, 2021	May 4, 2021	NORTH SALT LAKE	84054
EVUT_363150	EV Level 2 Charger (Residential)	1	1	$ 149.99	$ 199.99	Apr 14, 2021	May 4, 2021	WEST VALLEY CITY	84120
EVUT_363342	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Apr 19, 2021	May 4, 2021	SALT LAKE CITY	84105
EVUT_363339	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 450.00	Apr 19, 2021	May 4, 2021	SALT LAKE CITY	84105
EVUT_364843	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,000.00	Apr 23, 2021	May 4, 2021	MILLCREEK	84124
EVUT_364708	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 569.00	Apr 23, 2021	May 4, 2021	SALT LAKE CITY	84109
EVUT_364560	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Apr 23, 2021	May 4, 2021	DRAPER	84020
EVUT_364954	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Apr 26, 2021	May 4, 2021	SANDY	84094
EVUT_364951	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 329.99	Apr 26, 2021	May 4, 2021	LAYTON	84041
EVUT_364945	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Apr 26, 2021	May 4, 2021	SALT LAKE CITY	84105
EVUT_364944	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Apr 26, 2021	May 4, 2021	WEST JORDAN	84081
EVUT_365793	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Apr 27, 2021	May 4, 2021	FARMINGTON	84025
EVUT_365794	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Apr 28, 2021	May 4, 2021	HYDE PARK	84318
EVUT_366902	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	May 6, 2021	May 11, 2021	WEST JORDAN	84081
EVUT_366353	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	May 6, 2021	May 11, 2021	WEST JORDAN	84081
EVUT_366338	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	May 7, 2021	May 11, 2021	SOUTH JORDAN	84095
EVUT_364950	EV Level 2 Charger (Residential)	1	1	$ 168.75	$ 225.00	Apr 26, 2021	May 19, 2021	HERRIMAN	84096
EVUT_367211	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	May 10, 2021	May 19, 2021	OREM	84097
EVUT_367209	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 995.00	May 10, 2021	May 19, 2021	NORTH OGDEN	84414
EVUT_367364	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 979.60	May 12, 2021	May 19, 2021	WEST JORDAN	84081
EVUT_367365	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	May 12, 2021	May 19, 2021	DRAPER	84020

EV Program Prescriptive Incentives (2021 Budget Funds)

Project Name	Measure_Name	Quantity	Number of Ports	Customer Incentive	Measure Cost	Creation Date	Payment Creation Date	Site City	Site Postal Code
EVUT_367731	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 299.29	May 12, 2021	May 19, 2021	SANDY	84093
EVUT_367732	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	May 12, 2021	May 26, 2021	PARK CITY	84098
EVUT_361920	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 350.00	Apr 7, 2021	May 28, 2021	MIDVALE	84047
EVUT_363272	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Apr 16, 2021	May 28, 2021	NORTH SALT LAKE	84054
EVUT_366074	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Apr 28, 2021	May 28, 2021	OREM	84057
EVUT_367340	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 529.00	May 10, 2021	May 28, 2021	OREM	84057
EVUT_367207	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	May 10, 2021	May 28, 2021	HERRIMAN	84096
EVUT_367208	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	May 10, 2021	May 28, 2021	PLEASANT GROVE	84062
EVUT_367933	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	May 12, 2021	May 28, 2021	SOUTH JORDAN	84095
EVUT_367736	EV Level 2 Charger (Residential)	1	1	$ 142.49	$ 189.99	May 12, 2021	May 28, 2021	WEST VALLEY CITY	84128
EVUT_368074	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 399.99	May 14, 2021	May 28, 2021	SYRACUSE	84075
EVUT_367994	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	May 17, 2021	May 28, 2021	SARATOGA SPRINGS	84045
EVUT_368717	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 589.00	May 20, 2021	May 28, 2021	EAGLE MOUNTAIN	84005
EVUT_369022	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	May 21, 2021	May 28, 2021	CENTERVILLE	84014
EVUT_368934	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 319.99	May 21, 2021	May 28, 2021	WEST VALLEY CITY	84119
EVUT_368719	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 429.99	May 21, 2021	May 28, 2021	WOODS CROSS	84087
EVUT_369178	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	May 25, 2021	May 28, 2021	DRAPER	84020
EVUT_369238	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	May 25, 2021	May 28, 2021	EAGLE MOUNTAIN	84005
EVUT_369209	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	May 25, 2021	May 28, 2021	MIDVALE	84047
EVUT_369556	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 399.00	May 27, 2021	May 28, 2021	SOUTH JORDAN	84095
EVUT_359910	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Mar 12, 2021	Jun 3, 2021	SOUTH JORDAN	84009
EVUT_362498	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 609.00	Apr 14, 2021	Jun 3, 2021	EAGLE MOUNTAIN	84005
EVUT_367206	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 399.00	May 10, 2021	Jun 3, 2021	OGDEN	84401
EVUT_369711	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	May 28, 2021	Jun 3, 2021	OREM	84057
EVUT_370490	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 2, 2021	Jun 3, 2021	DRAPER	84020
EVUT_370482	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Jun 2, 2021	Jun 3, 2021	FRUIT HEIGHTS	84037
EVUT_369957	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Jun 2, 2021	Jun 3, 2021	VINEYARD	84059
EVUT_369955	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 2, 2021	Jun 3, 2021	COTTONWOOD HEIGHTS	84121
EVUT_369938	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Jun 2, 2021	Jun 3, 2021	NORTH SALT LAKE	84054
EVUT_361439	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 299.00	Apr 5, 2021	Jun 14, 2021	APPLE VALLEY	84737
EVUT_370802	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Jun 3, 2021	Jun 14, 2021	COTTONWOOD HEIGHTS	84121
EVUT_370840	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 8, 2021	Jun 14, 2021	CEDAR CITY	84720
EVUT_370845	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,000.00	Jun 8, 2021	Jun 14, 2021	PARK CITY	84098
EVUT_371342	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 312.51	Jun 8, 2021	Jun 14, 2021	WEST JORDAN	84084
EVUT_371341	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Jun 8, 2021	Jun 14, 2021	FRUIT HEIGHTS	84037
EVUT_370846	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 550.00	Jun 8, 2021	Jun 14, 2021	MURRAY	84107
EVUT_367984	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	May 17, 2021	Jun 28, 2021	HOLLADAY	84117
EVUT_371743	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Jun 14, 2021	Jun 28, 2021	FRUIT HEIGHTS	84037
EVUT_371782	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 279.00	Jun 16, 2021	Jun 28, 2021	Riverton	84065
EVUT_371797	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 987.00	Jun 16, 2021	Jun 28, 2021	HIGHLAND	84003
EVUT_371793	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 279.00	Jun 16, 2021	Jun 28, 2021	SALT LAKE CITY	84109
EVUT_372260	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,226.31	Jun 17, 2021	Jun 28, 2021	HERRIMAN	84096
EVUT_372312	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 529.99	Jun 17, 2021	Jun 28, 2021	SANDY	84092
EVUT_372268	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 619.00	Jun 17, 2021	Jun 28, 2021	EAGLE MOUNTAIN	84005
EVUT_372711	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 449.00	Jun 24, 2021	Jun 28, 2021	SARATOGA SPRINGS	84045
EVUT_372775	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 749.38	Jun 24, 2021	Jun 28, 2021	RIVERTON	84096
EVUT_372825	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,125.00	Jun 24, 2021	Jun 28, 2021	PLEASANT VIEW	84414
EVUT_372975	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 28, 2021	Jul 2, 2021	SOUTH WEBER	84405
EVUT_373164	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 30, 2021	Jul 2, 2021	SANDY	84092
EVUT_373002	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 30, 2021	Jul 2, 2021	KEARNS	84118
EVUT_373000	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 30, 2021	Jul 2, 2021	TOQUERVILLE	84774
EVUT_362359	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Apr 12, 2021	Jul 27, 2021	MILLCREEK	84124
EVUT_367218	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,422.50	May 10, 2021	Jul 27, 2021	MAPLETON	84664
EVUT_370611	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,050.00	Jun 3, 2021	Jul 27, 2021	SARATOGA SPRINGS	84045
EVUT_370884	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 8, 2021	Jul 27, 2021	SALT LAKE CITY	84103
EVUT_371638	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Jun 11, 2021	Jul 27, 2021	SOUTH JORDAN	84009
EVUT_371603	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 439.00	Jun 11, 2021	Jul 27, 2021	AMERICAN FORK	84003
EVUT_371741	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,075.00	Jun 14, 2021	Jul 27, 2021	SOUTH SALT LAKE	84115
EVUT_371746	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Jun 14, 2021	Jul 27, 2021	LINDON	84042
EVUT_372810	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 329.99	Jun 24, 2021	Jul 27, 2021	SOUTH JORDAN	84009
EVUT_372773	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 399.00	Jun 24, 2021	Jul 27, 2021	PLEASANT VIEW	84414
EVUT_373418	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 424.00	Jul 2, 2021	Jul 27, 2021	SARATOGA SPRINGS	84045
EVUT_373501	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 746.18	Jul 7, 2021	Jul 27, 2021	FARMINGTON	84025
EVUT_373706	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jul 12, 2021	Jul 27, 2021	SOUTH JORDAN	84095
EVUT_374733	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 545.00	Jul 15, 2021	Jul 27, 2021	RIVERTON	84065
EVUT_375262	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 450.00	Jul 20, 2021	Jul 27, 2021	SOUTH OGDEN	84405
EVUT_375226	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 350.00	Jul 20, 2021	Jul 27, 2021	WEST VALLEY CITY	84119
EVUT_375211	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jul 20, 2021	Jul 27, 2021	HERRIMAN	84096
EVUT_374703	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jul 20, 2021	Jul 27, 2021	LIBERTY	84310
EVUT_374720	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.99	Jul 21, 2021	Jul 27, 2021	NORTH SALT LAKE	84116
EVUT_375366	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Jul 21, 2021	Jul 27, 2021	SOUTH OGDEN	84403
EVUT_374731	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jul 21, 2021	Jul 27, 2021	VINEYARD	84059
EVUT_377694	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 574.00	Aug 3, 2021	Aug 6, 2021	CENTERVILLE	84014
EVUT_377446	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 625.00	Aug 3, 2021	Aug 6, 2021	HERRIMAN	84096
EVUT_377939	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 5, 2021	Aug 6, 2021	RIVERTON	84065
EVUT_377934	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 268.97	Aug 5, 2021	Aug 6, 2021	MAPLETON	84664
EVUT_375677	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 600.00	Aug 6, 2021	Aug 13, 2021	VINEYARD	84059
EVUT_375709	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 690.00	Aug 6, 2021	Aug 13, 2021	WEST HAVEN	84401
EVUT_375719	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 6, 2021	Aug 13, 2021	DRAPER	84020

EV Program Prescriptive Incentives (2021 Budget Funds)

Project Name	Measure_Name	Quantity	Number of Ports	Customer Incentive	Measure Cost	Creation Date	Payment Creation Date	Site City	Site Postal Code
EVUT_377987	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 900.00	Aug 6, 2021	Aug 13, 2021	PARK CITY	84098
EVUT_373165	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 30, 2021	Aug 16, 2021	MILLCREEK	84109
EVUT_373527	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 530.00	Jul 7, 2021	Aug 16, 2021	CENTERVILLE	84014
EVUT_375119	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,152.50	Jul 20, 2021	Aug 16, 2021	VINEYARD	84059
EVUT_377362	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 499.95	Jul 29, 2021	Aug 16, 2021	HIGHLAND	84003
EVUT_375690	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 6, 2021	Aug 16, 2021	OREM	84057
EVUT_378136	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 5,590.85	Aug 9, 2021	Aug 16, 2021	SALT LAKE CITY	84105
EVUT_378008	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 619.00	Aug 9, 2021	Aug 16, 2021	SOUTH OGDEN	84405
EVUT_377996	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 2,418.67	Aug 9, 2021	Aug 16, 2021	LAYTON	84041
EVUT_378243	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 12, 2021	Aug 16, 2021	OGDEN	84401
EVUT_379160	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 569.00	Aug 13, 2021	Aug 16, 2021	SNYDERVILLE	84098
EVUT_379161	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 850.00	Aug 13, 2021	Aug 19, 2021	NORTH OGDEN	84414
EVUT_379147	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.99	Aug 13, 2021	Aug 19, 2021	EMIGRATION CANYON	84108
EVUT_375213	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Jul 20, 2021	Aug 30, 2021	BLUFFDALE	84065
EVUT_377408	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,900.00	Jul 29, 2021	Aug 30, 2021	SALT LAKE CITY	84102
EVUT_380212	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 589.00	Aug 19, 2021	Aug 30, 2021	SOUTH JORDAN	84095
EVUT_379893	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 569.00	Aug 19, 2021	Aug 30, 2021	WEST JORDAN	84088
EVUT_379200	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 292.99	Aug 19, 2021	Aug 30, 2021	WEST VALLEY CITY	84119
EVUT_379179	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Aug 19, 2021	Aug 30, 2021	ROY	84067
EVUT_375816	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 950.00	Jul 29, 2021	Sep 1, 2021	WEST JORDAN	84084
EVUT_375682	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,186.00	Aug 6, 2021	Sep 1, 2021	LIBERTY	84310
EVUT_379896	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 539.00	Aug 19, 2021	Sep 1, 2021	FARMINGTON	84025
EVUT_379895	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 579.00	Aug 19, 2021	Sep 1, 2021	WEST JORDAN	84088
EVUT_379195	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 309.00	Aug 19, 2021	Sep 1, 2021	WEST HAVEN	84401
EVUT_380399	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 24, 2021	Sep 1, 2021	SANDY	84093
EVUT_380398	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 24, 2021	Sep 1, 2021	OREM	84097
EVUT_380395	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 24, 2021	Sep 1, 2021	ROY	84067
EVUT_380394	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 24, 2021	Sep 1, 2021	SARATOGA SPRINGS	84045
EVUT_380416	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Aug 26, 2021	Sep 1, 2021	STANSBURY PARK	84074
EVUT_381202	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 26, 2021	Sep 1, 2021	COTTONWOOD HEIGHTS	84121
EVUT_381242	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 27, 2021	Sep 1, 2021	WEST JORDAN	84081
EVUT_381251	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 27, 2021	Sep 1, 2021	SOUTH WEBER	84405
EVUT_381253	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Aug 27, 2021	Sep 1, 2021	MILLCREEK	84109
EVUT_381266	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 977.00	Aug 30, 2021	Sep 1, 2021	EAGLE MOUNTAIN	84005
EVUT_381457	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 303.35	Sep 1, 2021	Sep 1, 2021	SOUTH SALT LAKE	84115
EVUT_378872	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 13, 2021	Sep 10, 2021	HERRIMAN	84096
EVUT_380210	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 19, 2021	Sep 10, 2021	SALT LAKE CITY	84106
EVUT_381270	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Aug 30, 2021	Sep 10, 2021	SALT LAKE CITY	84103
EVUT_381881	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 3, 2021	Sep 10, 2021	SOUTH JORDAN	84009
EVUT_381869	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 550.00	Sep 3, 2021	Sep 10, 2021	FARR WEST	84404
EVUT_382502	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Sep 7, 2021	Sep 10, 2021	DRAPER	84020
EVUT_382733	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 7, 2021	Sep 10, 2021	DRAPER	84020
EVUT_371779	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 15, 2021	Sep 13, 2021	WOODS CROSS	84087
EVUT_372472	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 23, 2021	Sep 13, 2021	HIGHLAND	84003
EVUT_372998	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jun 30, 2021	Sep 13, 2021	WOODS CROSS	84087
EVUT_373358	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jul 2, 2021	Sep 13, 2021	LAYTON	84040
EVUT_374729	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Jul 21, 2021	Sep 13, 2021	HIGHLAND	84003
EVUT_375817	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jul 29, 2021	Sep 13, 2021	BLUFFDALE	84065
EVUT_377440	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 539.00	Aug 3, 2021	Sep 13, 2021	SALT LAKE CITY	84103
EVUT_377933	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 459.00	Aug 5, 2021	Sep 13, 2021	WEST VALLEY CITY	84128
EVUT_375807	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 399.00	Aug 6, 2021	Sep 13, 2021	BLUFFDALE	84065
EVUT_377981	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Aug 6, 2021	Sep 13, 2021	MIDVALE	84047
EVUT_378885	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 13, 2021	Sep 13, 2021	SANDY	84092
EVUT_379197	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Aug 19, 2021	Sep 13, 2021	SALT LAKE CITY	84105
EVUT_380429	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 24, 2021	Sep 13, 2021	SOUTH JORDAN	84009
EVUT_380488	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Aug 26, 2021	Sep 13, 2021	DRAPER	84020
EVUT_380460	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 26, 2021	Sep 13, 2021	MILLCREEK	84109
EVUT_381237	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Aug 26, 2021	Sep 13, 2021	MIDVALE	84047
EVUT_381254	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 27, 2021	Sep 13, 2021	SOUTH WEBER	84405
EVUT_381278	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 293.00	Aug 30, 2021	Sep 13, 2021	SANDY	84093
EVUT_381275	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 30, 2021	Sep 13, 2021	DRAPER	84020
EVUT_381272	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 359.00	Aug 30, 2021	Sep 13, 2021	DRAPER	84020
EVUT_381264	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 399.99	Aug 30, 2021	Sep 13, 2021	SALT LAKE CITY	84106
EVUT_382500	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 7, 2021	Sep 13, 2021	SOUTH JORDAN	84095
EVUT_382499	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 629.10	Sep 7, 2021	Sep 13, 2021	WEST JORDAN	84088
EVUT_382497	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 297.98	Sep 7, 2021	Sep 13, 2021	AMERICAN FORK	84003
EVUT_382495	EV Level 2 Charger (Residential)	1	1	$ 128.99	$ 171.99	Sep 7, 2021	Sep 13, 2021	WEST JORDAN	84081
EVUT_382489	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 459.00	Sep 7, 2021	Sep 13, 2021	COTTONWOOD HEIGHTS	84121
EVUT_382754	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 619.00	Sep 8, 2021	Sep 13, 2021	SUMMIT COUNTY	84098
EVUT_383098	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 299.99	Sep 10, 2021	Sep 13, 2021	GRANTSVILLE	84029
EVUT_382763	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Sep 10, 2021	Sep 13, 2021	SOUTH JORDAN	84095
EVUT_380432	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 625.00	Aug 24, 2021	Sep 13, 2021	SALT LAKE CITY	84106
EVUT_375819	EV Level 2 Charger (Residential)	1	1	$ 162.75	$ 217.00	Jul 29, 2021	Sep 14, 2021	SOUTH JORDAN	84009
EVUT_359761	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 350.00	Mar 10, 2021	Sep 17, 2021	IVINS	84738
EVUT_381268	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 30, 2021	Sep 17, 2021	WEST POINT	84015
EVUT_383069	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 650.00	Sep 10, 2021	Sep 17, 2021	TAYLORSVILLE	84129
EVUT_383204	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 15, 2021	Sep 17, 2021	WEST JORDAN	84081
EVUT_383202	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,000.00	Sep 15, 2021	Sep 17, 2021	MAGNA	84044
EVUT_384455	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 16, 2021	Sep 17, 2021	DRAPER	84020

EV Program Prescriptive Incentives (2021 Budget Funds)

Project Name	Measure_Name	Quantity	Number of Ports	Customer Incentive	Measure Cost	Creation Date	Payment Creation Date	Site City	Site Postal Code
EVUT_384444	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 346.60	Sep 16, 2021	Sep 17, 2021	MILLCREEK	84107
EVUT_382755	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Sep 8, 2021	Sep 23, 2021	MOUNTAIN GREEN	84050
EVUT_384479	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 459.00	Sep 17, 2021	Sep 23, 2021	NORTH LOGAN	84341
EVUT_384478	EV Level 2 Charger (Residential)	1	1	$ 164.25	$ 219.00	Sep 17, 2021	Sep 23, 2021	SOUTH JORDAN	84009
EVUT_384489	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 20, 2021	Sep 23, 2021	SANDY	84070
EVUT_384660	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 273.60	Sep 20, 2021	Sep 23, 2021	SOUTH JORDAN	84009
EVUT_384490	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,150.00	Sep 20, 2021	Sep 23, 2021	SALT LAKE CITY	84103
EVUT_384806	EV Level 2 Charger (Residential)	1	1	$ 149.99	$ 199.99	Sep 21, 2021	Sep 23, 2021	DRAPER	84020
EVUT_384446	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 488.98	Sep 16, 2021	Sep 27, 2021	WEST HAVEN	84401
EVUT_384439	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Sep 16, 2021	Sep 27, 2021	COTTONWOOD HEIGHTS	84093
EVUT_384894	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 360.40	Sep 22, 2021	Sep 27, 2021	BLUFFDALE	84065
EVUT_385215	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 23, 2021	Sep 27, 2021	SALT LAKE CITY	84103
EVUT_385212	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 473.99	Sep 23, 2021	Sep 27, 2021	SALT LAKE CITY	84102
EVUT_385207	EV Level 2 Charger (Residential)	1	1	$ 149.25	$ 199.00	Sep 23, 2021	Sep 27, 2021	EAGLE MOUNTAIN	84005
EVUT_385202	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Sep 23, 2021	Sep 27, 2021	HERRIMAN	84096
EVUT_381274	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 30, 2021	Oct 4, 2021	LAYTON	84040
EVUT_382491	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 300.00	Sep 7, 2021	Oct 4, 2021	IVINS	84738
EVUT_383208	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 15, 2021	Oct 4, 2021	SALT LAKE CITY	84108
EVUT_385238	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 27, 2021	Oct 4, 2021	AMERICAN FORK	84003
EVUT_385235	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 419.00	Sep 27, 2021	Oct 4, 2021	WEST VALLEY CITY	84128
EVUT_385231	EV Level 2 Charger (Residential)	1	1	$ 149.25	$ 199.00	Sep 27, 2021	Oct 4, 2021	MONA	84645
EVUT_385377	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 626.60	Sep 28, 2021	Oct 4, 2021	MAPLETON	84664
EVUT_385371	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Sep 28, 2021	Oct 4, 2021	WEST VALLEY CITY	84128
EVUT_385738	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 305.00	Sep 28, 2021	Oct 4, 2021	SOUTH SALT LAKE	84115
EVUT_385758	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 30, 2021	Oct 4, 2021	MAPLETON	84664
EVUT_378194	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 12, 2021	Oct 11, 2021	SALT LAKE CITY	84108
EVUT_382804	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Sep 10, 2021	Oct 11, 2021	SALT LAKE CITY	84116
EVUT_386503	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 299.00	Oct 7, 2021	Oct 11, 2021	SALT LAKE CITY	84109
EVUT_386336	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Oct 7, 2021	Oct 11, 2021	HOLLADAY	84117
EVUT_386095	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Oct 7, 2021	Oct 11, 2021	PARK CITY	84098
EVUT_386080	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 279.00	Oct 7, 2021	Oct 11, 2021	MILLCREEK	84109
EVUT_386078	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Oct 7, 2021	Oct 11, 2021	BLUFFDALE	84065
EVUT_386076	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 7, 2021	Oct 11, 2021	WEST JORDAN	84081
EVUT_386075	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 459.00	Oct 7, 2021	Oct 11, 2021	WEST VALLEY CITY	84128
EVUT_386073	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 539.00	Oct 7, 2021	Oct 11, 2021	ROY	84067
EVUT_378011	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 489.99	Aug 9, 2021	Oct 11, 2021	EAGLE MOUNTAIN	84005
EVUT_373701	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jul 8, 2021	Oct 18, 2021	HERRIMAN	84096
EVUT_373708	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 600.00	Jul 12, 2021	Oct 18, 2021	SYRACUSE	84075
EVUT_377419	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 800.00	Aug 3, 2021	Oct 18, 2021	MAPLETON	84664
EVUT_380476	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 359.00	Aug 26, 2021	Oct 18, 2021	TAYLORSVILLE	84129
EVUT_385245	EV Level 2 Charger (Residential)	1	1	$ 128.25	$ 171.00	Sep 27, 2021	Oct 18, 2021	LAYTON	84040
EVUT_386074	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 799.00	Oct 7, 2021	Oct 18, 2021	EAGLE MOUNTAIN	84005
EVUT_387372	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 426.50	Oct 11, 2021	Oct 18, 2021	KAMAS	84036
EVUT_387371	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 11, 2021	Oct 18, 2021	AMERICAN FORK	84003
EVUT_387954	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 13, 2021	Oct 18, 2021	HUNTSVILLE	84317
EVUT_387965	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 14, 2021	Oct 18, 2021	SALT LAKE CITY	84103
EVUT_387977	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 574.00	Oct 15, 2021	Oct 18, 2021	MILLCREEK	84106
EVUT_387510	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 645.00	Oct 14, 2021	Oct 19, 2021	SARATOGA SPRINGS	84045
EVUT_387976	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Oct 15, 2021	Oct 19, 2021	RIVERTON	84096
EVUT_387985	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 15, 2021	Oct 19, 2021	SARATOGA SPRINGS	84045
EVUT_388075	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 971.85	Oct 18, 2021	Oct 19, 2021	HUNTSVILLE	84317
EVUT_375269	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Jul 20, 2021	Oct 26, 2021	ROY	84067
EVUT_384468	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 459.00	Sep 17, 2021	Oct 26, 2021	HERRIMAN	84096
EVUT_385945	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 751.08	Oct 8, 2021	Oct 26, 2021	PARK CITY	84098
EVUT_388070	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 18, 2021	Oct 26, 2021	COTTONWOOD HEIGHTS	84121
EVUT_388614	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Oct 21, 2021	Oct 26, 2021	SALT LAKE CITY	84105
EVUT_388309	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Oct 21, 2021	Oct 26, 2021	MILLCREEK	84106
EVUT_388203	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 21, 2021	Oct 26, 2021	HOOPER	84315
EVUT_388198	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 21, 2021	Oct 26, 2021	FARMINGTON	84025
EVUT_388109	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 21, 2021	Oct 26, 2021	SALT LAKE CITY	84103
EVUT_388098	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,586.00	Oct 21, 2021	Oct 26, 2021	VINEYARD	84059
EVUT_388199	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Oct 21, 2021	Oct 29, 2021	OREM	84097
EVUT_388871	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 26, 2021	Oct 29, 2021	LAYTON	84041
EVUT_388812	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 26, 2021	Oct 29, 2021	PARK CITY	84098
EVUT_388811	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Oct 26, 2021	Oct 29, 2021	HOLLADAY	84121
EVUT_388810	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Oct 26, 2021	Oct 29, 2021	WEST JORDAN	84084
EVUT_388805	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 459.00	Oct 26, 2021	Oct 29, 2021	SANDY	84093
EVUT_388803	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,965.00	Oct 26, 2021	Oct 29, 2021	SALT LAKE CITY	84108
EVUT_373728	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,318.00	Jul 12, 2021	Nov 10, 2021	CLINTON	84015
EVUT_389697	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 3, 2021	Nov 10, 2021	IVINS	84738
EVUT_389693	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Nov 3, 2021	Nov 10, 2021	SALT LAKE CITY	84108
EVUT_389629	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,446.00	Nov 3, 2021	Nov 10, 2021	RIVERTON	84065
EVUT_389628	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 749.68	Nov 3, 2021	Nov 10, 2021	DRAPER	84020
EVUT_389505	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 587.39	Nov 3, 2021	Nov 10, 2021	HERRIMAN	84096
EVUT_388758	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 619.00	Nov 3, 2021	Nov 10, 2021	PARK CITY	84098
EVUT_392436	EV Level 2 Charger (Residential)	1	1	$ 149.25	$ 199.00	Nov 5, 2021	Nov 10, 2021	WEST BOUNTIFUL	84087
EVUT_389719	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 3, 2021	Nov 11, 2021	SARATOGA SPRINGS	84045
EVUT_392417	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 649.00	Nov 4, 2021	Nov 11, 2021	SOUTH JORDAN	84009
EVUT_392453	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 9, 2021	Nov 11, 2021	DRAPER	84020

EV Program Prescriptive Incentives (2021 Budget Funds)

Project Name	Measure_Name	Quantity	Number of Ports	Customer Incentive	Measure Cost	Creation Date	Payment Creation Date	Site City	Site Postal Code
EVUT_392450	EV Level 2 Charger (Residential)	1	1	$ 149.25	$ 199.00	Nov 9, 2021	Nov 11, 2021	CENTERVILLE	84014
EVUT_392448	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 9, 2021	Nov 11, 2021	SANDY	84092
EVUT_392447	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 309.99	Nov 9, 2021	Nov 11, 2021	DRAPER	84020
EVUT_387973	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 619.00	Oct 15, 2021	Nov 17, 2021	SANDY	84093
EVUT_392633	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 10, 2021	Nov 17, 2021	HIGHLAND	84003
EVUT_381447	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Sep 1, 2021	Nov 18, 2021	TOOELE	84074
EVUT_393906	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Nov 17, 2021	Nov 18, 2021	MILLCREEK	84124
EVUT_393900	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 459.00	Nov 17, 2021	Nov 18, 2021	SALT LAKE CITY	84103
EVUT_393726	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 17, 2021	Nov 18, 2021	LAYTON	84041
EVUT_393723	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,354.00	Nov 17, 2021	Nov 18, 2021	OGDEN	84403
EVUT_393720	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Nov 17, 2021	Nov 18, 2021	PARK CITY	84098
EVUT_393641	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,474.00	Nov 17, 2021	Nov 18, 2021	IVINS	84738
EVUT_393599	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 17, 2021	Nov 18, 2021	SANDY	84094
EVUT_394406	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 18, 2021	Nov 18, 2021	SOUTH JORDAN	84009
EVUT_381450	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Sep 1, 2021	Nov 23, 2021	DRAPER	84020
EVUT_386071	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Oct 8, 2021	Nov 23, 2021	MOUNTAIN GREEN	84050
EVUT_387364	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 425.00	Oct 8, 2021	Nov 23, 2021	LAYTON	84041
EVUT_388813	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 330.99	Oct 26, 2021	Nov 23, 2021	SANTAQUIN	84655
EVUT_389684	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 3, 2021	Nov 23, 2021	PARK CITY	84060
EVUT_394168	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 350.00	Nov 17, 2021	Nov 23, 2021	OREM	84057
EVUT_394434	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 950.00	Nov 19, 2021	Nov 23, 2021	SALT LAKE CITY	84102
EVUT_394705	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,450.00	Nov 22, 2021	Nov 23, 2021	SALT LAKE CITY	84105
EVUT_394719	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 22, 2021	Nov 29, 2021	GRANTSVILLE	84029
EVUT_394765	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Nov 23, 2021	Nov 29, 2021	VINEYARD	84059
EVUT_394799	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Nov 23, 2021	Nov 29, 2021	NORTH OGDEN	84414
EVUT_394833	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Nov 29, 2021	Dec 1, 2021	SARATOGA SPRINGS	84045
EVUT_395437	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 30, 2021	Dec 1, 2021	SANDY	84092
EVUT_395319	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 30, 2021	Dec 1, 2021	EAGLE MOUNTAIN	84005
EVUT_378199	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Aug 12, 2021	Dec 8, 2021	CENTERVILLE	84014
EVUT_381241	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 1,200.00	Aug 27, 2021	Dec 8, 2021	SANDY	84094
EVUT_386334	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 619.00	Oct 7, 2021	Dec 8, 2021	BLUFFDALE	84065
EVUT_395451	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 320.00	Nov 30, 2021	Dec 8, 2021	PARK CITY	84060
EVUT_395898	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 540.55	Dec 2, 2021	Dec 8, 2021	SALT LAKE CITY	84108
EVUT_395902	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 428.99	Dec 2, 2021	Dec 8, 2021	MILLCREEK	84109
EVUT_395900	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 636.00	Dec 2, 2021	Dec 8, 2021	LAYTON	84040
EVUT_395333	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Nov 29, 2021	Dec 8, 2021	LAYTON	84040
EVUT_396146	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 8, 2021	Dec 8, 2021	WEST HAVEN	84401
EVUT_395328	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 574.00	Nov 29, 2021	Dec 10, 2021	DRAPER	84020
EVUT_395316	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 550.00	Nov 29, 2021	Dec 10, 2021	GRANTSVILLE	84029
EVUT_395308	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 569.00	Nov 29, 2021	Dec 10, 2021	MILLCREEK	84124
EVUT_395307	EV Level 2 Charger (Residential)	1	1	$ 180.00	$ 240.00	Nov 29, 2021	Dec 10, 2021	DRAPER	84020
EVUT_395185	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 699.00	Nov 29, 2021	Dec 10, 2021	PLAIN CITY	84404
EVUT_395441	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 599.00	Nov 30, 2021	Dec 10, 2021	DRAPER	84020
EVUT_395709	EV Level 2 Charger (Residential)	1	1	$ 200.00	$ 500.00	Dec 1, 2021	Dec 10, 2021	SANDY	84092
EVUT_331509	EV Level 2 Charger (single port)	1	1	$ 434.03	$ 578.70	Aug 13, 2020	Oct 1, 2020	Salt Lake City	84105
EVUT_340887	EV Level 2 Charger (single port)	1	1	$ 321.75	$ 429.00	Oct 6, 2020	Oct 16, 2020	SALT LAKE CITY	84116
EVUT_340898	EV Level 2 Charger (single port)	1	1	$ 381.38	$ 508.50	Oct 6, 2020	Oct 23, 2020	OREM	84057
EVUT_345507	EV Level 2 Charger (single port)	3	3	$ 1,023.75	$ 1,365.00	Nov 5, 2020	Nov 20, 2020	SALT LAKE CITY	84101
EVUT_345628	EV Level 2 Charger (single port)	7	7	$ 2,357.77	$ 3,143.70	Nov 6, 2020	Nov 20, 2020	Clearfield	84015
EVUT_346384	EV Level 2 Charger (single port)	1	1	$ 481.28	$ 641.70	Nov 17, 2020	Nov 20, 2020	HOLLADAY	84121
EVUT_340894	EV Level 2 Charger (single port)	2	2	$ 1,069.21	$ 1,425.62	Oct 6, 2020	Jan 4, 2021	CENTERVILLE	84014
EVUT_340894	EV Level 2 Charger (single port)	4	4	$ 1,347.30	$ 1,796.40	Oct 6, 2020	Jan 4, 2021	CENTERVILLE	84014
EVUT_349085	EV Level 2 Charger (single port)	1	1	$ 299.99	$ 399.99	Dec 7, 2020	Jan 4, 2021	Salt Lake City	84104
EVUT_347998	EV Level 2 Charger (single port)	2	2	$ 673.65	$ 898.20	Dec 1, 2020	Jan 13, 2021	WEST VALLEY CITY	84119
EVUT_349373	EV Level 2 Charger (single port)	38	38	$ 38,000.00	$ 53,124.00	Dec 10, 2020	Jan 13, 2021	SALT LAKE CITY	84111
EVUT_349394	EV Level 2 Charger (single port)	1	1	$ 654.08	$ 872.10	Dec 11, 2020	Jan 13, 2021	MIDVALE	84047
EVUT_350724	EV Level 2 Charger (single port)	6	6	$ 2,288.25	$ 3,051.00	Dec 17, 2020	Jan 13, 2021	COTTONWOOD HEIGHTS	84121
EVUT_350726	EV Level 2 Charger (single port)	1	1	$ 1,000.00	$ 2,300.00	Dec 17, 2020	Jan 13, 2021	OREM	84058
EVUT_350756	EV Level 2 Charger (single port)	1	1	$ 336.83	$ 449.10	Dec 17, 2020	Jan 13, 2021	CEDAR CITY	84720
EVUT_351999	EV Level 2 Charger (single port)	1	1	$ 381.38	$ 508.50	Dec 21, 2020	Jan 13, 2021	SALT LAKE CITY	84116
EVUT_351999	EV Level 2 Charger (single port)	10	10	$ 3,368.25	$ 4,491.00	Dec 21, 2020	Jan 13, 2021	SALT LAKE CITY	84116
EVUT_353707	EV Level 2 Charger (single port)	1	1	$ 456.75	$ 609.00	Jan 4, 2021	Jan 13, 2021	WEST HAVEN	84401
EVUT_355452	EV Level 2 Charger (single port)	4	4	$ 1,347.30	$ 1,796.40	Jan 21, 2021	Feb 8, 2021	WOODS CROSS	84087
EVUT_355452	EV Level 2 Charger (single port)	2	2	$ 762.75	$ 1,017.00	Jan 21, 2021	Feb 8, 2021	WOODS CROSS	84087
EVUT_356338	EV Level 2 Charger (single port)	1	1	$ 381.38	$ 508.50	Jan 29, 2021	Feb 8, 2021	SALT LAKE CITY	84104
EVUT_357200	EV Level 2 Charger (single port)	1	1	$ 428.63	$ 571.50	Feb 9, 2021	Feb 19, 2021	SPRINGDALE	84767
EVUT_357200	EV Level 2 Charger (single port)	1	1	$ 375.00	$ 500.00	Feb 9, 2021	Feb 19, 2021	SPRINGDALE	84767
EVUT_357200	EV Level 2 Charger (single port)	3	3	$ 1,010.47	$ 1,347.30	Feb 9, 2021	Feb 19, 2021	SPRINGDALE	84767
EVUT_354293	EV Level 2 Charger (single port)	4	4	$ 4,000.00	$ 8,960.00	Jan 11, 2021	Mar 1, 2021	SOUTH SALT LAKE	84115
EVUT_354103	EV Level 2 Charger (single port)	1	1	$ 347.63	$ 463.50	Jan 8, 2021	Mar 8, 2021	MAGNA	84044
EVUT_354103	EV Level 2 Charger (single port)	5	5	$ 1,684.13	$ 2,245.50	Jan 8, 2021	Mar 8, 2021	MAGNA	84044
EVUT_358400	EV Level 2 Charger (single port)	10	10	$ 3,750.00	$ 5,000.00	Feb 24, 2021	Mar 12, 2021	CENTERVILLE	84014
EVUT_358419	EV Level 2 Charger (single port)	1	1	$ 375.00	$ 500.00	Feb 24, 2021	Mar 12, 2021	MAGNA	84044
EVUT_358406	EV Level 2 Charger (single port)	3	3	$ 1,010.47	$ 1,347.30	Feb 24, 2021	Mar 23, 2021	CEDAR CITY	84720
EVUT_359957	EV Level 2 Charger (single port)	2	2	$ 762.75	$ 1,017.00	Mar 16, 2021	Apr 2, 2021	SALT LAKE CITY	84104
EVUT_360757	EV Level 2 Charger (single port)	1	1	$ 491.25	$ 655.00	Mar 22, 2021	Apr 2, 2021	SALT LAKE CITY	84103
EVUT_359961	EV Level 2 Charger (single port)	3	3	$ 1,144.13	$ 1,525.50	Mar 16, 2021	Apr 22, 2021	SALT LAKE CITY	84116
EVUT_362511	EV Level 2 Charger (single port)	1	1	$ 347.63	$ 463.50	Apr 14, 2021	Apr 22, 2021	EAGLE MOUNTAIN	84005
EVUT_361951	EV Level 2 Charger (single port)	2	2	$ 673.65	$ 898.20	Apr 7, 2021	Apr 28, 2021	OREM	84057

EV Program Prescriptive Incentives (2021 Budget Funds)

Project Name	Measure_Name	Quantity	Number of Ports	Customer Incentive	Measure Cost	Creation Date	Payment Creation Date	Site City	Site Postal Code
EVUT_352002	EV Level 2 Charger (single port)	10	10	$ 3,750.00	$ 5,000.00	Dec 21, 2020	May 11, 2021	SALT LAKE CITY	84108
EVUT_359519	EV Level 2 Charger (single port)	1	1	$ 524.25	$ 699.00	Mar 8, 2021	May 11, 2021	MIDVALE	84047
EVUT_363151	EV Level 2 Charger (single port)	12	12	$ 4,500.00	$ 6,000.00	Apr 14, 2021	May 11, 2021	MILLCREEK	84106
EVUT_367342	EV Level 2 Charger (single port)	1	1	$ 444.83	$ 593.10	May 10, 2021	May 19, 2021	South Jordan	84009
EVUT_367343	EV Level 2 Charger (single port)	1	1	$ 347.63	$ 463.50	May 10, 2021	May 19, 2021	HERRIMAN	84096
EVUT_367344	EV Level 2 Charger (single port)	1	1	$ 327.38	$ 436.50	May 10, 2021	May 19, 2021	MAGNA	84044
EVUT_367345	EV Level 2 Charger (single port)	1	1	$ 336.83	$ 449.10	May 10, 2021	May 28, 2021	SALT LAKE CITY	84115
EVUT_367341	EV Level 2 Charger (single port)	20	20	$ 7,500.00	$ 10,000.00	May 10, 2021	May 28, 2021	DELTA	84624
EVUT_368100	EV Level 2 Charger (single port)	8	8	$ 3,051.00	$ 4,068.00	May 17, 2021	May 28, 2021	SALT LAKE CITY	84104
EVUT_368097	EV Level 2 Charger (single port)	2	2	$ 1,316.10	$ 1,754.80	May 17, 2021	Jun 3, 2021	LA VERKIN	84745
EVUT_369200	EV Level 2 Charger (single port)	1	1	$ 336.83	$ 449.10	May 24, 2021	Jun 3, 2021	SALT LAKE CITY	84101
EVUT_371756	EV Level 2 Charger (single port)	1	1	$ 347.63	$ 463.50	Jun 14, 2021	Jun 28, 2021	MAGNA	84044
EVUT_373007	EV Level 2 Charger (single port)	1	1	$ 381.38	$ 508.50	Jun 29, 2021	Jul 2, 2021	MIDVALE	84047
EVUT_374724	EV Level 2 Charger (single port)	1	1	$ 347.63	$ 463.50	Jul 13, 2021	Jul 27, 2021	CLINTON	84015
EVUT_370807	EV Level 2 Charger (single port)	2	2	$ 762.75	$ 1,017.00	Jun 3, 2021	Jul 27, 2021	PARK CITY	84060
EVUT_372986	EV Level 2 Charger (single port)	2	2	$ 750.00	$ 1,000.00	Jun 28, 2021	Aug 13, 2021	West Jordan	84088
EVUT_379901	EV Level 2 Charger (single port)	1	1	$ 1,000.00	$ 2,569.00	Aug 17, 2021	Aug 30, 2021	SOUTH SALT LAKE	84106
EVUT_375806	EV Level 2 Charger (single port)	20	20	$ 7,500.00	$ 10,000.00	Jul 27, 2021	Sep 13, 2021	FARMINGTON	84025
EVUT_377704	EV Level 2 Charger (single port)	1	1	$ 486.75	$ 649.00	Sep 3, 2021	Sep 17, 2021	OREM	84057
EVUT_381896	EV Level 2 Charger (single port)	2	2	$ 2,016.00	$ 2,688.00	Sep 10, 2021	Sep 17, 2021	OGDEN	84401
EVUT_386098	EV Level 2 Charger (single port)	1	1	$ 381.38	$ 508.50	Oct 5, 2021	Oct 11, 2021	Park City	84098
EVUT_386324	EV Level 2 Charger (single port)	4	4	$ 4,000.00	$ 17,000.00	Oct 5, 2021	Oct 18, 2021	SALT LAKE CITY	84104
EVUT_392419	EV Level 2 Charger (single port)	1	1	$ 347.63	$ 463.50	Nov 4, 2021	Nov 11, 2021	Farmington	84025
EVUT_392412	EV Level 2 Charger (single port)	8	8	$ 3,012.75	$ 4,017.00	Nov 4, 2021	Nov 18, 2021	WEST JORDAN	84088
EVUT_392416	EV Level 2 Charger (single port)	1	1	$ 381.38	$ 508.50	Nov 4, 2021	Nov 18, 2021	OREM	84058
EVUT_393609	EV Level 2 Charger (single port)	2	2	$ 762.75	$ 1,017.00	Nov 11, 2021	Nov 23, 2021	SALT LAKE CITY	84104
EVUT_393855	EV Level 2 Charger (single port)	13	13	$ 4,957.88	$ 6,610.50	Nov 15, 2021	Nov 23, 2021	CENTERVILLE	84014
EVUT_393607	EV Level 2 Charger (single port)	2	2	$ 673.65	$ 898.20	Nov 11, 2021	Nov 29, 2021	Salt Lake City	84111
EVUT_363152	EV Level 2 Charger (single port)	1	1	$ 375.00	$ 500.00	Apr 14, 2021	Nov 29, 2021	NORTH OGDEN	84414
EVUT_394766	EV Level 2 Charger (single port)	1	1	$ 1,000.00	$ 4,008.00	Nov 23, 2021	Dec 8, 2021	SALT LAKE CITY	84111
EVUT_394793	EV Level 2 Charger (single port)	1	1	$ 1,000.00	$ 2,440.68	Nov 23, 2021	Dec 8, 2021	PARK CITY	84098
EVUT_395335	EV Level 2 Charger (single port)	18	18	$ 18,000.00	$ 63,000.00	Nov 29, 2021	Dec 16, 2021	Draper	84020
EVUT_395369	EV Level 2 Charger (single port)	2	2	$ 1,387.50	$ 1,850.00	Nov 29, 2021	Dec 16, 2021	OREM	84058
EVUT_395370	EV Level 2 Charger (single port)	2	2	$ 847.50	$ 1,130.00	Nov 29, 2021	Dec 16, 2021	MIDVALE	84047
EVUT_395446	EV Level 2 Charger (single port)	9	9	$ 6,412.50	$ 8,550.00	Nov 30, 2021	Dec 20, 2021	WEST JORDAN	84088
EVUT_395448	EV Level 2 Charger (single port)	6	6	$ 2,250.00	$ 3,000.00	Nov 30, 2021	Dec 20, 2021	SALT LAKE CITY	84104
EVUT_399410	EV Level 2 Charger (single port)	2	2	$ 2,000.00	$ 4,214.84	Dec 20, 2021	Dec 20, 2021	SOUTH JORDAN	84095
EVUT_399411	EV Level 2 Charger (single port)	2	2	$ 2,000.00	$ 4,214.84	Dec 20, 2021	Dec 20, 2021	SALT LAKE CITY	84115
EVUT_337757	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Sep 24, 2020	Oct 1, 2020	SALT LAKE CITY	84108
EVUT_337698	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Sep 24, 2020	Oct 1, 2020	SALT LAKE CITY	84102
EVUT_337804	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Sep 24, 2020	Oct 15, 2020	EDEN	84310
EVUT_337576	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Sep 24, 2020	Oct 15, 2020	CEDAR HILLS	84062
EVUT_330542	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Aug 3, 2020	Oct 22, 2020	COTTONWOOD HEIGHTS	84121
EVUT_342833	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Oct 14, 2020	Oct 30, 2020	NORTH SALT LAKE	84054
EVUT_342854	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Oct 16, 2020	Oct 30, 2020	TAYLORSVILLE	84129
EVUT_343313	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Oct 22, 2020	Oct 30, 2020	SOUTH SALT LAKE	84115
EVUT_343737	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Oct 22, 2020	Oct 30, 2020	SOUTH JORDAN	84009
EVUT_339206	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Sep 28, 2020	Nov 16, 2020	WOODS CROSS	84087
EVUT_340297	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Oct 2, 2020	Nov 16, 2020	LINDON	84042
EVUT_341035	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Oct 7, 2020	Nov 16, 2020	MILLCREEK	84107
EVUT_341972	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Oct 9, 2020	Nov 16, 2020	OGDEN	84401
EVUT_345653	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Nov 9, 2020	Nov 16, 2020	SANDY	84070
EVUT_342629	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Oct 12, 2020	Nov 20, 2020	SANDY	84092
EVUT_345051	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Nov 4, 2020	Nov 20, 2020	MIDVALE	84070
EVUT_345087	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Nov 4, 2020	Nov 20, 2020	MOUNTAIN GREEN	84050
EVUT_347013	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Nov 23, 2020	Dec 10, 2020	PARK CITY	84098
EVUT_348747	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Dec 7, 2020	Dec 21, 2020	DAMMERON VALLEY	84783
EVUT_349103	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Dec 9, 2020	Dec 21, 2020	SOUTH OGDEN	84405
EVUT_349416	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Dec 14, 2020	Dec 21, 2020	HERRIMAN	84096
EVUT_345040	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Nov 4, 2020	Jan 4, 2021	SALT LAKE CITY	84116
EVUT_350946	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Dec 21, 2020	Jan 4, 2021	COTTONWOOD HEIGHTS	84121
EVUT_352544	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Dec 29, 2020	Jan 19, 2021	SALT LAKE CITY	84109
EVUT_353529	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Dec 30, 2020	Jan 19, 2021	SALT LAKE CITY	84108
EVUT_345034	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Nov 2, 2020	Feb 19, 2021	SALT LAKE CITY	84105
EVUT_350238	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	1		$ 200.00	$ -	Dec 17, 2020	Feb 19, 2021	SALT LAKE CITY	84101
EVUT_336354	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Sep 17, 2020	Oct 1, 2020	SNYDERVILLE	84098
EVUT_337241	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Sep 21, 2020	Oct 1, 2020	SALT LAKE CITY	84116
EVUT_337805	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Sep 24, 2020	Oct 1, 2020	FARR WEST	84404
EVUT_339066	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Sep 28, 2020	Oct 15, 2020	SOUTH JORDAN	84095
EVUT_339244	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Sep 28, 2020	Oct 22, 2020	SOUTH JORDAN	84009
EVUT_342628	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Oct 12, 2020	Oct 22, 2020	SMITHFIELD	84335
EVUT_335217	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Sep 8, 2020	Oct 30, 2020	PARK CITY	84060
EVUT_342938	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Oct 16, 2020	Oct 30, 2020	RIVERTON	84065
EVUT_342927	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Oct 16, 2020	Oct 30, 2020	SANDY	84093
EVUT_343938	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Oct 26, 2020	Nov 16, 2020	HIGHLAND	84003
EVUT_344013	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Nov 2, 2020	Nov 16, 2020	SANDY	84070
EVUT_345031	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Nov 2, 2020	Nov 16, 2020	PROVIDENCE	84321
EVUT_345652	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Nov 9, 2020	Nov 16, 2020	OGDEN	84404
EVUT_345629	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Nov 9, 2020	Nov 16, 2020	SALT LAKE CITY	84108

EV Program Prescriptive Incentives (2021 Budget Funds)

Project Name	Measure_Name	Quantity	Number of Ports	Customer Incentive	Measure Cost	Creation Date	Payment Creation Date	Site City	Site Postal Code
EVUT_346343	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Nov 16, 2020	Nov 20, 2020	PARK CITY	84060
EVUT_347584	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Nov 30, 2020	Dec 10, 2020	SANDY	84070
EVUT_348676	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Dec 4, 2020	Dec 10, 2020	CENTERVILLE	84014
EVUT_347561	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Nov 30, 2020	Dec 21, 2020	DRAPER	84020
EVUT_347617	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Nov 30, 2020	Jan 4, 2021	PARK CITY	84098
EVUT_350214	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Dec 17, 2020	Jan 4, 2021	MURRAY	84121
EVUT_350764	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Dec 21, 2020	Jan 4, 2021	HIGHLAND	84003
EVUT_350934	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Dec 21, 2020	Jan 4, 2021	OGDEN	84404
EVUT_349940	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Dec 16, 2020	Jan 19, 2021	HERRIMAN	84096
EVUT_352305	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Dec 24, 2020	Jan 19, 2021	NORTH LOGAN	84341
EVUT_353618	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Jan 4, 2021	Jan 19, 2021	COTTONWOOD HEIGHTS	84121
EVUT_353728	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Jan 4, 2021	Jan 19, 2021	SOUTH JORDAN	84009
EVUT_349379	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Dec 10, 2020	Jan 25, 2021	WEST JORDAN	84088
EVUT_353541	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	1		$ 200.00	$ -	Dec 31, 2020	Feb 8, 2021	OREM	84059

Sub-Totals	EV Time of Use Rate option 1 - off peak 7 cents, on peak 22 cents	$ 5,400.00
	EV Time of Use Rate option 2 - off peak 3 cents, on peak 34 cents	$ 5,600.00
	Residential AC Level 2 Charger Incentive Payments	$ 101,048.39
	Non-Residential AC Level 2 Charger Single Port Incentive Payments	$ 159,584.73
	Non-Residential AC Level 2 Charger Multi-Port Incentive Payments	$ 488,482.61
	Non-Residential & Multi-Family DC Fast Charger Incentive Payments	$ 337,389.80
Grand Total		**$ 1,097,505.53**

*Includes EV incentive payments from October 1, 2020 - February 28, 2022

Exhibit 2-B

EV Program Custom Project Committed Funds and Expenditures

EV Program Budget Custom Project Expenditures

Year Committed	Custom Projects	Committed Funds	Year Completed	$ Paid	$ Variance
2017	Project 1	$ 250,000	2018	$ 250,000	$ -
	Project 2	$ 8,000	2019	$ 7,998	$ (2.32)
	Project 3	$ 470,000	2018	$ 456,441	$ (13,558.76)
	Project 4	$ 153,000		$ 153,000	$ -
	Project 5	$ 237,500	2020	$ 237,500	$ -
	Project 6	$ 50,000	2018	$ 50,000	$ -
	Project 7	$ 57,005		$ 56,963	$ (42.05)
	Project 8	$ 69,369		$ 69,369	$ -
	Project 9	$ 65,000		$ 58,047	$ (6,953)
	Total	**$ 1,359,874**	--	**$ 1,339,317.87**	**$ (20,556.13)**
2018	Project 10	$ 308,000	2019	$ 308,000	$ -
	Project 11	$ 70,000		$ 70,000	$ -
	Project 12	$ 120,500		$ 120,500	$ -
	Project 13	$ 500,000	2020	$ 500,000	$ -
	Total	**$ 998,500**	--	**$ 998,500**	**$ -**
2019	Project 14	$ 330,000	2020	$ 330,000	$ -
	Project 15	$ 170,000	2021	$ 117,830.50	$ (52,169.50)
	Project 16	$ 169,439.49	2021	$ 169,439	$ (0.49)
	Total	**$ 669,439.49**	--	**$ 617,269.50**	**$ (52,169.99)**
2020	Project 17	$ 100,000	2021	$ 100,000	$ -
	Project 18	$ 504,418.79	2021	$ 450,000	$ (54,418.79)
	Total	**$ 604,418.79**	--	**$ 550,000**	**$ (54,418.79)**
2021	Project 19	$ 91,500	2021	$ 91,500	$ -
	Project 20	$ 97,535	2021	$ 97,535	$ -
	Project 21	$ 40,000	2021	$ 40,000	$ -
	Project 22	$ 91,125.12	2021	$ 91,125.12	$ -
	Total	**$ 320,160.12**	--	**$ 320,160.12**	**$ -**

Exhibit 2-C

EV Program Custom Project Details Year Over Year

Custom EV Projects Year over Year Committed vs. Completed

Committed Information					Completed Information			
Year Committed	Project #	Description	Equipment type	Incentive	Year Completed	Description	Equipment type	Incentive
2017	Project 1	Installation of an electric bus charger for an electric bus that will provide free public transit throughout a community. The electric bus will reduce traffic congestion and improve carbon emissions.	500 kW Electric Bus Charger	$ 250,000	2018	No change from committed.	No change from committed.	$ 250,000
2017	Project 2	Project 2 covers three aspects of installation and monitoring that include: 1) fees for materials associated with installing charging units in snowy, high-alpine environments; 2) two meters to track monthly usage of Tesla and standard chargers (as this would otherwise not be available,); and 3) develop a comprehensive marketing plan to promote electric vehicle chargers and promote electric vehicles at a resort.	4 AC Level 2 Chargers (single port)	$ 8,000	2019	No change from committed.	No change from committed.	$ 7,998.00
2017	Project 3	The goal of this project is to provide EV charging along major traffic corridors in Utah. DC Fast chargers will be strategically placed along interstate corridor to reduce range anxiety among EV drivers.	6 AC Level 2 Chargers & 6 DC Fast Chargers (single port)	$ 470,000	2018	Acutal project costs were less than intial estimates, resulting in a lower incentive payment.	No change from committed.	$ 456,441
2017	Project 4	This project aims to provide electric vehicle charging for the public and employees at a prominent location in down town Salt Lake City by installing 12 AC Level 2 dual port charging stations, and infrastructure for seven future stations.	12 AC Level 2 Chargers (multi-port)	$ 153,000	2018	No change from committed.	No change from committed.	$ 153,000
2017	Project 5	The goal of this project is to significantly expand and enhance the EV charging infrastructure at a major workplace in the Salt Lake Valley. South Parking Lot: • Five dual-port Level 2 EV chargers which will be pay-for-use and available to the public. • Three dual-port Level 2 EV chargers for fleet and enterprise vehicles. • One Level 3 pay-for-use EV charger in the east-side visitor parking area. If unable to support a Level 3 charger, the plan would be to install an additional dual-port Level 2 EV charger at this location. North Parking Lot: • Two dual-port Level 2 pay-for-use EV chargers which will be available to the public. • Tech Center: We are proposing to have two dual-port Level 2 chargers for state vehicles. We are also proposing to add two pay-for-use dual-port Level 2 chargers that would be in front of the Tech Center and be available for public use. • Multiple EV chargers throughout the campus facilities	18 AC Level 2 Chargers & 1 DC Fast Charger (multi-port)	$ 237,500	2020	No change from committed.	No change from committed.	$ 237,500
2017	Project 6	A city plans to collaborate with commercial and industrial businesses to increase the adoption of electric vehicle purchases within the city and county in order to satisfy growing driver demand; increase property value, complement LEED and Green Building Programs, and achieve the city community fuel, carbon and energy goals. The project strives to use innovations, test new ideas, and pursue interesting opportunities to better understand how consumers think about and use PEVs to further increase the market penetration of PEVs and hybrids. Installed on city property for public use.	2 AC Level 2 Chargers and 1 DC Fast Charger (single port)	$ 50,000	2018	No change from committed.	No change from committed.	$ 50,000
2017	Project 7	The site selected for the EVSE installation is an Electric Vehicle & Roadway (EVR) Research Facility and electrified test track. The EVR is a state-of-the-art research facility at the forefront of electric vehicle charging and roadway technology development. The EVR is the most appropriate location in Rocky Mountain Power's service area to conduct high-level EV research, enhance infrastructure, and promote sustainable transportation. This project proposes to install two AC Level II chargers and one DC Fast Charger. All ports will be equipped with an advanced network and innovative data tracking capabilities. The DC Fast Charger as proposed herein will be the first available to all EV drivers in Northern Utah. The customizable data will provide further research, grants, and contracts as well as fortify existing research to help develop industry partnerships.	2 AC Level 2 Chargers and 1 DC Fast Charger (multi-port)	$ 57,005	2018	Acutal project costs were less than intial estimates, resulting in a lower incentive payment.	No change from committed.	$ 56,963
2017	Project 8	This site plans on installing four new Level 2 charging stations and one DC fast charger to increase the amount of chargers available to the public, and staff. This site currently has two Level 2 dual port charging stations. One located at the main entrance to campus for the public, free of charge in the Visitor Lot. The other charging station is located by the Facilities building for fleet vehicles. Three new level 2 charging stations will be located around the entire main grounds with one located at the West grounds. The DC Fast Charger will be located in the visitor lot in the front of campus. This is to serve the growing public facility and will be positioned with good access to I-15.	4 AC Level 2 Chargers and 1 DC Fast Charger (multi-port)	$ 69,369	2018	No change from committed.	No change from committed.	$ 69,369
2017	Project 9	This site intends to install EVSE in the parking lot next to an LEED Platinum certified Building. This project involves installing one DC Fast Charger under the solar canopy in the parking lot, and one dual port AC Level 2 charger.	1 AC Level 2 Charger and 1 DC Fast Charger (multi-port)	$ 65,000	2018	Minor change in project scope	AC Level 2 charger was not installed	$ 58,047
2018	Project 10	A major City will be installing a city-wide system of EV equipment for residents, guests, travelers, and ride-share drivers. The City is in a key strategic position to embark on such a wide-ranging project. The City is centrally located in the Wasatch Front and has notable popular attractions within its borders which attract a considerable amount of vehicles. The city experiences significant air pollution during bad inversion events in the winter and ozone buildup in the summer. To mitigate these effects, the city believes that by providing EV equipment on a city-wide scale, residents will be encouraged to adopt zero-emissions vehicles as a way to improve air quality.	44 AC Level 2 Charging Ports and 2 DC Fast Charging Ports	$ 308,000	2019	No change from committed.	No change from committed.	$ 308,000

Custom EV Projects Year over Year Committed vs. Completed

Committed Information					Completed Information			
Year Committed	Project #	Description	Equipment type	Incentive	Year Completed	Description	Equipment type	Incentive
2018	Project 11	A City is in the final stages of completing a new 130,000 sq-ft Public Works facility. The City has been evaluating and preparing to transition to electric fleet vehicles and is preparing to install charging stations at the new facility to service residents, employees, and fleet vehicles.	6 AC Level 2 Charging Ports and 1 DC Fast Charging Port	$ 70,000	2019	No change from committed.	No change from committed.	$ 70,000
2018	Project 12	A County is committed to leading sustainability actions that balance their fiduciary responsibility to taxpayers with stewardship of our extraordinary natural surroundings, while aligning with partners who have common goals to serve the public. This custom project provides an opportunity for the County and Rocky Mountain Power to partner together in service to residents, local governments, and businesses by expanding the EV charging infrastructure in the County. A DC Fast charger was selected for installation in to fill the gap in charging stations along the east-west Interstate 80 corridor. Level 2 chargers were selected for their lower cost and ease of installation to serve the County fleet as well as residents. This project will provide EV charging infrastructure in the County where little, if any, EV charging exists. In so doing, the County and other municipal governments will be able to deploy more EVs that eliminate tailpipe emissions and lower annual operating costs; provide charging for County employees as well as residents, and set an example for other businesses to provide charging stations.	12 AC Level 2 Charging Ports and 1 DC Fast Charger Port	$ 120,500	2019	No change from committed.	No change from committed.	$ 120,500
2018	Project 13	A public transit group will be transitioning to electric buses. The chargers will be used for on-route use and battery charging while parked in bus depots.	Two 500 kW Electric Bus Chargers and 5 DC Fast Charging Ports	$ 500,000	2020	No change from committed.	No change from committed.	$ 500,000
2019	Project 14	A major healthcare provider is committed to provide vehicle charging to its customers and caregivers. Its goal is to install EV charging at all of its campuses, clinics and business locations. The business is committed to maintaining a consistent model and technology for ease of our customers, maintenance, and data. The equipment also provides us with the needed billing functionality required for Stark laws regarding our physician population. The project will include 66 AC Level 2 Chargers at 33 different locations.	66 AC Level 2 Charging Ports	$ 330,000	2020	Equipment installed at 23 different locations instead of 33 different locations.	64 AC Level 2 chargers	$ 330,000
2019	Project 15	A city is planning to install 45 AC Level 2 electric vehicle chargers. The city has a goal to promote elecrification and wants charging to convenient for residents and visitors	45 AC Level 2 Charging Ports	$ 170,000	2021	Installed fewer charging stations than original scope, resulting in lower incentive.	39 AC Level 2 chargers	$ 117,830.50
2019	Project 16	A government agency will be installing several electric vehicle chargers throughout the state of Utah. Specific sites have been identified in areas where electric vehicle charging is lacking. The intent of this project is to allow EV drivers to be able to charge throughout the state.	18 AC Level 2 Charging Ports and 10 DC Fast Charger Port	$ 169,439.49	2021	Installed more charging stations than original scope, but incentive remained the same.	22 Level 2 chargers, 12 DC Fast Charger	$ 169,439.00
2020	Project 17	A business along I-80 is planning to install a 120 kW DC Fast charger to accommodate interstate travel for electric vehicles. The charger will paired with solar and batteries for an innovative EV Charging project.	1 DC Fast Charger Port	$ 100,000	2021	Installed additional charging stations than original scope, but incentive remained the same.	2 DC Fast Chargers	$ 100,000.00
2020	Project 18	A public transit group will be transitioning to electric buses. The chargers will be used for battery charging while parked in bus depots.	16 DC Fast Charging Ports	$ 504,418.79	2021	Installed fewer charging stations than original scope, resulting in lower incentive.	15 DC Fast Charging ports	$ 450,000.00
2021	Project 19	Installation of DC Fast Chargers and Level 2 chargers at grocery stores along the Wasatch Front. Project will also include installing level 2 chargers at their corporate office.	10 AC Level 2 chargers; 4-DC Fast Chargers	$ 91,500	2021	No change from committed.	No change from committed.	$ 91,500
2021	Project 20	Healthcare provider to install EV chargers at medical clinics and hospital throughout Utah.	24 AC Level 2	$ 97,535	2021	No change from committed.	No change from committed.	$ 97,535
2021	Project 21	School District EV chargers for student busses	4 DC Fast Chargers	$ 40,000	2021	No change from committed.	No change from committed.	$ 40,000
2021	Project 22	Installation of EV chargers at various county government locations. Electric vehicle chargers will be used for fleet vehicles, employees, visitors, and public.	48 EV chargers	$ 91,125.12	2021	No change from committed.	No change from committed.	$ 91,125.12

Exhibit 2-D

EV Program Actual SAP Postings by Calendar Year

Actual SAP Postings by Calendar Year for EV Program

EV Program Actual Postings in SAP by Calendar Year							
Cost Category	**CY 2017**	**CY 2018***	**CY 2019**	**CY 2020**	**CY 2021**	**CY 2022**	**TOTAL**
Time of Use Rate Sign-up	$ 6,800	$ 24,000	$ 28,600	$ 30,600	$ 3,200	$ -	**$ 93,200.00**
Time of Use Load Research Study Participation	$ -	$ 10,000	$ 17,000	$ 100	$ -	$ -	**$ 27,100.00**
Time of Use Meters	$ -	$ 79,393.61	$ 554.48	$ 341.06	$ 450.16	$ -	**$ 80,739.31**
Residential AC Level 2 Chargers	$ -	$ -	$ -	$ 34,660.58	$ 88,798.94	$ 3,400.00	**$ 126,859.52**
Non-Residential AC Level 2 Chargers – Single Port	$ 116,157	$ 109,990.11	$ 108,565.43	$ 223,421.85	$ 152,770.67	$ -	**$ 710,905.06**
Non-Residential AC Level 2 Chargers – Multi-Port	$ -	$ 180,716	$ 507,769.60	$ 482,235.98	$ 317,645.96	$ -	**$ 1,488,367.54**
Non-Residential & Multi-Family DC Fast Chargers	$ 54,618	$ 97,877.50	$ 265,678.33	$ 245,779.61	$ 279,472.31	$ 14,259.00	**$ 957,684.75**
Custom Projects	$ -	$ 1,093,820.19	$ 506,497.68	$ 1,067,500	$ 1,157,429.62	$ -	**$ 3,825,247.49**
Administration	$ 176,176	$ 176,426.62	$ 127,958.88	$ 93,512.91	$ 208,313.22	$ 17,430	**$ 799,818.07**
Outreach & Awareness	$ 133,751	$ 109,478.83	$ 261,514.66	$ 327,304.18	$ 234,365.66	$ -	**$ 1,066,414.33**
Total	**$ 487,502**	**$ 1,881,702.86**	**$ 1,824,139.06**	**$ 2,505,456.17**	**$ 2,442,446.54**	**$ 35,089.44**	**$ 9,176,336.07**

* Includes transferred (OMAG) costs of program expenditures prior to Commision approval in July 2017.

Exhibit 2-E

EV Program Budget Allocations Year Over Year

EV Program Budget Costs / Committed Funds by Year

	2017 EV Budget Costs / Committed Funds			2018 EV Budget Costs / Committed Funds			2019 EV Budget Costs / Committed Funds			2020 EV Budget Costs / Committed Funds			2021 EV Budget Costs / Committed Funds		
	Prescriptive Incentives Completed Q3 2017	Custom Incentives Committed Q3 - Q4 2017	Total 2017	Prescriptive Incentives Completed Q4 2017 - Q3 2018	Custom Incentives Committed Q1 - Q4 2018	Total 2018	Prescriptive Incentives Completed Q4 2018 - Q3 2019	Custom Incentives Committed Q1 - Q4 2019	Total 2019	Prescriptive Incentives Completed Q4 2019 - Q3 2020	Custom Incentives Committed Q1 - Q4 2020	Total 2020	Prescriptive Incentives Completed Q4 2020 - Q1 2022	Custom Incentives Committed Q1 - Q4 2021	Total 2021
TOU Incentives	$ 2,800		$ 2,800	$ 22,400		$ 22,400	$ 29,400		$ 29,400	$ 30,400		$ 30,400	$ 11,000		$ 11,000
TOU Load Research Incentives				$ 10,000		$ 10,000	$ 17,000		$ 17,000	$ 100		$ 100	$ -		$ -
TOU Meters						$ 79,394			$ 554.48			$ 341.06			$ 450.16
AC Level 2 Incentives (Residential)	$ -		$ -	$ -		$ -	$ -		$ -	$ 22,811.33		$ 22,811.33	$ 101,048.39		$ 101,048.39
AC Level 2 Incentives (Single Port)	$ 65,309		$ 65,309	$ 102,907		$ 102,907	$ 108,013.58		$ 108,013.58	$ 228,573.06		$ 228,573.06	$ 159,584.73		$ 159,584.73
AC Level 2 Incentives (Multiple Port)				$ 189,844		$ 189,844	$ 520,440.58		$ 520,440.58	$ 472,956.43		$ 472,956.43	$ 488,482.61		$ 488,482.61
DC Fast Charger Incentives	$ 54,618		$ 54,618	$ 97,878		$ 97,878	$ 265,678.33		$ 265,678.33	$ 219,582.24		$ 219,582.24	$ 337,389.80		$ 337,389.80
Custom Project Incentives		$ 1,359,874	$ 1,359,874		$ 998,500	$ 998,500		$ 669,439.49	$ 669,439.49		$ 604,418.79	$ 604,418.79		$ 320,160.12	$ 320,160.12
Administration			$ 176,176			$ 175,427			$ 127,958.88			$ 93,512.91			$ 208,313.22
Outreach & Awareness			$ 133,751			$ 109,479			$ 261,514.66			$ 327,304.18			$ 234,365.66
		Total	**$ 1,792,528**		**Total**	**$ 1,785,828**		**Total**	**$ 2,000,000**		**Total**	**$ 2,000,000.00**		**Total**	**$ 1,860,794.69**

TOTAL ALLOCATED BUDGET FOR ALL YEARS $ 9,439,151

Exhibit 2-F

rEV RMP Report Spring 2021

2021

NEF

ROCKY MOUNTAIN POWER

rEV

Program Report

Prepared for:

Michael Snow

Rocky Mountain Power

1407 West North Temple

Suite 330

Salt Lake City, UT 84116

Prepared by:

Kelly Flowers

rEV Director

National Energy Foundation

4516 S 700 E Suite 100

Salt Lake City, UT 84107

June 29, 2021

Table of Contents

Program Overview

Program Description

rEV, a secondary education EV outreach program, is a collaborative partnership between Rocky Mountain Power, National Energy Foundation and Electrify America. **rEV** teaches about the advantages of electric transportation delivered through a "choose your adventure" interactive movie format, with accompanying teacher and student materials. A key component of **rEV** is the *Share Form* that collects valuable household information about EV knowledge and attitudes.

Program Administration

rEV is administered by NEF, a 501 (c)(3) nonprofit organization, founded in 1976. It is dedicated to increasing energy literacy through the development, distribution and implementation of educational programs and materials. These resources relate primarily to energy, natural resources, energy efficiency, energy safety and the environment. Concepts are taught through science, math, art, technology and writing. NEF recognizes the importance of educating individuals about energy so they can make informed decisions about energy issues and use.

Oversight for program implementation was provided by Kelly Flowers, NEF Program Senior Director and Alison Pinnock, Program Administrator. The program met and exceeded partnership expectations.

Building Collaborations

The target audience for rEV was secondary schools, mainly high schools but junior high schools were also contacted for participation. NEF reviewed NexGen Science, Common Core and American Driver and Traffic Safety Education Curriculum Standards. Rocky Mountain Power can feel secure that the **rEV** program supports educational needs of teachers in grades 7-12 for topics in Science (earth and space, physical, and engineering design), Math, English Language Arts (reading, writing, speaking and listening) and Driver's Education and Automotive classes. Correlations are posted on the website, *reved.org/rockymountainpower/teachers*.

Program Implementation

Schools within Rocky Mountain Power's service territory were contacted in April and May and registered via phone or email. **rEV** materials were prepared and delivered to schools during the weeks of April 26 - May 10, 2021 for teacher directed presentation during the weeks of May 10 - May 24, 2021. Program materials included:

- Teacher folder, which included a welcome letter, Rewarding Results flier, ***rEV*** *Challenge* Contest flier, and **rEV** classroom poster
- Classroom sets of mini student **rEV** posters and string bags

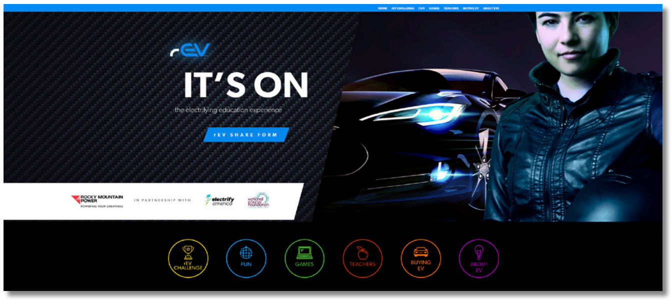
Total program participation was eight schools, 13 teachers and 1,146 students spanning grades 7-12.

School	Teacher	Students	Share Forms Returned	% Returned
Brighton High School	Jonnie Knoble	40	34	85%
Cottonwood High School	Michael Robinson	50	0	0%
Cyprus High School	Ben Schwitters	154	93	60.3%
Herriman High School	Larry Farnsworth	100	0	0%
Olympus High School	Christopher Nielsen	172	152	87.3%
Olympus High School	Richard Hopkins	22	0	0%
Olympus Jr High School	JoAnne Brown	30	27	90%
Tooele Junior High School	Bill Knight	95	81	85.2%
Tooele Junior High School	Roger Davis	103	80	77.7%
Tooele Junior High School	Richard Spence	97	86	88.7%
Tooele Junior High School	Charlotte Greager	99	79	79.8%
Tooele Junior High School	Michael Sumner	104	85	81.7%
West High School	Alison Bulson	80	1	1.2%

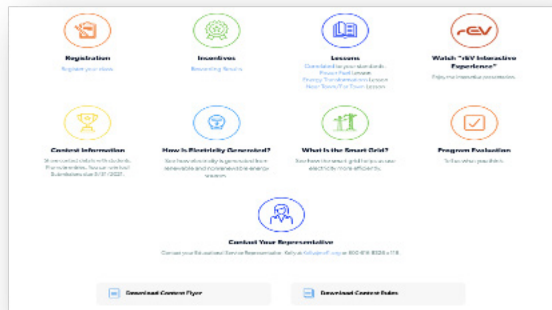
The **rEV** program used a fun, interactive "choose your adventure" dramatization of a rideshare driver experiencing EV for the first time. While teachers and students chose the path of the presentation, information was given on EV technology, batteries, charging, driving performance, environmental and economic benefits.

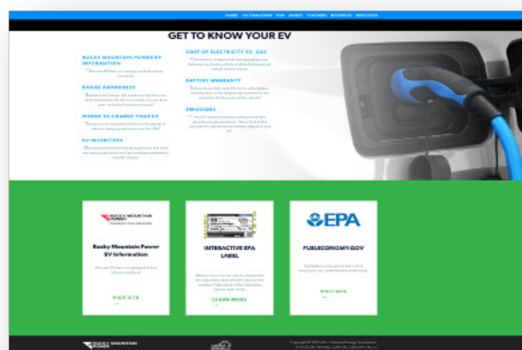
After the presentation, students took home a customized string bag and a mini-poster version of the classroom poster to increase EV awareness with their families. The website URL directs students and families to EV information and interactive activities. Students were asked to fill out the ***rEV** Share Form* with their families. All forms were submitted online using the URL from the student mini-poster. Teachers were incentivized with a $100 mini-grant if 60% or more students submitted a form.

Rocky Mountain Power rEV website



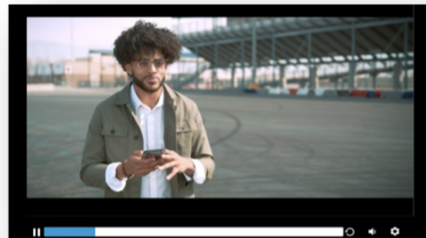
The Rocky Mountain Power's **rEV** website found at *reved.org/rockymountainpower* has multiple pages for teachers, students and families. The teacher page contains information on the presentation, lessons, incentives, ***rEV** Challenge* contest information, program evaluation as well as information on how electricity is generated and the Smart Grid. Families can find information on EVs and buying EVs. Fun and games pages are included for the students. These pages contain links to Rocky Mountain Power's Cost Calculator, Spotify Playlist, games, ***rEV** Challenge* contest information, the interactive video presentation, information on how electricity is generated and the Smart Grid. The link to the *Share Form* appears on all pages.

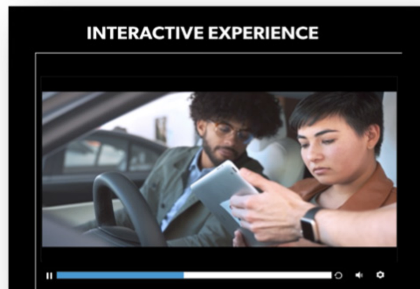


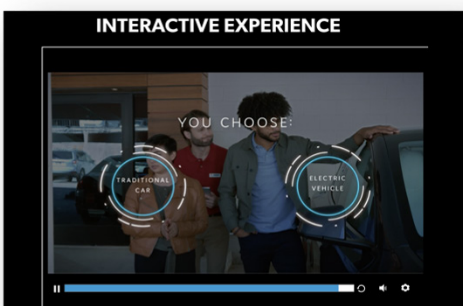


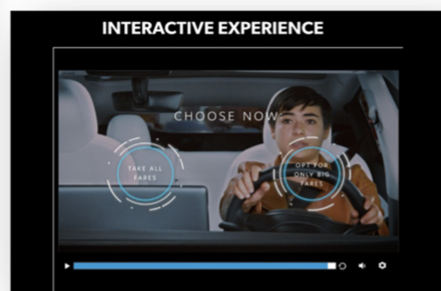
rEV Presentation

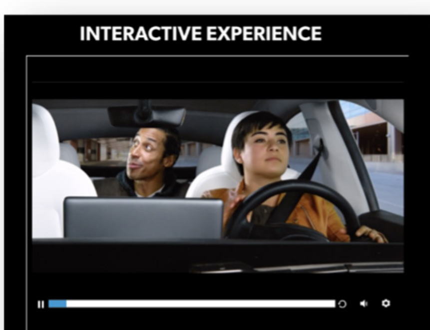
THe **rEV** presentation is a uniquely created method of presenting. Through a series of film clips, information on EVs was relayed to the students. Sarah, the central character of the films, was introduced to EVs as a rideshare operator as her friend, Noah, tried to help her gain knowledge on EVs. Varying passengers in Sarah's car had different views and information on EVs, often dispelling myths. Any of the various paths that the students chose for their story gave the same information.

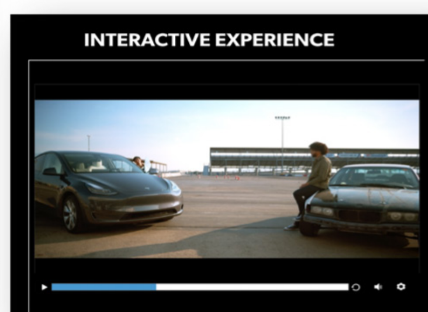












Student and Teacher Incentives

One student from each school that submitted a ***rEV*** *Share Form* was randomly chosen to receive a pair of Beats headphones. Each teacher that had over 60% of their students submit the ***rEV*** *Share Form* earned a $100 classroom mini-grant. See details in the chart below.

School	Teacher	Student headphone winner	Mini-grant Earned
Brighton High School	Jonnie Knoble	Nick B	$100
Cyprus High School	Ben Schwitters	Taniela M	$100
Olympus High School	Christopher Nielsen	Joseb M	$100
Olympus Jr High School	JoAnne Brown	Nolan P	$100
Tooele Junior High School	Bill Knight	Kymber O	$100
Tooele Junior High School	Roger Davis	-	$100
Tooele Junior High School	Richard Spence	-	$100
Tooele Junior High School	Charlotte Greager	-	$100
Tooele Junior High School	Michael Sumner	-	$100

Program Summary and Analysis

rEV Share Form Data

There were several interesting responses from the students regarding their participation in the **rEV** program and EVs in general. These were junior high and high school students during the last few weeks of school. While this can be a difficult age group to read, they also provided fairly open and honest responses. See the attachments for full responses.

- 84% have gained general knowledge about EVs.
- 70% of students chose “all of the above” when asked which advantages they could see in purchasing an EV, which included environmental benefits, fuel cost, driving performance, and decreased car maintenance.
- 68% indicated the roadblocks to owning an EV were vehicle cost and availability of charging.
- 64% have a more favorable attitude about EVs after participating in the **rEV** program.
- 43% of the students reported that they visited their utility website to learn more about EVs, and another 38% plan to.
- 19% reported they had charging stations near home, 39% said they don’t know if they do, but want to know.

rEV Share Form Student Comments

Students' ***rEV** Share Form* responses were mostly positive with 25% giving additional comments. A few wanted to hear more about the cons of EVs, or the science behind them. See the attachments for full comments.

- *Good presentation, interaction made it more engaging.*
- *I already have an EV but I do think this helped shed some more light on EVs.*
- *I know a lot more about EV's now and their benefit to the environment, thanks!*
- *I love EV!! This is revolutionizing technology. The fact that we can be mobile and save the environment is great!*
- *I think this program is very useful and can be used to help people learn about what an ev is and their benefits*
- *I like this program for giving kids the chance to make a choice early, although it felt a good bit more like an advertisement than a program. It could've talked a bit more about the cons of EVs and how to move around them.*
- *It was very nice and I loved the story.*
- *Starting to change my mind about EVs.*

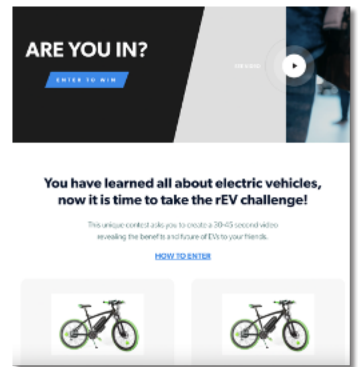
Program/Teacher Evaluation Comments

Teacher comments were a mix of positive and negative. We have invited one of the teachers with a lower evaluation to be on our teacher advisory council and will incorporate ideas for improvement. See the attachments for full comments.

- *It's a good introduction to the value of electric vehicles.*
- *The video was too scripted.*
- *It was a good way to get the word out with up and coming automotive students.*
- *It feels like you're selling cars when you teach it.*
- *This is a great program and set up really well! You might consider targeting middle school more. Even though they can't drive more, they are thinking about it A LOT!*

rEV Challenge Contest

This unique contest asked students to create a 30-45 second video revealing the benefits and future of EVs to their friends. Students completed a digital entry form and uploaded their video file. There were nine entries from the Rocky Mountain Power service area. Judging took place in June 2021. The winning student, Jaedin M, and her teacher received an electric bike of their choice. This national winner was from the Rocky Mountain Power service area. Her video will be added to the **rEV** website in the fall. See contest flier in the attachments.



Screen shot from the Grand Prize winning video:

Program Attachments

Welcome Letter

Rewarding Results Flier

rEV *Challenge* Flier

Student Mini-Poster

rEV *Share Form* Summary Report

Program/Teacher Evaluation Report

Welcome Letter

ROCKY MOUNTAIN POWER
POWERING YOUR GREATNESS

rEV

Now you know, time to go

rEVed.org/rockymountainpower

Ready, set, rEV!

Three easy steps to educate and earn your $100 eGift card from Rocky Mountain Power:

1. Watch the 35 minute “rEV Interactive Experience” on the “Fun” or “Teachers” page of ***rEVed.org/rockymountainpower***. Students can watch independently or with you in class. EV, natural resources, electrical generation, smart technology, economics and history are taught through the story of Sarah. In the “rEV Interactive Experience,” students choose the direction of the story line during pivotal parts of the film.

2. Send home the string bags and the *Student Sheets* as a reminder to revisit the website. Students can enter the rEV Challenge, experience e-learning and use emissions and fuel cost calculators. You can access EV lessons and resources from the “Teachers” page.

3. Remind students to complete and submit the *rEV Share Form* at ***rEVed.org/rockymountainpower***. When 60% or more of your enrolled students share feedback, you earn your $100 eGift card from Rocky Mountain Power. Your teacher ID from the label on the clear mailer is helpful, but not necessary.

ROCKY MOUNTAIN POWER
POWERING YOUR GREATNESS

rEV®

Rewarding Results

Reward Your Students

All students receive a string bag. The string bags will identify them as participants in the rEV electrifying education experience.

Students who complete the *rEV Share Form* on the website are entered into a drawing for a pair of Beats headphones.

Giving a completion grade or extra credit may encourage students to complete the form.

Reward Yourself

Earn a $100 eGift Card when 60% or more of your class completes the *rEV Share Form* by the due date in your program emails.
Direct your students to the website to fill out the form online.*

electrify america

National Energy Foundation
cultivating energy literacy

Now you know, time to go

rEVed.org/rockymountainpower

*Offer available for teachers participating in the rEV program. Classes must submit 60% or more of the *rEV Share Forms* by the deadline to earn the $100 eGift card from Rocky Mountain Power.

ARE YOU IN?

You have learned about electric vehicles (EVs), now it is time to take the rEV Challenge!

1. Create a 30 – 45 second video that reveals the future of EVs to your friends. Get out your camera (even if it is your phone) to record a compelling message about the benefits of EVs.

2. Review the rEV Challenge official rules. *bit.ly/rEVChallengeRules*

3. Complete the digital entry form (including an electronic signature from your parent/guardian) and upload your video file. *bit.ly/rEVChallengeEntry*

Now you know, time to go ***rEVed.org /rockymountainpower***

Enter by May 31, 2021 for your chance at the grand prize, an electric bike!

You can win one for your teacher too!

ROCKY MOUNTAIN POWER
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National Energy Foundation
cultivating energy literacy

Student Mini-Poster

Picture Yourself in an EV.

rEV®

ROCKY MOUNTAIN POWER
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rEVed.org/rockymountainpower

What Is an EV?

- A vehicle powered by electricity or a combination of electricity and gasoline (HEV)
- The growing technology of tomorrow
- A truck, scooter, self-driving car, mass transit, bus or SUV

Price Is Right

- Wide range of decreasing purchase prices
- New or used
- Fewer moving parts equals less maintenance cost
- EV fueling is generally less expensive than fueling a similar, conventional vehicle

Driving Experience

- Smooth and quiet
- Zero to 60 mph possible in under three seconds
- Batteries can last over 200,000 miles
- Locate chargers and plan trips with ease

Take Charge

- Like plugging in a toaster
- Charge while you shop, at work or home
- Potential to charge when electricity is cheaper
- Up to 250 miles on a single charge

Easy Bein' Green

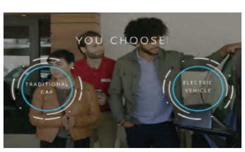
- Potential to fuel with electricity generated with renewable resources
- Can improve local air quality and reduce carbon
- EVs can store electricity for an efficient grid
- Electricity costs are more stable than gasoline

Now you know, time to go rEVed.org/rockymountainpower

rEV Share Form

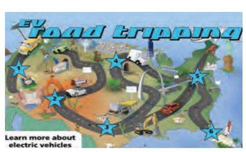
Share your voice to earn your reward.

What is the *rEV Share Form*? It is a way to share insights that shape the future of your community. Visit the form on any page of *rEVed.org/rockymountainpower*. Two minutes is all it takes to earn a chance at wireless Beats headphones.



"rEV Interactive Experience"

Watch "rEV Interactive Experience" on the "Fun" page. YOU choose what Sarah does next.

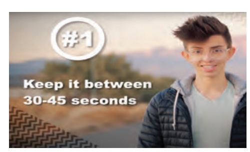


Games and Information

Play EV games.

Calculate EV Savings

Discover fuel cost savings and find vehicle incentives at *rockymountainpower.net/ev*.



rEV Challenge

Create a 30 – 45 second video to convince your friends to to drive an EV. Entry details and information about the electric bike grand prize are on the program website. Are you in?

How Do You rEV?

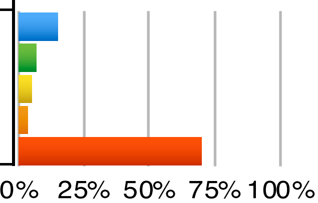
Show your newfound knowledge with the social media links below. Bust an EV myth, share the Spotify® playlist, or encourage your friends to complete the *rEV Share Form*.

ROCKY MOUNTAIN POWER POWERING YOUR GREATNESS | electrify america | National Energy Foundation cultivating energy literacy

Rocky Mountain Power **rEV** Program
Form Share Summary Report

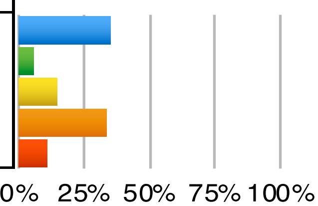
Which of the following do you see as advantages of purchasing an EV?

Response	Frequency	Percent
Environmental Benefits	101	15%
Fuel Cost	46	7%
Driving Performance	34	5%
Decreased Car Maintenance	24	4%
All of the Above	476	70%
Total:	681	



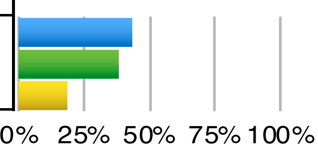
Which of the following do you see as roadblocks to purchasing an EV?

Response	Frequency	Percent
Vehicle Cost	240	35%
Fuel Cost	39	6%
Driving Range	101	15%
Availability of Charging	229	33%
Other	75	11%
Total:	684	



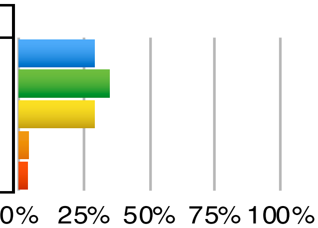
Did you visit your utility website to learn about EVs?

Response	Frequency	Percent
I Did	295	43%
I Plan To	259	38%
I Will Not	126	19%
Total:	680	



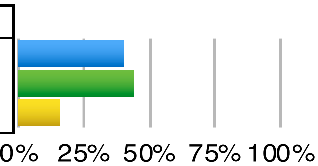
How did your participation in this program affect your attitude about EVs?

Response	Frequency	Percent
It Is Much More Favorable	197	29%
It Is Somewhat More Favorable	236	35%
It Is the Same	196	29%
It Is Somewhat Less Favorable	26	4%
It Is Much Less Favorable	23	3%
Total:	678	



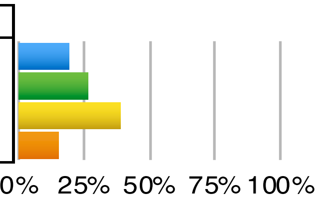
How did your participation in this program affect your general knowledge about EVs?

Response	Frequency	Percent
I Know Much More	273	40%
I Know Somewhat More	298	44%
It Is the Same	108	16%
Total:	679	



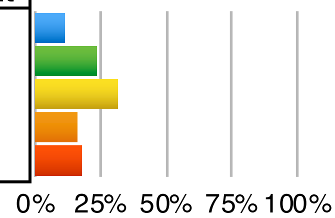
Do you have an EV charging structure within one mile of your home?

Response	Frequency	Percent
Yes	131	19%
No	180	27%
I Do Not Know but Want to Know	263	39%
I Do Not Know and Am Not Interested	103	15%
Total:	677	



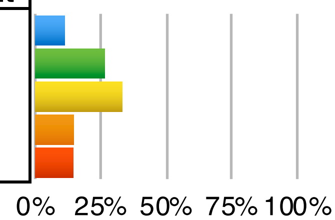
Prior to participation in this program, how likely were you, or your family, to purchase an EV?

Response	Frequency	Percent
Very Likely	75	11%
Somewhat Likely	157	24%
Undecided	210	31%
Somewhat Unlikely	107	16%
Very Unlikely	118	18%
Total:	667	



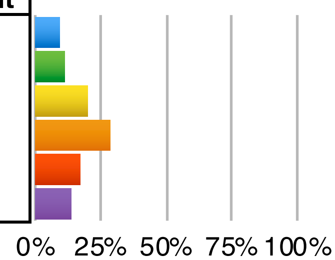
Having participated in this program, how likely are you, or your family, to purchase an EV in the next three years?

Response	Frequency	Percent
Very Likely	75	11%
Somewhat Likely	176	27%
Undecided	220	33%
Somewhat Unlikely	97	15%
Very Unlikely	96	14%
Total:	664	



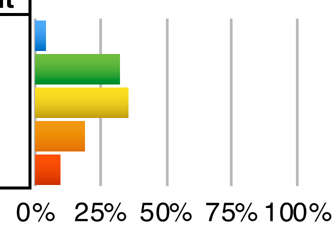
What is your best guess for when your family will purchase its next vehicle?

Response	Frequency	Percent
Less than 1 Year	62	9%
1 – 2 Years	75	11%
2 – 3 Years	134	20%
3 – 4 Years	115	17%
4 – 5 Years	92	14%
More than 5 Years	192	29%
Total:	670	



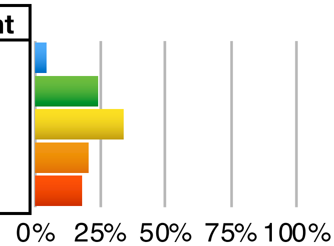
Number of Drivers in Household

Response	Frequency	Percent
1	26	4%
2	213	32%
3	235	35%
4	125	19%
5+	63	10%
Total:	662	



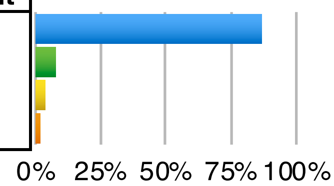
Number of Vehicles in Household

Response	Frequency	Percent
1	28	4%
2	159	24%
3	225	34%
4	135	20%
5+	119	18%
Total:	666	



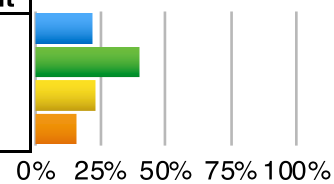
Number of EVs in Household

Response	Frequency	Percent
0	572	87%
1	51	8%
2	25	4%
3+	12	2%
Total:	660	



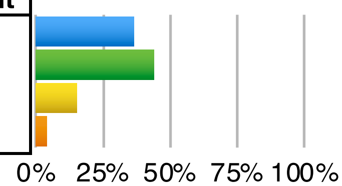
Average Miles Driven by a Household Driver

Response	Frequency	Percent
1 to 15 Miles per Day	143	22%
16 to 30 Miles per Day	262	40%
31 to 45 Miles per Day	151	23%
46+ Miles per Day	102	16%
Total:	658	



How do you rate the rEV program?

Response	Frequency	Percent
Great	244	37%
Good	294	44%
Fair	102	15%
Poor	28	4%
Total:	668	



Additional Comment(s):
5/10
Cars are quite cool.
Cool
cool
Did she win?
Esto es Genial
EV are not good.
ev cool
ev's are pretty
EVs are wiered
Explaining the benefits of EVs is good but I am more interested in how they mechanically work. If you would put a little explanation of how the electric motors work, I think more people would be less scared and more interested in EVs. People are scared of what they don't understand.
**** your evs
good
Good presentation
Good presentation, interaction made it more engaging.
Good program, just seemed like it was aimed more towards a younger audience
Hope I win and will you guys let my parents know
I already have an EV but I do think this helped shed some more light on EVs.
I can tell you as a fact I will be purchasing a EV in the future when I'm old enough to legally drive
I do not feel comfortable answering
i do not like nor support electric vehicles
I don't believe there are no negatives, and the only reason my family will get a new car within a year is because my family is going to get a new member soon, and our current cars are too small for a family of six. I wasn't aware EV's really existed before the thing, and again, I don't believe they have no negatives. even if I wanted an EV, I wouldn't know how or where to charge it, and I doubt I'd be able to convince anyone with any logic. there's just no way it can be that good with no negative counterbalance, and even if it COULD be, I can't drive yet, so it wouldn't matter tell the full truth. both the positives, AND the negatives. at the very least you could explain some more about what an EV can do that a regular car can't!
i don't like this car type.
i dont like electric cars
i dont like it
I Enjoyed How Educational The Interactive Experience Was.
I hate all electric cars. except for the raesr tachyon speed.
I have divorced parents so i just added them all together for those last few questions
i hope i win and if i dont rhen tell the person thea won kongrats
I know a lot more about EV's now and their benefit to the environment, thanks!
I learned a lot from this program.
i like cars
i like electric cars more because they are much easy to understand and probably fix
i like electric cars more because they are much easy to understand and probably fix

Additional Comment(s):
I like this program for giving kids the chance to make a choice early, although it felt a good bit more like advertisement then a program. It could've talked a bit more about the cons of EVs and how to move around them. This could give us information on how to combat it in the future and how we can make the difference early.
I like what your guys are doing and I hope that the progress continues.
i liked it
I love EV!! This is revolutionizing technology. The fact that we can be mobile and save the environment is great!
I need some headphones.
I need these beat headphones
i now know much more about evs than i did before.
I really want a EV
I really want a Tesla after this video
I think EV's are great and the future.
i think that ev are good
i think that ev are very important to everything
i think that evs are the future but its gonna take a while for people to get use to it but there will be a bad side of it people will possibly lose there job in the gas powerd car industry
i think that it is a good cause cause it helps nature
i think the rEV is cool
I think this program is very useful and can be used to help people learn about what an ev is and their benefits
I thought that these EVs really are the future, and this program will absolutely bring awareness of the problem of regular cars.
I want da headphon
i want some new head phones
i want the ear buds
I want to go home.
I would like to have the finish the story.
I would love a pair of beats headphones. :)
idk it's cool, it's better for the environment so that's good.
idk what those are but they sound nice.
im bored
it alright
It was a great program that really taught me about EV 's. It showed me what they were how do use for the are in the benefits that come with having one
It was cool to learn about this
It was vary nice and i loved the story.
Jackson Evers, Drivers Ed, Knoble P.2
love the ev"s
Love this program, EVs are the future!!! I definitely want to buy an EV when I am older.
May the best car win.
my dad always wanted me to drive his car, but i think on considering getting a nice tesla EV.

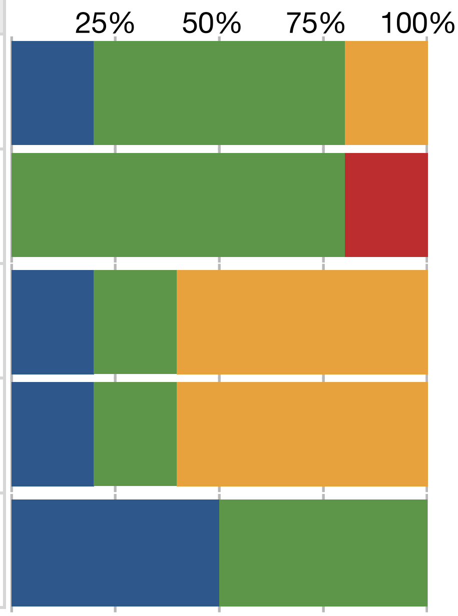
Additional Comment(s):
My Dad bought a Tesla about a year ago and he absolutely loves it and finds it much more promising than a normal car
My thing is the cost if you could sell them for like 20k or 15k instead of 60 to 70k would be more favorable to all people in general.
None. Thank You so Much!!!
Once tesla comes out with a cheap car then I will buy it cause im broke
Our household has many older day cars, and i think they are cool! but EV's seem like an interesting future.
please give me the beats :)
Please i want some headphones i only have earbuds me sad boy please.
Please pick me. I have two uncles who owns a tesla
please, I have no headphones :(. My mommy wants them too)
pleasseeeeeeeeeeeee pick mee.
Starting to change my mind about EV's
Tesla is overrated
thank you
thank you
Thank you for all the information, it may help my family in the future.
Thank you for this program, it is very informative.
Thank you!
thank you!
Thanks for allowing us to do this. I'm making the students take a screenshot of their finished survey for an assignment so I wanted to complete one of these to see what it looks like when I submit it.
Thanks for what you're doing
The guy talking sucked
The Learning Experience Was Great! In The Future I Will Buy An EV
the video was werid
The videos were very informational and I learned a lot, but they were very cheesy and it made them hard to watch.
These EV's sound really cool
they are cool
they are fast cars that go to 60 really fast
They look stupid. But they are useful.
This is a great program to learn the benefits of EV's and more about them
this is an extremely informational program, I learned a lot.
This is pretty cool man.
this video kinda sucked, garbage quality and didn't cover the disadvantages as much as I wished.
This was a fun activity
This was a fun class but my family already has an EV and its awesome.
this was really good info
This was really great. I think that it's a good idea to switch to electric vehicles.
This was very interesting
Those cars look really cool.

Additional Comment(s):
uhhh cooool
Very good
Very nice
vroom vroom
vroom vroom
We have an electric car and ordered another one that is coming in the beginning of June. It is great to learn more about them!
why do you like electric vehicles?
why does this even mater
why does this even matter
yea rock on
yezzuh

Program Evaluation - Rocky Mountain Power **rEV** Program

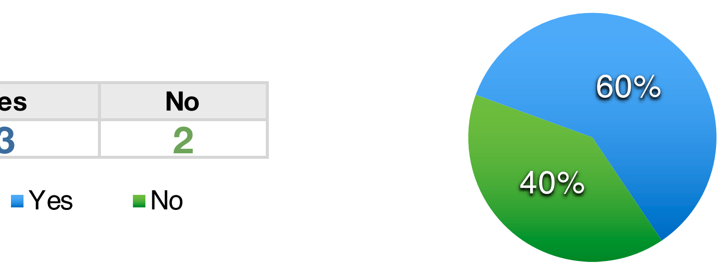
Educators' impressions of the program from 5 educators.

	Excellent	Good	Fair	Poor
Materials	1	3	1	0
Student engagement	0	4	0	1
Content	1	1	3	0
Program overall	1	1	3	0
Flexible COVID options	2	2	0	0



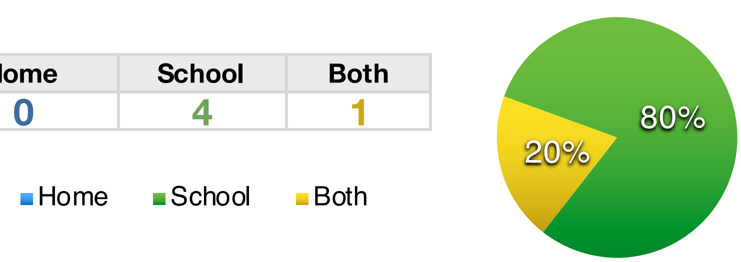
Was the electronic gift card a good incentive to participate in the program?

Yes	No
3	2



Where did your students participate with the presentation?

Home	School	Both
0	4	1



What additional activities did you, or will you, use from the website?
Student form
Nothing this year since it's over.
We looked at locations of EV chargers as well as some of the resources on renewable energy.
Watched the interactive teachers

What would you tell other teachers about the program?
It feels like you're selling cars when you teach it.
Great way to share the EV community's perspective with up and coming automotive students.
It was good to get the word out.
It ties really well with the 7th and 8th grade core curriculum. There are fun activities and the students love to make videos!
It's a good introduction to the value of electric vehicles

What would you like us to tell rEV program sponsors about the program?
You could add in more actual science for the students to evaluate or problems to solve.
Let the students work on some electric cars and see if it changes their mind. I believe the biggest issue is repairs are scary to them (or not repairable).
The video was too scripted.
This is a great program and set up really well! You might consider targeting middle school more. Even though they can't drive yet, they are thinking about it A LOT!

Additional comments and recommendations:
Even the students felt it was just a big ad for electric vehicles. It was so pushy, some students were turned off by EVs. The EV side needs to be more subtle and the science behind why it matters
More curriculum about electric car maintenance or safety.
I suggest you roll out the program in January or so, so that you don't hit the end of the school year.

Exhibit 2-G

rEV RMP Report Fall 2021

Fall 2021

NEF

ROCKY MOUNTAIN POWER
rEV

Program Report

Prepared for:

Michael Snow

Rocky Mountain Power

1407 West North Temple

Suite 330

Salt Lake City, UT 84116

Prepared by:

Kelly Flowers

rEV Director

National Energy Foundation

4516 S 700 E Suite 100

Salt Lake City, UT 84107

February 10, 2022

Table of Contents

Program Overview

Program Description

rEV, a secondary education EV outreach program, is a collaborative partnership between Rocky Mountain Power, National Energy Foundation and Electrify America. **rEV** teaches about the advantages of electric transportation delivered through a "choose your adventure" interactive movie format, with accompanying teacher and student materials. A key component of **rEV** is the *Share Form* that collects valuable household information about EV knowledge and attitudes.

Program Administration

rEV is administered by NEF, a 501 (c)(3) nonprofit organization, founded in 1976. It is dedicated to increasing energy literacy through the development, distribution and implementation of educational programs and materials. These resources relate primarily to energy, natural resources, energy efficiency, energy safety and the environment. Concepts are taught through science, math, art, technology and writing. NEF recognizes the importance of educating individuals about energy so they can make informed decisions about energy issues and use.

Oversight for program implementation was provided by Kelly Flowers, NEF Program Senior Director and Alison Pinnock, Program Administrator.

Building Collaborations

The target audience for rEV was secondary schools, mainly high schools but junior high schools were also contacted for participation. NEF reviewed NexGen Science, Common Core and American Driver and Traffic Safety Education Curriculum Standards. The **rEV** program supports educational needs of teachers in grades 7-12 for topics in Science (earth and space, physical, and engineering design), Math, English Language Arts (reading, writing, speaking and listening) and Driver's Education and Automotive classes. Correlations are posted on the website, *reved.org/rockymountainpower/teachers*.

Program Implementation

Schools within Rocky Mountain Power's service territory were contacted throughout the fall and registered via phone or email. **rEV** materials were prepared and delivered to schools from October 2021 through January 2022 for in-person and teacher directed presentations. Program materials included:

- Teacher folder, which included a Welcome Letter, Rewarding Results flier, ***rEV** Challenge* Contest flier, and **rEV** classroom poster
- Classroom sets of mini student **rEV** posters and string bags

Total program participation was 13 schools, 15 teachers and 1,973 students spanning grades 7-12.

School	Teacher	Students	Share Forms Returned	% Returned
American Fork High School	Michael Davis	140	2	1%
American Fork Jr High School	Gerald Dibb	80	66	87%
Butler Middle School	David Olsen, Erin Hemingway	305	*	*
Canyon View High School	Shaylie Christensen	90	73	81%
Hillcrest High School	Jake Flanigan	90	2	2%
Hunter High School	Scott Watson	197	0	0%
Judge Memorial High School	Dasch Houdeshel	70	23	33%
Kearns High School	Nick Angell	132	44	33%
Northwest Middle School	Dani Bainsmith, Robert Dahl	310	*	*
Pleasant Grove Junior High School	Windee Maughan	210	80	38%
Taylorsville High School	Arielle Meredith	40	15	37%
The Academy for Math, Engineering and Science	Daane Helmus	59	0	0
Wasatch Jr High School	Alan Crookston	250	73	29%

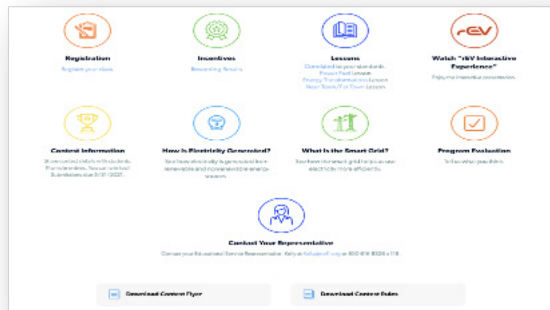
**These teachers will implement the rEV program during their spring curriculum*

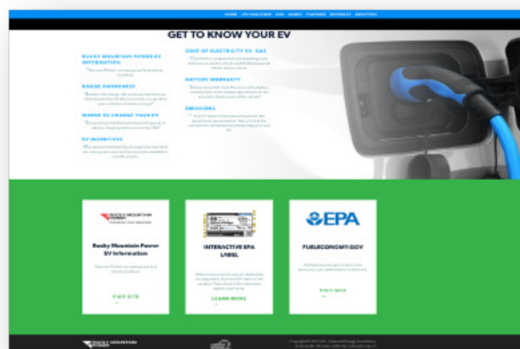
The **rEV** program used a fun, interactive "choose your adventure" dramatization of a rideshare driver experiencing EV for the first time. While teachers and students chose the path of the presentation, information was given on EV technology, batteries, charging, driving performance, environmental and economic benefits.

After the presentation, students took home a customized string bag and a mini-poster version of the classroom poster to increase EV awareness with their families. The website URL directs students and families to EV information and interactive activities. Students were asked to fill out the ***rEV** Share Form* with their families. All forms were submitted online using the URL from the student mini-poster. Teachers were incentivized with a $100 mini-grant if 60% or more students submitted a form.

Rocky Mountain Power rEV website

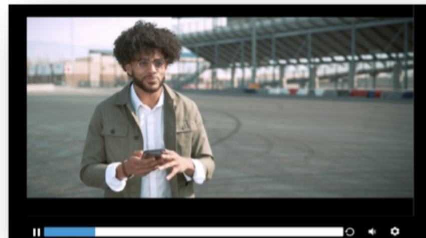
Rocky Mountain Power's **rEV** website found at *reved.org/rockymountainpower* has multiple pages for teachers, students and families. The teacher page contains information on the presentation, lessons, incentives, ***rEV** Challenge* contest information, program evaluation as well as information on how electricity is generated and the Smart Grid. Families can find information on EVs and buying EVs. Fun and games pages are included for the students. These pages contain links to Rocky Mountain Power's Cost Calculator, Spotify Playlist, games, ***rEV** Challenge* contest information, the interactive video presentation, information on how electricity is generated and the Smart Grid. The link to the *Share Form* appears on all pages.

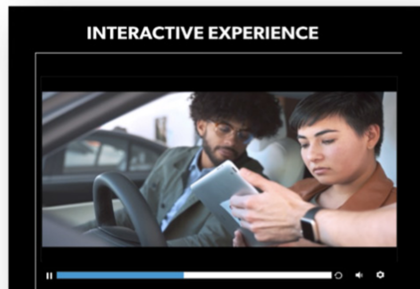


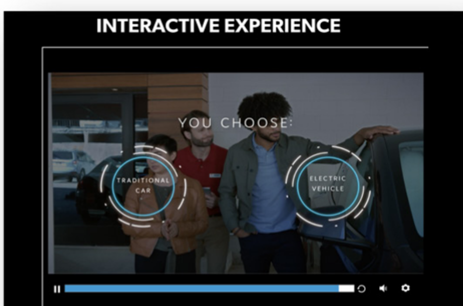


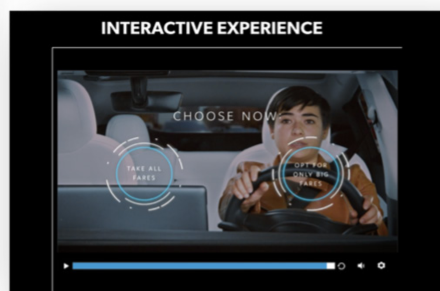
rEV Presentation

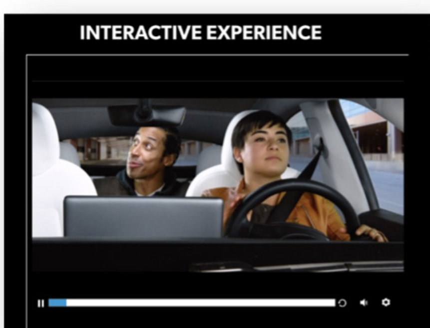
THe **rEV** presentation is a uniquely created method of presenting. Through a series of film clips, information on EVs was relayed to the students. Sarah, the central character of the films, was introduced to EVs as a rideshare operator as her friend, Noah, tried to help her gain knowledge on EVs. Varying passengers in Sarah's car had different views and information on EVs, often dispelling myths. Any of the various paths that the students chose for their story gave the same information.

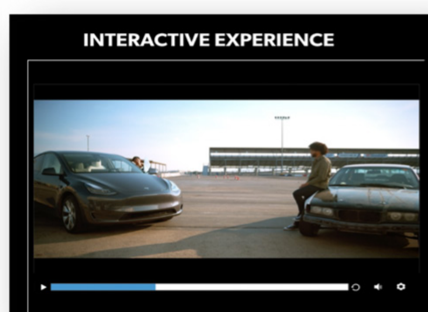












Student and Teacher Incentives

One student from each school that submitted a ***rEV** Share Form* was randomly chosen to receive a pair of Beats headphones. Each teacher that had over 60% for their students submit the ***rEV** Share Form* earned a $100 classroom mini-grant. See details in the chart below.

School	Teacher	Student headphone winner	Mini-grant Earned
American Fork High School	Michael Davis	Michael B	
American Fork Jr High School	Gerald Dibb	Brody C	$100
Butler Middle School	Erin Hemingway, David Olsen	*	*
Canyon View High School	Shaylie Christensen	Valeria M	$100
Hillcrest High School	Jake Flanigan	Matthew	
Judge Memorial High School	Dasch Houdeshel	John M	
Kearns High School	Nick Angell	Brian A	
Northwest Middle School	Dani Bainsmith, Robert Dahl	*	*
Pleasant Grove Junior High School	Windee Maughan	Hailey A	
Taylorsville High School	Arielle Meredith	Ajishai H	
Wasatch Jr High	Alan Crookston	Eli H	

**These teachers will implement the rEV program during their spring curriculum*

Program Summary and Analysis

rEV Share Form Data

There were several interesting responses from the students regarding their participation in the **rEV** program and EVs in general. See the attachments for full responses.

- 87% have gained general knowledge about EVs.
- 68% of students chose "all of the above" when asked which advantages they could see in purchasing an EV, which included environmental benefits, fuel cost, driving performance, and decreased car maintenance.
- 73% indicated the roadblocks to owning an EV were vehicle cost and availability of charging.
- 66% have a more favorable attitude about EVs after participating in the rEV program.
- 49% of the students reported that they visited their utility website to learn more about EVs, and another 32% plan to.
- 13% reported they had charging stations near home, and 41% said they don't know if they do, but want to know.

rEV Share Form Student Comments

Students' ***rEV*** *Share Form* responses were mostly positive with many giving additional comments. See the attachments for full comments.

- *This was very informational and I learned a lot.*
- *I want to help the environment by getting a car with renewable energy.*
- *EVs are awesome!*
- *I liked how the EVs are made because these vehicles don't produce pollution at all, we just need more charging stations.*
- *Thank you for trying to make the environment better.*
- *I think there is a lot of potential in EVs, but from where I live I see very few electric vehicles and charging stations. Maybe this will change in the future, though.*
- *It was a good program and I know more about EVs.*

Program/Teacher Evaluation Comments

Teachers were also asked to evaluate the program after participating. Their comments were mostly positive, with a few suggesting ways to expand the program. Here is a sample of their responses. See the attachments for full comments.

- *It was good for the students to hear about EVs and know about them, more than they are just cool looking.*
- *It was informational and entertaining.*
- *It's cool. We're in an awkward stage of EVs where we're just getting out of Junior high and it's becoming more common and cool but there's still a lot of kids that just don't think they're cool. This push for hybrids is great and a better selling point than a full electric car.*
- *Maybe have the students DO things (like go through the parts of the EV) during the presentation. Discussion is good, but if they can do something where they have to ACT during it, it would be more effective.*
- *A better format than the movie for me would be system drawings of how EV's work, how the batteries work, how the electrical system was set up 20 years ago vs today vs your vision for the future. The Smart Grid video and the first stop on the EV Game are in line of what I am thinking about, but for high schoolers, I would love to see these introduce case studies. Students want to see specifics.*

rEV Challenge Contest

This unique contest asked students to create a 30-45 second video revealing the benefits and future of EVs to their friends. Students completed a digital entry form and uploaded their video file. There were nine entries from the Rocky Mountain Power service area. Judging took place in January 2022. The winning student and their teacher were from Eagle Valley High School in Gypsum, Colorado. They each received an electric bike of their choice. There was one honorable mention winner from Wasatch Junior High School in the Rocky Mountain service area. See contest flier in the attachments.

Program Attachments

Welcome Letter

Rewarding Results Flier

rEV *Challenge* Flier

Student Mini-Poster

rEV *Share Form* Summary Report

Program/Teacher Evaluation Report

Welcome Letter

ROCKY MOUNTAIN POWER
POWERING YOUR GREATNESS

rEV®

Now you know, time to go

rEVed.org/rockymountainpower

Ready, set, rEV!

Three easy steps to educate and earn your $100 eGift Card from Rocky Mountain Power:

1. Watch the 35 minute “rEV Interactive Experience” on the “Fun” or “Teachers” page of ***rEVed.org/rockymountainpower***. Students can watch independently or with you in class. Electric vehicle (EV), natural resources, electrical generation, smart technology, economics and history are taught through the story of Sarah. In the “rEV Interactive Experience,” students choose the direction of the story line during pivotal parts of the film.

2. Send home the string bags and the *Student Sheets* as a reminder to revisit the website. Students can enter the rEV Challenge, experience e-learning and use emissions and fuel cost calculators. You can access EV lessons and resources from the “Teachers” page.

3. Remind students to complete and submit the *rEV Share Form* at ***rEVed.org/rockymountainpower***. When 60% or more of your enrolled students share feedback, you earn your $100 eGift Card from Rocky Mountain Power. Your teacher ID from the label on the clear mailer is helpful, but not necessary.

electrify america | National Energy Foundation cultivating energy literacy

ROCKY MOUNTAIN POWER
POWERING YOUR GREATNESS

rEV®

Rewarding Results

Reward Your Students

All students receive a string bag. The string bags will identify them as participants in the rEV electrifying education experience.

Students who complete the *rEV Share Form* on the website are entered into a drawing for a pair of Beats headphones.

Giving a completion grade or extra credit may encourage students to complete the form.

Reward Yourself

Earn a $100 eGift Card when 60% or more of your class completes the *rEV Share Form* by the due date in your program emails.
Direct your students to the website to fill out the form online.*

Now you know, time to go

rEVed.org/rockymountainpower

electrify america

National Energy Foundation®
cultivating energy literacy

*Offer available for teachers participating in the rEV program. Classes must submit 60% or more of the *rEV Share Forms* by the deadline to earn the $100 eGift card from Rocky Mountain Power.

ARE YOU IN?

You have learned about electric vehicles (EVs), now it is time to take the rEV Challenge!

1 Create a 30 – 45 second video that reveals the future of EVs to your friends. Get out your camera (even if it is your phone) to record a compelling message about the benefits of EVs.

2 Review the rEV Challenge official rules. *bit.ly/rEVChallengeRules*

3 Complete the digital entry form (including an electronic signature from your parent/guardian) and upload your video file. *bit.ly/rEVChallengeEntry*

Now you know, time to go ***rEVed.org /rockymountainpower***

Enter by December 1, 2021 for your chance at the grand prize, an electric bike!

You can win one for your teacher too!

ROCKY MOUNTAIN POWER
POWERING YOUR GREATNESS

National Energy Foundation
cultivating energy literacy

Student Mini-Poster

Picture Yourself in an EV.

rEV®

ROCKY MOUNTAIN POWER
POWERING YOUR GREATNESS

rEVed.org/rockymountainpower

What Is an EV?

- A vehicle powered by electricity or a combination of electricity and gasoline (HEV)
- The growing technology of tomorrow
- A truck, scooter, self-driving car, mass transit, bus or SUV

Price Is Right

- Wide range of decreasing purchase prices
- New or used
- Fewer moving parts equals less maintenance cost
- EV fueling is generally less expensive than fueling a similar, conventional vehicle

Driving Experience

- Smooth and quiet
- Zero to 60 mph possible in under three seconds
- Batteries can last over 200,000 miles
- Locate chargers and plan trips with ease

Take Charge

- Like plugging in a toaster
- Charge while you shop, at work or home
- Potential to charge when electricity is cheaper
- Up to 250 miles on a single charge

Easy Bein' Green

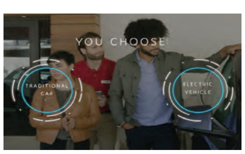
- Potential to fuel with electricity generated with renewable resources
- Can improve local air quality and reduce carbon
- EVs can store electricity for an efficient grid
- Electricity costs are more stable than gasoline

Now you know, time to go rEVed.org/rockymountainpower

rEV Share Form

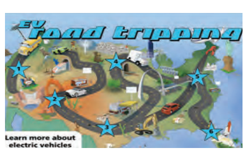
Share your voice to earn your reward.

What is the *rEV Share Form*? It is a way to share insights that shape the future of your community. Visit the form on any page of *rEVed.org/rockymountainpower*. Two minutes is all it takes to earn a chance at wireless Beats headphones.



"rEV Interactive Experience"

Watch "rEV Interactive Experience" on the "Fun" page. YOU choose what Sarah does next.

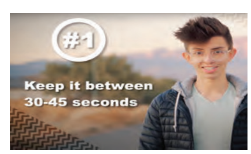


Games and Information

Play EV games.

Calculate EV Savings

Discover fuel cost savings and find vehicle incentives at *rockymountainpower.net/ev*.



rEV Challenge

Create a 30 – 45 second video to convince your friends to to drive an EV. Entry details and information about the electric bike grand prize are on the program website. Are you in?

How Do You rEV?

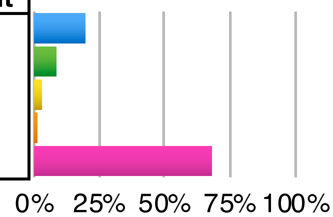
Show your newfound knowledge with the social media links below. Bust an EV myth, share the Spotify® playlist, or encourage your friends to complete the *rEV Share Form*.

ROCKY MOUNTAIN POWER POWERING YOUR GREATNESS | electrify america | National Energy Foundation cultivating energy literacy

rEV Program
Form Share Summary Report

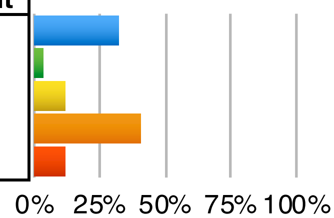
1. Which of the following do you see as advantages of purchasing an EV?

Response	Frequency	Percent
Environmental Benefits	69	20%
Fuel Cost	30	8%
Driving Performance	10	3%
Decreased Car Maintenance	4	1%
All of the Above	240	68%
Total:	353	



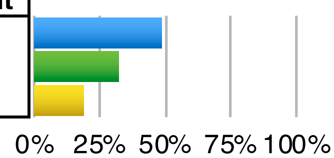
2. Which of the following do you see as roadblocks to purchasing an EV?

Response	Frequency	Percent
Vehicle Cost	114	32%
Fuel Cost	12	3%
Driving Range	42	12%
Availability of Charging	144	41%
Other	42	12%
Total:	354	



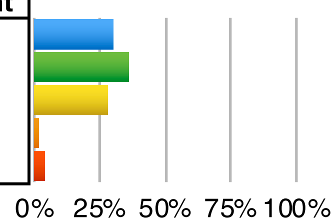
3. Did you visit your utility website to learn about EVs?

Response	Frequency	Percent
I Did	172	49%
I Plan To	114	32%
I Will Not	67	19%
Total:	353	



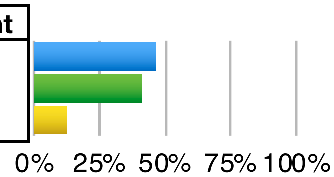
4. How did your participation in this program affect your attitude about EVs?

Response	Frequency	Percent
It Is Much More Favorable	106	30%
It Is Somewhat More Favorable	127	36%
It Is the Same	99	28%
It Is Somewhat Less Favorable	6	2%
It Is Much Less Favorable	14	4%
Total:	352	



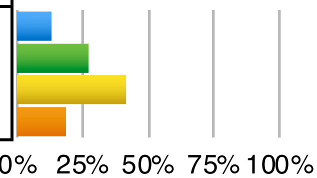
5. How did your participation in this program affect your general knowledge about EVs?

Response	Frequency	Percent
I Know Much More	164	46%
I Know Somewhat More	145	41%
It Is the Same	44	12%
Total:	353	



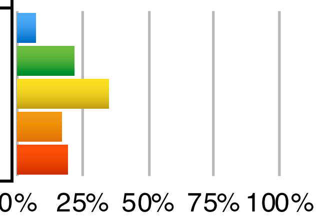
6. Do you have an EV charging structure within one mile of your home?

Response	Frequency	Percent
Yes	46	13%
No	96	27%
I Do Not Know but Want to Know	147	41%
I Do Not Know and Am Not Interested	66	19%
Total:	355	



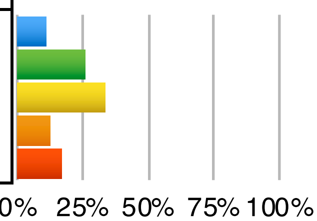
7. Prior to participation in this program, how likely were you, or yourfamily, to purchase an EV?

Response	Frequency	Percent
Very Likely	25	7%
Somewhat Likely	77	22%
Undecided	123	35%
Somewhat Unlikely	60	17%
Very Unlikely	68	19%
Total:	353	



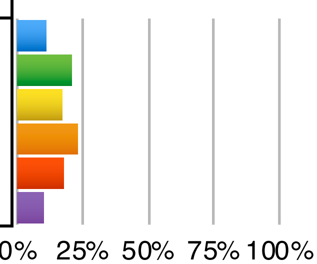
8. Having participated in this program, how likely are you, or your family, to purchase an EV in the next three years?

Response	Frequency	Percent
Very Likely	39	11%
Somewhat Likely	91	26%
Undecided	118	34%
Somewhat Unlikely	44	13%
Very Unlikely	60	17%
Total:	352	



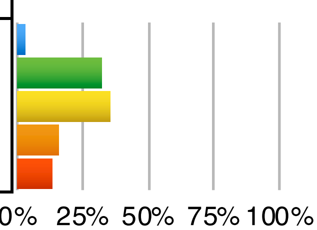
9. What is your best guess for when your family will purchase its next vehicle?

Response	Frequency	Percent
Less than 1 Year	39	11%
1 – 2 Years	74	21%
2 – 3 Years	61	17%
3 – 4 Years	63	18%
4 – 5 Years	36	10%
More than 5 Years	82	23%
Total:	355	



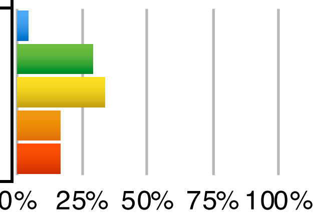
10. Number of Drivers in Household

Response	Frequency	Percent
1	11	3%
2	114	32%
3	125	35%
4	56	16%
5+	47	13%
Total:	353	



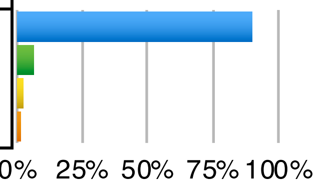
11. Number of Vehicles in Household

Response	Frequency	Percent
1	15	4%
2	102	29%
3	118	34%
4	58	17%
5+	58	17%
Total:	351	



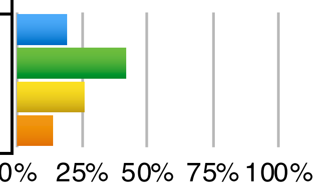
12. Number of EVs in Household

Response	Frequency	Percent
0	314	90%
1	22	6%
2	8	2%
3+	5	1%
Total:	349	



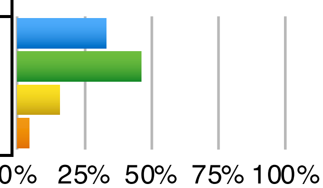
13. Average Miles Driven by a Household Driver

Response	Frequency	Percent
1 to 15 Miles per Day	67	19%
16 to 30 Miles per Day	147	42%
31 to 45 Miles per Day	91	26%
31 to 45 Miles per Day	48	14%
Total:	353	



14. How do you rate the rEV program?

Response	Frequency	Percent
Great	117	33%
Good	163	46%
Fair	56	16%
Poor	16	5%
Total:	352	



Program Teacher Evaluation Report

Teacher Evaluations

Timestamp	11/22/21 13:59	11/22/21 17:00	12/13/21 12:37
Email Address	acmeredith@graniteschools.org	michaeldavis@alpinedistrict.org	dhoudeshel@judgememorial.com
Name	Arielle Meredith	Michael Davis	Dasch Houdeshel
School	Taylorsville High School	American Fork High	Judge Memorial High School
City, State	Taylorsville, UT	American Fork, UT	Salt Lake City, UT
Please share your impression of rEV. [Teaching materials]	Good	Good	Good
Please share your impression of rEV. [Student engagement]	Fair	Fair	Good
Please share your impression of rEV. [Content]	Good	Fair	Excellent
Please share your impression of rEV. [Program overall]	Good	Fair	Good
Please share your impression of rEV. [Flexible COVID options]	Good	Good	Excellent
What additional activities did you, or will you, use from the website?	Games and Lesson plans	Some of the extras talking about the energy and EV stuff	A better format than the movie for me would be system drawings of how EV's work, how the batteries work, how the electrical system was set up 20 years ago vs today vs your vision for the future. The Smart Grid video and the first stop on the EV Game are in line of what I am thinking about, but for high schoolers, I would love to see these introduce case studies. Students want to see specifics.
What would you tell other teachers about the program?	Informational and entertaining	Probably just have the kids watch the video on their own. We did it as a class and half of my classes had a hard time watching the video's acting and overselling EVs	The overall concept is good, but I was not a fan of the dramatization.
What would you like us to tell rEV program sponsors about the program?	It was good for the students to hear about EVs and know about them, more than they are just cool looking	It's cool. We're in an awkward stage of EVs where we're just getting out of Junior high and it's becoming more common and cool but there's still a lot of kids that just don't think they're cool. This push for hybrids is great and a better selling point than a full electric car.	We want more detailed systems diagrams, graphs, and infographics - what are the actual power uses of specific cars at different speeds? What triggers a hybrid to switch between electrical and gas? Give us reviews of actual things.
Where did your students participate with the presentation? (in school, virtual from home, etc.)	In school	Both in class and online for those not in attendance	In my class
Additional comments and recommendations:		The "choose your own destiny" wasn't much of a choose your own since it still found ways to bring it back to the other side. Which is fine but kids just wanted to screw with the destiny and few wanted to follow the correct path. Which you probably foresaw and that's why it always drove home the point each time anyway.	Look at the "data points" from HHMI - they do a really great job of explaining a particular data point with an infographic and supporting materials. Allowing students to choose a bunch of infographics to discuss would be more engaging, beneficial, and flexible.
Was the electronic gift card a good incentive to participate in the program?	Yes	Yes	Yes
Did a presenter visit your school?	No	No	

Student Open-ended Comments

Student Comments
Ask drivers?
Car
De Landa
Do farts work a fuel
EVs are awesome!!!!!!
EVs are cool, and I want one but I don't know when I will get one
EVs are pretty cool, glad I know a bit more about them.
EVs are sick
Give me head phones now
I don't like electric cars, nor the future of technology. I would rather have none then what we're going into.
I go to Kearns. Go Cougars!!!
I just don´t really like EV´s. I just like the sound of actual cars.
I liked how the EVs are made becuase these vehicles don't produce pollution at all, we just need more charging stations.
I love EVs but my family just got 2 new cars so it will be awhile
I love music and would love new headphones
I love the EV!
I personally would love to purchase a EV car but not likely in my household.
I really appreciate how informative this was.
I really dislike EV's they are not good
I really like EV's because we already have one
I really want an EV! This program is very informative.
I think that EV will change to whole preview and perspective of cars. Its very interesting too.
I think that EVs are super cool and everyone who can buy them should
I think the program was very interesting and helpful to understand.
I think there is a lot of potential in EVs, but from where I live I see very few electric vehicles and charging stations. Maybe this will change in the future though.
I want to help the environment by getting a car with renewable energy
If there was an hand on "battery" activity to do with students that would be great
It is cool
It is ok
It was a good program and I know more about EV's
Its mid
johnson
Make it more exciting
My family has a 2012 Prius (out of the 4 cars we own, we use it the most, mostly because it has good miles to gallon) and I don't know the average miles per day driven by my family, so I just guessed, but that seemed to be the most logical answer for it, but it might be more or less. (The Prius is a hybrid, BTW)
My family wants an EV but a lot of ESUVs (my family only fits in an SUV) that are outside our price range.
My last pair of headphones just broke recently and really need some bad
My sibling is close to driving so idk
EVs are very cool and I think it would be cool to drive one and learn all the new and cool things
Thank U for trying to make the environment better
Thank You!
The connection was really bad. I tried to do the activity but it kicked me out and the video wouldn't play.
The more hands on activities the better.
There's many pro's to this vehicle
This video was really garbage, please work on the acting and maybe I'll consider buying something. btw youngboy better
This was very informational and I learned a lot
Watching from Cedar City, Utah!!
We have a hybrid and we really like it. It is super reliable, it uses electricity and then gas
You need to do a good truck then I will get one
You're too biased

STEP Project Report

Period Ended: December 31, 2021

STEP Project Name: Co-firing Tests of Woody-waste (biomass) Materials in Hunter Unit 3

Project Objective:

This project was proposed to conduct co-firing tests of two different types of processed woody-waste (biomass) to be fired in pilot scale tests and in utility scale tests at the Hunter Unit 3 boiler. The target heat input from woody waste material was between 10% to 20% of the required total fuel input of the Unit 3 boiler, with coal making up the remainder. The processed woody waste was anticipated to consist of wood resources including scrap and waste material from logging operations and wood processing plants. A torrefied product and a steam exploded product are the two types of processed woody waste that were to be tested. The primary objective of these tests was to determine whether these processed biomass fuels can be effectively used as “drop-in” fuel replacing a portion of the coal that is burned. In addition to displacing coal and its attendant CO_2 and NOx emissions, using these processed woody waste materials was expected to have the benefit of minimizing particulate matter emissions associated with either controlled or uncontrolled burns of collected forest materials. These tests were proposed to be a mechanism to further evaluate and demonstrate these processed woody waste technologies. Engineering professors from the University of Utah’s Combustion Laboratory and from Brigham Young University were contracted to be the consultants responsible for planning, conducting, and reporting the results of the tests.

In Docket No. 16-035-36, the Commission approved the Company’s request to increase the original funding of $789,873 for the Co-Fired Woody Waste project by $748,980, utilizing funds from the canceled Alternative NOx project, for total project funding of $1,538,853. With these additional funds, the Company expanded the scope to substantially increase the amount of processed biomass material from both woody waste providers to extend the number of hours in the test burn and to increase the measurements taken during the test to gain a better understanding of boiler operation during the co-firing.

Project Progress:

2017: PacifiCorp’s consulting contract with the University of Utah was executed with Brigham Young University as a subcontractor. Amaron and AERP (formerly AEG) were selected to process and provide torrefied and steam biomass respectively. A wood processing company in Salt Lake County was selected to provide feedstock to both vendors after it was determined that harvest and processing of deadfall material from forest areas specifically for the biomass project would add considerable cost and schedule risk to the project.

2018: Amaron and AERP worked to bring their processing facilities in Salt Lake City up to full production capability. Successful pilot scale co-firing of the Amaron and AERP processed biomass pellets was conducted in November 2018. Amaron began producing material and delivering it to the Hunter Plant. PacifiCorp received approval from the Public Service Commission of Utah for an expanded scope for the biomass co-firing test, increasing the budget by $748,980.

2019: With the additional funds, the Company expanded the scope to substantially increase the amount of processed biomass material from both woody waste providers to extend the number of hours in the test burn and to increase the measurements taken during the test to gain a better understanding of boiler operation during the co-firing.

Amaron provided a total of 724 tons of torrefied biomass material to the Hunter Plant. The test burn of the torrefied material was conducted in Unit 3 of the Hunter Plant on August 22nd and August 23rd of 2019 and the consultants provided a review of preliminary results of the torrefied test burn on December 5, 2019. The test used a blend of 20% biomass material and 80% coal over a period of 12 hours. The biomass fuel performed as planned in the test and produced lower concentrations of NO_x and SO_2 as expected.

AERP, the supplier of steam exploded biomass material, moved their production facility to North Carolina. PacifiCorp and AERP entered discussions to re-negotiate the supply contract for the steam exploded biomass material with a delivery schedule in the second half of 2020.

2020: PacifiCorp and AERP re-negotiated the supply contract and set a delivery deadline of June 11, 2021 for up to 900 tons of steam exploded biomass material to be delivered to Hunter Plant. AERP made plans to build a second production facility in Maine. The test burn of the steam exploded material in Unit 3 of the Hunter Plant was scheduled to occur the week of June 14, 2021.

2021: AERP was not able to meet the June 14, 2021 production schedule in the supply contract they had with PacifiCorp due to difficulties processing and pelletizing the biomass to meet PacifiCorp's technical requirements. PacifiCorp and AERP rescheduled the test burn at Hunter for the fall of 2021, but an equipment failure at AERP's processing facility in Maine halted all production. The halt in production made it impossible to schedule the utility scale test burn and analysis by the end of 2021.

AERP delivered 10 tons of processed biomass material to the Hunter Plant in June 2021, which was used to conduct a pilot scale blend ratio test to study the milling characteristics of with biomass and coal mixtures at rates of 0%, 25%, 50%, 75%, and 100% biomass to coal. By using the same pilot scale test equipment that was used in 2018, the results of the 2018 pilot tests, the 2019 utility scale test and the 2021 blend ratio test could be correlated. The blend ratio test was completed in October 2021 and results were reported in December 2021.

A comprehensive final report is attached as Exhibit 3-B which presents the results and analyses of the technical tests. This report was prepared by the consultants at the University of Utah and Brigham Young University.

Project Accounting:

	2018	2019	2020	2021	Total
Annual Collection (Budget)	$262,837	$588,943	$79,307	$640,326	$1,571,413
Annual Spend	$262,837	$588,943	$79,307	$274,294	$1,205,381
Committed Funds	$0	$0	$0	$0	$0
Uncommitted Funds	$0	$0	$0	$0	$0
External OMAG Expenses	$0	$0	$0	$0	$0
Subtotal	$262,837	$588,943	$79,307	$274,294	$1,205,381

Project Milestones:

Project Milestones	Delivery Date	Status/Progress
Contracts with PacifiCorp complete	UofU – June 27, 2017 Amaron – February 14, 2018	Complete Complete
Select biomass fuel source	December 1, 2017	Complete
Process first ton of Amaron biomass material	March 9, 2018	Complete
Sign new Amaron supply agreement	May 31, 2019	Complete
Revise schedule for expanded Amaron test burn	July 1, 2019	Complete
All Amaron biomass material delivered to the Hunter plant	August 15, 2019	Complete
Finalize Amaron test burn plan and operating procedures	August 15, 2019	Complete
Test burn monitoring equipment installation complete	August 15, 2019	Complete
Amaron test burn conducted	August 31, 2019	Complete

Sign updated AERP supply agreement	December 21, 2020	Complete
Schedule expanded AERP test burn	December 16, 2020	Complete
All AERP biomass material delivered to the Hunter plant	June 11, 2021	Cancelled
Finalize AERP test burn plan and operating procedures	May 31, 2021	Cancelled
Test burn monitoring equipment installation complete	June 15, 2021	Cancelled
AERP test burn conducted	June 16-18, 2021	Cancelled
Blend ration test contracted	September 2021	Complete
Blend ration test conducted	October 2021	Complete
Final report completed	December 2021	Complete

Key Challenges, Findings, Results and Lessons Learned:

Challenges	Anticipated Outcome	Findings	Results	Lessons Learned
Secure raw biomass material	Several biomass sources were researched and priced.	Finding biomass sources that could guarantee sufficient material availability at a specific price was a challenge.	Amaron is using Woodscapes as their biomass supplier.	
Secure supply agreement with AERP	Complete supply agreement with AERP.	After finding no alternative suppliers for steam exploded biomass material, having patience with AERP's business processes eventually led to an agreement.	Supply agreement with AERP was finalized December 21, 2020, but AERP was unable perform to the terms of the contract.	With unproven technologies, structure contract terms to allow payment only if the suppliers fulfill the terms of the contract.
Design the test burn and monitoring plan	University of Utah developed the project plan.	The test burn and monitoring plan were updated in response to the project expansion approval.	The test burn of the Amaron product went smoothly and met expectations.	
Address plant	Worked with Jim Doak to	The relatively small quantities of biomass	No impact on air permits.	

operation or air permit concerns	notify the State of Utah about the project.	material do not impact the air permit.		

Program Benefits:

The project has created an option to use forest waste products to generate electricity without requiring construction of new facilities or expensive equipment retrofits at existing coal plants. The 2019 utility scale test burn proved torrefied biomass could be burned in a utility scale coal plant. The 2017 and 2021 pilot scale test burns allow industry to compare torrefied biomass with steam exploded biomass in milling and test burn scenarios and review the possibilities of using larger ratios of drop-in biomass fuel in utility scale coal facilities. The ability of an existing coal plant to supplement its coal fuel with biomass, when biomass is available, eliminates the supply chain problem of needing to have continuous biomass resources available to fuel a biomass-specific generation resource. Burning biomass in a controlled environment also provides air quality benefits compared to open burns of forest material.

Potential future applications for similar projects:

The results of this project could be used in future initiatives to improve forest health and reduce emission from forest fires and open burn piles. The project results could also inform future treatment processes for biomass material and firing parameters if biomass is burned in other coal plants.

Attachments:

• Exhibit 3-A: Executive Summary: Technical Assistance in Support of Biomass Co-firing Demonstration

• Exhibit 3-B: Technical Assistance in Support of Biomass Co-firing Demonstration (note – report is voluminous)

Exhibit 3-A

Executive Summary Technical Assistance

Technical Assistance in Support of Biomass Co-firing Demonstration

Summary Report provided to Pacificorp/Rocky Mountain Power

March 15, 2022

Andrew Fry[1], Eric Eddings[2] and Klas Andersson
[1]Chemical Engineering, Brigham Young University
[2]Chemical Engineering, University of Utah
[3]Department of Space, Earth and Environment, Energy Technology, Chalmers University

The health of national forests in Utah has been strongly impacted by bark beetles, with areas of up to 70% mortality. The abundance of dead trees poses a significant environmental challenge if left to decay in place or in the case of a wildland fire. Additionally, operators of coal-fired utility boilers are facing increasing pressure to reduce their CO_2 emissions. These environmental conditions suggest an obvious solution to offset the utilization of coal in power plants by burning dead trees, which are carbon neutral in their life cycle. The objective of this project was to evaluate the technical feasibility of firing these dead trees in a coal-fired utility boiler, without modifications to the plant hardware or operating conditions, hopefully culminating in a demonstration at full-scale. To satisfy this objective, woody biomass would have to be prepared, to be more like coal, to minimize the impacts on the plant. Two preparation processes were investigated. Torrefied biomass was prepared and delivered for both pilot-scale testing and for demonstration by Amaron Energy. Steam Exploded biomass was provided for pilot-scale testing by Active Energy Group.

The key technical challenges identified were fuel preparation and ash behavior. It is known that the lignin in biomass poses a challenge to milling equipment designed for coal. It is also known that the mineral chemistry in fuel blends can negatively impact ash deposition rate. To elucidate these effects pilot-scale milling and combustion tests were performed at the University of Utah in 2016 through 2018 and subsequently at the San Rafael Energy Research Center using the same equipment in 2021. A full-scale demonstration was performed at PacifiCorp's Hunter, Unit 3 in 2019.

Pilot scale milling and combustion tests were performed to support the eventual demonstration of the firing of a blend of prepared woody biomass with coal in PacifiCorp's Hunter, Unit 3. Pre-demonstration tests were focused on a 15/85% (mass) blend of biomass/coal. The pilot-scale tests consisted of both milling and combustion trials. The mill tests verified that it was possible to mill a 15/85 blend of biomass with minimal impacts to the equipment and the product fuel. It was determined that the temperature of biomass torrefaction strongly influenced the power required to mill the blended fuel. The steam exploded material was milled with a slightly reduced mill power requirement. Both biomass preparation methods resulted in an increase in large particles in the milled product. The combustion trials showed that flame stability and emissions would not be a concern and that NO_x emissions were expected to reduce when firing the biomass blend. Additionally, the deposition rate when firing the biomass blend was similar or slightly lowered when firing the blend. All data provided confidence in proceeding to the demonstration tests.

The demonstration of biomass cofiring at Hunter Plant in August of 2019 was successful. During this test 724 tons of torrefied biomass were burned in Unit 3. The unit was able to maintain steady operation in terms of unit load, flue gas excess O_2, turbine throttle pressure and flue gas pressure drop. The ash deposition rate was decreased. NOx and SO_2 emission decreased and the lime utilization in the wet FGDs was significantly reduced. The mill operation was observed to be negatively impacted when milling the biomass blend in terms of power consumption and reject rate including fuel material. This adverse effect is likely the result of 1) firing the torrefied biomass at a ratio higher than was tested in the pilot-scale trials, and 2) possibly control of the torrefaction process at the required temperature and residence time, which was shown during the pilot-scale milling trials to be critical parameters during fuel preparation for mill performance.

Originally, a separate demonstration test was planned to fire the steam exploded biomass. This test was not performed because the fuel supplier was not able to provide enough material for demonstration testing. As an alternative, additional pilot-scale testing was performed to investigate the impact of steam exploded biomass blend ratio on milling and combustion performance. This test was performed in October of 2021. A range of blending ratios from pure coal to pure biomass were investigated. The milling tests showed that the there was a linear increase in mill power requirement with increasing biomass content of the blend. However, after adjusting the roller spacing closer to the bowl, even pure biomass was milled with no impact on mill power requirement. Combustion testing showed that biomass decreased the intensity of the flame in the near burner region. The deposition rate decreased as a function of biomass content with no synergistic effects of blending with coal.

Exhibit 3-B

Technical Assistance in Support of Biomass Co-firing Demonstration

THIS ATTACHMENT IS VOLUMINOUS AND PROVIDED SEPARATELY

STEP Project Report

Period Ending December 31, 2021

STEP Program Name: Huntington Plant Neural Network Optimization Project (NOx Neural Network Implementation)

Program Objective:

The objective of PacifiCorp's study and use of Neural Network Optimization/Optimizers (NNO) for control optimization is to achieve the best possible unit efficiency with the lowest possible emissions while safely operating our Electrical Generations Units (EGU). The goal of control optimization is unit specific; however, optimization efforts should always address the following: safety, environmental constraints, equipment condition and plant or fleet operating requirements. There are three factors affected by control optimization that must always govern optimization efforts within the PacifiCorp fleet. In order of priority, they are:

Safety – Optimization efforts will not jeopardize personnel safety.

Environment - Emissions limits will take precedence over all optimization aspects except safety.

Availability – Emphasis on maintaining unit reliability will take precedence over optimizing the unit for efficiency.

This project is designed to provide a detailed analysis of the implementation of NNO on unit controls. The NNO control optimization will initially be applied to the combustion control system. During this time the available control inputs and outputs will be evaluated relative to their use or weight by the NNO. With the combustion optimization targeting Nitrogen Oxides (NO_X) for improved emissions and also targeting Carbon Monoxide (CO) for improved emissions and unit efficiency. Once the combustion control phase is well underway additional plant systems will be evaluated for control optimization. It is expected that the Flue Gas Desulfurization FGD control systems will be next for control optimization. The experience gained from combustion control optimization will guide those decisions.

Program Accounting:

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$547,807	$178,924	$216,718	$0	$32,000	$1,007,449
Annual Spend	$457,767	$207,616	$231,621	$14,527	$32,000	$943,531
Committed Funds						-
Uncommitted Funds						-
External OMAG Expenses						
Subtotal	$457,767	$207,616	$231,621	$14,527	$32,000	$943,531

Total spend in 2021 was for the required software maintenance. There are no expected ongoing expenditures as part of this program.

Program Milestones:

Milestones	Target Date	Status/Progress
Project Kick off Meeting	January 26, 2017	Complete
Contracts with PacifiCorp complete	February 15, 2017	Univ. of Utah – Complete Griffin Software – Complete
Instruments upgrades complete	June 5, 2017	Complete
Base Line Data set established. 3 Month Average	April 1 – June 30, 2017	For the 425 – 450 MW range NO_x = 0.23 lbs/mmbtu CO = 348 ppm
Unit base line optimization Manual Boiler tuning	July 27 – August 5, 2017	Complete
Initial installation complete	August 11, 2017	Complete
Neural Network Model and Predictors running	November 30, 2017	Complete
Optimizer turned on	March 31, 2018	Optimizer on
Parametric study on optimization of auxiliary systems complete	October 31, 2018	Cooling Tower Data being analyzed site visit by U of U completed
Annual progress report complete for Year 2	March 31, 2019	Complete
Flue Gas Desulfurization FGD control systems	June 30, 2019	Trying two cells of the Cooling Towers.
Exploratory study on dynamic optimization with set point ramping complete	August 31, 2019	Data collection ongoing
Final study on impact on emissions complete U of U	March 31, 2020	Complete March 11, 2020

Key Program Findings/ Challenges / Lessons Learned:

Challenges	Results/Progress
a. Communications between the Neural Network Server and the Distributed Control System (DCS)	Problems with OPC have been identified and resolved. Changed communication protocol to Modbus to prevent further issues in the future.
b. Supplied Basic Optimization component of software incomplete	Building new optimization algorithm as interim solution. Griffin optimizer has been refined.
c. Reducing NO_x (Nitrogen Oxides)	The model tuning and using predictor at near full load operations is showing positive

	reduction of NO_x. As seen in below of about 15% seen in Figure 1.
d. Reducing CO (Carbon Dioxide) and unburned coal improvement.	The initial indication for CO reduction is very positive. Initially a large improvement has been observed with as much a 50% reduction in CO.
e. Reheat tube temperatures high during load ramping up events forces less than optimal configuration to be used.	Several solutions to this problem have been tried. A solution that allows optimization and controls temperature has not yet been identified.
f. Low load NOx reduction very difficult due to minimum air flow requirement.	Air flow monitoring devices have been installed and are currently being added to control system. Air flow monitoring should allow reduction of air flow, and improved NOx reduction at low load.
g. Flue Gas Desulfurization control systems	Not started at this time.
h. Cooling Tower Optimization	The cooling Tower Optimization was activated on August 27, 2019 and has been running since the unit overhaul. Some improvements have been noted. – Ongoing
i. Upgrading Neural Network Server for required Cyber Security controls	This has been a periodic issue. When DCS controls upgrade was completed on the unit, the communication between the DCS and the COS was interrupted temporarily and a new patch from Griffin solved this issue.
j. Unit Load Volatility	The unit load profile has shifted to more of a short-term dispatch mode which means larger and more frequent load changes. This creates additional challenges for optimization. – Ongoing
k. Lower Low Load Operation	In trying to get the unit load to as low as possible, it is clear the unit is not designed for optimized low load operation. However, from the experience gained with this project, we can get the NO_x and CO lower than initial levels. This is an area that needs additional effort, but it is improving.

Program Results and Benefits

During this five-year STEP program, the Combustion Optimization System (COS) and the sootblower control module KSB (Knowledgeable Soot Blowing) have been implemented and continue to run with significant benefit to the Huntington plant. With the support of the University of Utah and the Neural Network supplier, Griffin Open Systems, the NNO systems have achieved the program objectives

The baseline data measurements were taken from April 2017 through June 2017. For this period the average unit load was 282 MW with 0.230 #/mmbtu average NO_X emissions and 348 CO ppm average CO emissions. For the last six months of the project, July through December 2021, the average unit load was 430 MW with 0.208 #/mmbtu average NO_X emissions and 159 CO ppm average CO emissions. With both NO_X and CO varying by load it was important to compare results with various loads. For the comparison periods noted above, the average NO_X improvement over all loads was 15%, and the average CO improvement was 19% with over a 40% improvement at upper loads, as seen in figure 1 and figure 2 below.

Figure 1

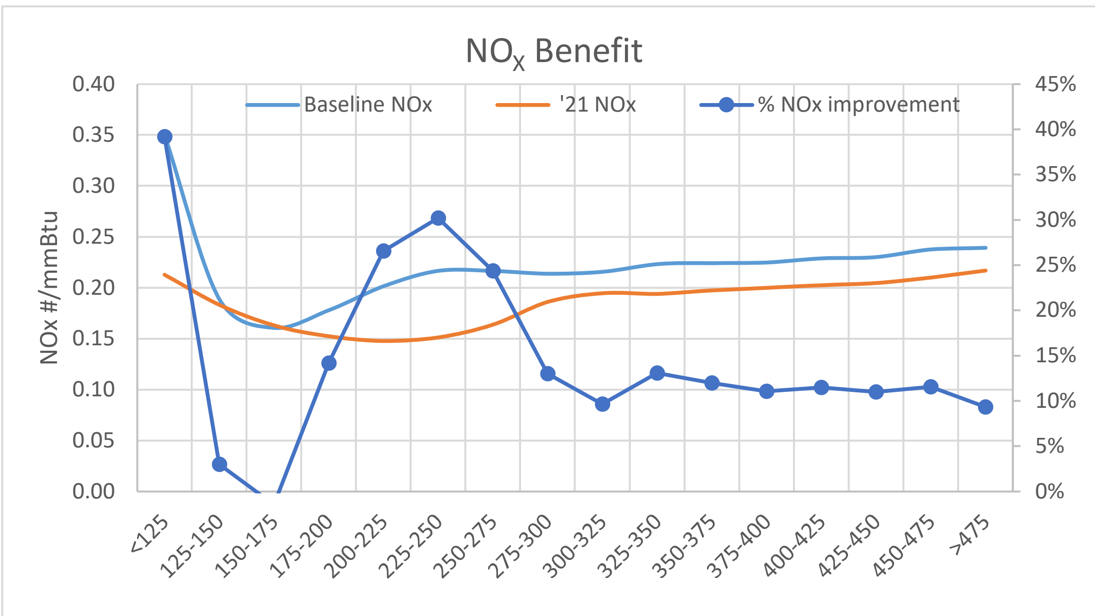
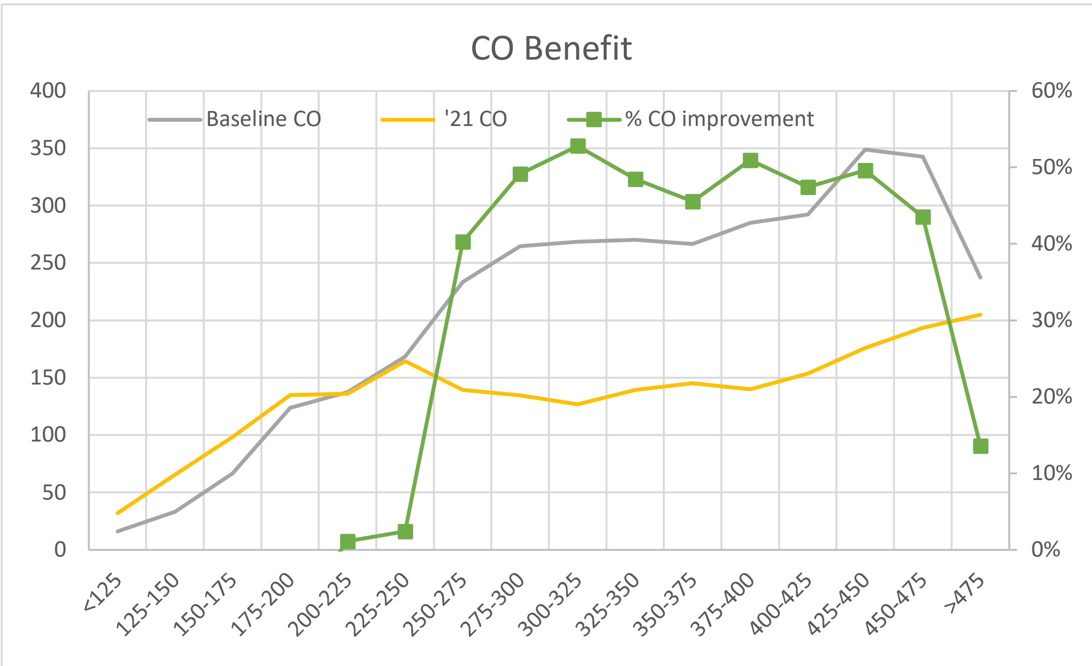


Figure 2



Since NO_X and CO do vary by load, it was important to select a consistent load range in order to evaluate results over a given time period. For comparison purposes, the consistent load range of 425-450 MW was chosen. This is 90 – 95% of full load. Since this three-month baseline date was in the spring, loads were typically lower. As seen in charts 3 & 4 in appendix 1, the unit was in the upper load range of 425-450 MW most every day but at that only in this range a total of 10% of the time and only 154 of the 183 days was it in this range. The monthly average load was 429 MW. The unit was at or near full load (greater than 450 MW), 56% of the six months (see chart 3 in appendix 1).

The comparison numbers for the 425-450 MW load range show a reduction in the average NOX from 0.230 to 0.205 #/mmBtu or an 11% improvement. The CO from the baseline was 348 ppm and improved down to 156 ppm during the last six months of 2021. Both parameters indicate very good success over a six-month period which should see continued results going forward.

The KSB system has grown in usability and provides consistent operating practice even with the different operating styles of the crews. In some areas of the boiler, it has led to increased sootblower operating and others it has reduced the number of sootblower cycles. With the KSB system, the steam temperature control has improved. Overall, the sootblower operation has increased slightly, and more importantly, the best locations have been identified for when operators need to improve both NO_X and steam temperatures.

The unit load volatility has played a significant role in the ability to optimize. With the unit load swinging it is more of a challenge for the system to optimize and this is true whether it is a neural network or and combustion expert. This variability was measured with a Volatility Factor. For the baseline test period, the unit load volatility factor averaged 29% from April through June 2017. In comparison, the last six months of 2021 the volatility average was 25%. However, during the five-year program there were months when the average volatility factor had a high of 44%. This volatility factor for the six months can be seen in Chart 5.

For tracking proposes CO_2 was reviewed. However, since the potential for CO_2 reductions was not identified in the original scope of this STEP project, no analysis of CO_2 has been done. The baseline average CO_2 at 425-450 MW load range was 11.14%. The last six months of 2021 at the 425-450 MW load range CO_2 was 10.73%.

The acceptance of the system by the operators was a key factor and went through several iterations before the operators really accepted the system and realized there was a benefit. Part of the benefit was making their job easier. The system utilization is best when the unit is running in “normal” operating conditions. When the unit swings or gets a run back due to either equipment issues or system conditions the operators tend to turn off both the COS and the KSB. For the last six months in 2021 the average utilization rate or time on was 80% for the COS and 58% for the KSB. This indicates good “buy-in” by the operators which is key to the success of this type of optimization system.

Potential Future Applications

With the positive results, Huntington has implemented a similar Combustion and Sootblower Optimization on Unit 1. This has been a very successful project. A similar system is now installed on Hunter units 1 & 2 with similar results.

Appendix 1

Chart 1 – NO_X and CO versus load and percent of time at Load. (baseline)

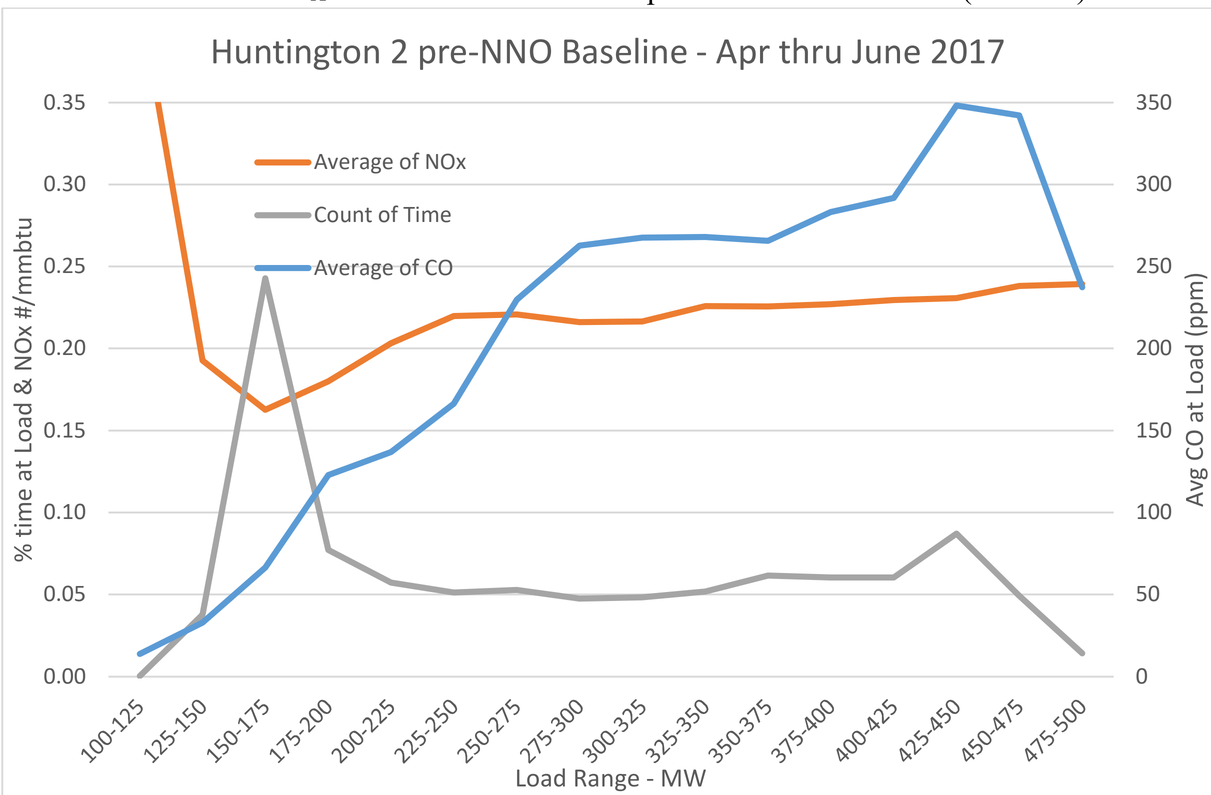


Chart 2 – Three Month data establishing baseline.

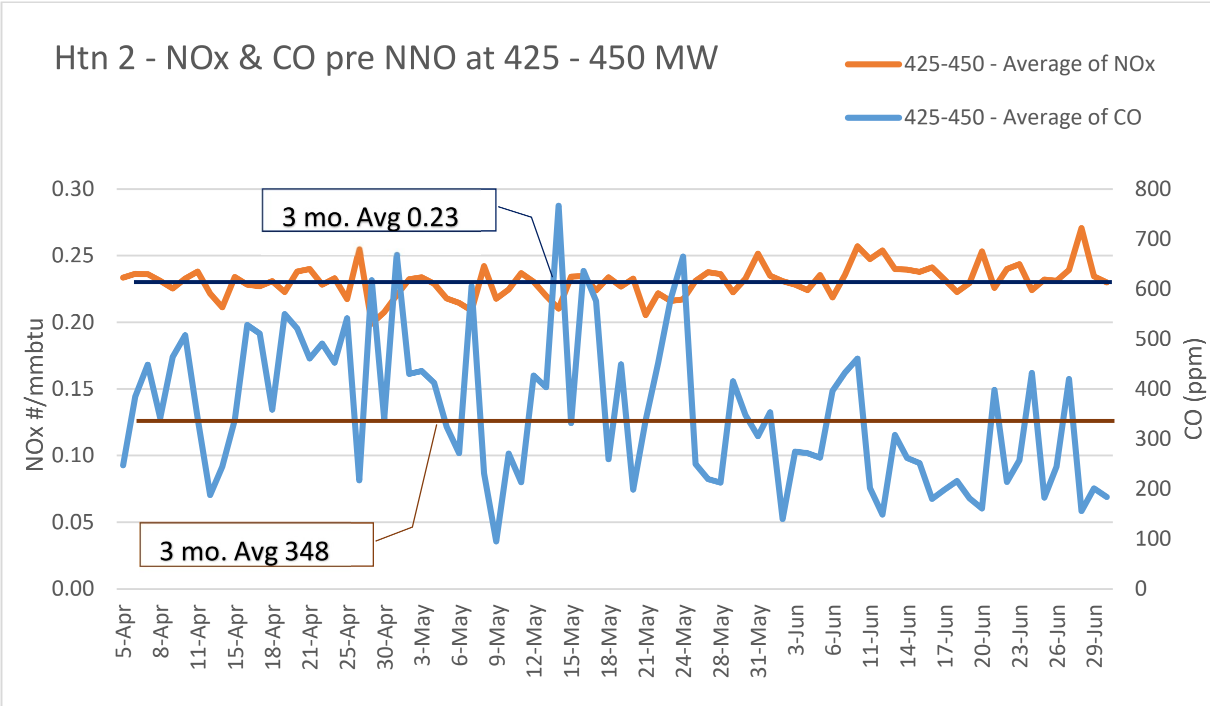


Chart 3 – NO_X and CO versus load and percent of time at Load.

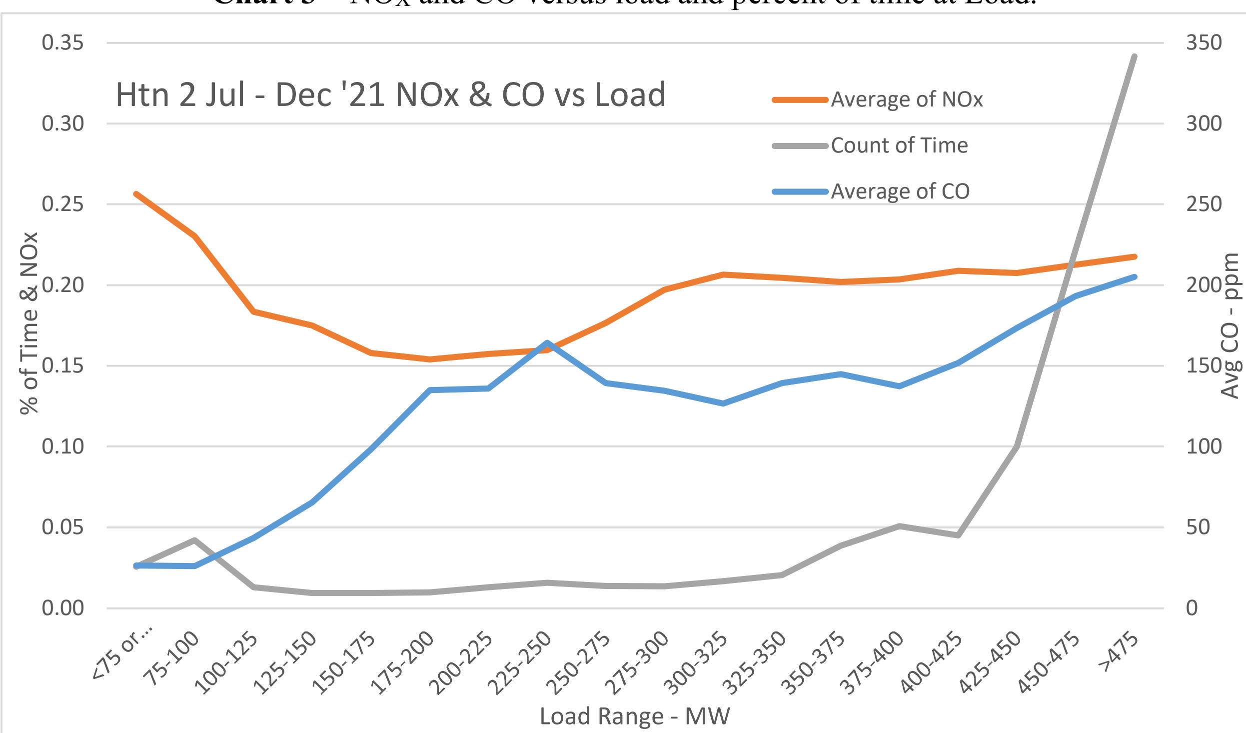


Chart 4 – July – Dec '21 – NO_x & CO

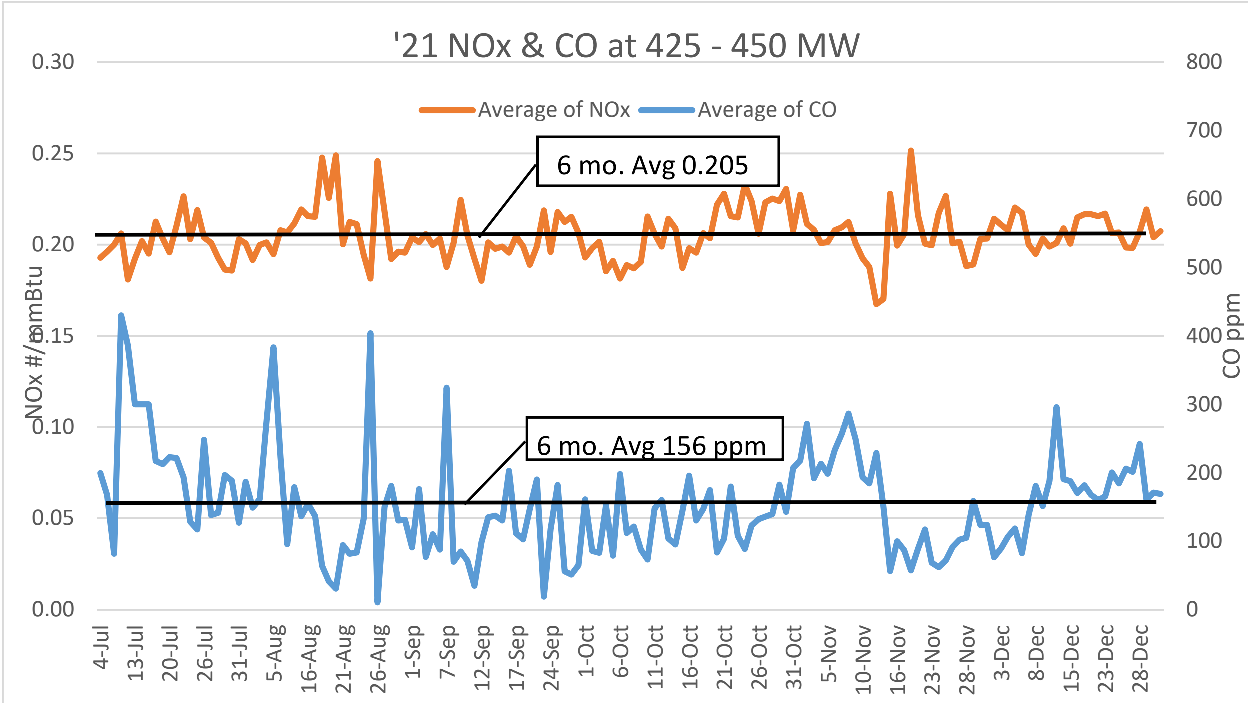
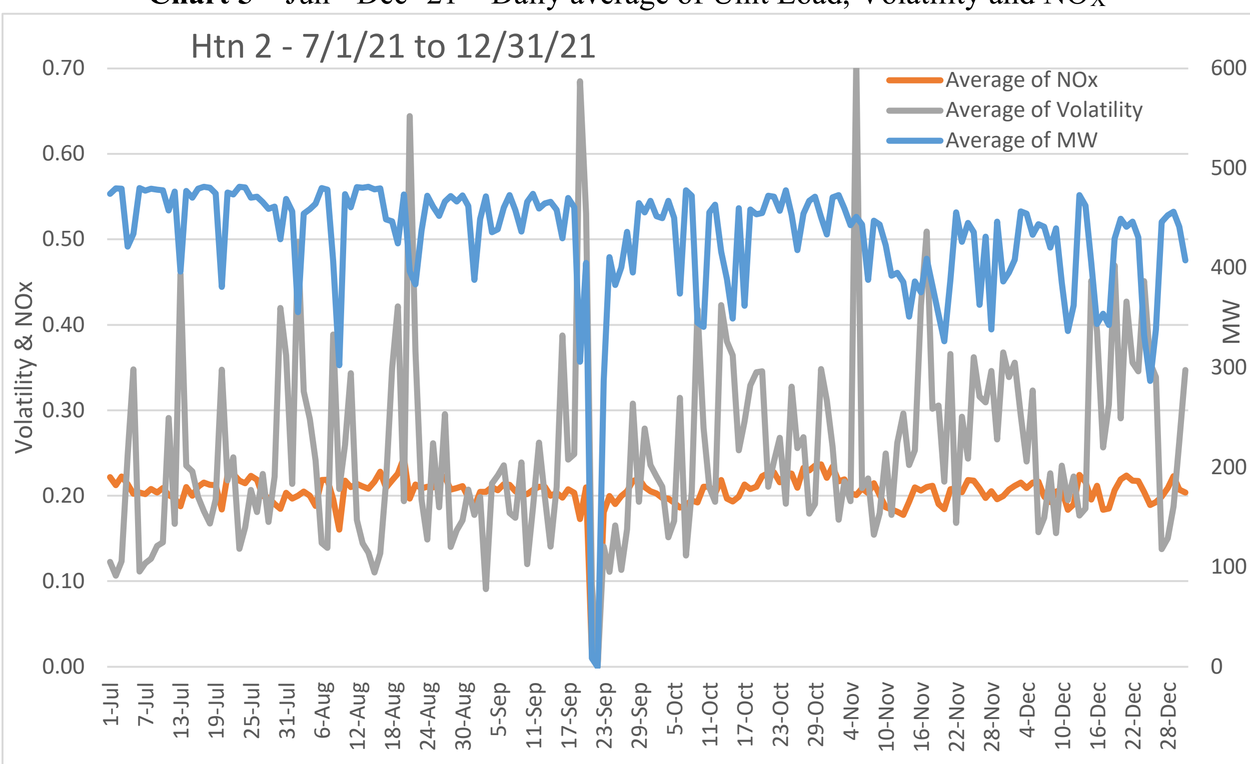


Chart 5 – Jun - Dec '21 – Daily average of Unit Load, Volatility and NO_X



STEP Project Report

Period Ending: December 31, 2021

STEP Project Name: Alternative NO_X Reduction (PROJECT CANCELED)

Project Objective:

The project was designed to perform one or more utility scale demonstration tests of an alternative NO_X emission control technology at the Hunter or Huntington power plants. The objective of the project was to find a cost effective technology, or combination of technologies, that can achieve or approach the NO_X emissions that match a Selective Catalytic Reduction ("SCR").

Project Cancelation:

The Alternative NOx Project, which was approved on May 24, 2017, commenced with issuing a request for information from technology providers. The results of the technical and commercial proposals showed that none of the vendors would be able to meet the project's criteria for a cost-effective and innovative technology for a demonstration test. Each of the vendor proposals were outside the project's budget or proposed a technology that was known and established. Rocky Mountain Power concluded, based on the results of the Request for Proposals ("RFP"), that the STEP funding would be better utilized in furthering other Clean Coal Research projects already approved by the Commission over demonstrating a non-innovative NOx control technology with a known emission reduction capability. The Company communicated the proposal to abandon the project in the March 12, 2018, STEP Project Update meeting, and it was also included in the First STEP Annual Report in Docket No. 18-035-16 ("STEP Report Docket"). On November 13, 2018, the Company requested approval to reallocate the remaining unspent funds, a total of $1,161,501, from the Alternative NOx project to the Co-Firing Test of Woody-waste Materials at Hunter Unit 3 and the Croygenic Carbon Capture projects. The Commission approved the request on February 6, 2019. The Company will continue to submit a project report for the canceled Alternative NOx project, although no additional spend or project milestones will occur beyond what is reported below for 2018. The 2018 funds were spent in early 2018 prior to the project's cancellation on the outside services of an owners engineer as part of the evaluation of the RFP.

Project Accounting:

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$125,000	$0	$0.00	$0.00	$0.00	$125,000
Annual Spend (Capital)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Committed Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Uncommitted Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

External OMAG Expenses	$131,405	$26,010	$0.00	$0.00	$0.00	$157,415
Subtotal	$131,405	$26,010*	$0.00	$0.00	$0.00	$157,415

*In the Company's Application to Modify Funding Amounts Previously Authorized by STEP filed on November 13, 2018, in Docket No. 16-035-36, paragraph 19 of the Application stated that a total of $170,356 had been spent on the Alternative NOx project for the RFP and owner's engineer services. This amount included $131,405 in CY 2017 expenses and $38,951 in CY 2018 expenses. The $38,951 in CY 2018 included an accounting accrual of which $12,941 was subsequently reversed. The total for CY 2018 is $26,010. Also in paragraph 19, the Company requested $1,161,501 be transferred to the other clean coal projects, leaving $89,964 unallocated. With the revision in CY 2018 expenses, the unallocated amount is revised as follows:

Original budget for the Alternative NOx Project	$1,415,821
Funds spent on Alternative NOx Project	$157,415
Funds transferred to other clean coal projects	<u>$1,161,501</u>
Unallocated funds	$96,905

Project Milestones:

Project Milestone	Delivery Date	Status
Kick off meeting	March 30, 2017	Complete
Draft version of RFI for Alternative NO_X Technologies	May 18, 2017	Complete, draft received on May 1, 2017
Issue RFI for Alternative NO_X Technologies	May 29, 2017	Completed
RFI Response Due	June 22, 2017	Completed
Summary of RFI Response	August 6, 2017	Completed
Issue RFP for Alternative NO_X Technologies Demonstration Test	August 20, 2017	Complete, August 24, 2017
RFP Response Due	October 9, 2017	Completed
Selection of Technologies for Demonstration Test	December 27, 2017	Complete
Submit Implementation APR for Demonstration Test	February 20, 2018	Deferred (see key challenges)
Project Cancellation	June 30, 2018	Complete

Funding Reallocation to Other STEP Clean Coal Projects	December 31, 2018	Complete

Key Challenges, Findings, Results and Lessons Learned:

Description of Investment	Anticipated Outcome	Challenges	Findings	Results	Lessons Learned
a. Request for Information	Selected vendors for alternative emission reduction technology	Limited availability implementable technology	Sixteen vendors were approached for their technology	Two vendors provided a substantially different technology for implementation	There is limited number of technologies on the market reach SCR type emission reduction
b. Request for Proposal Cost	A technology supplier capable for performing a demonstration test within the allocated budget	Limited number low cost technology for emission reduction	Only two vendors could meet the target emission reduction rate and neither were within the target budget	No vendor could be sourced that could meet the STEP requirement and were within the allocated budget.	The company should provide more direction to potential vendors before release of the RFP to gain a better understanding as to the cost associated with a demonstration test.

STEP Project Report

Period Ending: December 31, 2021

STEP Project Name: Study Evaluation for CO_2 Enhanced Coal Bed Methane Recovery

Project Objective:

Perform a feasibility study evaluating opportunities to use carbon dioxide ("CO_2") for beneficial use in enhanced natural gas recovery from coal seams. The focus of the study will be coal seams in the Emery County area. As part of the study, an assessment will be made on the capability of Emery County coal seams to concurrently sequester CO_2.

Project Progress:

The feasibility study was completed by the University of Utah in November 2021. The Application Feasibility of Regional and Commerical Use of CO_2 for Enhanced Coal Bed Methane Recovery final report is available in Attachment A. Key findings from the report are highlighted below:

1. **Methane capture and purification before injection.** Laboratory scale, experimental work using a surrogate to flue gas (a nitrogen-carbon dioxide mixture) suggested that there could be some advantages in injecting flue gas directly without separation of the carbon dioxide explicitly. The advantage is not necessarily that NO_x can be sequestered but that the presence of nitrogen may enable moving CO_2 deeper into the coal (hypothesis at this point, based on laboratory observations, requiring validation).

2. **Coal swelling** impacts coal-bed methane production. The experience in the past has been that chemisorption and associated swelling have reduced cleat permeability in coals. Tactical changes in the injection strategy – multiple horizontal wells, with water diversion stages and pressures above fracturing are envisioned to effectively provide conformal injection and storage of CO_2 through the bulk of the reservoir. The experimental work in this study demonstrates the consequences of adsorption and points to some advantages in injecting flue gas rather than explicitly separated carbon dioxide. A carefully monitored and designed pilot injection program could safely help to clarify this at a scale larger than in the laboratory.

3. The true **capacity** for carbon dioxide storage in coals in-situ has not been established. Continuous injection below fracturing pressure may not be a realistic scenario. The potential for refined injection procedures including fracturing, water stages, and in particular horizontal wells, might alleviate the mismatch between a necessarily large and constant CO_2 supply and the sequestration volume in the coals. A pilot project could provide clarification. The geologic specifics of the Ferron coal/sandstone packages could be favorable for injection where the movement of carbon dioxide (or flue gas) through the sands would be relatively unimpeded and storage in the coal could move well away from the injectors. The potential complication is the potentially finite extent of the sands.

4. **Seal integrity and permanence of sequestration** are always a concern for subsurface storage. Effective monitoring is required. Injection of water, particularly calcified water after periodic injection of carbon dioxide could afford mineralization and more permanent sequestration. Predicting, monitoring, and mitigating leakage is a common theme of all subsurface storage operations. The overlying Mancos formation is thick and would provide an effective seal.

5. **Logistics and feasibility of piping CO_2** to injection equipment from a plant environment to the injection facility. The two plants are close to a historically produced coal bed methane play. In particular, the Buzzard Bench field was evaluated in this work.

6. **The estimated OGIP (original gas in place - methane)** in the northern block of the Buzzard Bench field abutting the Hunter and Huntington power plants is 153 to 202 bcf methane (using typical gas contents of 190 and 350 scf/ton, respectively for worst- and best-case scenarios). The estimated OGIP for the southern block ranges from 192 to 450 bcf methane. Some of this gas has been already produced because of coalbed production operations over the past twenty years or so.

7. **The estimated CO_2 maximum storage capacity:** The dry-ash free CO_2 gas capacity of a Ferron coal sample at in-situ conditions was measured as 670 scf/ton, which leads to a volumetric capacity of carbon dioxide of 523 and 673 bcf of CO_2, for the northern and southern Buzzard Bench blocks, respectively.

8. **This is not an insignificant operation.** Consider servicing the Huntington plant. As a benchmark, consider an annual CO_2 emission of 6,000,000 tons of CO_2. Over twenty years, simulations suggest that about 75 to 100 injectors would be required – a significant investment with significant OPEX requirements. Only a pilot program can characterize this for sure. These numbers are conservative because the Langmuir isotherm for the CO_2 was not available from Schlumberger when the simulations were completed. After those data were generated, the storage capacity appears to be substantially higher, and the number of injectors could be halved – still a significant operation.

9. A limitation on the rate of injection per well is the reduction in permeability associated with swelling. As the permeability reduces, the injection pressure increases. The limit on the injection pressure has been taken to be minimizing the bottomhole pressure to avoid hydraulic fracturing. Only a pilot/field experimentation will ultimately confirm these pressure limitations. There is also some laboratory evidence that direct injection of flue gas may mitigate the consequences of the swelling.

10. **Question: Will an increase in injection pressure due to swelling be as severe as simulated if the interfingering sands act as a pressure relief and delivery mechanism?** Almost certainly not. The Ferron sands are interfingered with the coals. Measurements of the permeability of the Ferron sand suggest preferential gas flow would occur into the sands, offering the ability to bypass *locally* reduced permeability in the coals. With time, flow into and adsorption would occur in the interfingered coals with accompanying sequestration.

Simulations tend to suggest this as well. A pilot test would establish the value of this revolutionary concept – relying on the sands to deliver the CO_2 and the coals to sequester it.

11. **Question: What happens if the pressure causes local fracturing?** This is an unanswered technical question. If the fracturing is restricted to the sands and the coals, the results will be beneficial. Areas of locally reduced permeability in the coals would be breached/bypassed and injectate could move beyond the impaired zones. The concern is breaching a seal. However, the overlying Mancos formation is relatively thick and could tolerate some local fracture penetration. Consequently, the method for fracturing, as part of the storage protocol, needs to be carefully defined and tested at a pilot scale. For example, if high pressures are encountered during injection, a small slug of water might be injected to allow a small fracture to occur, to see if pressure can be relieved. This is "unexplored technical territory" and would require testing and validation. Assuming that the carbon dioxide can be maintained in a super critical state, a nominally incompressible slug (the water) may not be needed to generate a small fracture step. This is advocating the possibility of a WAG (water alternating gas) operation. Corrosion would need to be considered.

12. **Question: Can flue gas be pumped?** There are some indications that it could be viable to pump flue gas or at least a nitrogen-carbon dioxide mix. Oxygen and non-scavenged H_2S are undesirable from a corrosion perspective, but possibly reduced separation of the flue gas is feasible. Laboratory testing has shown that the degree of swelling is contingent on the amount of nitrogen present with the carbon dioxide and that permeability reduction is similarly impacted. If flue gas is injected, permeability reduction may be reduced. The drawbacks are that the relative concentration of carbon dioxide injected is less and the hydrostatic pressure will be reduced (with miscibility or perfect mixing) and expenditure for compression and pumping will consequently be higher.

Project Accounting:

Cost Object	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Annual Collection (Budget)	$0.00	$62,500	$42,133	$63,408	$86,024	$254,065
Annual Spend (Capital)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Committed Funds***	$0.00	$0.00	$0.00	$0.00	$10,529	$10,529
Uncommitted Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
External OMAG Expenses*	$0.00	$73,041**	$42,133	$64,696	$74,250	$254,120
Subtotal	$0.00	$73,041	$42,133	$64,696	$74,250	$254,120

* All external OMAG for was for contractual payments to the University of Utah for the feasibility study they provided on the project.

**The amount reported in the 2018 STEP report, $94,029 was the amount of original committed funds, but has been updated to reflect the actual amount spent of $73,041.

***Committed funds were accrued on the Company's accounting books in 2021 but have not been paid on a final invoice to the University of Utah and are not included in the total.

Project Milestones:

Project Milestone	Delivery Date	Status
Notice to Proceed Start Date	January 1, 2018	Completed
Contracts with PacifiCorp Complete	January 31, 2018	Completed
Draft Test Program Submitted	January 31, 2018	Completed
Revised Program Submitted	February 15, 2018	Completed
Annual Report 1 Presented and Submitted	January 31, 2019	Completed
Annual Report 2 Presented and Submitted	January 31, 2020	Completed
Annual Report 3 Presented and Submitted	January 30, 2021	Completed
Develop Concept for Future In-situ Pilot Testing	July 1, 2021	Completed
Final Report Presented and Submitted	October 31, 2021	Completed

Program Benefits:

The study will give us more knowledge on the technical, economic, and environmental effects of injecting coal-fired-power-plant-derived CO_2 into underground coal beds for enhanced methane recovery. The study will also determine whether the Emery County coal beds are conducive to enhanced methane recovery using CO_2. Deliverables will include an evaluation of the technologies and strategies for improving CO_2 injection efficiency. The University of Utah will also study the risk of induced seismicity due to CO_2 injection.

Depending on the results of the study, Rocky Mountain Power's customers may ultimately benefit through increased efficiency of energy production with less CO_2 emissions. When the benefits of the study are combined with other studies and work being conducted under the STEP program, applicable real-world knowledge will be gained about the risks, costs, and benefits of carbon sequestration.

Key Challenges, Finding, Results and Lessons Learned:

Key Challenges	Results / Progress
Task 1: Resource Evaluation: Identification and selection of a	a) Drill logs have been digitalized for coal resource identification

coal resource to be studied for volumetric CO_2 storage	b) Stratigraphic coal units have been identified from well logs. Six coal units have been identified in Emery County's Buzzard Bench Field. c) The coal units' geological structure was delineated by identifying the top of the Ferron Sandstone from well logs. d) The data was gathered from the geological structure of the coal units and used to develop a three-dimensional model of the study area. e) The three-dimensonal model was completed and modeling begun to determine CO_2 storage capiability of the field. f) A 20 year CO_2 simulated injection was modeled (March 2019 – Februay 2039). Injection rates of 1 million standard cubic foot per day (mmscf/d), 1.5 mmscf/d and 2.0 mmscf/d were modled to avoid fracturing the coal units. g) At the 1.0 mmscf/d injection rate, 14.36 billion cubic feet of CO_2 was injected and 12.58 bcf of CH_4 produced. At 1.5mmscf/d, 18.18 bcf of CO_2 was injected and 13.50 bcf of CH_4 was produced. At 2.0 mmscf/d, 13.95 bcf of CH_4 produced. CO_2 breakthrough occurred early in the model which is detrimental to CO_2 sequestion. h) Sensitivity analysis was performed as to the injection well locations with no increase in CO_2 stored or CH_4 produced. i) Further analysis of the model found that CO_2 injection into the coals units may not remain within coals units and instead migrate to adjancet sandstone boundry layers. The model was expanded to include the adjacent sandstone and results indicate about 8 to 10% of the CO_2 would be stored in the sandstone. The sandstone forms a conducuitve conduit and storage medium for the CO_2. j) Next stesp will be to conduct further modeling of CO_2 injection into the sandstone and coal units simultaneously.
Task 2: Bench Scale Demonstration:	a) The test apparatus was designed and constructed in 2019. Shake down tests of various materials began in late 2019. b) Labortory testing was limited in 2020 due to the University of Utah campus being shut down for the majority of the year due to the COVID-19 pandemic. Coal sample testing started in summer of 2020.

	c) When coal sample testing begun, initial focus was on flooding the samples with helimum in unconfind conditions at room temperature to measure the samples density, pore density and grain density. d) Further work was perfomed strain gauge calibration to measure coal sample volumentric expansion during testing. e) Following calibration of test equipment, pulse-decay tests were performed on the samples. The pulse decay test involves flooding the sample under confided stress with known pressures and temperature. The tests will result in the obtaining Pore Volume, Pseudo-permeability, Volumetric strain and Poroelastic properties. The test was successful in providing the pore volume, permeability and voluementic strain. f) Pore volume testing demonstrated that initially that CO_2 filled the macro pores in the early stages before diffusing into the coal matrix. Greatly increasing the amount of CO_2 that was stored in the sample when compared to other gases. g) As expected, volumentric strain was recored as the coal sampled swelled during CO_2 injecation and abosrtion into the coal matrix. h) Permability of the coal sample was tested by incjecting super critical CO_2. Swelling was immediately detected when injection supercritical CO_2. As the coal swelled permability decreases of the sample i) The next steps plan for the testing is to integrate the results of the different stages of the pressure decay tests; identify data distribution and patterns related to adsorption and swelling; and to continue to evaluate mechanisms to explain the kinetics seen and adsorptive behavior.

Potential future applications for similar projects:

When combined with the results of the STEP CarbonSAFE project and the STEP Cryogenic Carbon Capture program, Rocky Mountain Power would have sufficient experience with these technologies to perfom further development for carbon sequestration in Utah. Additionally, information gathered from the study can be utilized to develop further understanding of potential enhanced energy recovery in Utah with simultaneous sequestration.

Attachments:

- Exhibit 6-A: The Application Feasibility for Regional and Commercial Use of CO_2 for Enhanced Coal Bed Methane Recovery – Final Report

Exhibit 6-A

The Application of CO2 for Enhanced Coal Bed Methane Recovery

THIS ATTACHMENT IS VOLUMINOUS AND PROVIDED SEPARATELY

Cryogenic Carbon Capture - STEP Project Report

Period Ending: December 31, 2021

STEP Project Name: Cryogenic Carbon Capture (CCC) Demonstration (Emerging CO_2 Capture)

Project Objective:

The objective of this project was to continue the development and demonstration of promising CCC technology.

The scope of work was divided into two primary phases. The first, called the Development Phase, involves research to be performed by a contractor into specific areas where it is believed efficiency, reliability, or overall performance of the CCC process can be improved. Rocky Mountain Power (RMP) contracted with Sustainable Energy Solutions (SES) to do this work. SES's recommendations and experimental results were used to make changes and enhancements to the skid demonstration unit provided as part of this Scope of Work. On-site preparations by SES and RMP personnel of the testing area at the Hunter Power Plant in central Utah were completed in 2019. The Field Demonstration Phase used the demonstration unit at the site during an extended test run over approximately six months. SES's development work took place during 2017 and early 2018 with the field testing beginning in early 2019.

These phases were conducted by SES in parallel with a proposed DOE project to mature the technology and gather critical information in preparation for a scale-up.

In Docket No. 16-035-36, the Commission approved the Company's request to increase funding for the Cryogenic Carbon Capture project by $412,521, utilizing funds from the cancelled Alternative NOx project. With these additional funds, the Company expanded the scope to plan for the next scale of CCC operation to explore the scalability of these and related unit operations as part of this investigation. This project includes one task for each of three major systems. These systems require major changes to the previous skid operation in contrast to the incremental changes supported by the current Department of Energy project.

The project includes an economic assessment of utility-scale implementation of technology. In 2019 RMP hired Sargent & Lundy to deliver a report assessing the scalability of SES's technology to a size capable of processing all exhaust flue gas from one or more existing coal fueled thermal generation power plants owned by RMP.

Project Accounting:

Cost Object	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$356,557	$668,301	$412,521	$150,142	$0.00	$1,587,521
Annual Spend (Capital)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Committed Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Uncommitted Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
External OMAG Expenses*	$160,451	$530,289	$711,750	$192,809	($970)	$1,594,329
Subtotal	$160,451	$530,289	$711,750	$192,809	($970)	$1,594,329

*External OMAG consists of contractual payments to Sustainable Energy Solutions for services performed on the project. A description of these services is described in the project milestone section below.

Project Milestones:

Project Milestone	Delivery Date	Status
SES will deliver a report containing the basic designs for both a self-cleaning heat exchanger and the experimental dual solid-liquid separations system. SES will also begin purchasing equipment for these systems.	6/15/2017	Completed
SES will deliver a report containing the following: - The final designs, documentation of parts ordered, and initial tests of the experimental alternate refrigeration system. - The final designs and documentation of parts ordered of the experimental self-cleaning heat exchanger. - The design, documentation of parts ordered and installation of equipment for pre-treatment of real flue gases and dual solid-liquid separations.	8/15/2017	Completed
SES will deliver a report containing the following: - The purchase orders and initial test reports of improved instrumentation such as advanced cryogenic flow measurement and output measurement. - Results of testing for the experimental integrated system with simulated flue gas at minimum 1/4 tonne per day CO2	11/15/2017	Completed

- Results of testing of the experimental integrated system tested with real flue gas.		
SES will deliver a report containing the following: - Designs and documentation of parts ordered for permanent skid-scale unit ops, including heat exchangers, dryers, separations.	2/15/2018	Completed
SES will deliver a report containing the following: - Documentation of parts ordered for permanent skid-scale unit ops and skid integration. - Results of testing the permanent skid system with simulated flue gas at 1 tonne/day. - Shakedown testing completed.	11/20/2018	Completed
SES will deliver a report containing the following: - A description of the preparations and modifications at the Hunter PP site. - Documentation of insurance, transport, personnel trailer, and other on-site needs. - A description of the ongoing on-site setup and shakedown of the ECL testing skid.	8/15/2018	Completed
SES will deliver the following: - Finalized setup and operation of the ECL Skid at the Hunter PP. - A full report of the testing to-date under RMP funding, with continued testing occurring under the NETL contract.	2/26/2019	Completed
SES will deliver a report containing the following: **Task A1** – Finalized integrated dryer design. Results of experiments used to validate design. Equipment sourced. **Task A2** – Final selection of the solid-liquid system, or other system designed to meet the same requirements, which will be tested. Initial long lead time parts ordered. Assessment of pollutant removal options and modeling of basic design of system.	4/15/2019	Completed
SES will deliver a report containing the following: **Task A1** – Record of dryer system equipment being ordered. **Task A2** – Finalized design and record of system ordered. Description of assembled solid-liquid or other separation system. Designs and parts ordered for the pollutant removal system.	7/15/2019	Completed
SES will deliver a report containing the following: **Task A1** – The receipt of the system and initial results of both assembly and dryer testing.	10/15/2019	Completed

Task A2 – Results of initial testing and subsequent iteration on solid-liquid or other separations system. Description of assembled pollutant removal system.		
SES will deliver a report containing the following: **Task A1** – Results of further test results including using real flue gas and initial integration with skid system. Final Reporting. **Task A2** – Results of testing the finalized designs. Final Reporting. **Task A3** – Assessment of scale-up potential of innovative unit ops including dryer and solid-liquid separations.	1/15/2020	Completed
Sargent & Lundy scalability study assessing the scalability of the technology for complete processing of flue gas at utility power plants.	7/1/2020	Completed

Program Benefits:

This program will help determine the economic feasibility of CCC technology. The technology shows promise in being able to reduce CO_2 emissions. The demonstration test proved largely successful instilling confidence in the ability of SES's CCC technology to meet these goals.

The added milestones provide for modifications which improved the reliability and, in some cases, decreased the energy and economic costs of the process.

Potential Future Applications:

SES was awarded U. S. Department of Energy ARPA-e funding for additional work including adding energy storage capability to the CCC technology and scale up to a larger pilot project capable of over 30 tons/day of CO_2 capture. Utah State funding had been approved for a larger SES CCC scale-up project which may be hosted at one of PacifiCorp's plants; however that funding was eliminated in 2020 due to the COVID-19 pandemic. In 2020 SES was acquired by Chart Industries. Chart Industries intends to continue with the larger scale pilot project between 30 and 100 tons per day of CO_2 capture.

Attachments:

- Exhibit 7-A: Final Reports for the Cryogenic Carbon Capture (CCC) Demonstration (Emerging CO_2 Capture) Program

Exhibit 7-A

Final Reports for the CCC Demonstration Program

THIS ATTACHMENT IS VOLUMINOUS AND PROVIDED SEPARATELY

STEP Project Report
Period Ending: December 31, 2021

STEP Project Name: CarbonSAFE Pre-Feasibility Study – Phase 1 (Sequestration Site Characterization)

Project Objective:

The Company co-funded participation in a University of Utah pre-feasibility study to evaluate the development of commercial scale carbon capture and sequestration ("CCS") storage in Utah. The pre-feasibility study is being performed under Funding Opportunity Announcement (FOA Number DE-FOA-00001584) and is known as the Carbon Storage Assurance Facility Enterprise ("CarbonSAFE").

Project Accounting:

Cost Object	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$150,000	$0.00	$0.00	$0.00	$0.00	$150,239
Annual Spend (Capital)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Committed Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Uncommitted Funds	$0.00		$0.00	$0.00	$0.00	$0.00
External OMAG Expenses	$150,239	$0.00	$0.00	$0.00	$0.00	$150,239
Subtotal	$150,239	$0.00	$0.00	$0.00	$0.00	$150,239

Project Milestones:

Project Milestone	Delivery Date	Status
Project Kick-off	July 10, 2017	Completed
Quarterly Report	December 31, 2017	Completed
Technology Assessment Completed	December 31, 2017	Completed
Phase II – Application Submission	February 28, 2018	Completed
Quarterly Report	April 31, 2018	Completed

Final Report Presented and Submitted	May 2019	Completed

Key Challenges, Findings, Results and Lessons Learned:

Description of Investment

STEP funding for this project was used to support a pre-feasibility study of carbon dioxide (CO_2) capture and sequestration capabilities in the intermountain west. The CarbonSAFE STEP funding was part of a larger funding initiative from the Department of Energy of $1.2 million for conducting a pre-feasibility study into a developing a commercial scale CO_2 storage reservoir. The summary provided below is taken from the Carbonsafe Rocky Mountain Phase I: Ensuring Safe Subsurface Storage Of Carbon Dioxide In The Intermountain West Final Report (Attachment A).

Anticipated Outcome

- Determine if central Utah's geological formations were suitable for storing up to 50 million metric tons (tonnes) of CO_2 in a saline aquifer.
- Identify a study area that could be utilized by Utah's existing coal-fired facilities.
- Identify the commercial and non-techncial challenges in developing a CO_2 storage aquifer.
- Provide a template protocol for future and existing coal-fired and gas-fired facilities that could be utilized for further development of a CO_2 storage aquifer.

Challenges

- Four key challenges were identified in pre-feasiblity study. These challenges are:
    - Cost and cost recovery of construction and operation CO_2 capture and sequestration (CCS) infrastructure;
    - the lack of price signal or financial incentive for developing, construction and operation of a CCS;
    - liability risks associated with the storage aquifer, including legacy liability; and
    - an overall lack of a comprehensive CCS regulation.
- Additional challenges recognized were:
    - Overall lack of CCS regulatory framework; and
    - lack of historical cost information to implement and operated CCS.

Findings / Results

- Capture assessments were performed using both commercial and emerging technologies to capture approximately 2.75 million tonnes per year for one of the boiler units at the Hunter Power Plant. The estimates showed that the:
    - Amine based (commercial technology) system cost of capture was estimated of 45.50/tonne.
    - The cryogenic based (emerging technology) cost of capture was estimated at $37.75/tonne.

- Compression of the captured CO_2 and transportation, via high pressure pipeline, would increase the cost per tonne. The cost would be highly dependent on the specific injection location and rights of way and therefore not estimated in the pre-feasibility study.
- The area around the Hunter and Huntington Power Plants were subject of a high-level technical sub-basinal evaluation to verify CO_2 storage capacity and integrity. The result of the evaluation showed potential injection sites might be available, into the high permeability (~200 mD) and high porosity (20%) Navajo sandstone in the Buzzards Bench area of central Utah.
- A comprehensive analysis of the proposed reservoir and seals was conducted and a 3-dimensional model was created. Simulation and risk assessment on the proposed site were conducted. The findings showed that the CO_2 capacity estimates for the Navajo Sandstone, approximately 18 kilometers from the Hunter plant, are well in excess of the 50 million tonnes goal of the project.
- Non-technical assessments for a commercial-scale CO_2 storage facility in central Utah was conducted. The Environmental Protection Agency's Underground Injection Control Class VI and National Environmental Policy Act permitting present particular challenges in developing a saline aquifer for CO_2 storage. Surface and subsurface ownership and rights are also not straight forward and would need to be resolved if any storage facility would be constructed. Most critically is the legacy ownership and risk of a CO_2 storage facility.

Lessons Learned

- Some critical lessons learned and challenges that were identified in the study were:
    - Lack of clarity of pore space ownership – Utah does not have a clear precedent on who would own the subsurface pore space for CO_2 storage.
    - Commercial operation capital cost, operations and maintenance cost and regulatory recovery – Further work is needed to determine if regulatory approval for PacifiCorp could be obtained to construct and CCS facility. Challenges identified include PacifiCorp's six state operations and differing regulatory requirements.
    - Permitting a CO_2 capture and storage facility – There is not a clear process in which an entity could permit a CO_2 capture and storage facility. History of previously permitted facilities were reviewed and each faced numerous challenges, environmental approvals and public comments.
    - Brine and waste disposal – Since brine would be created from the saline aquifer and cannot be used for enhanced oil recovery another method must be used for disposal. Methods such as evaporation face their own environmental challenges and would increase cost and risk of a storage facility

Program Benefits

The participation into the study has resulted in a high level cost estimate as to the cost to construct a CO_2 capture facility at one of the existing Utah coal fired power plants. The pre-feasibility study along with the high level cost estimate provides information to the Company to determine if CO_2 capture is feasible in Utah. The University of Utah to the Department of Energy final report provides insight as to the challenges in constructing a CCS facility.

STEP Project Report

Period Ending: December 31, 2021

STEP Project Name: Feasibility Assessment of Solar Thermal Integration – Hunter Plant

Project Objective:

This project will investigate the potential of integrating solar thermal collection to provide steam and/or feedwater heating into the Hunter 3 boiler/feedwater cycle. Integration of a solar thermal collection system would minimize coal consumption and the attendant emissions associated with reduced coal use. The study will focus on the application of parabolic solar troughs and will also consider power tower collections systems. The project is on schedule and began in February 2019.

Factors that will be evaluated in the study are:

- Site specific costs and benefits of solar thermal integration at the Hunter Plant;
- Steam/feedwater injection points in the boiler feedwater cycle and those impacts on performance;
- Impact on coal consumption and associated emissions; and
- Land requirements.

Project Accounting:

Cost Object	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$0.00	$0.00	$187,000	$0.00	$0.00	$187,000
Annual Spend (Capital)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Committed Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Uncommitted Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
External OMAG Expenses	$0.00	$0.00	$83,057*	$103,781*	$14,046*	$200,884
Subtotal	$0.00	$0.00	$83,057	$103,781	$14,046	$200,884

*All OMAG expenses were paid to Brigham Young University for the completion of the milestones listed below.

Project Milestones:

Project Milestones	Delivery Date	Status
Contract between BYU and PacifiCorp complete	2/5/2019	Completed
Kickoff Meeting	2/12/2019	Completed
Report 1 to include literature review and representative model development	4/30/2019	Completed
Report 2, baseline plant model comparison to operational data	8/31/2019	Completed
Report 3, solar resource data, solar integration point, CSP characterization for modeling	12/31/2019	Completed
Report 4, preliminary estimates of fuel reduction, estimates for land use, capital cost, and impact on power generation	4/30/2020	Completed
Report 5, refine the plant model, parametric variations and optimization analyses	12/31/2020	Completed
Final report submitted, update and compilation of previous reports, and recommendation for implementation	Extended from 12/31/2020 to 3/31/2020*	Completed

* BYU identified an opportunity for additional optimization specific to the Hunter plant and was granted a no-cost extension to March 31, 2021, to include the optimization in the final report.

Program Benefits:

Thermal energy collected from a Concentrated Solar Power ("CSP") plant can be integrated into a traditional power plant (coal, natural gas, etc.) to offset the amount of fossil fuel required for heating. With CSP contributing to the heating load, less fuel is required, resulting in a decrease in fossil fuel cost and emissions. This study will address the viability of integrating CSP with coal-fired power plants including the Hunter Plant in Castle Dale, Utah. To aid in future evaluations, this study will include identifying a general plant model that can be used to determine hybrid feasibility and the optimization of solar integration into a general hybrid plant model. This statement of work outlines the milestones to be achieved during each period.

Potential future applications for similar projects: As we learn more about the technology, we will have a better understanding of potential future applications. It is possible that this technology could be deployed at several traditional power plants.

STEP Project Report

Period Ending December 31, 2021

STEP Project Name: Circuit Performance Meters (Substation Metering).

Project Objective:

Deploy an advanced substation metering program that includes installing advanced metering infrastructure on approximately fifty circuits connected to distribution substations in Utah where limited or no existing communications exist. This project will enable higher data visibility on the distribution system by providing for the installation of advanced meters. The scope of the project involves setting up remote communication paths with all installed meters and the purchase of a data management and analytics tool to analyze, interpret and report on the collected data.

Project Accounting:

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$110,000	$550,000	$440,000	$0	$0	$1,100,000
Annual Spend (Capital)	$13,676	$427,349	$451,777	$118,262	$241	$1,011,305
External OMAG Expenses	$0	$0	$0	$0	$0	$0
Subtotal	$13,676	$427,349	$451,777	$118,262	$241	$1,011,305

Project Milestones:

Milestones	Delivery Date	Status/Progress
Complete two pilot sites in 2017	December 31, 2017	The two pilot sites were completed by December 31, 2017.
Execute contract for data analytics software	December 31, 2017	A vendor was selected in December 2017 but due to a delay caused by contract negotiations, contract was awarded in March 2018.
Install metering on 25 circuits in 2018	December 31, 2018	Meter installations on twenty circuits were completed in 2018. All installed meters are operating and sending data to the Company's data collection system.

Install metering on 23 circuits in 2019	December 31, 2019	Meter installations on thirty four circuits were completed in 2019. All installed meters are operating and sending data to the Company's data collection system.

Program Benefits

- Enable increasing levels of distributed energy resources on the power grid by economically providing increased visibility on loading levels, load shape, and event information. Information gained will be used to develop interconnection studies and hosting capacities for customers while determining safe switching procedures and cost-effective capital improvement plans.
- Assist in preventing load imbalance on a distribution circuit caused by single phase distributed energy resources which can result in three phase voltage imbalance issues and increased potential for unintended circuit breaker operations from elevated neutral currents.
- Understand harmonic issues caused by distributed energy resources and take appropriate steps to resolve issues, if any, in a proactive way.
- Improve optimization opportunities for capital costs and system losses by providing measurements of per-phase vector quantities for voltage and current.
- Identify service quality issues early and allow timely development and implementation of cost-effective mitigation.
- Enhance understanding of intermittent generation resources and their impact on the power grid.
- Reduce distributed generation interconnection customer approval delays.
- Provide customers with circuit information with a higher level of accuracy.
- Identify and control risks associated with the integration of significant penetration of distributed energy resources. This includes controlling claims from power quality issues, customer equipment failure, utility/customer equipment damage or impact on customer generation levels.

Recommendations and lessons learned:

See section 11 of the attached final report for recommendations and lessons learned.

Attachments:

- Exhibit 10-A: Substation Metering Final Report

Exhibit 10-A

Substation Metering Final Report

Final Report
Substation Metering

Utah Innovative Technologies Team

Project Sponsor: Rohit Nair

Revision #3

Revision by: Stephen Petersen

Date: February 23, 2022

IAD Originator: *Sustainable Transportation and Energy Plan Workgroup*

1 Glossary

Aliasing – The misidentification of a signal frequency, introducing distortion or error

APN – Access Point Name – Gateway between the cellular network and another computer network. Typical term to reference to the private cellular network utilized by the Company.

Company – Rocky Mountain Power

DER – Distributed Energy Resource – Frequently used to refer to customer owned, and operated energy generation typically used to offset the customer's load. DER encompasses PV arrays, wind turbines, battery reserves, and cogeneration.

Distribution Circuit – 12.47 kilovolt feeder owned and operated by the Company

Grid Edge – The varying hardware, software and business innovations required to enable a connected infrastructure installed at or near the "edge" of the electric power grid. – *Greentech Media*

High Penetration Circuit – Distribution circuits that serve customers that produce near the circuits light loading limit.

LAN – Local area network

Meter – Measurement device with the primary purpose of recording customer energy usage. Values are retained by the device are applicable to customer usage and not system behavior

Monitor – Measurement device with the primary purpose of recording system values (Volts, Amps, Energy, and Harmonics)

SCADA – Supervisory control and data acquisition – Typically used in the Company to refer to Operations ability to view measurements and control system with real time impact

STEP – Sustainable Transportation & Energy Plan

Substation Metering & Substation Monitoring – The original project name submitted under the STEP program was Substation Metering; however, the scope and use of devices would be more suitably defined as Substation Monitoring. Consequently, Substation Metering is substituted in the body of the report with Substation Monitoring

2 Executive Summary

As part of the Sustainable Transportation Energy Plan (STEP), a Utah statute, The Company deployed a substation monitoring system that installed advanced monitors on fifty-three distribution circuits in Utah. The implementation of digital metering with cellular communication provides engineers remote access and fidelity of distribution circuits not available in legacy systems. The digital monitor (Shark 250) data is accessed and retained in SCHOOL and PQView. The Company system of record, SCHOOL, retains data of system loading with PQView facilitating the role of a data analysis tool of harmonic and waveform information. The Substation Monitoring program provides a preliminary iteration of the development of a more interconnected grid by accessing substations with limited or no communication capabilities.

3 Introduction

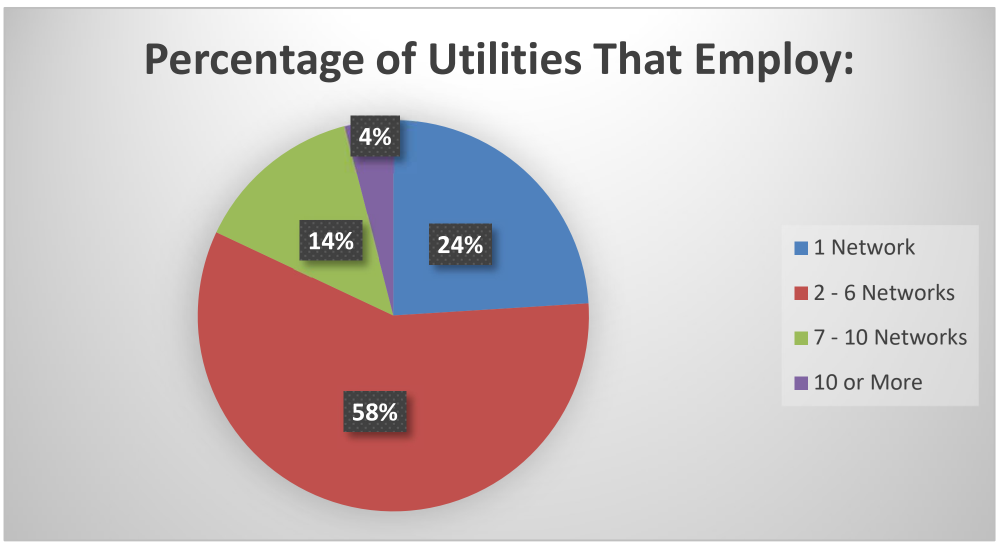
Grid edge monitoring of the electric utility's distribution network has become a focal point of development for the electric utility industry. The increasing complexity of customers' expectations of the grid's capabilities and environmental concerns drives the industry's increasing focus on system visibility. Achieving comprehensive network monitoring will be best implemented by leveraging the existing capabilities of the distribution equipment augmented by new technology. The Substation Monitoring project funded by STEP emphasized the need to balance the selection of circuits with high levels of DER capacity with substations that would not otherwise obtain communication capabilities.

Legacy systems have access to multiple communication options: Multiple Address Radio (MAS), Advanced Meter Infrastructure *Silver Springs Network* (AMI), secured utility local area network (LAN), Cellphone modems, and truck rolls. The concept of the Substation Monitoring project was to evaluate the use of cellphone connected monitors to provide a cost-effective expansion of system monitoring. The installation of a MAS or utility managed LAN at every distribution substation within the Company service territory would be cost prohibitive. The Company's revenue metering system has had a long-standing use of a cellular APN to securely poll meters of high usage customers. The extrapolation of the metering group's practices was vetted and implemented by the Substation Monitoring project with the goal of expanding the reach of the communication network beyond that of the legacy communication systems. The cellular option allowed for the targeting of circuits that would not practically receive SCADA but still have need of monitoring. The project coordinated with several business and engineering groups to ensure that efforts to expand communication to distribution substations were not duplicated, nor that the existing legacy system would be capable of reaching the selected circuit. The cellular connected digital monitors were not to supplant the operational value of a SCADA connected substation but augment what would be observable on the system.

Purpose and Necessity

Substation monitoring and measurement of various electrical quantities is seen by the Company and its customers as a necessity to provide for the integration of DER into the existing electric grid. Limited visibility of power flow, loading levels, load shape, and event information inhibits the accurate development of interconnection studies, determining safe switching procedures, and cost-effective capital improvement plans. A primary restriction of developing the requisite visibility at the grid's edge is the associated communication network. A poll of Berkshire Hathaway Energy utilities identified that the use of multiple communication systems is requisite to properly cover an expansive service area. Reliance upon a single communication network will leave service areas dark and waiting upon network development to reach them as the expectations of customers remains contemporary.

Table 1 Utility communication network breakdown of BHE companies



Cellular network coverage has become near ubiquitous in the US and has been utilized in collection of metering data by the Company for some time, but not to remotely connect feeder monitoring equipment data collection systems. The project developed a process to securely utilize cellular modems in appropriate substations to provide network access to the monitor devices. The use of cellular modems provides an economically practical communication path needed to remotely access circuits with distributed energy concerns. Company owned MAS or LAN connections provide the value of SCADA capabilities and have an economical implementation in certain applications. Circuits that were not currently nor would be feasibly accessible by legacy communication network systems were prioritized to be monitored. As the implementation of a cellular communication in the stead of a SCADA enabled connection would not be in the interest of the customers or company, circuits slated for installation SCADA were excluded from the prioritization process. The use of cellular modems in the Substation Monitoring project expanded monitoring to 16% of the Company's High Penetration Circuits.

Table 2 Observable DER Levels – upon completion of the report.

Metric	DER kW	Sites	Initial DER kW
Total	26,315.70	2606	39,621
Average	496.52	49.17	792.42
Median	342.91	34	119.5

Table 3 High Penetration Circuit Observability Improvement

High Penetration Circuits	STEP Sites	(%)
42	7	16.67

Distributed energy resources involve more than photovoltaic generation but also includes cogeneration. Quarry circuit number 15 contains a profile of distributed energy resources that is unique, and customers have benefited from the capability of the monitors. The circuit feeds a customer that offsets much of their load utilizing a cogeneration system. Waste heat from the generator is utilized for other services to limit the need for energy consumption which can improve voltage levels and reliability. The customer's system was experiencing severe frequency fluctuations and voltage deviations that would cause protection equipment to operate. The substation monitor provided a historical trend of the system frequency that the customer was able to use for troubleshooting. The historical data allowed for the customer to prioritize the analysis of the cogeneration system to prevent future trips. The preemptive acquisition of data can allow for engineers to troubleshoot customer issues without the need to wait for the event to occur reducing customer down time and potential damage to equipment.

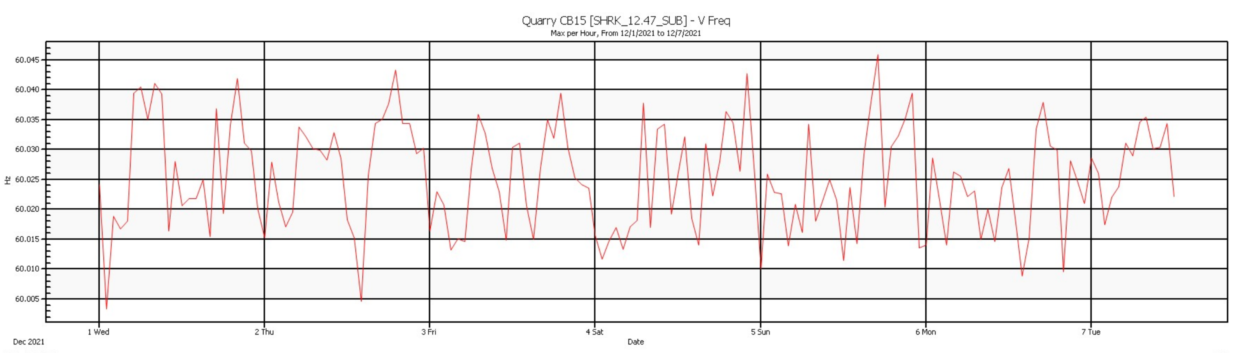


Figure 1 Frequency measurement of Quarry circuit number 15. The frequency of the system indicates that the impact seen at the end of the feeder is a response to faults or the momentary response to the cogeneration load dropped on the system.

Single phase distributed energy resources can exacerbate load imbalance on a distribution circuit, causing three phase voltage imbalance issues. Circuit imbalances increase the potential of unintended circuit breaker operations from elevated neutral currents. While the power monitors are not capable of directly inhibiting the neutral currents, the information the monitors provide enable engineers to intervene.

Huntington City number 12 is a member of the High Penetration Circuit list and had a severe ampere imbalance prior to the installation of the monitor, *96% at the extreme*. The circuit imbalance was identified by the field engineer and was mitigated through load balancing measures, resulting in the ampere imbalanced reduced to below 40%. The drastic results of the feeder balancing may not be present within every circuit or appear since the completion of the project; however, the preemptive installation of monitoring to identify emerging concerns is an asset for customers.

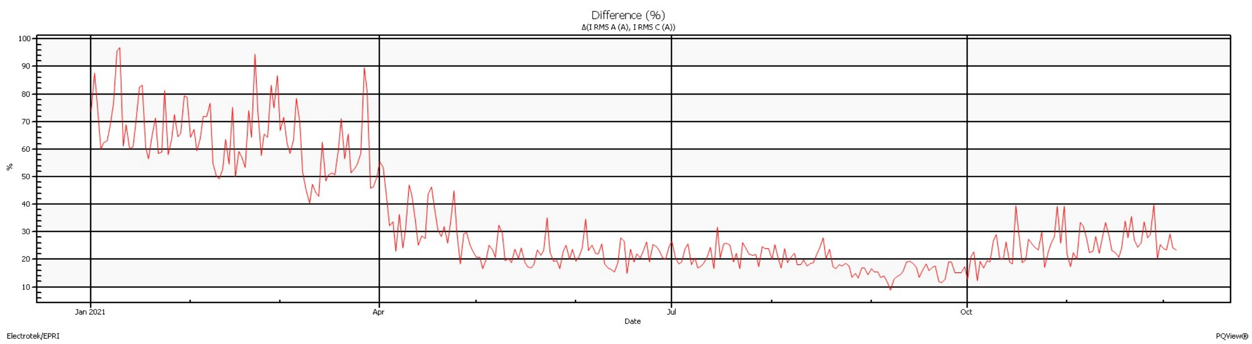


Figure 2 Current imbalance found on Huntington City circuit number 12 and the accompanying mitigation

The interaction between growing quantities of DERs and distribution system equipment can result in transient and steady state voltage levels reaching unacceptable levels. Understanding the production levels on a circuit can accurately determine the need for effective grounding and fault clearing control schemes, which if not installed appropriately can cause temporary over voltages to customers or circuits improperly protected during fault conditions. The Mountain Green circuit number 11 is an example of voltage levels that are currently monitored to ensure that the steady state does not exceed the Company's standards.

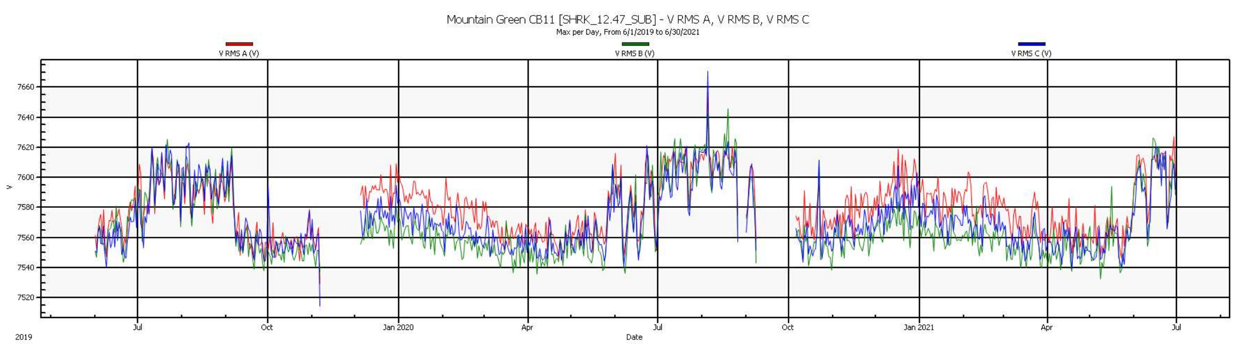


Figure 3 Maximum voltage values from Mountain Green circuit number 11. The circuit has been monitored to ensure that the summer voltage levels do not exceed the Company's voltage requirements.

Potential harmonic issues from inverter-based distributed energy resources can cause customer motor damage and interfere with high frequency communications. Enterprise Valley circuit number 12, a High Penetration Circuit, is an example that the voltage harmonic distortion levels are currently being monitored to ensure harmonic levels do not rise or present an issue to the attached customers. Harmonic impact and concerns have been a reactive component of power quality and the Substation Metering project allows for engineers to monitor areas and begin investigations prior to customer reports. The Company does rely upon customers to report on issues on the grid edge, however the project is a preliminary step to develop situational awareness and enforce Company standards.

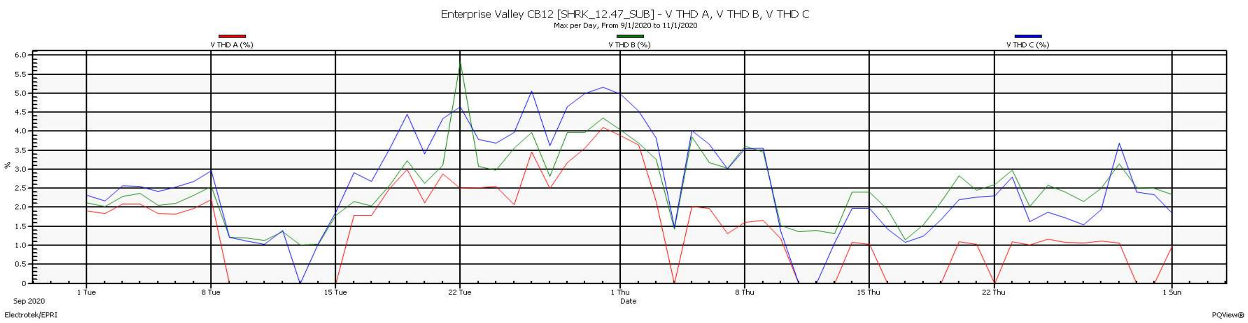


Figure 4 Enterprise Valley circuit number 12 voltage total harmonic distortion, VTHD. VTHD levels regulated by the Company's standards and can lead to power quality concerns for customers.

4 Public Interest Justification

In the state of Utah, the Company continues to experience rapid growth in penetration levels of distributed energy resources. In fact, the rate of net energy metered interconnections has doubled annually. To further facilitate the integration of distributed energy resources of different types and sizes in a cohesive and cost-effective manner, data collection at substations will be of paramount importance in the following ways:

- **Modernized Grid:** The integration of circuit data to legacy database systems permits for load studies to be performed more accurately through existing Company processes. The addition of the power quality analysis tool permits for engineers to identify system issues from measurement values that are not stored within the Company database. The identified examples of voltage harmonic distortion and current imbalance and their analysis was facilitated through the development of the project.
- **Higher Levels of Distributed Energy Resources**: Substation monitoring will continue to provide the necessary data required to perform interconnection studies. Accurate determination of a circuit's light load value will allow for engineers to permit for a DER project to seamlessly interconnect in an affordable manner.
- **Improved Customer Service**: Data availability will enable the Company to provide prospective interconnection customers with ample circuit information to help them make effective decisions at lower costs. Additionally, enhanced data availability can improve outage restoration efforts. An example of improved outage restoration efforts was

performed on Richfield circuit number 14. The circuit had been experiencing several blown fuses at a particular section with an unknown cause. Upon replacement of the fuse the engineer was able to evaluate loading levels on an hourly basis rather than a quarterly. The observation of the loading and identified that the fuse was undersized. The fuse was scheduled for replacement prior to its failure and the customers experienced a shortened outage as a result. Customers expect for the utility to have a greater awareness of the system and the STEP project provides the Company the preliminary capability of increased system awareness.

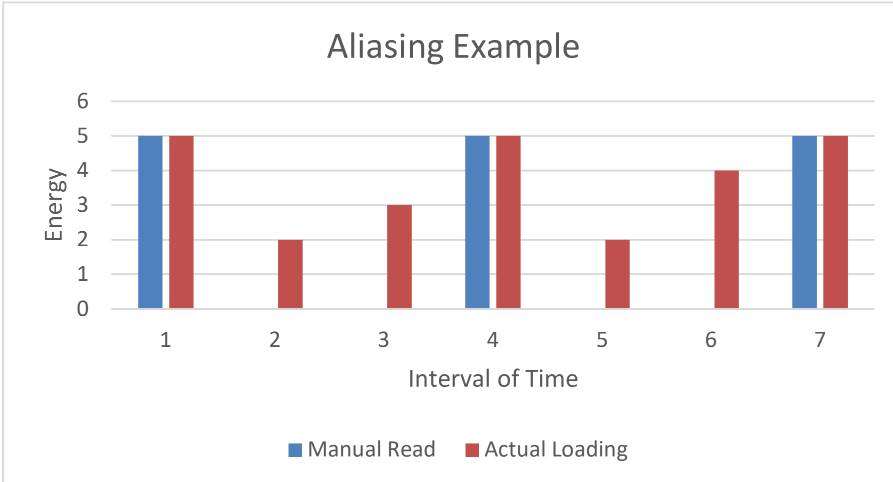
- **Maintain Grid Integrity**: Communication-enabled substation metering products can maintain the integrity and reliability of the electrical system. Observation of the massive load characteristic changes being experienced with the increasing levels of distributed energy resources permits engineers to act within an expedited timeframe.
- **Cybersecurity:** This program developed the Company's use of cellular modems to collect data from remote locations. The lessons learned from the development of a substation monitor coupled with a cellular modem provides a springboard for other applications of the cellular modem and reduction of costs associated with the expansion of communication to field devices. Access to remote equipment can allow for seasonal protection settings to be pushed to improve fire-mitigation settings or distribute high-end monitoring to identify power quality disturbances for customers. The project enabled engineers to develop a secure method for the Company to access substations to improve the uniformity of system visibility.

5 Alternatives Considered

Line mounted ammeters or circuit fault current indicators (cFCIs) were considered during the evaluation process; however, they do not provide historical voltage or harmonics measurements as part of their data analytics. The cFCI devices provide tracking of the circuit ampere levels but are not designed to be utilized as a power quality device, critical point regard DER monitoring. The devices measure ampere levels as a clamp on current transformer and do not have a neutral reference for the voltage of the attached line. The omission of a neutral reference removes the device's ability to determine a true voltage potential. The devices can capture the strength of the electric field (V/m) but is only recorded during fault events. The momentary capture of the electric field values did not provide the necessary information to perform system evaluations for DER management.

The Company does have the option of continuing to manual collect distribution loading values on a quarterly process. Manual reads do provide an indication of the circuit's loading but are limited in their determination of the light loading value for the circuit. The amount and frequency of data samples could obscure the circuits loading through aliasing.

Table 4 Example Visual Representation of Manual Reads



6 Major Project Milestones

- Anticipated project start date or actual project start date: January 2017
- Final in-service date: December

This project had multiple in-service dates related to the installation of the advanced meters and communications equipment at numerous substations. The installations were scheduled according to a prioritized need starting with areas with high penetrations of distributed energy resources. Additional work included the installation of the communication network and integrating the meters to the data management and analytical tool. The project team recorded the assets as technically complete in SAP as the assets were put into service.

7 Program Closure, Retirement and Removal Information

The Substation Monitoring program retains active support from Power Quality, Metering, and vendor technical support through software purchases. The Company currently renews the Shark 250 management software, Communicator PQA, at intervals of 7 years with Electro Industries. The power quality dashboard PQView by Electrotek is budgeted to be renewed annually to ensure the continued development of the analytics software.

If a site does receive SCADA communication or other substation equipment, the Substation Monitoring equipment would be relocated to another distribution substation to retain the system observation obtained through the project.

8 Target Costs

Table 5 Target costs of the Substation Metering Project

Costs	Prior Years	2017	2018	2019
10 Year Plan Budget:-STEP discretionary funding	N/A	$110,000	$550,000	$440,000
APR (Gross):	N/A	$110,000	$550,000	$440,000
- Reimbursements:	N/A	N/A	N/A	N/A
- Contingency:	N/A	N/A	N/A	N/A
APR (Net):	N/A	$110,000	$550,000	$440,000

9 Project Financial Analysis

The installation of the power monitors was concluded in 2020. The average cost of installation was $19,079 per meter with 53 circuits monitored by a Shark 250 meter. The cellphone plans are maintained by the Company's current cellular vendor and are managed by Power Quality and Metering for support.

Table 6 Actual Financial Project Spending

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$110,000	$550,000	$440,000	$0	$0	$1,100,000
Annual Spend (Capital)	$13,676	$427,489	$451,777	$118,262	$241	$1,011,305
External OMAG Expenses	$0	$0	$0	$0	$0	$0

10 Procurement and Project Delivery Strategy

To satisfy business requirements, ensure best value, and minimize risk, purchases and construction contracts were procured through a competitive bid process.

- Shark 200 (transitioned to the Shark 250 by the vendor)
- ION 7400
- Satec PM180

The devices were evaluated upon their capability to be utilized within existing substation designs. The Shark 250 was determined to have the most favorable capabilities of communication capabilities and integration with milliamp signal devices. Bidders were screened to meet credit and procurement requirements. This process is being managed by the PacifiCorp procurement department. The Shark's specifications were developed in accordance with applicable engineering specifications and standard designs.

11 Recommendations and Lessons Learned

- The installation of advanced substation meters at distribution substations with limited or no communications can be facilitated by the Company cellular APN. The cellular network can provide a cost-effective solution beyond the reach of the MAS/LAN system.
- Substation monitors installed as part of this program can provide smaller substations with remote communication capabilities. The small footprint of the communication and monitoring equipment does permit for the equipment to be relocated when legacy system grow into the area later.
- The data management system that automatically downloads, analyze and interprets data from the substation monitors does require continued engineering support to maintain operations.
- To ensure that all data collected is used to improve the interconnection study process in addition to improving long-term and short-term distribution and transmission planning studies, weekly inspection of meter data acquisition is performed. Ensuring SCHOOL (OSI-Soft) databases are properly populated is the mechanism to incorporate the metering data into the determination of light loading and limits of DER.

APPENDICES

Appendix A – Final list of distribution circuits

Appendix B – Initial list of distribution circuits

Appendix C – Technical requirements

APPENDIX A – Utilized Circuits

Site Name	DER kW	DER Sites
Bothwell CB11	0	0
Bothwell CB12	167.53	23
Carbonville CB11	66	9
Carbonville CB12	122.77	19
Central UT CB11	419	58
Dammeron Valley CB11	346.44	53
Dammeron Valley CB12	337.33	41
East Hyrum CB11	245.52	31
Elsinor CB11	85.21	13
Enterprise Valley CB11	342.91	17
Enterprise Valley CB12	508.32	15
Fielding CB11	313.44	45
Huntington City CB12	94.79	12
Huntington City CB13	114.04	15
Maeser CB11	355.94	52
Maeser CB12	292.21	42
Moab City CB11	497.54	58
Moab City CB12	580.28	87
Morgan CB11	205.65	26
Mountain Green CB11	1728	192
Newton CB11	238.53	34
Newton CB12	58.47	8
North Logan CB11	2361.13	72
North Logan CB12	1359.08	144
North Ridge CB12	473.13	63
Oakley CB11	682.09	98
Orangeville CB11	900	1
Orangeville CB12	0	0
Pony Express CB13	1255.63	209
Pony Express CB14	951.1	158
Quail Creek CB11	0	0
Quail Creek CB12	427.57	50
Quarry CB15	1788.43	61
Quarry CB16	915.95	127
Quarry CB17	300.22	49
Richfield CB11	157.62	19
Richfield CB12	134.83	17
Richfield CB13	301.54	40
Richfield CB14	379.74	58
Salina CB13	1044.31	20

Skull Valley CB11	837.39	6
Spanish Valley CB11	754.69	104
Spanish Valley CB12	419.89	62
Springdale CB11	221.71	18
Springdale CB12	137.14	15
Summit Park CB11	667.66	82
Tocqueville CB12	1209.21	170
Vernal CB11	92.97	8
Vernal CB12	10	1
Vernal CB13	261.91	20
Vernal CB14	120.95	23
Welfare CB11	600	2
Willow Creek CB11	429.89	59

APPENDIX B –

INITIAL LIST OF DISTRIBUTION CIRCUITS

The following table is the initial list of circuits that were selected based on existing communication capabilities at the substation and the level of distributed energy resources interconnected to the circuit:

Substation	Circuit	Area	DER (~kW)	Utilized	Omission
AMERICAN FORK	AMF13	N Utah Co.	105		SCADA Development
AMERICAN FORK	AMF12	N Utah Co.	71		SCADA Development
BANGERTER	BGT17	Jordan Valley	1490		SCADA Development
BLUFFDALE	BLF11	SL Valley	118		SCADA Development
BRICKYARD	BRK11	Ogden	77		SCADA Development
BROOKLAWN	BKL11	Dixie	2208		SCADA Development
BUSH	BSH11	Tremonton	126		Protection CTs Only
CASTO	CAS11	SL Valley	114		SCADA Development
COLEMAN	CLM18	Dixie	78		SCADA Development
DAMMERON VALLEY	DMR11	Dixie	100	X	
DEWEYVILLE	DEW12	Tremonton	88	X	
EMERY CITY	EMR11	Price	75		SCADA Development
ENOCH	ENO11	Cedar	14021		Parallel Project
ENOCH	ENO12	Cedar	3000		Parallel Project
ENTERPRISE VALLEY	ENV12	Cedar	3500	X	
ENTERPRISE VALLEY	ENV11	Cedar	200	X	
HIGHLAND	HIG13	N Utah Co.	135		SCADA Development
HIGHLAND	HIG12	N Utah Co.	121		SCADA Development
HIGHLAND	HIG11	N Utah Co.	113		SCADA Development
LINCOLN	LIN14	NUT	509		SCADA Development
LINDON	LDN12	N Utah Co.	134		SCADA Development

LINDON	LDN14	N Utah Co.	123		SCADA Development
MIDDLETON	MDD24	Cedar	6000		SCADA Development
MOAB CITY	MOA12	Moab	387	X	
MORONI	MOR12	Richfield	81		SCADA Development
MOUNTAIN GREEN	MTG11	S Ogden	126	X	
NORTH LOGAN	NOL12	NUT	80	X	
OAKLEY	OKY11	Park City	96	X	
PARKSIDE	PKD03	N Utah Co.	156		SCADA Development
PARKSIDE	PKD06	N Utah Co.	95		SCADA Development
PARKSIDE	PKD02	N Utah Co.	90		SCADA Development
PARKSIDE	PKD04	N Utah Co.	69		SCADA Development
PARLEYS	PAR12	Park City	334		SCADA Development
PARLEYS	PAR13	Park City	117		SCADA Development
QUAIL CREEK	QUA12	Dixie	105	X	
QUARRY	QRY14	SL Valley	300	X	
RIDGELAND	RDG14	SL Valley	285		SCADA Development
RIDGELAND	RDG12	SL Valley	265		SCADA Development
ROCKVILLE	RCK11	Dixie	95		Enclosed Breaker
SALINA	SAL13	Richfield	1225	X	
SANDY	SDY13	Jordan Valley	1770		SCADA Development
SOUTH PARK	SPK13	SL Valley	83		SCADA Development
SOUTHWEST	SWT12	SL Valley	83		SCADA Development
SPANISH VALLEY	SPA11	Moab	50	X	
SPRINGDALE	SPD11	Dixie	171	X	
SUMMIT PARK	SUM11	Park City	223	X	
TOOELE	TOO11	SL Valley	85		SCADA Development
VERNAL	VER11	Vernal	71	X	
Welfare	WLF11	S Utah Co.	600	X	
WINCHESTER HILLS	WNC11	Dixie	73		SCADA Development

APPENDIX C – TECHNICAL REQUIREMENTS

1) All installations were engineered, prints issued, and as-built drawings processed.
2) Meters utilized existing current transformers, potential transformers, and meter panel cutouts where available. Panel modifications were limited to control costs.
    a. Alternate designs will be available where no convenient panel space is available, possible using transducer only versions of available meters.
3) All monitors were configured to measure and record all phase quantities in all quadrants.
4) Monitors were configured so that that the recorded phases are consistent with system vectors.
5) Installed stand-alone monitors are easily upgradable so that they can be incorporated into SCADA when it becomes available at the monitoring point at a future time.
6) The monitors will support DNP and IEC 61850 Ethernet and provide at least six analog outputs each.
7) Monitors can record waveforms of all phases at the same time.
8) Monitors read and store internally per phase: kW, kVAR, current, power factor, frequency, accumulated energy, harmonics, and recorded waveforms generated when programed limits are exceeded.
9) Monitors can be read by cellular phone.
10) Monitors have adjustable data and storage rates to allow for different levels of granularity and data intervals.
11) Monitors have the ability to provide live and periodic data reads to be moved into MV90 so they can be transferred into the SCHOOL PI database.

STEP Project Report

Period Ending December 31, 2021

STEP Project Name: Commercial Line Extension Pilot Program.

Project Objective:

Incentivize developers of commercial/industrial property to install electrical backbone within their developments, and provide for Plug-in Electrical Vehicle charging stations.

Project Accounting:

Table 1 gives the budgeted amounts through 2021. Funds are considered committed when the Company has determined the qualifying job costs and the STEP incentive amount. This is the Approved Date in **Table 3**. When funds are transferred into the job they are included in the Annual Spend (Capital). These correspond to the Paid items in the Status column in **Table 3**.

Table 1

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$500,000	$500,000	$500,000	$500,000	$500,000	$2,500,000
Annual Spend (Capital)*	$0.00	$69,340	$81,743	$110,645	$139,868	$401,596
Committed Funds	$0.00	$0.00	$0.00	$0.00	$63,016**	$63,016
Uncommitted Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
External OMAG Expenses	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Subtotal	$0.00	$69,340	$81,743	$110,645	$139,868	$401,596

*The annual spend figures correlate to the numbers shown on the accounting information provided on page 1.0 of this report.

**The committed funds shown in 2021 will be paid in calendar year 2022.

Applications Received:

The request for primary voltage facilities also serves as the application for the Commercial Line Extension Pilot Program. When a line extension work request is received, the Company meets with the applicant and determines the nature of the project. The Company receives a wide range of line extension requests. For a request to qualify for the commercial line extension pilot program, the project must include installation of backbone infrastructure, and also not have enough electric service revenue allowances to cover the cost of that backbone. The Company notes that none of the developments receiving STEP funds are additional phases of the same development that had previously received STEP funds under a different phase.

Table 2

	2017	2018	2019	2020	2021	Total
Applications Received	2	12	10	8	6	38
Applications Approved	2	12	10	8	6	38
Recipients Receiving Multiple Rewards	0	0	0	0	0	0

Individual Project Details:

In Docket No. 16-035-36, the Commission issued an order on February 6, 2019 approving the Company's request to increase the per-project incentive payment limit to $250,000 from the previously approved amount of $50,000. The intention of this change was to incentivize larger projects that could benefit from the funds to participate in the program. Larger projects have been more complex, with longer timelines, selling tracts of land for individual larger customers one at a time rather than platting an entire development. The total program budget is $2.5 million over the five-year pilot program period.

As of December 31, 2021, many developments receiving STEP funds were still under construction. At the time of this report no PV charging stations have been installed but two have designated locations. Some developments only include road and utility infrastructure. These developments have no buildings or parking established by the initial developer. No charging station locations have been established at developments without buildings or parking.

Other developments have plans for specific business or buildings as part of the initial development. For those developments where parking is established, charging station locations have been provided as defined by the STEP program. However no independent charging stations have been established. Some individual customers may have charging for their own use.

Individual Project Details – Table 3

	Status (paid or committed)	Approved Date	Gross Project Cost	Internal Backbone Cost	STEP 20% Incentive	Number of lots in Develop-ment	Parking installed (Y or N)	Number of charging locations (Conduit Extensions)	Number of individual PV charging stations
1	Paid in 2018	7/7/2017	$ 38,253	$ 36,611	$ 7,322	7	Y	1	TBD
2	Paid in 2018	9/18/2017	$ 40,069	$ 37,606	$ 7,521	5	N	--	--
				2017 Total	**$ 14,843**				
3	Paid in 2018	1/16/2018	$ 43,685	$ 39,783	$ 7,957	7	Y	1	TBD
4	Paid in 2018	3/14/2018	$ 102,804	$ 102,670	$ 20,534	7	Y	1	TBD
5	Paid in 2019	3/19/2018	$ 80,183	$ 80,183	$ 16,037	9	N	--	--
6	Paid in 2019	3/20/2018	$ 102,360	$ 100,714	$ 20,143	3	Y	1	TBD
7	Paid in 2019	3/29/2018	$ 25,141	$ 24,218	$ 4,844	5	Y	1	TBD
8	Paid in 2019	5/29/2018	$ 68,720	$ 30,669	$ 6,134	6	Y	1	TBD
9	Paid in 2019	7/13/2018	$ 30,957	$ 29,315	$ 5,863	4	Y	2	TBD
10	Paid in 2020	7/26/2018	$ 58,410	$ 58,410	$ 11,682	1	Y	1	TBD
11	Paid in 2019	11/1/2018	$ 52,789	$ 13,035	$ 2,607	5	Y	2	TBD
12	Paid in 2019	11/7/2018	$ 37,081	$ 33,803	$ 6,761	6	N	--	--
13	Paid in 2019	11/12/2018	$ 19,192	$ 19,192	$ 3,838	8	Y	1	TBD
14	Paid in 2019	12/6/2018	$ 248,411	$ 118,107	$ 23,621	1	N	--	--
				2018 Total	**$ 130,020**				
15	Canceled	2/6/2019	~~$ 51,316~~	~~$ 48,038~~	~~$ 9,608~~	~~6~~	~~N~~	--	--
16	Paid in 2020	3/4/2019	$ 28,080	$ 22,827	$ 4,565	8	N	--	--
17	Paid in 2019	3/8/2019	$ 12,246	$ 11,794	$ 2,359	5	Y	1	1
18	Paid in 2020	4/10/2019	$ 56,807	$ 51,889	$ 10,378	8	N	--	--
19	Paid in 2020	4/10/2019	$ 57,078	$ 52,160	$ 10,432	8	Y	1	TBD
20	Paid in 2019	4/11/2019	$ 111,259	$ 77,709	$ 15,542	9	Y	1	TBD
21	Paid in 2020	5/29/2019	$ 209,393	$ 133,897	$ 26,779	10	N	--	--
22	Paid in 2020	10/4/2019	$ 36,628	$ 34,160	$ 6,832	5	N	--	--
23	Paid in 2020	10/9/2019	$ 81,901	$ 77,787	$ 15,557	10	Y	1	TBD
24	Paid in 2020	11/6/2019	$ 50,570	$ 50,570	$ 10,114	4	Y	1	TBD
				2019 Total	**$ 102,559**				
25	Paid in 2021	5/6/2020	$ 63,958	$ 58,183	$ 11,637	12	N	--	--
26	Paid in 2021	5/7/2020	$ 55,181	$ 51,062	$ 10,212	6	Y	1	TBD
27	Paid in 2021	5/7/2020	$ 9,835	$ 9,010	$ 1,802	2	N	--	--
28	Paid in 2020	7/15/2020	$ 74,067	$ 71,523	$ 14,305	13	N	--	--
29	Paid in 2021	8/4/2020	$ 174,834	$ 26,772	$ 5,354	2	N	2	--
30	Paid in 2021	8/18/2020	$ 99,893	$ 93,890	$ 18,778	TBD	N	--	--
31	Paid in 2021	10/1/2020	$ 86,420	$ 79,692	$ 15,938	11	N	--	--
32	Paid in 2021	12/21/2020	$ 88,885	$ 63,168	$ 12,634	3	N	--	--
				2020 Total	**$ 90,660**				
33	Paid in 2021	4/21/2021	$ 66,124	$ 61,026	$ 12,205	TBD	N	--	--
34	Paid in 2021	4/22/2021	$ 43,324	$ 42,012	$ 8,402	TBD	N	--	--
35	Committed	6/23/2021	$ 218,135	$ 214,789	$ 42,957	TBD	N	--	--
36	Paid in 2021	8/18/2021	$ 246,085	$ 214,997	$ 42,999	5	Y	5	32
37	Committed	8/26/2021	$ 31,944	$ 29,083	$ 5,817	10	N	--	--
38	Committed	10/11/2021	$ 73,173	$ 71,197	$ 14,239	5	Y	8	16
				2021 Total	**$ 126,620**				

Project Milestones

The Commercial Line Extension Pilot Program review is applied each time a commercial or industrial developer requests installation of primary voltage backbone facilities within their development. Each development is independent, and is evaluated when the developer makes the request for service. Funds are transferred to the individual job upon the developer paying its share of the cost of the development.

Key Challenges, Findings, Results and Lessons Learned:

Program Participation

The Commercial Line Extension Pilot Program was proposed under U.C.A. § 54-20-105(1)(d) to be implemented under Regulation No. 13. The program was designed as a pilot program to encourage developers to install a full electrical backbone within their developments. By installing the electrical backbone upfront, rather than piecemeal over time as the development fills in, the Company could better design the grid for the developments. Backbone infrastructure are primary lines that serve as network facilities and do not include direct assigned facilities or terminal facilities (tap lines, transformers and services), and are not eligible for an allowance under the Company's standard line extension Regulation No. 12, Section 4. To the extent developers would build within their developments, sites for EV charging will be identified and power made available to those locations. This would encourage adoption of EVs and contribute to the environmental benefits of EV use. The funding provided 20 percent of these eligible backbone costs, with the developer paying 80 percent.

As shown in Table 2 above, the interest in the program was less than anticipated and the number of applicants declined from 2018 to 2021. There are multiple possible reasons for the tepid interest in the program, but the Company believes it has to do with trends within the commercial development market. Anecdotally, PacifiCorp asked one of the largest developers in Utah, which mused the commercial market has transitioned from roads and utilities development, which was the target of the Commercial Line Extension Program to more vertical development. The developer further explained that it is pursuing development of planned buildings and the estimated load for those project does not qualify for Commercial line extension incentives. The values in Table 4 below indicate this may be an overall trend with developers.

Program Benefits

The project was approved in Docket No. 16-035-36 as part of Phase II of the proceeding. During the regulatory approval process, parties discussed the need to quantify the benefits from the project[1]. There is no proven methodology to isolate and quantify the benefits of doing a backbone installation all at once compared to doing it piecemeal. However, a possible method that has been discussed during the STEP program period is to compare the backbone costs of commercial line extension projects before and during the STEP timeframes.

[1] *See* Docket No. 16-035-36, Direct Testimony, Phase II, of Myunghee Sim Tuttle for Division of Public Utilities filed March 7, 2017 and Phase 2 Rebuttal Testimony of Danny A.C. Martinez for the Office of Consumer Services filed March 28, 2017.

Therefore, in an effort to quantify the benefits, the 2012 through 2016 ("Pre-STEP") backbone costs were compared with the backbone costs from 2017 to 2021 ("During-STEP"). The details of that comparison are provided as workpaper 11-A to this report and also summarized in table 4 below.

Table 4

Total 2012 to 2016				
	Job Cost	CIAC	Allowances	# of Jobs
ABL	$361,728	$167,586	$194,142	5
DEV	$8,745,740	$3,857,244	$4,888,496	214
GEW	$27,247,781	$8,472,170	$18,775,611	1690
Total	$36,355,248	$12,497,000	$23,858,248	1909

Total 2017 to 2021				
	Job Cost	CIAC	Allowances	# of Jobs
ABL	$997,712	$706,444	$291,268	26
DEV	$31,875,681	$9,433,944	$22,441,737	563
GEW	$30,745,774	$15,949,274	$14,796,500	2488
Total	$63,619,167	$26,089,662	$37,529,505	3077

Table 4 shows that the costs During-STEP were higher in all cost categories: job costs, customer contributions in aid of construction (CIAC) and allowances paid after implementation of the program. The Company does not believe that this analysis is conclusive for two reasons. First, as discussed the Company has observed a trend of commercial property developers pursuing more than just land development and including building construction as part of their developments. The increase in growth in construction of commercial property along the Wasatch Front has primarily been construction by developers with a small growth in end use businesses construction. This means that, as a percentage, developers who pursue land development projects and not buildings also has decreased. Table 3 also shows that the overall number of STEP projects that qualified for the Commercial Line Extension STEP funds decreased year over year, and the backbone costs decreased as well, but then increased in 2021. Second, the Company attributes at least a portion of the increase in 2021 over 2020 to the COVID pandemic, which caused price increases due to supply chain challenges rather than organic growth over the previous year. Last, as shown in Table 3, $464,702 was paid as STEP incentive from 2017 to 2021 which is only 1.24 percent of the total allowances paid from 2017 to 2021 shown in table 4 above. Due to the relatively low portion of allowances paid through STEP as shown in table 3 and the low number of applicants shown in table 2, the sample size is too small to draw inferences as to the effect the program had on the cost of backbone infrastructure costs.

The Company is willing to consider alternative approaches to quantifying the benefits of the project. However, pilot programs are intended to test a concept and due to the lack of interest from developers for the program, the Company believes the STEP Commercial Line Extension Pilot Program should be allowed to sunset as contemplated in its design.

Potential Future Applications

Under the STEP Commercial Line Extension Pilot, in exchange for a 20% backbone allowance, a developer installed all of the primary backbone within the development upfront and provided a location or locations for EV changing station(s) having access to the development's primary voltage backbone. After all the lots are sold the developer does not control what is built in the development. The installation of EV charging by the developer relies upon the developer maintaining an interest in the development. Future programs promoting EV charging need to link the program benefit with not only making EV charging station installation possible but the actual installation and maintenance of EV charging stations.

Attachments:

• Workpaper 11-A: Historical Data 2017 to 2021

STEP Project Report

Period Ending: December 31, 2021

STEP Project Name: Gadsby Emissions Curtailment

Project Objective:

To help improve air quality, the Gadsby Emissions Curtailment program allows the Gadsby Power Plant to curtail its emissions during winter inversion air quality events as defined by the Utah Division of Air Quality ("UDAQ"). The UDAQ issues action alerts when pollution is approaching unhealthy levels. These alerts proactively notify residents and businesses before pollution build-up so they can begin to reduce their emissions. When pollution levels reach 15 µg/m3 for PM2.5, UDAQ issues a 'yellow' or voluntary action day, urging Utah residents to drive less and take other pollution reduction measures. At 25 µg/m3, 10 µg/m3 below the EPA health standard, UDAQ issues a "red" or mandatory advisory prohibiting burning of wood and coal stoves or fireplaces. It is at the 25 µg/m3 level when RMP will take action to curtail the Gadsby Steam units.

Project Accounting:

Cost Object	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$100,000	$100,000	$100,000	$100,000	$100,000	$500,000
Annual Spend	$0.00	$0.00	$7,067	$0.00	$0.00	$7,067
Committed Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Uncommitted Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
External OMAG Expenses	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Subtotal	$0.00	$0.00	$7,067	$0.00	$0.00	$7,067

Program Benefits:

Many of the company's customers live in communities that are located within the non-attainment areas, including Salt Lake City, which is where the Gadsby Power Plant is located. The primary benefit of curtailing Gadsby is the potential reduction of NOx emissions which contribute to the formation of PM 2.5. According to UDAQ (see Appendix 1), the Gadsby Power Plant may emit 0.437 tons of NOx per day during a typical winter inversion day, which makes Gadsby the 10th largest emitter of NOx in the Salt Lake non-attainment area. This program would ensure that those emissions would not occur during periods of unhealthy air quality and not contribute pollutants to air sheds of non-attainment areas.

STEP Project Report

Period Ending December 31, 2021

STEP Project Name: Panguitch Solar and Storage Technology Project

Project Objective:
Rocky Mountain Power will install a five (5) megawatt-hours battery energy storage system to resolve voltage issues on the Sevier–Panguitch 69 kilovolt transmission line. Panguitch substation is fed radially from Sevier, and all capacitive voltage correction factors have been exhausted.

To correct the voltage issues experienced during peak loading conditions, a stationary battery system will be connected to the 12.47 kilovolt distribution circuits that are connected to the Panguitch substation. This reduces the loading on the power transformer and improves voltage conditions. The system will be sized to handle the voltage corrections as load grows in the area.

In Docket No. 16-035-36, the Commission approved the Company's request to increase funding for the Solar and Storage Technology Project by $1.75 million due to the response to the Company's Request for Proposals ("RFP"). Commercial operation commenced on March 9, 2020, and final completion occurred on August 7, 2020. The solar training is complete.

Project Accounting:

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$500,000	$2,350,000	$5,900,000	$0.00	$0.00	$8,750,000
Annual Spend (Capital)*	$331,995	$75,474	$6,373,549	$168,404	$1,658	$6,951,080
Committed Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Uncommitted Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
External OMAG Expenses	$0.00	$0.00	$0.00	$13,735	$0.00	$13,735
Subtotal	$331,995	$75,474	$6,373,549	$182,138	$1,658	$6,964,815

*The information provided includes funds charged to the STEP account and does not include funds from the Blue Sky program that were allocated to this project.

Project Milestones:

Milestones	Delivery Date	Status/Progress
Prairie Dog Permit	July 30, 2018	Complete

Small Generation Interconnection Agreement – Finalized	June 4, 2018	Complete
Award an engineering, procurement and construction (EPC) contract.	February 22, 2019	Complete
EPC Design Complete	August 1, 2019	Complete
EPC Major Equipment Delivered	September 3, 2019	Complete
Construction Complete	November 1, 2019	Complete
Commercial Operation Begins	March 9, 2020	Complete
Final Completion	August 7, 2020	Complete

Key Challenges, Findings, Results and Lessons Learned:

Description of Investment	Anticipated Outcome	Challenges	Findings	Results	Lessons Learned
a. Enable Investment Tax Credit (ITC)	Utility will operate the solar and battery system to address system issues as well as capture ITC benefits	System not original designed for such capability	The battery and solar control architecture was not initially designed to accommodate ITC requirements	Control architecture changes were implemented on January 21, 2020	During design and setting of design criteria include ITC philosophy in specification and controls
b. Interconnection cost increases	N/A	Tight labor market for procurement of contractors (and with required schedule); Nine poles required replacement from Panguitch Substation to the site	Contractor cost increases; Communication costs and labor higher than originally estimated	Passage of time also impacted estimates; in the end interconnection costs increased significantly	Detailed loading information and field inspection may be needed to accurately estimate interconnection costs.

c. Issues with fencing and grounding	Repaired in field	Issues with project construction quality	Multiple issues were identified that raised concerns regarding construction quality.	Fencing and grounding issues were corrected during the commissioning stage.	Establish clear fencing and grounding standards in the contract; conduct both design and field reviews during commissioning
d. Consider providing temporary diesel generators for battery back-ups	More reliable and robust system	Cost of generators, permitting, and other ancillary electrical	Cost of generators, permitting, and other ancillary electrical	Not included; future project if justified	May not be required depending on future project location
e. Network connection (internal) for data transfer	Data transfer and troubleshooting	Cost and resources for data connect	Facilitate data transfer and trending	Include in this and future projects	Needed annually at a minimum for ITC reporting

Project Benefits

- The loading on the 69–12.47 kilovolt power transformer at Panguitch substation will be reduced thereby ensuring the line voltage on the Sevier–Panguitch 69 kilovolt transmission line does not drop below 90% and will defer the traditional capacity increase capital investment beyond fifteen years when using present growth rates in this area.
- Enables the Company to get first-hand operational experience with control algorithms and efficiency levels associated with energy storage combined with solar. This experience will prepare the company in advance of large scale integration of such technology that are now becoming options for customers.
- Enables the Company to become familiar with and utilize innovative technologies to provide customers with solutions to power quality issues.
- Provides battery and solar training for Company personnel at both the office and field levels including the operation and maintenance on similar facilities and equipment.

Potential future applications for similar projects:

Depending on the outcome, there could be a number of applications across Rocky Mountain Power's system on long radial feeds similar to Panguitch. These applications would provide economic deferrals for major transmission rebuilds.

Attachments:

• Exhibit 13-A: Supplemental Rocky Mountain Power Final Report Dated April 18, 2022

Exhibit 13-A

Supplemental Panguitch Final Report

PANGUITCH SOLAR + STORAGE
PROJECT REPORT

Author:	Rohit Nair
Approval:	
Authoring Department:	
File Number-Name:	Panguitch_Report.docx
Date:	18 April 2022

PANGUITCH SOLAR + STORAGE
2021 PROJECT REPORT
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PANGUITCH SOLAR + STORAGE 2021 PROJECT REPORT

1 SUMMARY

This report addresses PacifiCorp's Panguitch solar and storage project. The project, approved in 2016 by the Utah Public Service Commission under the Sustainable Transportation and Energy Plan (STEP), became operational March 2020. Project challenges for Rocky Mountain Power have yielded valuable lessons learned that will support adoption of these relevant technologies. This report will address those lessons learned as well as provide project background, initial implementation, a financial summary, the engineer-procure-construct (EPC) process and initial observations.

2 BACKGROUND

PacifiCorp proposed a 650 kilowatt (kW) solar combined with a 1 megawatt (MW) / 5 megawatt-hour (MWh) battery storage project on a distribution circuit out of the Panguitch Substation located in Garfield County (Panguitch City), Utah to correct voltage issues experienced during peak loading conditions on a portion of PacifiCorp's system on the Sevier–Panguitch 69 kilovolt (kV) transmission line. The Panguitch Substation is fed radially from Sevier, and all capacitive voltage correction factors had been exhausted. The solar and battery storage system was intended to alleviate peak loading on the Panguitch power transformer and to improve voltage conditions on this upstream 69 kV sub-transmission line.

The potential project benefits extended beyond alleviating peak load, and included the following:

- Rocky Mountain Power would obtain first-hand operational experience with control algorithms and efficiency levels associated with energy storage combined with solar. This experience would prepare Rocky Mountain Power in advance of large-scale integration of similar technologies/projects that are becoming cost-effective, readily available options for customers.
- Rocky Mountain Power has been striving to make the grid more progressive; this project would enable a greater companywide understanding of these innovative solutions.

Rocky Mountain Power proposed that solution for the Panguitch system met the legislative intent of SB115 54-20-105-1(h) that pertains to "any other technology program" in the best interest of the customers in the state of Utah. This project would fall under the STEP discretionary allotment of funds as part of the Utah Innovative Technology category.

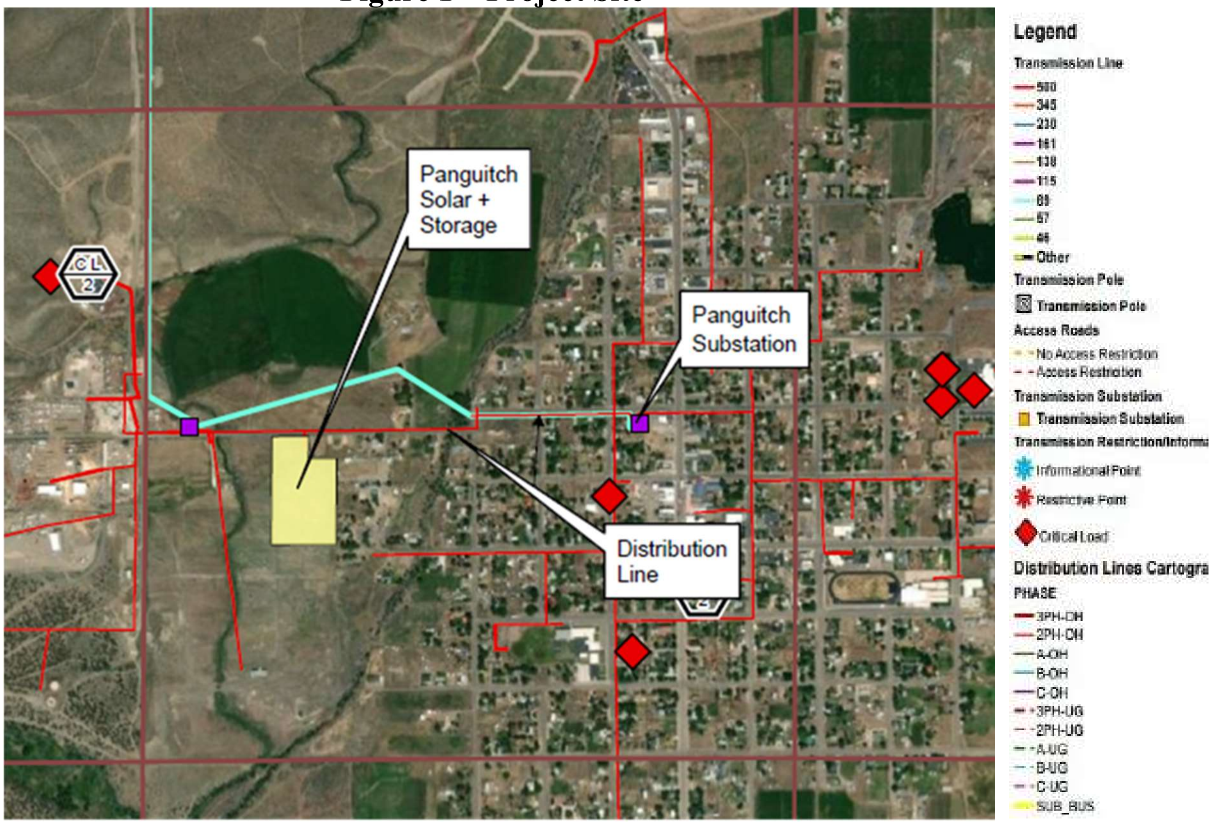
The Utah Public Service Commission approved PacifiCorp's Panguitch lithium-ion battery storage project (1 MW / 5 MWh) under the STEP/Utah Innovative Technologies (STEP/UIT) program December 29, 2016. A single-axis tracker, solar photovoltaic component (650 kW) of the project was to be separately funded by the company's Blue Sky program.

3 INITIAL IMPLEMENTATION

As part of the execution process, multiple steps were necessary to successfully implement the project. These steps included:

- Rocky Mountain Power initiated a Request for Qualification (RFQ) and Request for Proposal (RFP) to identify an Owner's Engineer (OE). As part of the process, POWER Engineers was identified as the most qualified vendor and a contract was executed to assign POWER Engineers as the OE. The responsibility of the OE was to provide technical engineering guidance to define the scope of services, identify risks, anticipate challenges and propose technical solutions.
- The OE developed a model to assess the solution proposed by Rocky Mountain Power to resolve the voltage issue. The model validated Rocky Mountain Power's proposal to solve the voltage issue by installing a 650 kW solar and 1 MW / 5 MWh energy storage project.
- The OE developed detailed technical specifications required to be complied with by the project developer.
- Rocky Mountain Power submitted interconnection requests for both the solar and energy storage projects. Both interconnection requests received approvals in April 2018.
- Rocky Mountain Power purchased land for the project installation (see Figure 1). Rocky Mountain Power also engaged with community leaders to help them understand the value of this project for the community.
- Rocky Mountain Power released an RFP to nine preselected vendors with experience in executing EPC contracts for energy storage and/or solar projects. Rocky Mountain Power received an affirmative response from two vendors. Subsequently, both vendors submitted their final bids through the Rocky Mountain Power's e-Auction process, however only one vendor submitted a detailed bid.
- The project EPC contract was awarded to Overland Contracting Inc. (OCI, Black & Veatch's EPC company) in early in 2019 to engineer, procure and construct the project.
- Rocky Mountain Power negotiated with the EPC contractor to determine contract terms and final pricing. As part of this effort, Rocky Mountain Power successfully reduced cost of the overall bid by making modifications to engineering design and material sourcing.

Figure 1—Project Site



4 FINANCIAL SUMMARY

Financial elements in the Panguitch solar and storage project can be loosely divided into preliminary cost analysis and project funding as it evolved.

4.1 Preliminary Cost Analysis

An initial analysis of the costs involved in addressing the load issues on the Sevier–Panguitch 69 kV transmission line suggested the solar and battery option would be cost effective as compared to traditional approaches: rebuilding the transmission line or rebuilding a new transmission substation. The cost to rebuild the transmission line using a low impedance conductor was estimated at $8m. The cost to rebuild a new transmission substation to connect the Sevier–Panguitch 69 kV transmission line to Sigurd–Parowan 230 kV transmission line was estimated at $14m. By comparison, the preliminary cost analysis suggested that installing an 5 MWh energy storage device would be the least cost at $7.4m.

4.2 Project Funding

When the project was approved by the Utah Public Service Commission in 2016, the agreement included $5m in STEP funds to install the energy storage technology. An additional $2m from Blue Sky community project funds was approved for a company-owned solar project at the same location.

Rocky Mountain Power was able to secure cost savings through reduction in project management and interconnection equipment costs; however, the overall price of procuring and installing the solar and energy storage system was higher than the initial 2016 funding request. Factors that caused the increase in costs included, but were not limited to: impact of trade tariffs on imported energy storage and solar materials, increase in contractor costs for project solar and storage integration and commercial risks, increased cost for battery storage due to high demand and limited supply, and higher construction due to low unemployment and higher labor costs, as well as any other costs that might not have been considered in the previous cost estimate. The budget was revised to an overall project estimate of $8.5m. (The estimated cost of resolving the voltage issue using *traditional* capital investments in the form of poles, wires and/or substations was revised from $8 to $8.75m, based on $2018 current market costs.)

As reported in March of 2020, per Docket No. 16-035-36, the Utah Public Service Commission approved PacifiCorp's request to increase funding for the Solar and Storage Technology Project by $1.75m due to the response to PacifiCorp's request for proposals (RFP). More specific detail on the project accounting appears in Table 1.

Table 1—Project Accounting

	2017	2018	2019	2020	Total
Annual Collection (Budget)	$500,000	$2,350,000	$5,900,000	$0	$8,750,000
Annual Spend (Capital)	$331,995	$75,474	$8,313,775	$168,404	$8,889,648
Committed Funds	$0.00	$0.00	$0.00	$0.00	$0.00
Uncommitted Funds	$0.00	$0.00	$0.00	$0.00	$0.00
External OMAG Expenses	$0.00	$0.00	$0.00	$13,735	$13,735
Subtotal	**$331,995**	**$75,474**	**$8,313,775**	**$182,138**	**$8,964,429**

5 ENGINEER-PROCURE-CONSTRUCT

After the contract was awarded to OCI, construction was completed on November 5, 2019. A timeline appears in Table 2.

Table 2—EPC Milestones

Milestones	Delivery Date	Status/Progress
Award EPC Contract	February 22, 2019	Complete
EPC Design Complete	August 1, 2019	Complete
EPC Major Equipment Procured and Delivered	September 3, 2019	Complete
Construction Complete	November 5, 2019	Complete
Commercial Operation Date	November 15, 2019	March 9, 2020

The OCI EPC design project work consisted first of verification of system design criteria, then primarily of multiple reviews and finalization of engineering drawings (67 total) and included internal coordination with the Rocky Mountain Power interconnection team. Significant drawings included the electrical one-line and site plan. As system and subsystem designs were completed, the associated equipment was procured by OCI. Major project equipment and subsystems (and controls) through all phases of the EPC contract included: electrical; single-axis tracker photovoltaic, lithium-ion battery energy storage; battery and backup power; and control buildings. Electrical systems also included switchgear, transformers and various panels / enclosures. Solar and battery systems included inverters and additional control systems. Other balance of plant systems included communications, fire protection and a meteorological station.

Once design and procurement were nearing completion, OCI site construction began. Most permitting occurred before or concurrent with design and procurement, except for the Stormwater Pollution Prevent Plan permit (SWPPP), which was obtained immediately before site construction commenced. The general sequence of construction commenced with clearing and leveling of the property and installation of fencing including a main access gate. The next stage (civil) consisted of underground electrical, grounding grid, and the placement of 11 concrete foundations including two battery energy storage containers, two transformers and multiple cabinets / panels. Subsequently, most of the large equipment including one control building and two battery energy storage containers were installed, followed by loading of the lithium-ion batteries. Steel posts and other horizontal components, and tracking motors and sensors, for the solar modules and panels were installed shortly thereafter. Rocky Mountain Power installed wooden poles and other equipment for interconnection, and an additional control building. All electrical and control wire (including for the solar modules) were pulled, terminated, and tested. Rocky Mountain Power provided transformers and metering, final electrical connection, and then backfed and synched the facility.

The post-construction commissioning and testing portion of the project took longer than planned and consisted of correction of punch-list items, programing of the battery management and control system, receipt of spare parts, final project documentation (commissioning / testing documentation, drawings, and operation & maintenance manuals) and training.

OCI's construction workforce peaked at 17 individuals and averaged about eight for the project duration. The number of hours for the construction portion of the EPC contract with OCI totaled slightly more than 13,000 with an additional 1,500 hours for commissioning and testing. Notably, OCI experienced zero recordable or lost-time accidents during the project; there was one near miss. OCI also had zero environmental issues while on-site.

6 OBSERVATIONS

Figure 2 presents a 24-hour load and generation profile at the Panguitch Substation on July 7, 2021. This profile shows that the solar and battery systems reduce the overall load to ensure the loading on Panguitch Substation is maintained at the predetermined level of 2.4 MW. The loading setpoint is determined by the Rocky Mountain Power's transmission engineer to ensure the loading at Panguitch Substation does not violate voltage compliance levels.

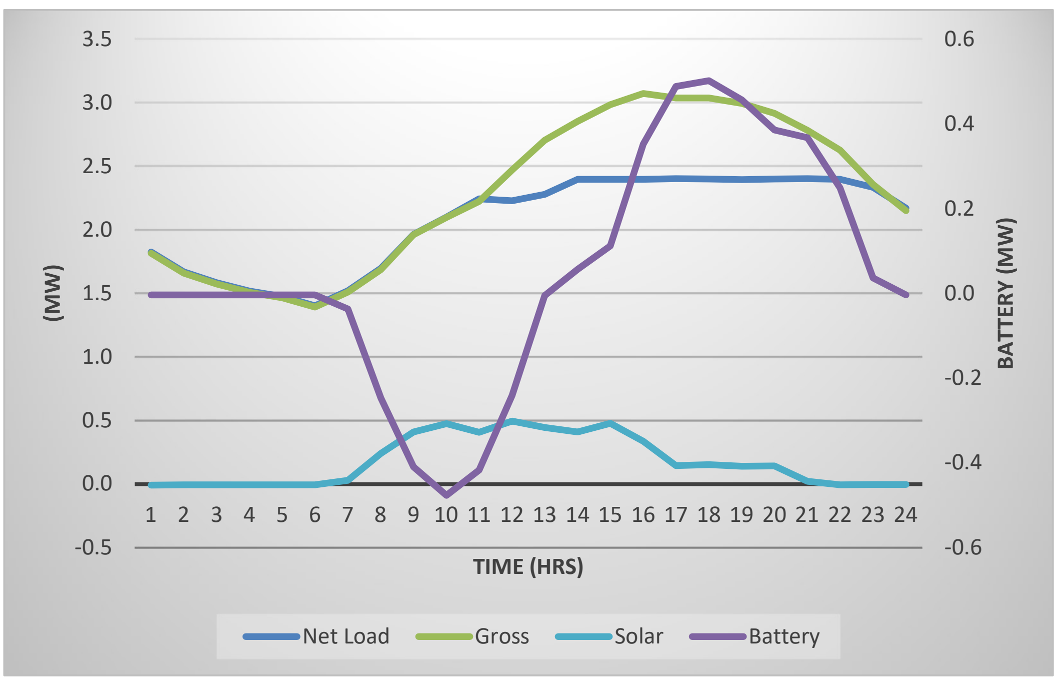


Figure 2— Panguitch Substation Loading—July 7, 2021

7 LESSONS LEARNED

Description of Investment	Anticipated Outcome	Challenges	Findings	Results	Lessons Learned
Enable Investment Tax Credit (ITC)	Utility will operate the solar and battery system to address system issues as well as capture ITC benefits	System not original designed for such capability	The battery and solar control architecture were not initially designed to accommodate ITC requirements	Control architecture changes were implemented on January 21, 2020	During design and setting of design criteria include ITC philosophy in specification and controls
Interconnection cost increases	N/A	Tight labor market for procurement of contractors (and with required schedule); nine poles required replacement from Panguitch Substation to the site	Contractor cost increases: communication costs and labor were higher than originally estimated	Passage of time also impacted estimates; in the end, interconnection costs increased significantly	Detailed loading information and field inspection may be needed to accurately estimate interconnection costs
Issues with fencing and grounding	Repaired in the field	Issues with project construction quality	Multiple issues were identified that raised concerns regarding construction quality	Fencing and grounding issues were corrected during the commissioning stage	Establish clear fencing and grounding standards in the contract; conduct both design and field reviews during commissioning
Consider providing temporary diesel generators for battery backups	More reliable and robust system	Cost of generators, permitting (emissions) and other ancillary electrical	Cost of generators, permitting and other ancillary electrical	Not included, future project if justified	May not be required depending on future project location
Enable SCADA connectivity	Added after project commissioning was completed	No remote control capability for Rocky Mountain Power dispatch operators	N/A	Completed SCADA connectivity	This is a MUST to ensure dispatch operators have complete control on battery dispatchability
Ensure access to battery software system	Remote access to battery control system software to monitor battery and solar activity	Requires field crew to drive from nearest service center to clear alarms/faults on the battery system	Firewalls and cybersecurity protocols for accessing the software should be determined during planning process	Rocky Mountain Power is currently working with the battery supplier to ensure remote accessibility to the software	Required to ensure accurate monitoring and battery control system alarms / faults can be cleared remotely
Data integrity	Battery control system data is aligned with Rocky Mountain Power's SCADA data	Confusion created due to data discrepancy	Discrepancy in data due to various issues such as scaling, data points mismatch, etc.	Battery supplier is investigating the source of the data discrepancy and provide recommendation to address future data integrity issues	Download data logs from the battery system early in the implementation phase to address the issue early in the project
Training	Field crews in the Panguitch area to be well trained on battery control systems	Lack of understanding among field crews on the different battery components and maintenance and operations of the same	N/A	Additional training provided to field crews to ensure all questions on operations are addressed	Have multiple trainings for field crews since they are not well-acquainted with advanced battery control systems

8 SUPPLEMENTAL INFORMATION

In accordance with the Public Service Commission of Utah's Acknowledgement Letter dated October 19, 2021 in Docket No. 21-035-29, the Company provides the following additional supplemental information as requested by the Division of Public Utilities ("DPU") and the Office of Consumer Services ("OCS").

8.1 Project Location

The map of the project site is provided in Figure 1 of this report, which was updated from the original version of this report filed August 25, 2021 that showed the proposed site at the time the Company was considering the project. The cost for the parcel that was selected was $99,333. The Company notes that it considered several alternative sites were considered including the proposed 10 acre property on the west side of the of Panguitch, which was marketed for $79,000. Although the originally proposed site was listed at a slightly lower price, the cost to upgrade the distribution feed to serve the proposed solar facilities would have far outweighed the benefit of the lower property cost. Therefore, the Company ultimately selected the site shown in Figure 1 of this report.

8.2 Investment Tax Credits

The Project qualified for a federal Investment Tax Credit (ITC) in the amount of $2.2 million which was claimed on PacifiCorp's 2020 federal income tax return. Investment tax credits are deferred and amortized over the estimated useful lives of the related properties, which is the treatment that was used for the ITC received for the Panguitch project. The deferred ITC is recorded to FERC Account 255. The ITC amortization is recorded to FERC Account 420.

The Company notes that ITC received for the Panguitch project is subject to the normalization requirements of the Internal Revenue Code. As a result, for ratemaking purposes, the Project ITC cannot be immediately "credited" to customers. Rather, the balance of the unamortized deferred ITC is included as a reduction to rate base, while ITC amortization may not be included as a reduction to income tax expense.

The ITC received for the Panguitch project was first recorded in March 2020, first reflected in Utah's June 2020 Results of Operations (allocated 100% to Utah customers and reflected as a reduction to rate base) and will be reflected in rates commencing with Rocky Mountain Power's next filed general rate case. Due to the normalization requirements of the Internal Revenue Code, the Company does not have discretion to apply any other regulatory or ratemaking treatment to the ITC received for the Panguitch Project.

8.3 Project Cost Overages

The actual expenditures for the project were $8.96 million versus the budget of $8.75 million. The cost overrun was largely due to increases in interconnection costs (design, material, equipment, and labor) that were not included in the original project budget, or the initial or subsequent funding request increase. These included nine (9) large wooden poles required replacement (65-feet including cross-arms, insulators, attachment hardware, guy wires, and conductor) from the Panguitch Substation to the project site, the requirement and addition of an aerial grounding transformer and protection, as well as the emergency replacement of a circuit switcher in the same substation during commissioning. These items combined with contractor cost increases for communication / network systems and overall labor caused the overruns. Please refer to the table under 'Section 7' titled 'Lessons Learned,' row / line 3.

8.4 Project Performance

In 2020, the system was not fully operational due to several technical issues including but not limited to fire panel failures, communication device programming challenges and incorrect control system settings. Most of these issues were addressed by March 2021. In 2021, the system was operational for 275 days.

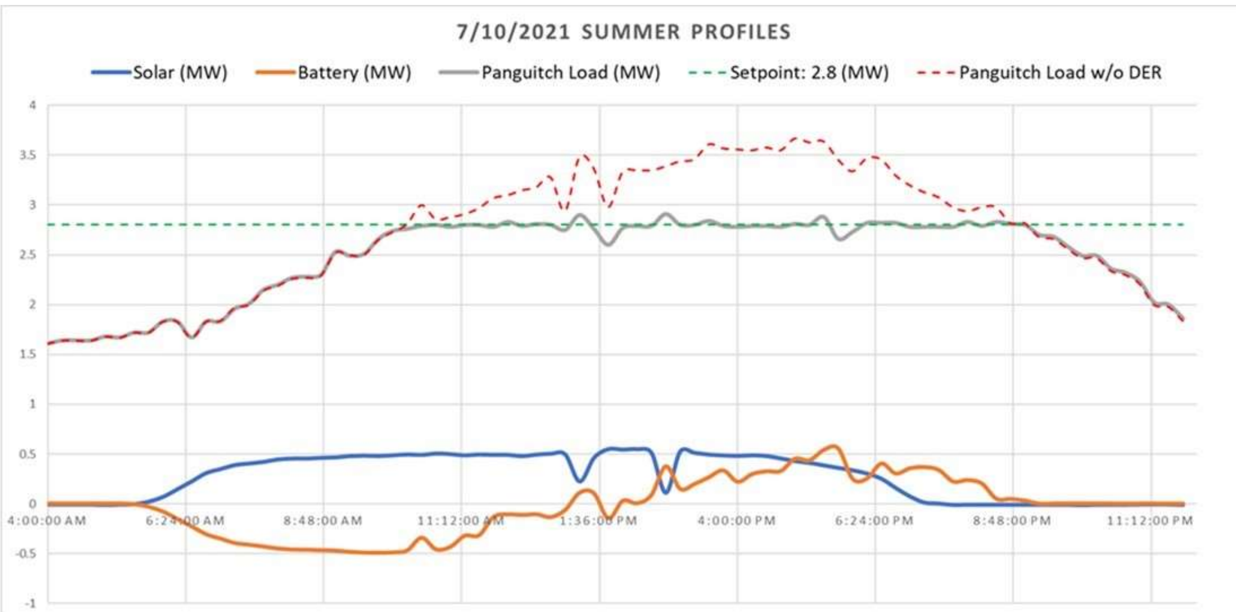


Figure 3— Panguitch Summer Load Profile

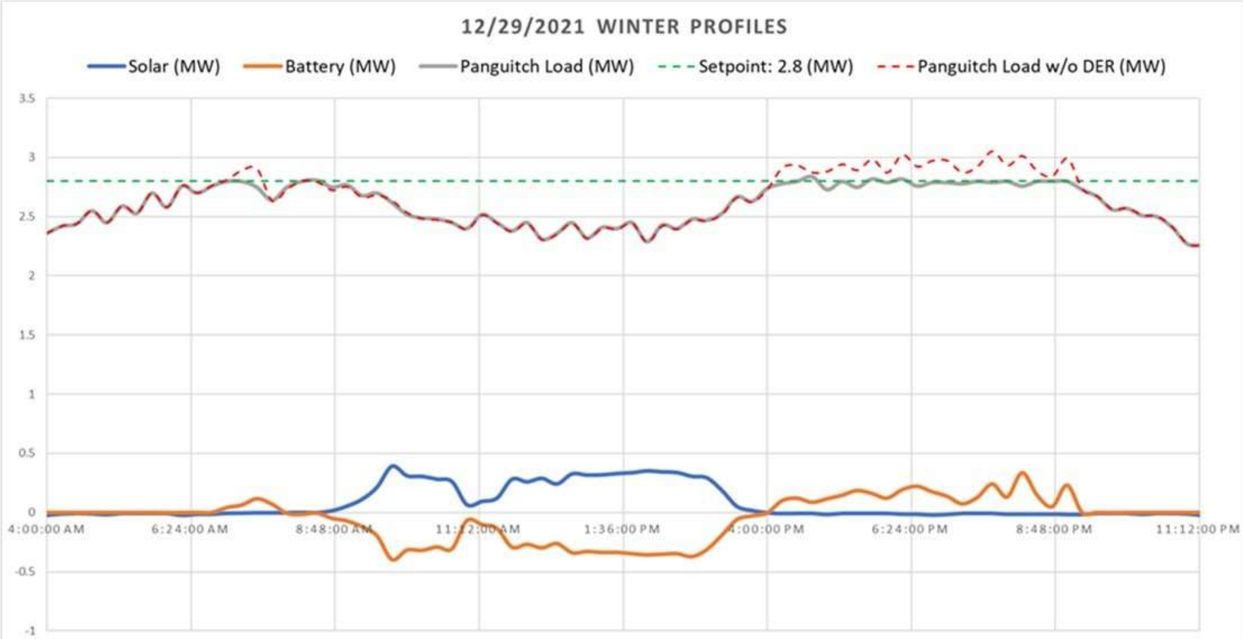


Figure 4— Panguitch Summer Load Profile

In regard to the sufficiency of the solar production, the system is designed to allow the solar production to supply power to the grid once the battery system is fully charged. The battery system is programmed to discharge during times when the net loading on the system (net load = total load – solar generation backfeed to grid) exceeds a predetermined threshold.

8.5 Diesel Generators

Page 6, lessons learned, states that RMP should consider providing temporary diesel generators for battery backups. The Company clarifies that the consideration of diesel generators was to ensure backup power is provided to the battery's control panel and HVAC during outages longer than 12 hours. The diesel generator was never intended to be used to backup the entire solar and/or battery system.

8.6 SCADA connectivity

The initial plan was to gain SCADA connectivity for monitoring and control by utilizing the vendor's proprietary software. However due to cybersecurity concerns and contractual disagreements, the software was never onboarded into PacifiCorp's control center. The company eventually established SCADA connectivity via the company's existing software that is used to connect to all distribution and transmission assets.

STEP Project Report
Period Ending December 31, 2021

STEP Project Name:

Microgrid Project

Project Objective:

Deploy a microgrid demonstration project at the Utah State University Electric Vehicle Roadway (USUEVR) research facility and test track to demonstrate and understand the ability to integrate generation, energy storage, and controls to create a microgrid.

Project Accounting:

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$0.00	$70,000	$110,000	$70,000	$0.00	$250,000
Annual Spend (Capital)	$0.00	$90,713	$77,717	$28,392	$55	$196,877
Committed Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Internal OMAG Expenses	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
External OMAG Expenses	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Subtotal	$0.00	$90,713	$77,717	$28,392	$55	$196,877

Project Milestones:

Milestones	Delivery Date	Status/Progress
Data collection and EVR characterization	06/30/2018	COMPLETE - Installed smart meter and started analyzing the EVR load profiles
Preliminary microgrid planning tool	09/30/2018	COMPLETE - Developed a linear programming-based planning tool to determine the size of energy storage.
Microgrid layout and test plan	12/31/2018	COMPLETE - Finalized layout of the EVR microgrid
Deploy microgrid system at EVR	04/30/2020	COMPLETE - A Python & MATLAB based EMS was developed and tuned with the facility's load data. System observation and streamlining of communication protocol of all microgrid components will continue.

Optimize planning tool for microgrid	08/31/2019	COMPLETE
Apply planning tool to HAFB microgrid	12/31/2019	MILESTONE REMOVED
Create fact sheet for planning tool	4/30/2020	COMPLETE – Authoring sheet to simplify explanation of planning tool and microgrid implementation with economic benefits.
Recommendations to DERs interconnection policy	06/30/2020	COMPLETE – Reviewing current proposed redlines to policy 138 and evaluating implementation of recommendations.

Key Challenges, Findings, Results and Lessons Learned:

Description of Investment	Anticipated Outcome	Challenges	Findings	Results	Lessons Learned
a. Microgrid system operational at USU's EVR	Connect microgrid components to the central control system at the EVR for monitoring and control.	1. Establishing a connection interface for all components to get a complete view of the system. Commands from inverters are not the same across vendors. 2. Policy 138 requirement of a grounding transformer. 3. Transformer requirement to be located at point of interconnection of the solar array (policy 138), but the microgrid system required a neutral reference when disconnected from the grid. This requires a neutral reference be located at the service entrance and automatic transfer switch rather than at the solar array POI. 4. Grounding transformer needed to be increased in order to handle the neutral currents of the single-phase loads of the facility when islanded while also meeting the interconnection requirements. 5. Determining the allowable facility ampacity and	1. With revisions to policy 138 and transient overvoltage protection, the need for a grounding transformer for that feature was not required. 2. Plotting of the transformer not a concern. 3. The different system voltage needs of the facility, along with the ampacity usage, resulted in the widespread installation of solar inverters across the facility. 4. Communications for data collection and control of the inverters are vital for microgrid operation. 5. Much equipment is designed for conventional grid and must be revised for microgrid operation.	1. Data / Solar data to be available on EVR server for real-time viewing.	1. The grounding transformer was needed due to the battery inverter not able to establish a neutral reference for the facility when isolated. 2. Smart inverters that adhere to the IEEE 1547-2018 standard have TROV protection. This eliminates the need for grounding transformer TROV. 3. Try to establish the same types of communication protocols. 4. Market share for microgrid equipment is limited. 5. Protection relays are necessary for quick response to grid transients and fast control of equipment. 6. Natural gas generators are limited at the hundreds of kilowatts range. 7. In order to parallel a generator with the utility, the generator has to be prime power rated. This kind of rating is only

		ampere interrupt capacity of the EVR for DER interconnections. 6. Limited market share for microgrid equipment. 7. Designing for facility constraints.	6. Shortage on micro grid equipment in the hundreds of kilowatts range (i.e. automatic transfer switch and natural gas generator).		currently available at higher power levels (thousands of kilowatt levels). 8. Emergency standby generators are only available at the power levels the EVR is operating at.
b. Optimize planning tool for microgrid	Creation of planning tool for use in industry.	1. Quantifying real equipment prices as tool inputs	1. Many different technical, financial, and meteorological components have an effect on the design and economics of a microgrid	1. Optimized planning tool for various customers communicated.	1. The design and financial benefits of a microgrid can be easily quantified, given accurate pricing, load, and weather data.
c. Create fact sheet for planning tool	Fact sheet to provide explanation for process to implement a microgrid and its benefits.	1. None currently identified.	1. Planning tool is simple to use and quantifies economic benefits of a microgrid to a customer	1. Clear fact sheet describing purpose of tool and value of results.	1. The microgrid planning tool can be applied to various customers to conceptually design a microgrid and detail its load-shaping and cost-saving capability.
d. Policy 138 review and proposed changes	Review of the interconnection policy, and identify areas for possible revision.	1. EVR facility has multiple inverters, policy 138 required a manual disconnect for each inverter within ten feet of the utility meter. Due to space limitations, the AC disconnects are not able to be located next to the meter. 2. Early challenge of grounding transformer for policy 138 compliance. 3. Transformer POI to the EVR facility was significant challenge. 4. Transformer requirement to be located at point of interconnection of the solar array (policy 138), but the microgrid system required a neutral reference when disconnected from the grid. This requires a neutral reference be located at the service entrance and automatic transfer switch rather than at the solar array POI.	1. Changes to policy 138 TROV protection, resulted in grounding transformer not needed. 2. Exceptions to AC disconnect locations can be granted on a per review basis. 3. Protection relays will help ensure that tripping times specified in the policy 138 are met.	1. Submission of proposed rule changes to policy 138.	1. Through software control, energy storage can be controlled similar to PV smart inverters. 2. SEL-751 protection relays have fast response to grid/facility transients. 3. Protection relays can be used to monitor energy storage, and disconnect the energy storage/facility from the grid. 4. A combination of software and hardware controls allows seamless control of energy storage to allow interconnection to utility. 5. The AC and DC disconnects on the inverters themselves are lockable and disable the inverter from operation. 6. The disconnects on the inverters could serve as the utility required disconnects for interconnection.

Program Benefits

- Qualifies the viability of operating a microgrid on the Company's distribution system, and any resultant reliability improvement.
- Assists in understanding the intricacies of microgrid system operation, costs and their ability to address other value streams such as reliability, load shaping and power quality.
- Creates a quantified list of Company distribution system impacts resulting from the interconnection of microgrids.
- Enables the creation of policy and standards for subsequent microgrid interconnection requests, if and when allowed by the Company.
- Enables the potential development of a future microgrid service program.
- Establishes a tool to optimize conceptual design for a microgrid given location, load shape, and rate structure.

Potential future applications for similar projects:

Collaborate with customers to identify and potentially deploy microgrid systems utilizing advanced control systems and Internet of Things (IoT) for optimizing distributed energy resources.

STEP Project Report

Period Ending December 31, 2021

STEP Project Name:

Smart Inverter Project

Project Objective:

To investigate the capabilities of smart inverters and their impact and benefit for the Company's electric distribution system.

Project Accounting:

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$0.00	$450,000	$0.00	$0.00	$0.00	$450,000
Annual Spend (Capital)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Committed Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Uncommitted Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Internal OMAG Expenses	$0.00	$33,861	$0.00	$0.00	$0.00	$33,861
External OMAG Expenses	$0.00	$349,998*	$0.00	$0.00	$0.00	$349,998
Subtotal	$0.00	$383,859	$0.00	$0.00	$0.00	$383,859

*External OMAG includes a contractual payment of $250,000 to Electric Power Research Institute and $100,000 to Utah State University for their services on the project.

Project Milestones:

Milestones	Delivery Date	Status/Progress
Hosting Capacity Study of RMP Distribution Circuits	6/31/2018	Complete
Laboratory Evaluation of Smart Inverters	09/30/2018	Complete
Smart Inverter Setting Analysis	8/31/2018	Complete
Review of Interconnection Requirements and Industry Practices	10/31/2018	Complete

Key Challenges, Findings, Results and Lessons Learned:

Description of Investment

STEP funding for this project was used to investigate the capabilities of smart inverters and their positive and negative impacts on RMP's electric distribution system.

Anticipated Outcome

- Evaluate readiness level of smart PV and battery inverters to comply with the new IEEE 1547-2018 standard.
- Performance analysis of smart inverters during both steady state and transient operating conditions.
- Investigate hosting capacity and potential benefit of smart inverters for several Rocky Mountain Power feeders.
- Analyze smart inverter settings in detail for two different feeders, and report on the range, requirements, and benefit of adjustability.
- Summarize current utility practices for voltage/frequency ride-through and communication between inverters and utility.

Challenges

- There are differences in the ability to control the inverters using Modbus communication protocol, and all the settings cannot be programmed using this protocol.

Findings/ Results

- All the tested PV inverters are compliant with the settings listed in category 2 of the IEEE 1547-2018, except Inverter 2, which is only compliant with category 1, and hence can only be used in areas with low distributed energy resources (DER) penetration.
- Three phase PV inverters are capable of injecting 100% and absorbing 95% of rated active power. Single phase PV inverters, however, are capable of injecting and absorbing 45%-65% of rated active power.
- Over the load range of 10%-100%, the efficiency of all the inverters is higher than 95%
- The battery inverter does not comply with most of the tests designed for smart inverter testing.
- The battery inverter ensures a continuous supply to the backup load, and establishes its local voltage within two fundamental cycles.
- Some of the distribution feeders studied showed hosting capacity gains by using smart inverters; however, most saw limited improvement due to already being thermally constrained.
- Because improvements in hosting capacity depended greatly on the connection point, the improvements were smaller for distributed systems than central systems because the locations were less finely controlled.

Lessons Learned

- The performance of all PV smart inverters matches closely to the manufacturer specifications. However, for the same power ratings, the performance of inverters differs among manufacturers.
- All PV inverters are suitable for grid integration in accordance with several of the IEEE 1547-2018 standard requirements, and autonomously support grid during voltage transients.
- In addition to hosting capacity, reactive power from inverters can be used to improve distribution losses and substation power factor.
- With the "best" settings, Volt-VAR control performed better than the fixed power factor function; however, with bad settings the performance was worse than all fixed power factor levels.
- Use of several smart inverter functions (such as Volt-VAR) will require updates to PacifiCorp's Generator Interconnection Policy (Policy 138).
- IEEE 1547 introduces the requirement for DER to have communications capability over an open protocol, utilities have not converged on an approach to interfacing with these devices.

Program Benefits

- This program will enable a greater understanding of these innovative solutions as the Company continues to make the grid more progressive.
- Provides the Company, Commission, and other stakeholders with information regarding the capabilities of advanced inverters and changes to interconnection standards.
- The findings from this project will assist the Company in updating PacifiCorp Policy 138: Distributed energy resource interconnection policy.
- Enables the Company to gain knowledge on smart inverter operation for solar and battery combined projects.
- Enables the Company to become familiar with and utilize innovative technologies to provide customers with solutions to power quality issues.
- Provides guidance to the Company's distribution engineers to enhance the distribution planning process.
- The Company continues to experience rapid growth in interconnection requests and considers innovative technologies such as smart inverters a valuable tool to improve service to customers.
- Provides a better understanding of smart inverter settings that will potentially assist in improved utilization of grid assets, leading to cost savings for customers.
- This project aligns with the goals of the program to support the greater use of renewable energy. Through this project, the Company is taking steps to prepare for increased deployment of distributed and renewable energy sources for its customers.

Potential future applications for similar projects:

Develop an automated hosting capacity analysis tool to leverage on smart inverter capabilities and provide enhanced grid support using DER systems connected to the distribution system.

STEP Project Report

Period Ending December 31, 2021

STEP Project Name:

Battery Demand Response

Project Objective:

Rocky Mountain Power has partnered with Wasatch Development on their 600 unit multi-family development in Herriman, Utah. The apartments, known as Soleil Lofts, feature solar panels on the rooftops and a large storage battery within each unit. The batteries are integrated to the grid for system-wide demand response. The Battery Demand Response Project provides Rocky Mountain Power experience in solar and battery integration. The Company will also gain valuable real-world experience in advanced grid management during peak/off-peak energy use.

There are three main objectives we are seeking with this program: 1) better understanding of demand response 2) how behind-the-meter behavior affects load shaping, and 3) insights into creating rate design for customers with batteries.

Demand Response: The partnership with Wasatch Development will allow the company to utilize each battery for demand response at any given time. The Company can draw on this resource during peak grid loads which will reduce the peak load for the entire electric system.

Load Shaping: The Company has historically had limited access to behind-the-meter data. In the future, similar projects will likely be added to the grid and will interact with the grid load in new ways. Information gained in this project will help the Company plan for these future integrations.

Rate Design: By looking at behind-the-meter battery behavior, the Company can better understand how to create rate design pilots for customers with batteries.

Table 1 Project Accounting:

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$0	$0	$0	$0	$0	$0
Annual Spend (Capital)	$0	$0	$4,270	$1,731,293	$1,053,418	$2,788,981
Committed Funds	$0	$0	$0	$0	$0	$0
Uncommitted Funds	$0	$0	$0	$0	$0	$0
Internal OMAG Expenses	$0	$0	$0	$0	$0	$0
External OMAG Expenses	$0	$0	$0	$0	$0	$0
Subtotal	$0	$0	$4,270	$1,731,293	$1,053,418	$2,788,981

Table 2 Project Milestones:

Milestones	Delivery Date	Status/Progress
Project Approved by Public Service Commission of Utah Docket No. 16-035-36	June 28, 2019	Approved
Battery installations start	July, 2019	Completed
First Building Completed	September, 2019	Completed
Soleil Lofts become available for occupancy	Third quarter 2019	Completed
Project Kickoff meeting with PacifiCorp and Sonnen	December 1, 2019	Completed
Develop preliminary system communication design	December 15, 2019	Completed
RTU Configuration	March 31, 2020	Completed
Establish VPN setup and establish security protocol	March 31, 2020	Completed
Battery Demand Response (DR) test event	May 2020	Completed
Battery dashboard developed	October 2020	Completed
Frequency response capability complete	February 2021	Completed
Enhancements to Battery Portal	Continual 2020/2021	Ongoing
Last building completed.	2021	Completed
Full 4.8 MW available for control	2021	Completed

Project Progress:

- ✓ 2019 – Five buildings completed (125 units)
- ✓ 2020 – Thirteen buildings completed (318 units)
- ✓ 2021 – Facility complete – twenty-two buildings (600 units)

Project Completion Conclusion:

The purpose of this STEP project at Soleil had a three fold purpose: 1) better understanding of demand response 2) how behind-the-meter behavior affects load shaping, and 3) insights into creating rate design for customers with batteries. During 2019 through 2021 data was collected and analyzed to better under these purposes. A comprehensive report was completed by a third party to evaluate the effectiveness and use cases for solar and behind the meter battery storage. The report in its entirety can be viewed in Exhibit 16-A. The data and information contained throughout this report provides detail and insight on the interactions between solar, batteries, load, and grid power during different conditions and seasonal periods.

The vision of the Soleil STEP project has become a reality with twenty-two building and 600 units each with solar and batteries which are benefiting the electrical grid and have created a sustainable model that can be replicated to effectively use renewable energy. The batteries at Soleil are a fully functional demand response resource which is used for peak load management, contingency reserves, frequency response and other ancillary grid benefits.

The batteries at Soleil are utilized on a continual basis and there has been no measurable degradation impacting efficiency and/or performance of the batteries. Due to the high quality Sonnen batteries installed at Soleil it is expected the efficiency and performance of the batteries will continue for many years.

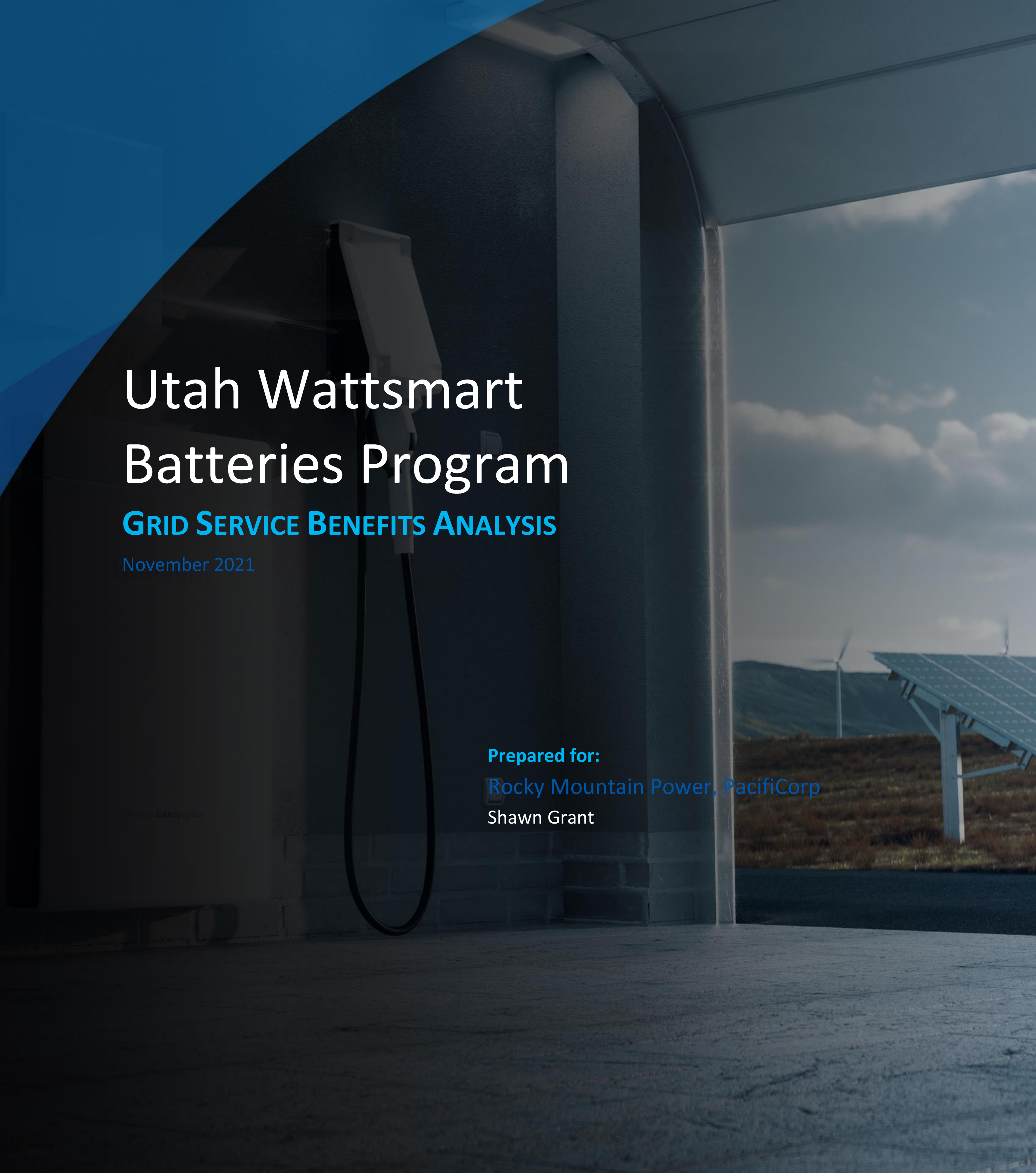
Attachments:

• Exhibit 16-A: Final Report - Utah Wattsmart Batteries Program, Grid Benefits Analysis

Exhibit 16-A

Final Report - Utah Wattsmart Batteries Program, Grid Benefits Analysis

CADMUS



Utah Wattsmart Batteries Program

Grid Service Benefits Analysis

November 2021

Prepared for:

Rocky Mountain Power, PacifiCorp
Shawn Grant

Prepared by:
Danielle Kolp
Stephen Treat
Ari Kornelis
Josh Fontes

CADMUS

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Glossary of Terms

Distributed Battery Grid Management System (DBGMS)
A battery control system which provides automated integrations with a utilities energy management system for advanced real-time grid management.

Distributed Energy Resource (DER)
A DER is a small-scale unit of power generation that operates independently and is connected to a larger power grid.

Load
Load, or electrical load, is a portion of a circuit that consumes electric power such as appliances or lighting.

Solar Production
Electricity produced from solar panels.

Virtual Power Plant (VPP)
A virtual power plant refers to a collection of decentralized distributed energy resources that are aggregated to enhance power generation and dispatch of power on the grid.

Introduction

Rocky Mountain Power (RMP) operates a battery management program, Wattsmart Batteries, which aggregates individual customer batteries into a coordinated system for providing grid services. The program provides incentives for utility customers who integrate their battery into a distributed battery grid management system (DBGMS), which RMP can call upon via software to provide grid services at scale. This distributed system of dispatchable batteries is also sometimes known as a virtual power plant (VPP). While typical demand response programs operate with predetermined dispatch calls, the Wattsmart program goes a step further, using the DBGMS to actively manage power dispatch in real time. To develop the Wattsmart Battery program, RMP partnered with a local housing developer and battery provider to explore the feasibility of the DBGMS and to support regulatory approval, using the pilot project, Soleil Lofts, as a proof of concept (using the sonnen Wattsmart Battery generation 1, or "SWB gen-1"). In addition to the participants from the housing development, additional residential customers have enrolled in the Wattsmart Battery program using the newer sonnen Wattsmart Battery generation 2, or "SWB gen-2," battery systems.

Study Objectives

In this study, Cadmus analyzed data from Wattsmart Battery Program participants to assess the benefits of the DBGMS VPP. While the data is primarily from participants at Soleil Lofts, the goal is to demonstrate the benefits from participating in the Wattsmart Battery program as a whole. We also documented lessons learned about the performance of residential buildings with solar arrays and battery storage, which included an analysis of seasonal variation in facility load and solar production, as well as of the expected performance of the batteries as a backup power resource.

Program Benefits

The Wattsmart Batteries program DBGMS provides four primary grid service benefits:

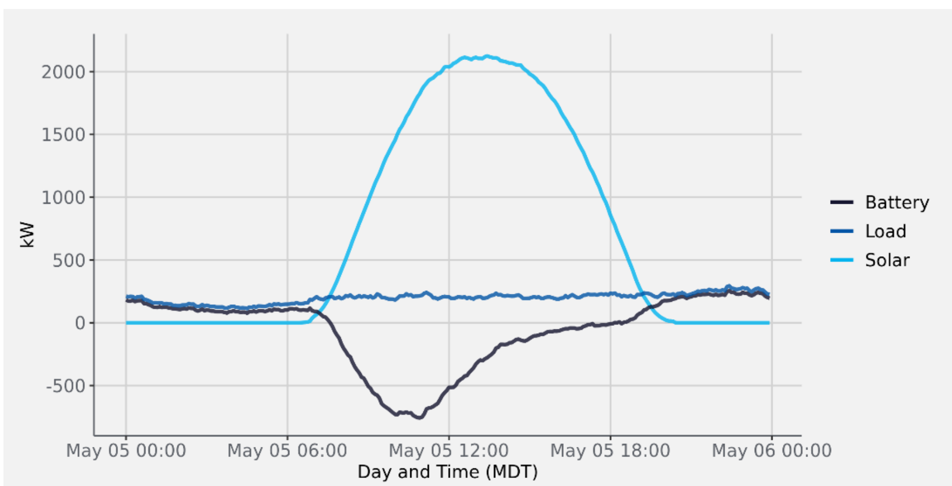
Frequency Regulation Services	Batteries can be dispatched automatically to provide real-time power output, stabilizing the grid in response to unexpected fluctuations in electricity consumption or generation.
Peak Load Management	Batteries can be deployed to offset load during peak hours. Depending on deployment timing, this can ease capacity restraints at the system level.
Circuit Congestion Relief	In aggregate, DBGMS can provide congestion relief at the circuit level.
Backup Power	Battery systems can be designed to deploy automatically during an outage to prevent service interruptions in customers' homes.

Multi-Family Pilot Facility

To demonstrate that the DBGMS concept would be successful, RMP partnered with a local developer Wasatch Development, battery manufacturer sonnen, and Auric Energy to deploy solar PV and battery storage across all units at the newly constructed 600-unit Soleil Lofts apartment complex in Herriman, UT (see Appendix A for further details). While the Soleil Lofts complex features sonnen equipment, the Wattsmart Batteries program is intended to be manufacturer agnostic, so long as the batteries meet the requirements to participate in the DBGMS. The facility pilot provides a rich dataset from which to analyze the various grid benefits as a proof of concept.

To introduce the electric load, solar production, and battery function, Figure 1 depicts aggregate facility operations on a sample day. During early morning hours, residents' energy use, or load, is primarily served by battery output. During midday hours, the solar arrays produce electricity and the batteries recharge using solar production. The energy consumed by the batteries during recharge is represented by negative battery values in the figure. The remaining excess solar production during midday hours is returned to the grid. In the evening, when solar is no longer producing, load is again served by the battery output and grid power, when necessary. This functionality demonstrates a day without a frequency regulation event or a loss of power.

Figure 1. Sample Daily Solar + Battery Facility Performance



Methodology

Cadmus' approach to analysis is primarily data driven, informed by qualitative research and interviews we used to gain useful context into the development and goals of the DBGMS for the Wattsmart Batteries program overall. Cadmus used visual analysis and descriptive statistics to analyze the performance of the DBGMS system and to answer a number of study research questions determined by Cadmus and RMP at the study start. The research questions focused on assessing the impact of distributed solar and storage on the per-unit and aggregate load over time. We also reviewed the impact of seasonality on DBGMS performance. Cadmus collected and prepared a variety of system performance data from the Soleil complex:

- Facility Load: per unit
- Solar Production: per unit, from date of interconnection
- Storage Recharge and Discharge

sonnen provided all other solar production, load, and battery charge data. sonnen provided the system performance data in 5-minute intervals for May 2020 through July 2021, and provided additional samples of 1-second interval data for analysis of frequency regulation events.

We focused on characterizing facility load, solar production, and battery storage operations for Wattsmart Battery Program participants. Cadmus determined the daily, seasonal, and annual peak loads and created supporting visualization. The load analysis revealed distribution outliers and provided an overview of the seasonal variation and coincidence of solar production, as well as details of facility and system peak load events.

Cadmus used the model[1] to analyze battery storage system operations and determine the systems' capability to provide backup power. In addition, we reviewed the average length of time the system was able to provide backup power during an outage, how quickly it provided backup power, and at what point the storage is recharged from the solar (specifically on November 4, 2020). As with our other analysis, we characterized the backup power timing and recharge variation with seasonality, as applicable.

[1] Cadmus conducted nearly all the system analysis research provided in the report using R or Excel. We used data visualization techniques and descriptive statistics to investigate relevant research questions, creating all data visualizations using the *ggplot2* and *plotly* packages in R.

Findings

The Soleil Lofts facility, which was the first phase of the Wattsmart Battery Program (using SWB gen-1 batteries), provides an ideal case study to demonstrate the many capabilities of DBGMS. RMP can control the dispatch of each of the 600 batteries, including timing and the amount of power, using the DBGMS. RMP has used the DBGMS to deliver several types of grid benefits: frequency regulation services, peak load management, circuit congestion relief, and backup power. Where possible, Cadmus provides comparisons between different battery generations to show the evolution of the technology.

Frequency Regulation Services

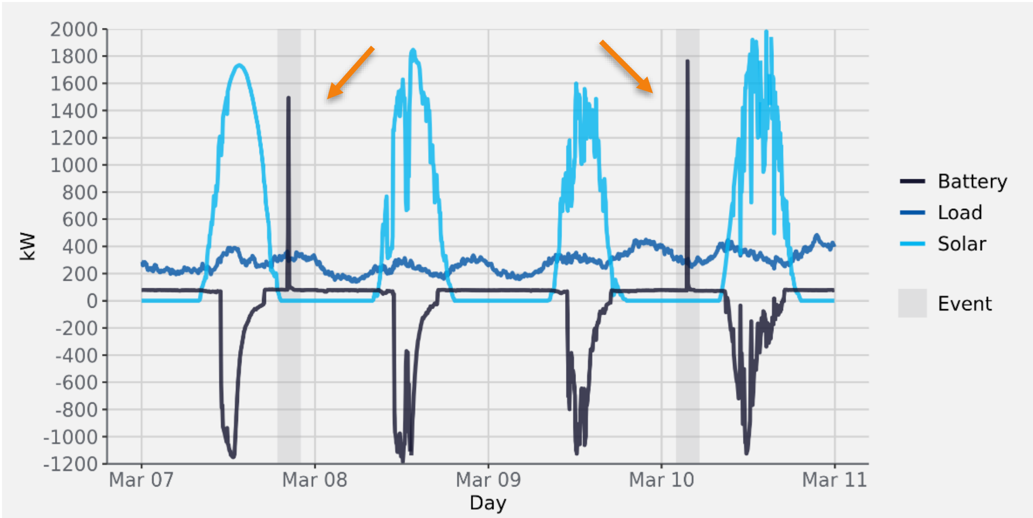
One primary benefit of the Wattsmart Battery program is its ability to provide frequency regulation services to the grid, helping to maintain grid stability by responding to rapid and unexpected electricity fluctuations on the overall grid. The DBGMS is integrated into RMP's Energy Management System (EMS) and provides these grid balancing services 24x7 by automatically controlling the batteries with near-immediate response times. Regulations dictate a response time of 50 seconds with traditional fossil fuel resources or demand response programs.

After conducting a series of tests in 2020 and early 2021, the Wattsmart Battery Program entered production as a frequency regulation resource in February 2021. Over a sample of frequency regulation events between February and May 2021 using the first-generation batteries, the average response time between the delivery of the frequency response signal and dispatch of the batteries to compensate load has been roughly 6.5 seconds for batteries set in discharge mode. The range in response time between the frequency response signal and dispatch of the battery to peak output was between 11 and 12 seconds.

Figure 2 depicts an example of two frequency regulation events, which occurred on the evening of March 7 and morning of March 10. On March 8 and 9 the system operated in a typical manner. Solar production occurred during midday, and the battery systems were in discharge mode during the night and evening hours and in recharge mode using solar production during midday hours.

On March 7 and 10 frequency events occurred. Frequency fluctuations generally occur due to issues with generation sources throughout the western United States. During these events, there are visible spikes in battery output as the batteries automatically responded to a command issued by RMP's EMS through the DBGMS (indicated with orange arrows). In each event, the aggregate battery output quickly ramped from approximately 75 kW to over 1.5 MW. As is typical for frequency regulation services, the events only lasted around five minutes.

Figure 2. March Frequency Regulation Events

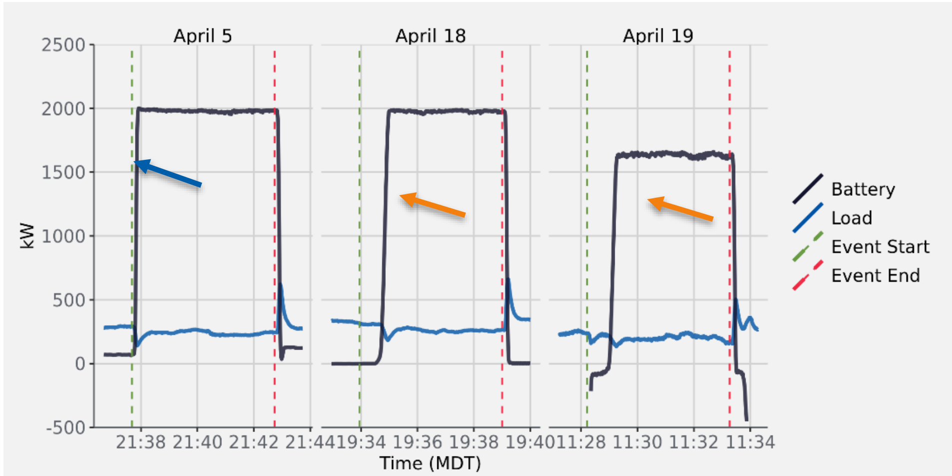


There is a limitation to the frequency regulation services provided by the SWB gen-1 batteries. The speed of the individual batteries' response to the frequency event signal depends on the battery status when the signal is received. If the batteries are in discharge mode, the response time is quite fast, with the batteries beginning to ramp up after 6-7 seconds after signal delivery and then reach target output level after approximately 12 seconds. If the batteries are in standby or recharge mode, there is a 45 second delay before the battery output begins to ramp up and the batteries reach the target output level after approximately 60 seconds. Figure 3 depicts a series of frequency regulation events, showing a dashed line for the DBGMS commands to begin and end each event, in comparison to when the batteries delivered.

- The first panel depicts an April 5 event, when the batteries were already discharging at a low level when the frequency event signal was delivered. This is visible in the *Battery* line, which is already slightly above zero before the event signal. In this event, the batteries responded quickly, with output spiking to 2,000 kW shortly (11 to 12 seconds) after the command was issued (blue arrow).
- The second and third panels depict events on April 18 and 19, when the batteries were in standby and recharge mode, respectively, when the event signal was delivered. In these cases, the response time was noticeably slower (60 to 65 seconds), which is visible in the space between the dashed *Event Start* line and the spike in the *Battery* line (to over 1,500 kW) (orange arrows).

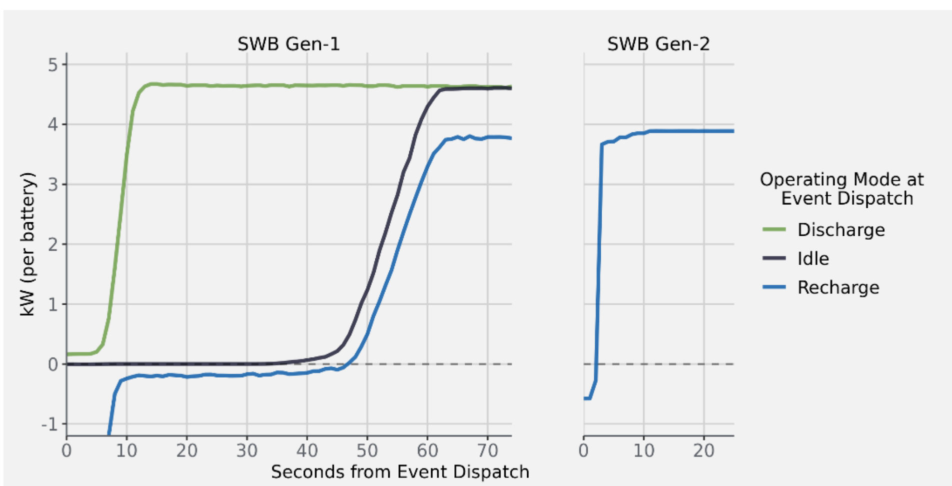
The figure makes it clear that, with this particular type of battery system and configuration, grid administrators should recognize that there is a difference in response times based on the battery charging mode.

Figure 3. April Frequency Events for Three Types of Battery Charging Mode



Based upon the lessons learned during the early stages of implementation, sonnen has implemented design improvements to further increase the response time for frequency events. The major improvement was a redesign of the inverter to increase the ability to respond near-real time. Figure 4 shows a comparison of the response times from the three SWB gen-1 battery frequency events discussed in the previous section and an additional test frequency event conducted with the new SWB gen-2 batteries. With the early generation program batteries, the batteries in discharge mode (green line) shows a quick event response, whereas the idle and recharge lines (black and blue) took nearly a minute. The newer battery model demonstrated a response time of less than 5 seconds when beginning in recharge mode (idle or discharge mode perform as well or better) showing the rapid improvements being made in the battery technologies.

Figure 4. Frequency Event Response Time Comparison



Peak Load Management

RMP has also operated the Wattsmart Battery Program to manage system peak loads. Battery storage capacity can absorb excess solar production during midday hours, then discharge during peak hours in the morning and evening when energy is needed most.

As an example, Figure 5 depicts program operations on December 16, 2020. The batteries operated in load compensation mode, offsetting a large share of consumption during morning and evening hours. The batteries delivered sustained output between 200 kW and 300 kW from 9 a.m. to 11 a.m. and from 5 p.m. to 9 p.m. (highlighted with dark gray vertical bands). During midday hours, the batteries recharged using available excess solar production, shown by the inverted production and charging curves.

Figure 5. Peak Management Operations, December 16, 2020

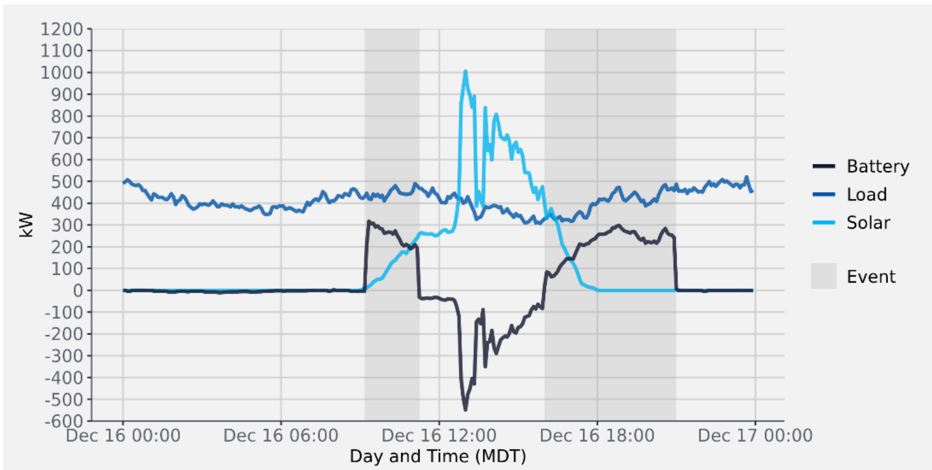
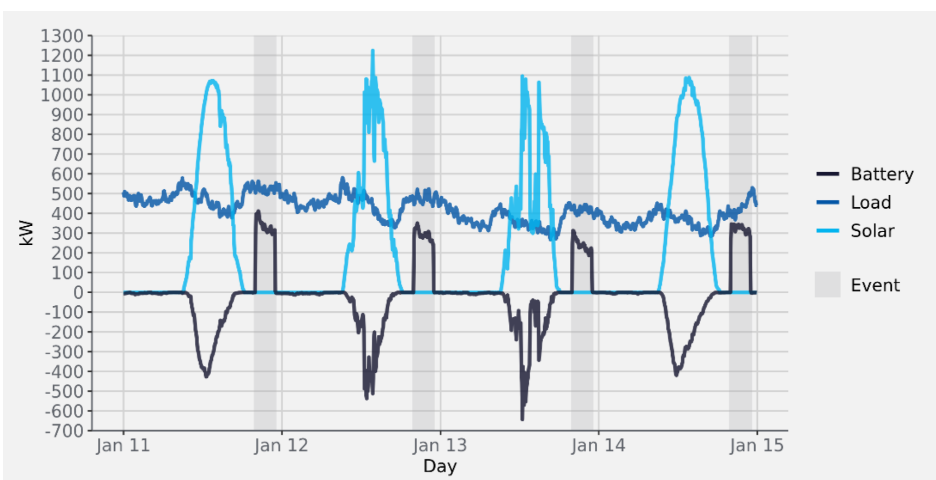


Figure 6 depicts a series of days in January 2021 when the battery systems were used to target evening peak hours between 8 p.m. and 11 p.m. Battery output, depicted by the black lines, ranged from 200 kW to 400 kW during these hours (highlighted with dark gray vertical bands).

Figure 6. Peak Management Operations, January 2021

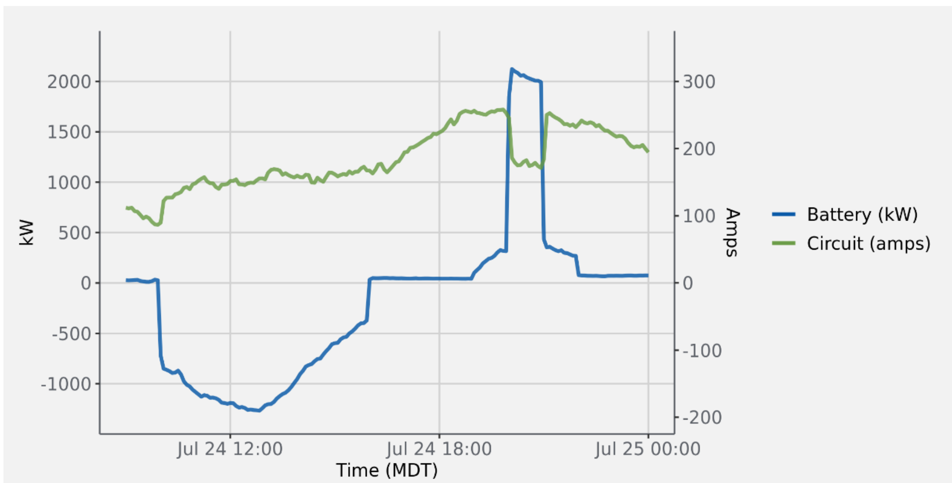


Congestion Relief

The Wattsmart Battery program can help mitigate congestion issues (such as insufficient transmission throughput due to transmission capacity constraints) by delivering power to the specific distribution system areas that are experiencing congestion. Congestion relief from battery storage can help defer costly future local transmission and distribution investments.

Figure 7 depicts operations during a local circuit congestion event on July 24, 2021. The figure includes the output of the program batteries and load on the nearby circuit. Between 8:00 p.m. and 9:00 p.m., the Wattsmart Battery systems were dispatched to reduce load at the circuit and relieve transmission congestion. In aggregate, the batteries delivered approximately 2 MW throughout the event hour. Due to the battery output, load at the circuit was reduced by 30% (from approximately 250 amps to 175 amps).

Figure 7. Distribution Circuit Congestion Event – July 24, 2021



Backup Power

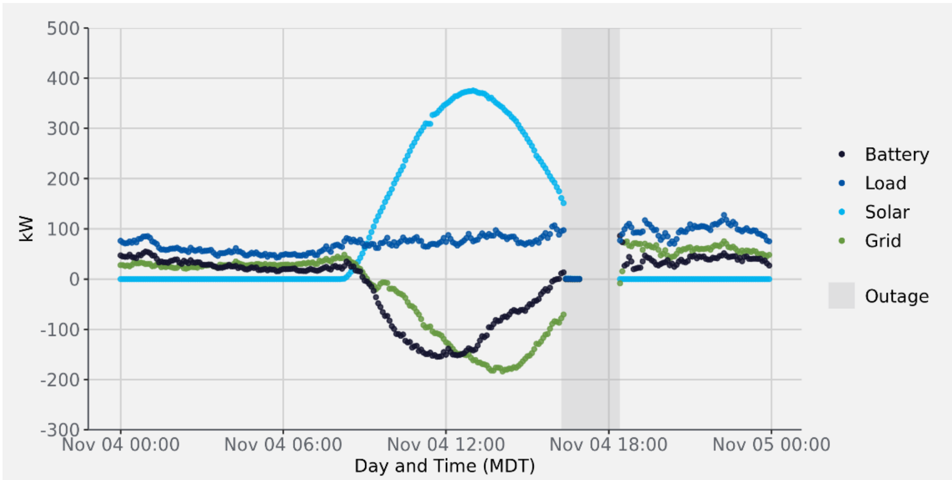
Another major grid benefit of battery systems is the backup power they can provide during power outages. When an outage occurs, battery output ramps up to serve electricity use in the home. If the outage occurs while solar is being produced, the solar output will serve home power needs, preserving energy in the battery for later use.

A power outage is known to have impacted the multi-family complex enrolled in the program (Soleil), on November 4, 2020. Figure 8 depicts aggregate power flows for a sample of units (*n*=267) on that day, where aggregate facility load is the sum of wattage used by that sample of units in 5-minute intervals. Solar production occurred between 8 a.m. and 5 p.m., peaking around 1 p.m. (shown in light blue dots). The green points indicate battery input and output. The positive battery values, which occurred before 8 a.m. and after 6 p.m., indicate output. The negative battery values between 8 a.m. and 5 p.m. indicate battery recharge coinciding with solar production. The grid points depict positive and negative power flows from the grid. Positive grid values indicate grid power consumed at the facility. Negative grid values indicate power exported from the facility to the grid.

Energy use during night, early morning, and evening hours was served by a mix of grid power and battery output. During midday hours, solar production serves all facility load and battery recharge, and exports additional power to the grid.

The outage occurred between approximately 4 p.m. and 6:20 p.m. During the outage, there was an interruption in data collection (the dark gray band in Figure 8). Based on information provided by RMP and sonnen, the solar and battery systems successfully responded to the outage automatically and provided continuous service. Few customers were aware that an outage even occurred.

Figure 8. Aggregate Facility Operations, November 4, 2020



General Backup Power Calculation

The calculation of how long a battery might last during an outage depends on many factors. Below is an example with various assumptions, for illustrative purposes.

Table 1. Backup Power Example Assumptions (Without Solar)

Variable	Assumption
Battery Size	10 kWh
State of Charge	80%
Daily Usage	24 kWh
Time of Outage	10:00 pm

$$Backup\ Coverage\ (no\ solar) = \frac{Battery\ Size\ \times State\ of\ Charge}{Daily\ Usage\big/ 24\ hours}$$

$$Backup\ Coverage\ (no\ solar) = \frac{10\ kWh\ \times 80\%}{24\ kWh\big/ 24\ hours} = 8\ hours$$

As can be seen from the above example (assuming no additional power from solar), a battery with 10 kWh of usable capacity, with an 80% state of charge could cover 8 hours of an average daily usage of 24 kWh. If the state of charge was only 40%, the coverage would be only 4 hours; or conversely, if the daily usage was 48 kWh, the battery would provide 2 hours of coverage, on average.

Next is a simplistic example showing the additional hours of back up power with the supplement of solar production during the day. Note that the solar power will charge the battery to full because the solar production is greater than the average hourly usage, and the battery will only start exporting power once the solar production stops serving the electric load of the home.

Table 2. Backup Power Example Assumptions (With Solar)

Variable	Assumption
Battery Size	10 kWh
State of Charge	80% charges to 100%
Daily Usage	24 kWh
Average daily solar production	30 kWh
Time of Outage	10:00 am
Solar Production Ending	5:00 pm

$$Backup\ Coverage\ (with\ solar) = \frac{Battery\ Size \times State\ of\ Charge}{Daily\ Usage/_{24\ hours}} + (Solar\ Production\ Ends - Time\ of\ Outage)$$

$$Backup\ Coverage\ (with\ solar) = \frac{10\ kWh\ \times 100\%}{24\ kWh/_{24\ hours}} + (5{:}00\ pm - 10{:}00\ am) = 10hr + 7hr$$
$$= 17\ hr$$

It is important to note that the state of charge can vary greatly during different hours of the day (between usage level as well as solar recharging), and average daily usage may vary greatly depending on the season of the year. As shown in the two examples above, the time of day that the power goes out can make a large difference. If the power went out at 9:00 pm, the battery could provide back up for the night but then would be depleted. If the power went out at 9:00 am, the solar PV system would provide ample power to cover the daily load and recharge the battery, so then the battery would be utilized only when solar was no longer available. Thus, the battery back-up coupled with the solar input could provide coverage throughout the day and night (again, caveating that usage patterns differ during the day and night). The variation in day-time and night-time usage complicates a straight average calculation of back-up battery coverage hours, but the subtleties are important to consider. Additional considerations are provided in the next sections.

Backup Power Seasonality

The battery systems are managed by RMP and dispatched to provide various grid services, while maintaining a minimum state-of-charge of 20% in each battery. This reserve capacity ensures that the systems are available to provide power during an outage. With typical unit load, a battery with 20%

remaining capacity would be capable of maintaining service for about 5 hours.[2] Throughout the year, the average battery state-of-charge was 71.3%. At this level, the batteries would be expected to provide service during an outage for 18.5 hours.

Due to differences in consumption patterns, the expected time period that the batteries could deliver backup service varies by season. Table 3 contains a summary of the typical electricity usage and expected length of outage service by season. The winter heating load and lower typical state-of-charge reduces the expected backup service to about half that of the other seasons. The backup service capabilities detailed in Table 3 would be expected to be consistent for multi-unit dwellings with electric heating. The following estimates do *not* include any solar recharging.

Table 3. Backup Power Service Expectations for a Unit with 20 kWh or 10 kWh Battery (With No Solar Recharge)

Battery Storage Capacity Rating	Season	Average Hourly Load (kWh)	Average State-of-Charge		Expected Backup Service at Average State-of-Charge (Hours)
			Percentage	kWh	
20 kWh	Summer	0.7	85%	16.9	24.2
	Winter	1.1	69%	13.9	12.6
	Fall	0.7	76%	15.2	21.7
	Spring	0.6	84%	16.8	28.0
	Average	**0.8**	**71%**	**14.3**	**17.8**
10 kWh	Summer	0.7	85%	8.5	12.1
	Winter	1.1	69%	6.9	6.3
	Fall	0.7	76%	7.6	10.8
	Spring	0.6	84%	8.4	14.0
	Average	**0.8**	**71%**	**7.1**	**8.9**

The expected performance of the batteries during a multi-day power outage differs by season due to the variation in typical hourly load and solar production. Under typical summer conditions, daily solar production was roughly twice as large as daily electricity consumption. After allowing for some loss of energy due to battery round trip efficiency, the battery systems would still be expected to recharge using excess solar production and provide continuous power throughout a multi-day outage of indefinite length. During winter, typical daily solar production was less than half of daily electricity consumption, so there is unlikely to be sufficient solar production to recharge the batteries during a multi-day outage.

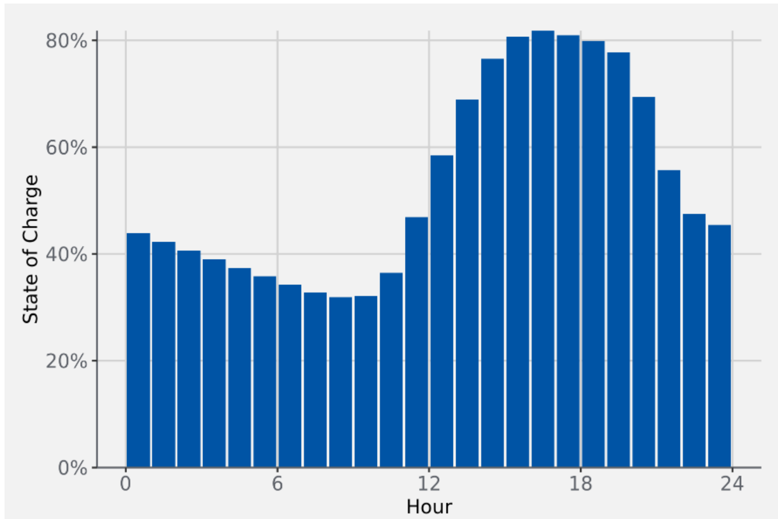
Hourly State of Charge

Available battery state of charge also varies throughout the day, following common profile where available charge peaks later in the day, after the solar PV has been charging the battery throughout the day. The available state of charge available during a power outage will approximately follow the profile

[2] Between May 2020 and May 2021, each unit consumed an average of 0.74 kWh per hour.

shown in Figure 9 below, meaning that more or less power would be available based on Table 2 depending on the time of day.

Figure 9. Daily Variation in Battery State of Charge (July 2021 Average)



Summary of Findings and Recommended Next Steps

The DBGMS employed by RMP provides many facility and grid benefits, which Cadmus quantified using representative data from Wattsmart Battery Program Participants. The Wattsmart Battery Program effectively allows RMP to:

- Manage customer owned batteries for the benefit of the overall grid, allowing the integration of renewable solar energy while avoiding solar energy congestion issues during the middle of the day
- Store excess solar generation on the system during the middle of the day and utilize it during peak time periods in the evening and the morning
- Automatically respond to broader western electric grid emergencies in real-time (frequency response)
- Change the load usage profile of participants based upon highest value for the benefit of all RMP customers by storing abundant low-cost power and utilizing it during more expensive peak times
- Effectively provide battery power to participants during power outages

This study also yielded many findings about solar and battery functions generally:

- Available energy from solar production varies greatly between seasons, with fall about twice as much as winter, and summer about three times as much as winter. This variation impacts battery recharge times throughout the year.
- Electrically heated homes will have shorter back up coverage in winter than homes heated with other fuels. The expected back up during an outage is about half the time during winter than all the other seasons.
- First-generation SWB Gen-1 batteries generally respond more quickly to frequency response signals when already in discharge mode. However, the newer SWB Gen-2 battery models provide frequency event response time in under 5 seconds in all operating modes.

Table 4. Frequency Regulation Response by Battery Vintage

Benefit	SWB Gen-1			SWB Gen-2		
	Discharge	**Idle**	**Recharge**	**Discharge**	**Idle**	**Recharge**
Frequency Regulation Services	Yes	No	No	Yes	Yes	Yes

Recommended Next Steps

Cadmus recommends that RMP revisit this analysis one year after the Soleil facility has reached full occupancy, as well as once the Wattsmart Batteries program has secured more participants. This additional data will allow a 3rd party to better distinguish the seasonal factors from solar output, battery performance, and loads that create differences in DBGMS capabilities.

Appendix A. Soleil Lofts Apartment Complex

Facility Specifications

RMP partnered with battery manufacturer sonnen and Auric Energy to deploy solar PV and battery storage across all units at the newly constructed 600-unit Soleil Lofts apartment complex in Herriman, UT. Each Soleil housing unit has a solar photovoltaic array and sonnen battery system. Residents of Soleil Lofts are renters, with the solar and storage simply included in rent. The battery systems have a storage capacity of 20 kWh and the inverters produce continuous output of up to 7.2 kW. The 600 Soleil Loft apartment units are linked through the DBGMS, creating an aggregate battery storage capacity of over 10 MWh with 4.8 MW of output potential. Each unit also includes a 5 - 8 kW solar array, for an aggregate solar capacity up to 5 MW. RMP has access to a DBGMS dashboard that allows them to schedule dispatches based on grid needs, initiate several automated operating scenarios it can assign, and specify how much battery capacity should be held in reserve in the event of a power outage.

Facility Operations

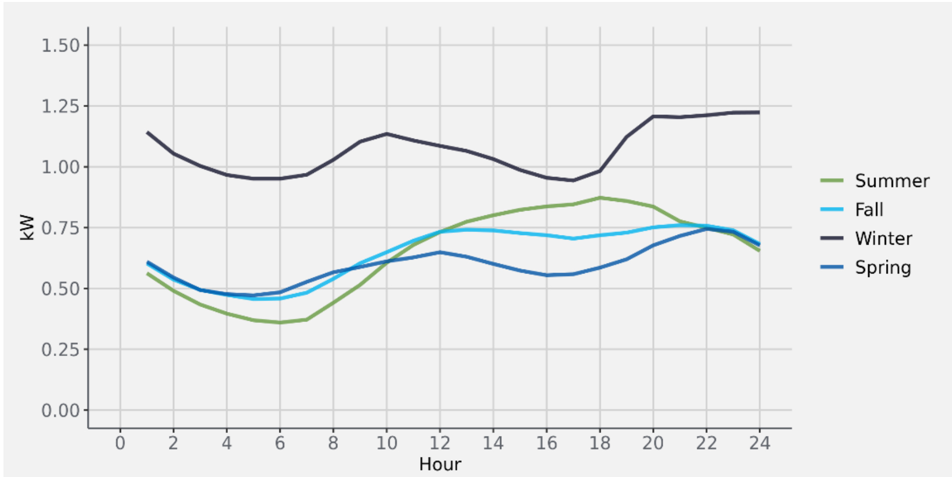
In the future, additional customers who enroll in the Wattsmart Batteries program will come from a mix of single-family homes and multi-unit dwellings. The Soleil Lofts apartment complex is a unique example of a comprehensive electric housing development. Some aspects of the unit operations are likely unique to this type of facility, but some of the lessons learned will be applicable to any residential housing unit with solar and storage. The following sections detail the seasonal variation in facility load and in solar production at the Soleil complex, along with a discussion of whether the load and solar production characteristics are unique to Soleil or can be more generally applied.

Facility Load

The Soleil Complex is a fully electrified facility, meaning that all units are designed for electric cooking, heating, cooling, and other home energy end uses. Figure 10 depicts the average 24-hour loadshape for a Soleil unit by season (note that weekend and weekdays did not show difference in consumption). Overall consumption is somewhat higher in the winter, likely due to greater heating load (which typically contributes to peak during morning [10 a.m.] and evening hours [8 p.m. to midnight] in winter months). There also appears to be a summer peak in consumption due to increased cooling loads during late afternoon and evening hours.

These customer loadshapes are likely somewhat unique to a fully electric multi-unit dwelling. A typical single-family house would likely exhibit greater seasonal and daily variation in consumption.

Figure 10. Per-Unit Average 24-Hour Soleil Loadshape by Season



Solar Production

Each unit in the Soleil Lofts apartment complex has a solar array. The average amount of daily solar production per unit by season is shown in Table 5. The annual average for daily solar production is 24.1 kWh. Daily solar production was greatest in the spring and summer months and the was smallest in the winter months. These seasonal differences in daily solar production can mainly be attributed to seasonal variations in climate. For instance, on average there is a greater proportion of cloud cover during the winter months, which can limit the amount of daily solar production. Furthermore, the duration of daily solar availability is much longer in the summer months than in the winter months, regardless of cloud cover. The variation in solar production and usage by season is shown in Table 5, and is illustrative of the relative level of production for other similar sized systems on other homes, but the actual values should not be assumed given the large range in potential differences in location and home characteristics.

Table 5. Average Daily Solar Production and Electricity Usage by Season

Season	Unit Count	Solar Production (kWh)	Daily Usage (kWh)	Hourly Usage (kWh)
Spring 2020	164	28.6	10	0.4
Summer 2020	253	34.2	16	0.7
Fall 2020	339	20.4	15.6	0.7
Winter 2021	430	10.4	26.1	1.1
Spring 2021	440	27.0	16.8	0.7
Average	-	**24.1***	18.6	0.8

* Annual average value includes summer 2020 to spring 2021.

STEP Project Report

Period Ending December 31, 2021

STEP Project Name:

Intermodal Hub

Project Objective:

The Intermodal Hub Project will develop a power balance and demand management system for multi modal vehicle charging at sites with high peak power demand. The Intermodal Hub Project is designed to address the high cost of grid infrastructure needed for high output chargers by researching methods to adaptively manage power flow between the grid and various electric charging needs. The project will combine a diversity of electric charging needs (light rail, bus, passenger, truck, and ride hailing services) at an intermodal transit center to create a multi-megawatt, co-located, coordinated, and managed charging system.

Project Accounting:

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Annual Spend	$0.00	$0.00	$802,510	$890,953	$215,320	$1,908,783
Uncommitted Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Internal OMAG Expenses	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
External OMAG Expenses	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Subtotal	$0.00	$0.00	$802,510	$890,953	$215,320	$1,908,783

Project Schedule:

Project Task	2019		2020				2021			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Analysis and Planning	■	■	■							
Simulation Planning/Validation			■	■	■	■	■			
Testbed for Software/Hardware				■	■	■	■	■		
Deployment and Evaluation						■	■	■	■	■

Project Milestones:

Milestones	Delivery Date	Status/Progress
Task 1 Analysis and Planning: Multi modal charging analysis (power levels, vehicle types)	3/31/2020	Complete – Consideration of current e-buses and charge equipment requirements have been accounted in learning model. Priority meters across the UTA site have been identified. Coordination with both UTA and RMP to obtain meter history for input to learning algorithms and load modeling. Continued development of model to simulate site dynamics and load optimization.
Task 1 Analysis and Planning: Distribution capacity/needs/impact analysis	3/31/2020	Complete – Ongoing development of Open DSS model to evaluate electric distribution loading. Conversion of CYME files to model input format. Required meter information received for model implementation – source UTA monthly metering reports.
Task 1 Analysis and Planning: City and suburban level planning of grid and transportation charging integration	3/31/2021	Complete – Site walk/review and CYME files of grid. Open DSS modeling to identify capacities and optimization potentials for charging equipment.
Task 1 Analysis and Planning: Confirm study participants in addition to UTA (e.g., fleet, including delivery and ride hailing participant vehicles)	3/31/2020	Complete – Determination with site (UTA) of current electric bus status and future planning. Site review for feasibility of EV public access and control. Discussions with EV charging equipment vendors (ABB) and third-party EV managers (Greenlots, EV Connect) to understand limitations of current management software and identify requirements for active

		control through USU developed algorithms.
<u>Task 2 – Distribution System Simulation Planning and Validation</u> Design initial intelligent prediction algorithms and demand response concepts	3/31/2021	Complete – Algorithm development in Python. Integration of learning algorithm with agent model. Identification of rewards (e.g. pricing, battery SOC, load optimization, etc).
<u>Task 2 – Distribution System Simulation Planning and Validation:</u> Develop system simulation models for charging network and agent-based vehicle response	3/31/2021	Complete – Initial agent-based models developed through Open AI Gym and Python. Reward identification and coding in process. Continued inputs and improvements as data inputs are received (both historical and real-time when available).
<u>Task 2 – Distribution System Simulation Planning and Validation:</u> Collect data from TRAX power feed and TRAX light rail cars; e-bus fleet; all charging equipment; fleet (including delivery and ride hailing participant vehicles) Data used for algorithm development and as machine learning training datasets	3/31/2021	Complete –Receipt of historical meter data from RMP for identified priority meters. New Flyer e-bus performance reports and API establishment for real-time input. ABB depot charger data through UTA monthly reports. ABB data at EVR, initial testing, completed through OCPP server development. Planning stages for integration of ABB chargers at UTA station to OCPP server. Siemens upgrade to TPSS complete.
<u>Task 2 – Distribution System Simulation Planning and Validation:</u> Perform systems level simulation analysis for early and broad deployment scenarios, validate benefit of managed approach when compared to worst-case design approach	3/31/2021	Complete – Review of monthly billing and meter data. Modeling of TRAX and e-buses, and the effect of charging on demand response load data/distribution network. Cost-benefit analysis to understand charging optimization and impacts to the grid – future infrastructure upgrades.
<u>Task 3 – Testbed for Software/Hardware Development and Integration:</u> Specify, bid, and procure system hardware	6/30/2021	Complete – Learning software for EVR testbed complete, along with training of agent. Server for communication to the chargers is complete and tested.

Task 3 – Testbed for Software/Hardware Development and Integration: Anticipate needs for and develop cyber security management Design for compatibility with and security of communication network	6/30/2021	Complete – Cyber security vulnerabilities are being identified for EVR testbed. Discussion pending with UTA IT department to identify additional security constraints for network.
Task 3 – Testbed for Software/Hardware Development and Integration: Write code and program algorithms on servers Algorithms include energy/load balancing and management Design for compatibility with AMI	6/30/2021	Complete – Codes written for EVR testbed include energy/load balancing and management (EVR EMS). Test scenario and code development/training for learning agent complete. Scripts in progress to establish communication between models (input/outputs).
Task 3 – Testbed for Software/Hardware Development and Integration: Evaluate hardware system (with integrated software) at the USU EVR	6/30/2021	Complete
Task 3 – Testbed for Software/Hardware Development and Integration: Iterate algorithm designs and develop pilot demand response program	6/30/2021	complete
Task 4 – Deployment and Evaluation: Integrate hardware and software systems with UTA and RMP equipment and cyber secure communication network	12/31/2021	complete
Task 4 – Deployment and Evaluation: Deploy hardware system at the UTA multi-modal hub site through a phased approach in direct coordination with IT and operations at UTA	12/31/2021	complete
Task 4 – Deployment and Evaluation: Finalize recruiting, engage work with participants for pilot demand response program	12/31/2021	complete

Task 4 – Deployment and Evaluation: Integrate real-time data collection from all partners and participants into the hardware system	12/31/2021	complete
Task 4 – Deployment and Evaluation: Evaluate power control and demand response performance; iterate algorithms; develop best practices and recommendations	12/31/2021	complete

Key Challenges, Findings, Results and Lessons Learned:

Description of Investment	Anticipated Outcome	Challenges	Findings	Results	Lessons Learned
Understanding of system and energy requirements to be managed	Gather necessary meter inputs from site loads and charging equipment. Develop learning and electrical system models.	Charge equipment and meter information in as close to real-time as possible	See final report	See final report	1. Continued efforts in installing required hardware for metering information 2. Determined type of equipment upgrades required at TPSS to enable active data acquisition. 3. Upgrade installation in progress
Active control of EV equipment – OCPP communication (Open Charge Point Protocol)	Receive inputs in real-time and actively control EV equipment	1. Installation of local communication for real-time data and active control. Limitations/lag through cloud database and current OCPP 2. Debugging of OCPP server, requires ABB assistance. ABB equipment supports OCPP 1.6 – however multiple standard interpretations by ABB requires ABB technicians to support	See final report	See final report	1. Realtime control anticipated to be accomplished in a laboratory setting and limited communication requirements, with increased complexities and public access, integration with third-party EV managers necessary. Currently these third-party managers are not actively controlling charge capacity to assist with load balancing across a site. 2. Lessons learned documentation for building OCPP for control of ABB units.

					Will enable better rollout for future applications.
Learning algorithm development as it applies to Intermodal Hub problem	Established more simplistic interpretation of Intermodal Hub problem to initiate agent training. Increased complexity over training iterations	Identification of critical elements to the training and application of the EVR testbed. Scaling application to Intermodal Hub site, with hardware limitations at the EVR (e.g. EVR does not have access to or the same BEBs as UTA – limits in data inputs for training model)	See final report	See final report	1. Identified critical elements to the training 2. Establish data input requirements – frequency, units, time stamping

Potential future applications for similar projects:

A key outcome of this project will be a "roadmap" for high power electric vehicle charging complexes that leverage existing infrastructure from dominant peak loads such as TRAX to support a host of additional multi modal vehicle charging needs at minimal cost. The roadmap guides the confluence of accommodating different vehicle types with combined known loading and scheduling of charging (expected and variable) and peak pricing/surge charging to level peak demand loading on the grid.

The system will serve as a model for deployment of highly efficient and intelligent power management systems to additional UTA and Company sites. It also enables leadership in managing charging demands that can disseminated to other agencies regionally, nationally and globally.

Attachments:

Exhibit 17-A: Intermodal Hub Final Report

Exhibit 17-A

Intermodal Hub Final Report

THIS ATTACHMENT IS VOLUMINOUS AND PROVIDED SEPARATELY

STEP Project Report

Period Ending December 31, 2021

STEP Project Name:

Advanced Resiliency Management System

Project Objective:

The ARMS project enables outage notifications from existing ERT[1] electric meters, installation of communication radios on distribution line equipment, and deployment of line sensor technology on distribution circuits. These technologies connect critical customers and enable real-time information exchange with the Company's control center. The Company will also study if there would be benefits of deploying this technology on distribution circuits that have poor reliability.

Project Accounting:

	2017	2018	2019	2020	2021	Total
Annual Collection (Budget)	$0	$0	$1,430,000	$2,874,624	$12,215,376	$16,520,000
Annual Spend (Capital)	$0	$0	$39,931	$2,874,624	$13,492,864	$16,407,419
Committed Funds	$0	$0	$0	$0	$0	$0
Uncommitted Funds	$0	$0	$0	$0	$0	$0
Internal OMAG Expenses	$0	$0	$0	$0	$0	$0
External OMAG Expenses	$0	$0	$0	$0	$0	$0
Subtotal	$0	$0	$39,931	$2,874,624	$13,492,864	$16,407,419

Project Milestones:

Milestones	Delivery Date	Status/Progress
Request for DOE funding	August 2019	Complete
Test cellular communications for distribution protection devices	December 2019	Complete
Develop process to finalize circuit list for fault indicator installation	December 2019	Complete

[1] An encoder receiver transmitter (ERT) is a technology that allows manual meter reading to be replaced by a human driving an automobile equipped with a special computer and radio receiver. The meter's consumption data is transmitted through a simple digital radio protocol. This general technique has come to be known as automated meter reading, or AMR.

Finalize Circuit List	February 2020	Complete
IT Cybersecurity clearance	June 2020	Complete
Test fault indicators	June 2020	Complete
Test EGMs	April 2021	Complete
Procure & Install EGMs	Oct 2021	Complete
EGMs Go Live	Dec 2021	Complete

Project Benefits:

- Reduces manual and mobile metering requirements by removing seven meter reading/collection FTEs and associated overhead.
- Provides meter tampering detection. This ability will improve Rocky Mountain Power's ability to detect and prevent theft.
- Provides interval usage data to Utah customers through the Company's website.
- Provides a platform that can be leveraged for future grid modernization applications including distribution automation, outage management, data analytics and demand-response programs.
- Reduces customer property visits, meter-reading miles, and employee exposure to safety hazards.
- Reduces CO_2 emissions through fewer Rocky Mountain Power vehicles on the road.
- Improves outage response operations by leveraging real-time information from distribution line device. Helps determine safe switching procedures and cost effective capital improvement and maintenance plans.
- Improves reliability metrics such as Sustained Average Interruption Duration Index (SAIDI) and Customer Average Interruption Duration Index (CAIDI).
- Leverages real-time information collected from distribution line equipment to augment predictive capability of existing outage management systems and reduces Company reliance on customer reporting for outage notification.
- Reduces operations and maintenance costs by eliminating the need for manual load reading performed on circuits that do not have sophisticated meters with remote communication capabilities.

Potential future applications for similar projects:

Lessons learned in this project can be used for a wide range of meter and circuit installations in the future. As improvements are made to the system, the Company can upgrade the system using the knowledge and experience gained from this project. See attached final report for a full explanation of lessons learned.

Attachments:

• Exhibit 18-A: Final Report - Advanced Resiliency Management System

Exhibit 18-A

Final Report - Advanced Resiliency Management System

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

FINAL REPORT
Advanced Resiliency Management System (ARMS)

Sustainable Transportation and Energy Plan

FINAL REPORT

ADVANCED RESILIENCY MANAGEMENT SYSTEM SUSTAINABLE TRANSPORTATION AND ENERGY PLAN

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LIST OF ACRONYMS

AC	Alternating Current
AMI	Advanced Metering Infrastructure
AMR	Automated Meter Reading
ANSI	American National Standards Institute
ARMS	Advanced Resiliency Management System
AWS	Amazon Web Services
CFAN	Cellular Field Area Network
CFCI	Communicating Faulted Circuit Indicator
CIP	Critical Infrastructure Protection
DNP	Distributed Network Protocol
EGM	ERT Gateway Mesh
EMS	Energy Management System
ERT Meter	Encoder Receiver Transmitter Meter (AMR)
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FAN	Field Area Network
FCI	Faulted Circuit Indicators
FEP	Front-End Processor
IED	Intelligent Electronic Device
IP	Internet Protocol
MWh	Megawatt-hour
NERC	North American Electric Reliability Corporation
OMS	Outage Management System
OT	Operational Technologies
P&C	Protection and Control
SAIDI	System Average Interruption Duration Index
SCADA	Supervisory Control and Data Acquisition
SCAN	Substation Connectivity Area Network
STEP	Sustainable Transportation and Energy Plan
TLS	Transport Layer Security

1. SUMMARY

A. Background and History

In 2016, the state of Utah passed Senate Bill 0115, the *Sustainable Transportation and Energy Plan (STEP) Act*; it was signed into law March 29, 2016. Through STEP, Rocky Mountain Power (the company) intended to increase compliance flexibility, minimize rate impacts on customers related to coal plants, provide incentives for electric vehicle infrastructure, fund research into clean coal technology, authorize the development of a renewable energy tariff for business customers, and serve as a funding source for other innovative utility programs. In addition — and most relevant to this report — STEP allowed Rocky Mountain Power to seek funding to support improvements to its energy storage, grid management and resiliency.

In 2019, under STEP, the Public Service Commission of Utah approved the Advanced Resiliency Management System (ARMS) project. With the primary goal of increasing situational awareness about the company's distribution grid, ARMS, the largest of several projects supported by STEP, included:

- Encoder receiver transmitter (ERT) gateways
- Enhanced distribution connectivity
  - Cellular field area network (CFAN)
  - Communicating faulted circuit indicator (CFCI)
  - Substation connectivity area network (SCAN)

The overall objective of ARMS was to support modernizing and automating the Rocky Mountain Power distribution system. This smart grid-type modernization will continue to help the company respond more effectively to outages (providing critical value to wildfire mitigation efforts that have grown in relevance since the original STEP legislation) and support more efficient grid management.

B. ARMS Projects In Brief

This 2022 report provides an overview of the end results of the four programs briefly described below, ERT Gateways and three projects that can be understood within the umbrella term enhanced distribution connectivity: CFAN, CFCI and SCAN. It will address the initial proposals, actions taken, initial observations, future expansion, and where appropriate, lessons learned and actions *not* taken for each of these four ARMS projects.

Encoder Receiver Transmitter Gateways

Rocky Mountain Power developed and deployed an advanced outage notification system using existing ERT-based electric meters and newly created ERT Gateway devices. With the new system in place the company will be able to respond to outages more quickly, reducing customer outage times throughout Utah.

Enhanced Distribution Connectivity

Three projects funded through ARMS address different facets of enhanced distribution connectivity: CFAN, CFCIs and SCAN. Generally, these three programs use intelligent devices and connectivity software to improve company situational awareness related to load and outages that impact distribution infrastructure. The final costs for the ARMS-related CFAN, CFCI and SCAN projects are summarized in Table 1.

Table 1—Enhanced Distribution Connectivity Final Project Costs

Work Stream	Actual [1]	Approved	Variance
Enhanced distribution connectivity	$5.15m	$5.23m	$0.08m

[1] *Financials will not be finalized until end of March 2022*

1. Cellular Field Area Network

The CFAN architecture delivers a secure, scalable alternative method for supporting communications with field-based intelligent electronic devices (IED) using commercially available cellular networks. The Rocky Mountain Power CFAN project delivers a standard, back-end infrastructure and set of operational procedures for installation, management and maintenance of communication devices that can be used to monitor and control distribution line protection and control (P&C) devices. This new, low-cost communication method provides wildfire mitigation and grid resiliency options for specific, typically remote, areas where adding communications with traditional fiber/microwave is cost prohibitive and/or requires excessively long implementation lead times.

2. Communicating Faulted Circuit Indicators

Traditional noncommunicating faulted circuit indicators (FCI) have been used for decades to locate faults on the company's distribution system. FCIs are purely visual, rely on static trip thresholds and customer call-ins to report loss of service, and typically use time-based settings that can create confusion when subsequent faults occur on the same faulted circuit. CFCIs — equipped with advanced microprocessors and embedded cellular modems — can overcome many of the challenges associated with FCIs. Using CFCIs, abnormal circuit conditions can be immediately classified and communicated in a centrally managed system accessible to dispatchers and engineers — before, or with customer calls, to narrow down the likely outage or fault locations.

3. Substation Connectivity Area Network

The CFAN and CFCI systems enable a higher level of situational awareness on company distribution circuits. However, to gain a holistic view of the distribution system at any given point in time, it is critical to establish a similar level of connectivity and situational awareness inside substations. The SCAN project evaluates cybersecure architectures, and subsequently builds and tests the back-end infrastructure to enable operations and management using a new, IP-based substation connectivity model. During the early stages of the SCAN project, integrating several existing and new applications for asset management, remote system operations management, security management and compliance management into a centralized suite of applications is required for success. The AssurX SCAN system was deployed as part of the project to achieve this objective.

2. ERT GATEWAYS

Rocky Mountain Power developed and deployed an advanced outage notification system using existing ERT-based Centron C1SR AMR electric meters and newly created ERT Gateway devices. With the new system in place, the company can respond to outages more quickly, reducing customer outage times throughout the state.

A. Initial Proposals

Rocky Mountain Power has over 825,000 ERT meters[1] installed in Utah that are read monthly with a mobile meter reading system to identify consumption and generate billing. These meters send out a data signal every 30 seconds with the current register read. As an additional default capability, these meters can send a power outage notification and restoration message, as well provide the current meter register reads, in each transmitted pulse. Lacking a network or devices capable of capturing loss-of-power-related signals, these outage notifications had gone unnoticed.

Before 2018, Itron, the supplier for the existing Rocky Mountain Power Centron C1SR ERT meters, had developed an "ERT Gateway" field device that interfaced with their Open Way RIVA AMI system to collect and transmit outage and restoration data from ERT-based gas and water meters. However, a similar device was not available for the existing Centron C1SR ERT electric meters.

The Utah STEP program provided a budget of $11.29m, as a component of ARMS, to fund a project to develop an ERT Gateway that would interface with Itron's Gen5 AMI network to capture and transport ERT meter outage notifications and metered data from the existing Centron C1SR AMR meters (see Figure 1—ERT Outage Notification GatewayFigure 1). Using the outage notifications, the company can analyze and respond to loss of power more quickly, reducing overall outage times.

[1] There were 764,000 meters in the original documentation. The increase in meter counts is due to customer growth over the project timeframe.

Figure 1—ERT Outage Notification Gateway

B. Actions Taken

Project Development

The ERT Gateway device was designed to interface with the AMI communications system to receive and translate outage-related data signals from existing Centron C1SR AMR meters without the need to replace the existing meters. The addition of the ERT Gateway allows the capture of outage notification messages from Centron C1SR AMR meters to enable faster response times while enabling the company to provide interval energy usage information to customers through a web portal.

Project Milestones

Key project milestones were planned for development, testing, and installation (Table 2) to ensure all ERT Gateway project-related activities were completed by the end of 2021.

Table 2—Key Project Milestones

Calendar Year	*Milestone*	*Status*
2019	Finalize contracts and project timeline with product vendors for ERT Gateways	Complete
	Initiate data integration tasks with the company's IT team and vendor software providers	Complete
2020	Work with Itron to finalize ERT Gateway requirements before testing and manufacturing	Complete
	Finalize locations where ERT Gateways would be deployed	Complete
	Complete hardware deployment and data integration into the CADOPS outage management tool	Complete
	Perform hardware and software system upgrades, as required	Complete
2021	Deploy the ERT Gateway system and integrate data into the company's IT network	Complete
	Verify communication of end devices with the software head-end system	Complete

While Itron continued development and testing of the ERT Gateway devices, company IT personnel designed and began development of the interfaces required to integrate the AMR metered data into the outage management and metered data systems. After all lab testing for the ERT Gateways was completed and accepted, field installations began with IT development continuing. The installation of the ERT Gateways went as expected with only a few requiring minor adjustments. These adjustments were required due to changes or additions to the equipment on the identified poles between planning and installation.

C. Initial Observations

Installation and Proof of Concept

ERT Gateway installations began on April 9, 2021, in Smithfield, Utah, with the final gateway installed on December 28, 2021, in Park City. A total of 1,588 ERT Gateways were installed and energized as part of the project.

In October 2021, proof-of-concept testing was conducted with a sample of field-installed Centron C1SR meters, ERT Gateways and the AMI network. The proof of concept was to ensure data flow from the meters to Itron's Utility IQ (UIQ) head-end system. UIQ is the software suite that includes applications designed to collect and manage AMI metered data. This testing was completed over multiple days and proved that outage notifications, restoration messages and metered data were accurately transmitted and captured by the head-end system and could be made available to other company IT systems (e.g., PacifiCorp's Outage Management System [OMS], ABB CADOPS, etc.).

Costs

ERT Gateway final project costs totaled $11.26m or 99.7% of the approved budget of $11.29m, see Table 3.

Table 3—ERT Gateway Final Project Costs

Work Stream	Actual [1]	Approved	Variance
ERT Gateways	$6.40m	$5.58m	$0.82m
IT	$4.66m	$4.84m	$0.18m
Project management	$0.20m	$0.87m	$0.67m
Total	**$11.26m**	**$11.29m**	**$0.03m**

[1] *Financials will not be finalized until end of March 2022*

D. Actions Set Aside

PacifiCorp has implemented all planned actions.

F. Future Expansion

AMI network installations started in January 2021 with the full AMI project to be completed by the end of 2023. As the AMI network is built out and optimized, the ERT

Gateways will begin transporting outage notifications and daily usage data from the Centron C1SR meters to UIQ. The ability to detect meter outages from AMR meters will enable faster response times and customers will be able to access their usage data through the company's energy usage website, which will increase customer engagement and empower them to make better decisions and conserve energy. The realization of full project benefits will be available in 2023.

3. CELLULAR FIELD AREA NETWORK

The CFAN project delivered a secure and scalable solution to provide an alternative method for supporting communications with field-based intelligent electronic devices (IED) using commercially available cellular networks. This effort delivered a standard back-end infrastructure (servers, network, circuits, software) and set of procedures for installation, management and maintenance of communication equipment attached to the company's P&C devices.

This cellular-based solution enables a new low-cost communication option to enable remote control and operation of distribution field devices during wildfire and reliability events. It supports monitoring and controlling distribution field equipment and supports situational awareness for efficient outage management to improve SAIDI for specific, typically remote, areas where adding communications with traditional fiber/microwave is cost prohibitive and/or requires excessively long implementation lead times. Table 4 highlights the cost differences between cellular, and the more traditional fiber optic and microwave communications methods; this offers a comparison of the expense for reaching locations that are currently cost prohibitive. However, a cellular network is not a direct replacement for all communication options; traditional fiber and microwave options are critical to establishing communications for faster P&C schemes, which are not technically feasible using public cellular networks.

Table 4—Capital Expenditure Comparison for Fiber, Microwave and Cellular Communications

Communication Type	Equipment	Cost[2]
Fiber	Line Extension/Remote Terminal Unit (RTU)	$43,000/mile
Microwave	New Tower/Building/RTU	$500,000/site
Cellular	Digital RTU/Modem	$25,000/site

A. Initial Proposals and Objectives

The initial proposal was to provide end-to-end cellular connectivity between Rocky Mountain Power's Energy Management System (EMS) and an IED in a lab environment, then install to an existing field-installed IED that otherwise did not have communication.

Before field installation, the project team needed to design the network architecture approved by the company's cybersecurity review team, procure a router and antenna

[2] These figures were identified in Rocky Mountain Power's 2019 Cellular Field Area Network Project Charter.

standard, develop standard settings, and perform end-to-end bench testing to ensure the equipment and system handshakes were functional.

B. Actions Taken

Rocky Mountain Power developed an overall project team for CFAN that included telecommunications and relay engineering teams. The telecommunications team developed the infrastructure from the EMS to the router, determined the specifications required for the router and antenna, chose a model, and developed a company router-antenna standard. The relay engineering team then developed the settings from the IED models to the router. Both teams subsequently performed a successful bench test to evaluate end-to-end operation.

After a successful end-to-end test, the project team chose a pilot, field-installed IED to do the first end-to-end testing in the field, see Table 5. After this was successfully completed, the project team transitioned into preparing for field deployment and installation.

Table 5—CFAN Milestone Schedule

Description	Date Completed
Start date	12/16/2019
Pilot SCADA implementation	08/20/2020
Network design, implementation and testing	09/04/2020
End-to-end testing complete	12/31/2020
Pilot field installation	02/08/2021
Develop settings, SCADA points and receive material for field deployment	10/01/2021
Field installation	12/31/2021

C. Initial Observations

The team successfully established a scalable communications architecture that could be applied to several thousand devices at any given time. However, integrating the communication routers with the company's legacy IED devices (e.g., distribution line reclosers) proved to be challenging.

To establish end-to-end communications between the end device and the company's control center, each of the IEDs required unique settings, and in some cases specialized communication-printed circuit boards. Further, due to supply chain constraints, there were significant delays in procuring communication routers as well as printed circuit boards to upgrade IEDs. Supply chain issues continue to delay field installation, however the main objective of the project to design, test and pilot cellular-based communication equipment has been successful.

D. Actions Set Aside

PacifiCorp has implemented all planned actions. The company plans to continue expanding the installation of CFAN devices on an increasing number of IEDs.

E. Lessons Learned

In May 2020 the longest material lead time was approximately 80 days. One year later the lead time had jumped up to approximately 182 days. This increased lead time, based on supply limitations, condensed the field installation window by approximately two months. In hindsight, the material could have been ordered earlier; the project team could have better anticipated the increasing lead times to schedule accordingly.

F. Future Expansion

Rocky Mountain Power has several projects across the state of Utah to retrofit CFAN to existing IEDs. Currently Rocky Mountain Power has installed CFAN on approximately 20 IEDs, five of which were funded by the ARMS project. Rocky Mountain Power has another 30 CFAN+ routers ready for field installation, out of which 10 installations are expected to be completed by end of 2022. The project team has determined that no additional maintenance or maintenance scheduling will be required. The pre-existing scheduled preventative maintenance for the field IEDs covers all necessary requirements for CFAN equipment.

4. COMMUNICATING FAULTED CIRCUIT INDICATORS

Traditional FCIs have been used for over 50 years to locate faults on the company's distribution system. FCI devices work by displaying an LED output or flag when they sense abnormally high currents, which are associated with fault conditions. Line crews tasked with patrolling a circuit can use the FCI visual targets to help pinpoint fault locations. While traditional FCIs are effective, the technology has a few key limitations:

- Fault indication is purely visual and can only be observed from a short distance — 10 feet to 500 feet depending on model and field conditions. Inclement weather, lines in backlots, or FCIs located in pad-mounted equipment can make data access difficult.
- Fault detection is still reliant upon customer call-ins to report a loss of service.
- Algorithms and trip thresholds used for fault detection are static and may not be effective if protection settings or loading conditions on the circuit change over time.
- FCIs typically use time-based settings to reset visual indication. After a temporary fault the indication may stay active for eight to 24 hours, which can cause confusion if a subsequent, unrelated permanent fault occurs on the same circuit.

CFCIs deployed in this project are equipped with advanced microprocessors and embedded cellular modems. This emerging technology overcomes many of the challenges associated with FCIs; abnormal circuit conditions can be immediately classified and communicated in a centrally managed systems accessible to dispatchers and engineers.

In 2018, the company completed an assessment of commercially available CFCIs reviewing features and physical form factors that would prove most beneficial. Measurement capabilities, physical device size, auxiliary power and communication infrastructure requirements were evaluated. Transport Layer Security (TLS) encryption, cellular-based distributed network protocol (DNP) communications, fault current magnitude measurement, line current profiling, and a form factor suitable for installation on different conductor sizes were identified as the critical components necessary for a successful CFCI deployment on the company's distribution system.

A. Initial Proposals and Objectives

The objective of the project was to deploy CFCIs and subsequently enable real-time information exchange between the devices and the company's control center, with CFCI devices installed on circuits serving critical Utah customers. Information from the CFCIs provided to control center operators could then be used during outage conditions to enable faster outage restoration of critical customers. For the purposes of this project, critical facilities were defined as major emergency facility centers such as hospitals, trauma centers, police and fire dispatch centers, etc.

Key deliverables outlined at the start of the project are summarized below:

- Installation of Sentient MM3 and ZM1 CFCI devices at targeted locations
- Deployment of Sentient head-end AMPLE analytics software within the company network
- Integration of new fault data into Monarch EMS
- Integration of fault data from CFCI devices into NMDMS CADOPS
- Deployment of an OSI external front-end processor (FEP)
- Implementation of zone-based fault location module within the existing NMDMS CADOPs

B. Actions Taken

Table 6 provides the CFCI project timeline.

Table 6—CFCI Timeline

Date	Action / Deliverable	Status
August 2020	Pilot CFCI installations (49 sensors)	Complete
December 2020	Phase 1 circuit and site selection	Complete
April 2021	On-premises AMPLE software test environment installed	Complete
April 2021	On-premises AMPLE software production environment installed	Complete
July 2021	Phase 1 critical customer CFCI sensor installations (473 sensors)	Complete
November 2021	DNPC integration with Monarch	Complete
November 2021	Monarch point pass-through with CADOPs	Complete

JANUARY 2022	Deployment of OSI external FEP	Complete
January 2022	TLS security enablement on MM3 sensors	Complete
March 2022 (Planned)	TLS security enablement on ZM1 sensors	Ongoing

The CFCI project was initiated on August 15, 2020, with a pilot deployment on three circuits with approximately 50 CFCI devices, communicating with an AMPLE software instance hosted in the cloud using Amazon Web Service (AWS). The pilot deployment was designed to assess power harvesting capabilities of the MM3 sensors, load and fault current measurement accuracy, and cellular connectivity under a variety of field conditions. An overview of the sensors and a summary of the pilot installation sensor numbers are provided in Table 7 and Table 8.

During the six-month evaluation period, loading and fault current measurements were found to align with records captured by substation relays. No issues were observed with cellular connectivity or power harvesting capabilities.

Table 7—Sensor Overview

Item	**ZM1**	**MM3**
Picture		
Power source	Battery powered (≈10-year life)	Line powered > 6 Amps (inductive harvesting)
Dimensions (L x W x H)	7″ × 6.5″ × 4″	8″ × 4.5″ × 5.5″
Weight	3.5 lbs.	6.5 lbs.
Maximum conductor diameter	1.02″	1.02″
Fault algorithms	Threshold	Threshold Percent-Change Di/Dt
Load profile interval data	60-min	5-min
Event oscillography	No	Yes

Table 8—CFCI Pilot Sensor Locations

Circuit	**Approximate Location**	**Sites**	**MM3 Sensors**	**ZM1 Sensors**
Mountain Dell (MTD11)	Parleys & Emigration Canyons	8	6	13
Fountain Green (FTG12)	Fountain Green Canyon	6	6	6
Commerce 17 (CMM17)	Cedar City	6	9	9

Planning for the larger, scalable deployment was undertaken during the pilot with the AMPLE software migrated to the company's on-premises servers, along with the development of policies, sensor settings, and circuit and site selection criteria. The methodology used to prioritize circuits using critical customer counts and reliability indices is depicted in Figure 2. Detailed analysis of the top-50 circuits was performed by field engineers to select optimal sites for the sensor installations summarized in Table 9. CFCI sensor installations were completed in July 2021.

Table 9—CFCI Phase-1 Sensor Locations

Region	Number of Circuits	Sites	Sensors
Northern Utah	22	44	132
Central Utah	18	92	279
Southern Utah	10	22	62

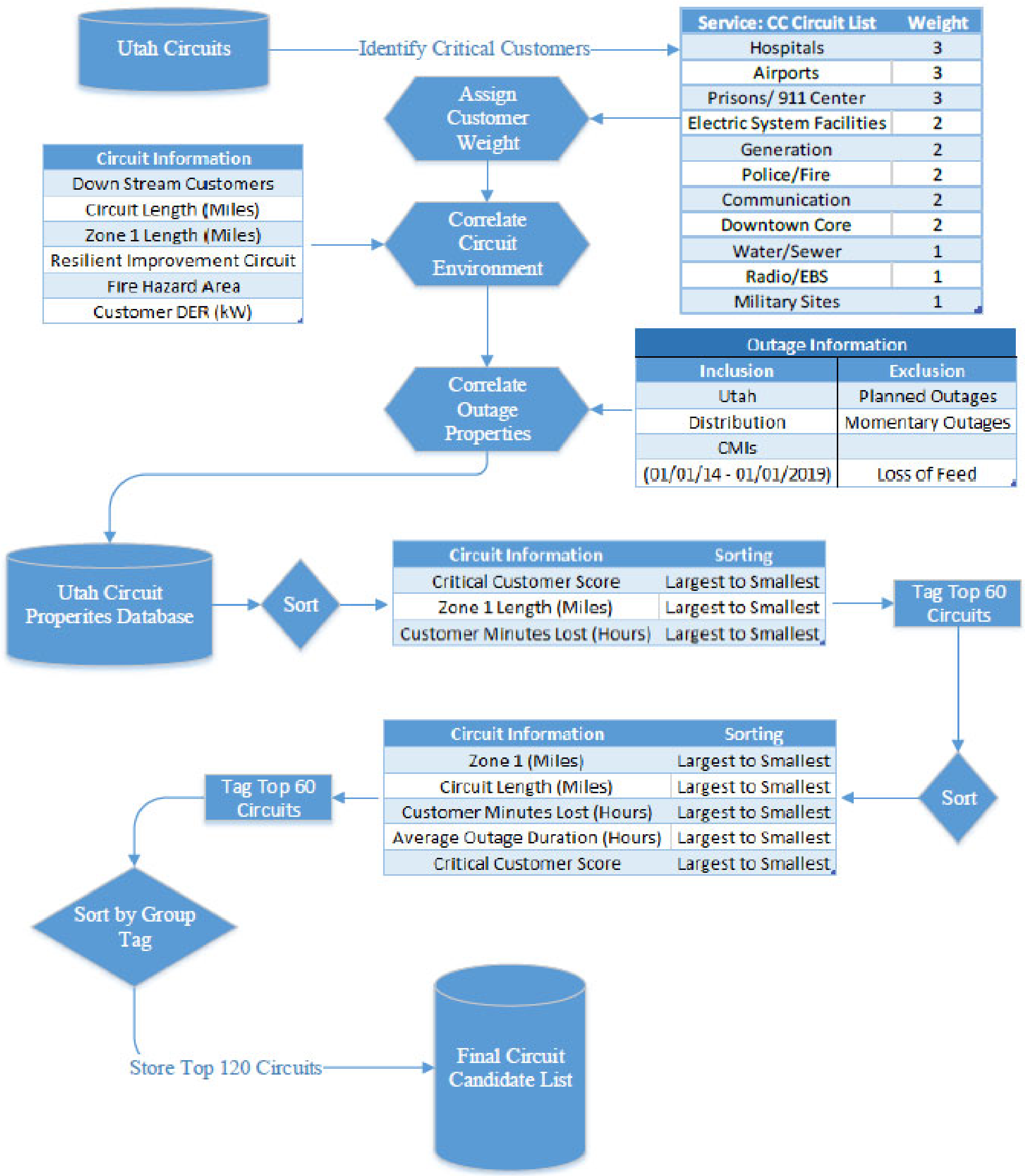

Figure 2—CFCI Circuit Prioritization

Integration and testing of the sensor data with the Monarch EMS and CADOPS NDMS system was completed in November 2021. An overview of the network and software architecture is shown in Figure 3.

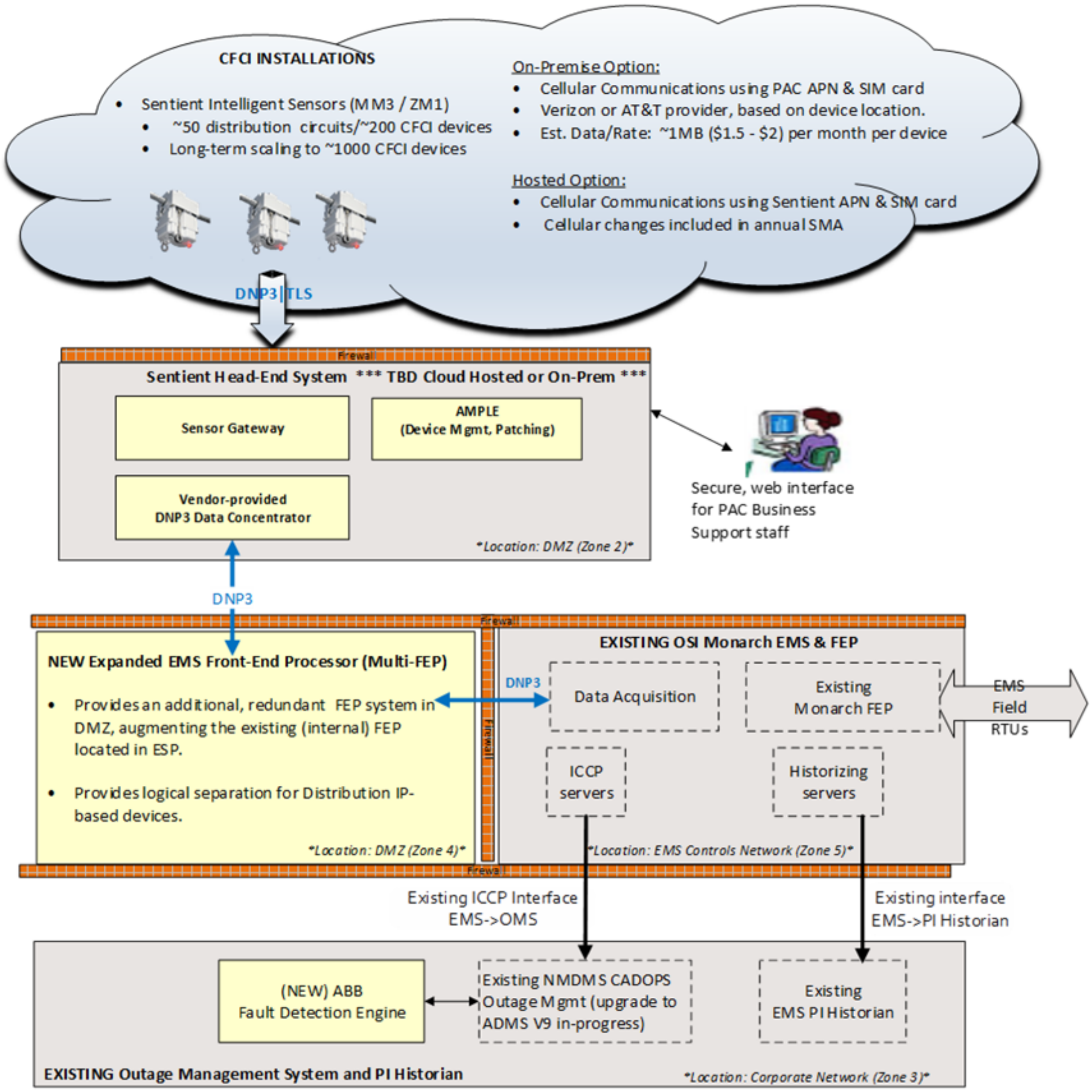

Figure 3—CFCI Network and Software Architecture

C. Actions Set Aside

Implementation of the fault location module within the ABB OMS was canceled; it was determined that the software would not likely trigger an indication on most fault events recorded by the CFCI devices.

D. Lessons Learned

The lessons learned focused on adapting existing business practices to take advantage of the near real-time information and data flow provided by the CFCI devices. Traditionally, outage restoration has relied on customer calls to report loss of service and observations made by field employees dispatched to patrol the circuit. CFCIs have enabled a much more proactive and collaborative process with engineering and management teams receiving fault notifications simultaneously, or before, the first customer calls.

With strategic placement of the CFCI sensors at major branch points and downstream of sectionalizing switches, circuits can be broken into discrete patrol zones as shown in Figure 4. In the example below tripped fault targets from the CFCI quickly locate the fault within Zone 3, allowing control center operators to initiate step restoration switching by closing Switch 2 and prioritizing the field crew's patrol zone. Additional data related to phases involved and current magnitude can be used to further refine patrol boundaries using short-circuit analysis.

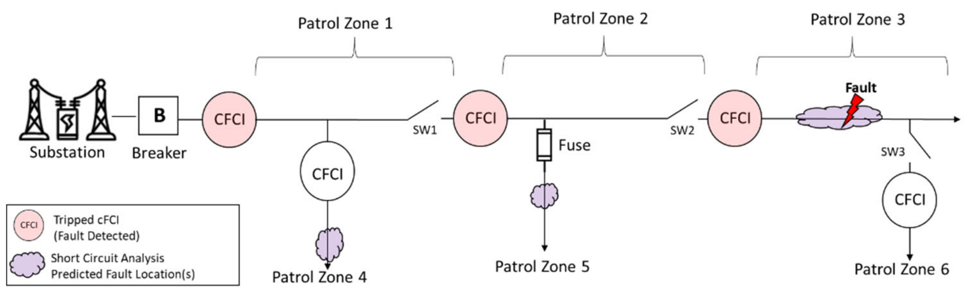

Figure 4—CFCI Patrol Zones

CFCI sensors have also found to be beneficial in validating performance and operational states for devices that are not connected to a SCADA system or where the primary telemetry link (fiber, microwave) is down. While also providing insights into the cause and nature of momentary outages, line loading data from the CFCIs is expected to be useful for validating and refining engineering models used for system planning and distributed resource integration studies.

Optimization and refinement of CFCI settings to increase sensitivity and effectiveness under additional fault scenarios is ongoing and is expected to continue in the future.

E. Future Expansion

Early successes in the CFCI deployments of this project resulted in a rapid expansion of the sensor fleet and the integration of the data into normal business practices. As the installations funded by ARMS were completed in July 2021, a project was launched to install CFCI sensors on all fire high consequence area (FHCA) circuits in the states of Utah, Oregon and California with a plan (not funded by ARMS) to complete the installation of an additional 3,500 sensors by the end of April 2022.

Management and maintenance of the sensor fleet is performed primarily through the AMPLE software platform which handles firmware updates, connectivity monitoring, and reporting battery health.

5. SUBSTATION CONNECTIVITY AREA NETWORK

PacifiCorp's legacy SCADA approach deployed a *serial* connectivity model to control devices in our substation environment. This was partially due to the available technology and best practices to support for SCADA deployment. When internet protocol (IP)-based communications[3] started being integrated into the more advanced microprocessor-based P&C devices, PacifiCorp opted to keep serial connectivity to control devices. This company choice was primarily due to the mandated NERC CIP version 3 compliance requirements pertaining to IP-based connectivity. Continuing to use a serial connectivity model reduced compliance risk and decreased workloads for managing compliance to the NERC CIP standards in the substation environment.

In 2016, the NERC CIP Version 5 compliance requirements became effective, bringing substations in-scope — or applicable to the standard — and thus subject to NERC audits, regardless of connectivity type. The scoping factor for the NERC CIP Version 5 requirements is primarily based on external routable connectivity (IP-based connectivity in or out of the substations) to in-scope cyber assets at the site.

Moving toward a better reliability future, PacifiCorp is deploying newer, sophisticated microprocessor P&C devices that leverage the use of IP-based communications for larger data packet transfer[4] and remote systems management. The solution proposed by this project allows PacifiCorp to capture the opportunities offered by using IP-based communications while continuing to maintain compliance to the NERC CIP and Berkshire Hathaway Energy security standards.

The IP-based connectivity model, coupled with a NERC CIP and Berkshire Hathaway Energy security-compliant substation cybersecurity infrastructure design solution, will be scalable for distribution and transmission substations regardless of criticality or NERC CIP impact rating.

During the early stages of the project, the AssurX platform was selected to allow integration of several existing and new applications for asset management, remote system operations management, security management and compliance management into a centralized suite of applications. By integrating these management systems, synergies and efficiencies can be obtained reducing the new workload on operations staff for managing remote systems configurations, security and compliance.

A. Initial Proposals and Objectives

The ARMS project was designed to increase connectivity to the company's distribution assets. The CFAN project enabled increased connectivity to distribution assets outside the

[3] IP (Internet protocol) uses what is called the OSI model of layering data into segments within a packet and sending that packet across the communications media — it allows the data to follow whatever path it can find to get to the destination because it uses an address (IP address). Serial connectivity is usually limited to point-to-point communications between two ends of the path that are already programmed between the two devices communicating via wires, fiber optics or microwave.

[4] Serial communications cannot handle the bandwidth required to transport the data that engineering is trying to access using the IP connectivity. Additionally, by automating compliance-related activities and applying internal controls to monitor compliance data collection, fewer new FTE are required to manage the connected systems for CIP compliance and to reduce the compliance risk (likelihood of violation and fines).

substation. The SCAN project was designed to increase connectivity and situational awareness inside substations.

B. Actions Taken

Berkshire Hathaway Energy entered a contract with AssurX for the purchase of the platform. The contract also included professional services for design and integration of the AssurX system to allow integration of remote system operations management applications, security and compliance management into a centralized suite of applications. PacifiCorp issued a purchase order agreement for the AssurX system and services and took delivery of the software in late 2021. Configuration design of the system components and implementation of the system is ongoing.

C. Initial Observations

The company is performing design and implementation of the system with AssurX. This system will increase oversight capabilities within the compliance organization by creating a centralized system for:

- Compliance control development and monitoring
- Systems of record data collection and management
- Evidence collection and storage
- Compliance management dashboards
- Automated alerting of potential compliance risks
- Data reporting capabilities from a master database
- Document management workflows

D. Actions Set Aside

PacifiCorp has implemented all planned actions.

E. Lessons Learned

PacifiCorp is in the early stages of design and implementation. It expects to learn more over the next six to 12 months of implementing and operating the system.

F. Future Expansion

The company anticipates ongoing work to be completed by mid-2022.

6. CONCLUSION

The company continues to develop a strategy to attain long-term goals for grid modernization and smart grid-related activities to continually improve system efficiency, reliability and safety, while providing a cost-effective service to our customers.

The ERT, CFAN, CFCI and SCAN projects, as part of ARMS, are smart grid elements that support these company goals. Using existing meters and lines, ERT, CFAN and CFCI implementation all increase infrastructure-based intelligence that allow for quicker identification and resolution of power outages. ERT and CFAN both found relatively low-cost methods to implement these improvements, by leveraging already installed AMR meters and low-cost cellular technology. The success of CFCI pilot and phase-1 deployments led to a rapid expansion of the program and the integration of the data into normal business practices. SCAN serves as part of establishing a back-end IT infrastructure necessary to maintain intelligent network improvements.

When the term "smart grid" was first officially defined in the *Energy Independence and Security Act of 2007* (EISA-2007), its implications were profound and its exact form was vague. Somehow information technology would connect with grid systems to create a more reliable, secure electric infrastructure. Through these ARMS-based projects, Rocky Mountain Power, under the guidance of utility commissions, and in conjunction with manufacturers and state governance has begun transforming the initial ideal of a smart grid into specific and useful benefits for its customers.

APPENDIX A – FINANCIAL

Work Stream	Actual [1]	Approved	Variance
ERT Gateways	$11.26m	$11.29m	$0.03m
Enhanced Distribution Connectivity	$5.15m	$5.23m	$0.08m
ARMS Overall	**$16.41m**	**$16.52m**	**$0.11m**

[1] Financials will not be finalized until end of March 2022

Utah Solar Incentive Program (USIP)

The USIP amounts shown on page 1.0 represent the actual expenditures of the USIP program. When STEP commenced, the Company anticipated that a portion of STEP revenues would be necessary to fund the remainder of the USIP program obligations through 2023. The Company's September 12, 2016, application in Docket No. 16-035-36 assumed funds would be needed for all remaining USIP project applications that had received, or were expected to receive, conditional approvals but had not yet qualified for incentive payments. At that time, the remaining USIP obligations was estimated to be $33.6 million. Since 2016, an estimated $14.2 million of projects that were previously approved for incentives have expired and are no longer eligible to receive USIP funds. Therefore, the revenues collected under the discontinued Electric Service Schedule 107 ("Schedule 107") are sufficient to cover all remaining USIP incentive obligations without the use of any of the $50 million in STEP funds.

Previously, a portion of revenues collected under STEP are credited to the USIP account. On June 28, 2019, the Commission approved the Company's request to use the STEP funds that were previously budgeted for USIP for the Advanced Resiliency Management System project. On August 20, 2019 the Commission approved the Company's request to begin refunding $3.06 million in surplus revenue collected through Schedule 107 through a reduction in Electric Service Schedule No. 196 Sustainable Transportation and Energy Plan ("STEP") Cost Adjustment Pilot Program rates over one year beginning November 1, 2019[1]. For transparency and consistency with prior reports, the company will continue to report USIP expenses in the annual STEP reports.

Table 1 provides the CY 2021 USIP account balance with USIP collections under Schedule 107.

Table 1: USIP Account Summary (With Electric Service Schedule 107 revenues only)

Utah Solar Incentive Program Account - Through 2021												
	Order	Program Total	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Program Revenue		(23,361,302)	(961,324)	(6,293,704)	(6,320,828)	(6,317,639)	(6,323,285)	(308,633)	-	127,762	3,036,349	-
Program Expenditures:												
Incentive	331190, 338901		-	981,796	2,328,676	3,292,006	4,884,763	4,766,963	3,459,713	2,317,571	1,585,779	1,023,487
Program Administration	331191; 338902		-	253,665	322,664	173,248	412,866	94,788	27,098	13,807	3,881	1,506
Marketing	331192; 338903		55,905	35,744	25,995	14,515	336	-	-	-	-	-
Program Development	331193' 338904		30,748	99,140	577	-	-	-	-	-	-	-
Expired Deposits	331194; 338905		-	-	-	(36,821)	(103,963)	(99,568)	-	(157,638)	-	-
	408641							-	-	-	-	-
Cool Keeper program			-	-	-	-	(200,000)	-	-	-	-	-
Total Expenditures		25,609,246	86,653	1,370,345	2,677,912	3,442,948	4,994,002	4,762,183	3,486,811	2,173,740	1,589,660	1,024,993
Interest		(3,696,392)	(5,995)	(219,165)	(473,909)	(721,712)	(685,628)	(627,425)	(569,938)	(147,937)	(175,669)	(69,015)
USIP Account Balance (Sch. 107 only)		(1,448,448)										

The Total Expenditure amounts showing for CY 2017, 2018, 2019, 2020 and 2021 tie to the USIP expenditures on page 1.0 of this report and also tie to Table 4 in the Company's USIP annual reports.

The 2019 and 2020 program revenue of $127,762 and $3,036,349 shown in Table 1 represents the credits back to customers through the reduction in Schedule 196 beginning November 1, 2019. The USIP workpaper provides the forecast program expenditures.

[1] See Docket No. 19-035-T12.

STEP Project Report

Period Ending December 31, 2021

STEP Project Name:

Study of Electrification Impacts on the Uintah Basin

Project Objective:

Obtain quantitative estimates of the air quality and economic impact that electrification of the oil and gas fields would have in the Basin. The work will be performed by personnel at Utah State University Uintah Basin Bingham Research Center and SLR International Corporation.

Project Accounting:

	2021	**Total**
Annual Collection (Budget)	$200,715	$200,715
Annual Spend	$106,070	$106,070
Committed Funds	$0	$0
External OMAG	$0	$0
Total Project Spend	$106,070	$106,070

Final invoicing in the amount of $94,645 was paid for the project in early 2022. The total project spend including the 2022 payments is $200,715.

Project Milestones:

Milestones	**Delivery Date**	**Status/Progress**
A1. History of NOx source	December 31, 2021	Complete
A2. History of NOx emissions	December 31, 2021	Complete
A3. History of NOx Concentrations	December 31, 2021	Complete
B1. Electrifications modeling	December 31, 2021	Complete
B2. NOx control modeling	December 31, 2021	Complete
C. Power Transmission Development	December 31, 2021	Complete
D1. Data Analysis	December 31, 2021	Complete
D2. Final Report	February 28, 2022	Complete
Final Billing	March 31, 2022	Complete

Project Benefits:

- The wintertime Uinta Basin ozone system is under NOx control, i.e., controlling NOx emissions will have a bigger impact than controlling VOC emissions.
- Electrification of the Uinta Basin oil and gas fields will permit a significant, irreversible reduction in NOx emissions and of winter ozone levels.

- The benefits of electrification will significantly offset other, reversible NOx emissions, such as drilling activities, and prevent a return to the very high ozone concentrations that occurred in the early 2010's.
- The logistics and economics of electrification will allow the oil and gas industry to continue operating.

Potential future applications for similar projects:

Study findings promote:

- More research into natural-gas fired engines as there is not definitive explanation for the non-linear behavior of NOx emissions.
- Current best practices for estimating pumpjack emissions need to be revised to consider actual operating conditions in the field.

Attachment:

Exhibit 20-A: Final Report - *Projecting the Impact of Electrification of the Uinta Basin Oil and Gas Fields on Air Quality* dated March 15, 2022. Prepared by Liji David, Huy Tran, and Seth Lyman at the Utah State University Uintah Basin Bingham Research Center and Robert Hammer and Xin Qiu at the SLR International Corporation.

Exhibit 20-A

Final Report Uinta Basin Study March 15, 2022

THIS ATTACHMENT IS VOLUMINOUS AND PROVIDED SEPARATELY