ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

1407 West North Temple, Suite 330
Salt Lake City, Utah 84116

June 15, 2017

VIA ELECTRONIC FILING

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

Attention: Gary Widerburg
Commission Secretary

Re: **Revised Report**
In the Matter of Rocky Mountain Power's Proposed Demand-Side Management 2016 Annual Energy Efficiency and Peak Load Reduction Report
Docket No. 17-035-32

On May 15, 2017, Rocky Mountain Power (the "Company") filed its Demand-Side Management 2016 Annual Energy Efficiency and Peak Load Reduction Report ("Report") in the above referenced docket. On May 23, 2017, the Company submitted a replacement page 12 of the Report that inadvertently contained 2015 dollar amounts in the Carrying Charge column in Table 4. On June 2, 2017, the Company discovered that some incorrect measure lives were used in the calculations for the Report, and notified the Division of Public Utilities ("DPU") and Office of Consumer Services of the Company's intention to file a revised Report by June 15, 2017, correcting items affected by the incorrect calculations. In light of this information, the DPU filed a request June 6, 2017, to extend the initial comment period due date to July 6, 2017, with reply comments due July 20, 2017. The Commission granted this request in its Amended Notice of Filing and Comment Period issued June 7, 2017.

Accordingly, attached hereto is a Revised Report with corrected calculations. Corrections were made to the lifetime savings, net benefits, and cost-effectiveness. Specifically, lifetime savings and total net benefits in the Executive Summary on page 5 were reduced from 3.75 MWh to 3.55 MWh and $116 million to $111 million, respectively, and the weighted average measure life of the portfolio was reduced from 11.2 years to 10.6 years in footnote 3. Tables 1, 14, and 27 on pages 6, 21, and 38, respectively, have also been updated. Lastly, attached hereto is a revised Appendix 2, reflecting updated cost-effectiveness numbers.

Sincerely,

Michael S. Snow
Manager, DSM Regulatory Affairs

Enclosures

Utah Energy Efficiency and Peak Reduction Annual Report

January 1, 2016 – December 31, 2016

Issued June 15, 2017

ROCKY MOUNTAIN POWER

Let's turn the answers on.

1912–2012 100 Years

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LIST OF ABBREVIATIONS AND ACRONYMS

CFL	Compact Fluorescent Lighting
DSM	Demand-side Management
HCD	Utah Department of Workforce Services, Housing and Community Development Division
HVAC	Heating, Ventilation and Air Conditioning
IRP	Integrated Resource Plan
kW	Kilowatt
kWh	Kilowatt hour
LED	Lighting-emitting Diode
MW	Megawatt
MWh	Megawatt hour
NTG	Net-to-Gross
PCT	Participant Cost Test
PTRC	Total Resource Cost Test with 10 percent adder
RIM	Ratepayer Impact Measure Test
Schedule 193	Demand-Side Management Cost Adjustment
TRC	Total Resource Cost Test
UCT	Utility Cost Test
VFD	Variable Frequency Drive

EXECUTIVE SUMMARY

PacifiCorp is a multi-jurisdictional electric utility providing retail service to customers in Utah, California, Idaho, Oregon, Washington, and Wyoming. Rocky Mountain Power, a division of PacifiCorp ("Company"), serves approximately 850,000 customers in Utah. Rocky Mountain Power, working in partnership with its retail customers and with the approval of the Public Utilities Commission of Utah ("Commission"), acquires energy efficiency and peak reduction resources as cost effective alternatives to the acquisition of supply-side resources. These resources assist the Company in efficiently addressing load growth and contribute to the Company's ability to meet system peak requirements.

Company energy efficiency and peak reduction programs provide participating Utah customers with tools that enable them to reduce or assist in the management of their energy usage, while reducing the overall costs to the Company's customers. These resources are relied upon in resource planning as a least cost alternative to supply-side resources.

This report provides details on program results, activities, expenditures, and status of the Demand-Side Management Cost Adjustment tariff rider ("Schedule 193") revenue for the performance period from January 1, 2016 through December 31, 2016.[1] The Company, on behalf of its customers, invested $60.4 million in energy efficiency and peak reduction resource acquisitions during the reporting period. The investment yielded approximately 334,147 megawatt hours ("MWh") in first year energy savings,[2] 3,550,537 MWh of lifetime savings[3] from 2016 energy efficiency acquisitions and approximately 65 megawatts ("MW") of capacity reduction from energy efficiency savings[4] and realized reductions associated with peak management activities of approximately 127 megawatts.[5] Net benefits based on the projected value of the energy savings over the life of the individual measures are estimated at $112 million.[6]

The Demand-side Management ("DSM") portfolio was cost effective based on four of the five standard cost effectiveness tests[7] for the reporting period. The ratepayer impact cost test was less than 1.0 indicating near-term upward pressure was placed on the price per kilowatt-hour ("kWh") given a reduction in sales. The DSM portfolio cost effectiveness is provided in Table 1. Annual performance information for 2016 cost effectiveness is provided in detail in Appendix 2.

[1] Appendix 1 provides specific requirements from Docket No. 17-035-04 and where they are located in the annual report and appendices.
[2] Reported ex-ante savings are gross and at generation.
[3] Estimated lifetime savings of 2016 Energy Efficiency Acquisitions was calculated by multiplying First Year Acquisitions (measured at the generator) by the weighted average measure life of the portfolio of 10.6 years. No discount was assumed for possible savings degradation over the life of the measures. Savings are gross at generator.
[4] See Planning Process Section for explanation on how the capacity contribution savings values are calculated.
[5] Realized load as measured at generation.
[6] See Table 1 – Utility Cost Test Net Benefits.
[7] Cost effectiveness results include realization rates and Net-to-Gross ("NTG") ratios.

Table 1 – DSM Portfolio Cost Effectiveness

Benefit/Cost Test	Benefit/Cost Ratio	Net Benefits
PacifiCorp Total Resource Test plus 10 percent (PTRC)[8]	1.89	$119,470,080
Total Resource Cost Test (TRC)[9]	1.72	$96,407,238
Utility Cost Test (UCT)[10]	1.94	$111,996,428
Participant Cost Test (PCT)[11]	2.61	$149,483,273
Ratepayer Impact Cost Test (RIM)[12]	0.89	($28,871,030)

2016 Performance Compared to Forecast

In Docket No 15-035-48 filed November 2, 2015, the Company filed its 2016 forecast for Class I load control and Class II energy efficiency programs against its Integrated Resource Plan ("IRP") forecast. Overall, the Company achieved 93% of its Class I and Class II forecast. The *Irrigation Load Control* program experienced higher than expected participant opt-outs. For the Class II achieved savings, the residential sector was not meeting its forecasted target. Subsequently, the decision was made to ramp up non-residential participation. Table 2 compares the November filings to actual savings achieved.

[8] The PTRC is the total resource cost test with an additional 10 percent added to the benefit side of the benefit/cost formula to account for non-quantified environmental and non-energy benefits of conservation resources over supply side alternatives.
[9] The TRC considers the benefits and costs from the perspective of all utility customers, comparing the total costs and benefits from both the utility and utility customer perspectives. It's assumed to be the closest in valuation methodology to how supply-side resources are valued.
[10] The UCT provides a benefit to cost perspective from the utility only, comparing the total utility cost incurred to the benefit/value of the energy and capacity saved and contains no customer costs or benefits in calculation of the ratio.
[11] The PCT compares the portion of the resource paid directly by participants to the savings realized by the participants.
[12] The RIM examines the impact of energy efficiency expenditures on non-participating ratepayers overall. Unlike supply-side investments, energy efficiency programs reduce energy sales. Reduced energy sales can lower revenue requirements while putting near-term upward pressure on rates as the remaining fixed costs are spread over fewer kilowatt-hours.

Table 2 - 2016 Forecast to Actual Savings Comparison

Utah DSM 2016 Projected Savings	2015 IRP for 2016 (Gross - at Gen)		2016 Forecast (Gross - at Gen)		2016 Actual (Gross - at Gen)	
	MWH	MW	MWH	MW	MWH	MW
Class 1 - Load Control Programs						
A/C Load Control		115		115		113
Irrigation Load Control		20		20		14
Total Class 1		**135**		**135**		**127**
Class 2 - Residential Programs						
Low Income			426	0	230	0
New Homes			3,454	1	3,598	1
Home Energy Reports			62,476	12	53,833	10
Refrig. Recycle			15,237	3	169	0
Home Energy Savings			71,223	14	49,910	10
Total Residential Class 2	**N/A**		**152,816**	**29**	**107,739**	**21**
Class 2 - Non-Residential Programs						
wattsmart Business			212,316	41	226,408	43
Total Non-Residential Class 2	**N/A**		**212,316**	**41**	**226,408**	**43**
Total Class 2	**303,040***	**58**	**365,132**	**70**	**334,147**	**64**

*Includes incremental HER savings only.

2016 Performance

Program and Sector level results for 2016 are provided in Table 3.

Table 3[13]
Utah Program Results for January 1, 2016 – December 31, 2016[14]

Load Management Programs	MW/Yr Savings (at site)	MW/Yr Savings (at gen)	Program Expenditures
Cool Keeper	103	113	$ 4,573,746.18
Irrigation Load Control	13	14	$ 426,103.31
Total Load Management	**116**	**127**	**$ 4,999,849**
Energy Efficiency Programs	**kWh/Yr Savings (at site)**	**kWh/Yr Savings (at gen)**	**Program Expenditures**
Low Income Weatherization	210,154	229,737	$ 59,339
New Homes	3,290,951	3,597,602	$ 1,453,696
Refrigerator Recycling	154,191	168,559	$ 25,376
Home Energy Savings	45,655,622	49,909,813	$ 11,680,011
Home Energy Reporting	49,244,502	53,833,105	$ 2,758,456
Total Residential	**98,555,421**	**107,738,815**	**$ 15,976,879**
watt smart Business Agricultural	10,851,979	11,854,062	$ 1,100,018
watt smart Business Commercial	133,500,517	145,131,082	$ 20,054,995
watt smart Business Industrial	65,589,443	69,423,146	$ 10,315,226
watt smart Business Portfolio			$ 6,356,869
Total *watt* smart Business	**209,941,939**	**226,408,290**	**$ 37,827,108**
Total Energy Efficiency	**308,497,359**	**334,147,105**	**$ 53,803,987**
Outreach & Communications + Class 4			
Outreach and Communication Campaign			$ 1,317,861
Total System Benefit Expenditures - All Programs			**$ 55,121,847**
Portfolio Technical Reference Library			$ 26,223
Portfolio Potential Study			$ 58,754
Portfolio Training			$ 36,588
Portfolio DSM Central			$ 125,051
Total Utah Program Expenditures			**$ 60,368,313**

[13] Reported savings are ex-ante.
[14] The values at generation include line losses between the customer site and the generation source. The Company's line losses by sector for 2016 are 9.32 percent for residential, 8.71 percent for commercial, 5.85 percent for industrial and 9.24 percent for irrigation.

REGULATORY ACTIVITIES

During the reporting period, the Company made a number of filings with the Commission to be in compliance with various reporting requirements and to modify DSM programs. The Company also provided various reports and evaluations to the DSM Steering Committee, per Commission order.

- On January 19, 2016, the Company filed for modifications to the Low Income Weatherization Program in Docket No. 16-035-T01. Key modifications included adding LED bulbs and fixtures as new offerings. The Commission approved these modifications in its order issued February 12, 2016, with an effective date of March 1, 2016.
- On February 2, 2016, the Company circulated its quarterly DSM Balancing Account Report for the fourth quarter of 2015 to the DSM Steering Committee.
- On February 5, 2016, the Company filed to cancel the See ya later, refrigerator Appliance Recycling Program in Docket No. 16-035-T02. The Commission approved the cancelation in its order issued March 1, 2016, with an effective date of March 6, 2016.
- On February 9, 2016, the Company filed for modifications to the *watt*smart Business Program in Docket No. 16-035-T03. Key modifications included lowering lighting incentives and clarify all measure incentives as maximum not-to-exceed or "up to" amounts. The Commission approved these modifications in its order issued March 9, 2016, with an effective date of March 10, 2016.
- On April 15, 2016, the Company filed to permanently change the due date of the DSM Spring Semi-Annual Forecast Report from May 1st to July 1st in Docket No. 09-035-T08. The Commission approved the revised due date in its order issued April 20, 2016, with an effective date the same day.
- On April 25, 2016, the Company circulated its quarterly DSM Balancing Account Report for the first quarter of 2016 to the DSM Steering Committee.
- On May 9, 2016, the Company posted a 45-day notice on its website to make modifications to the *watt*smart Business LED Instant Incentive Program through the "up to" incentive process established in Docket No. 16-035-T03. Key modifications included lowering lighting incentives offered through the mid-market channel. Notice of these changes was also sent to the DSM Steering Committee on May 9, 2016. These modifications went into effect June 22, 2016.
- On May 23, 2016, the Company filed its 2015 Energy Efficiency and Peak Reduction Report in Docket No. 16-035-17. The Commission acknowledged the report as being compliant with reporting requirements in its correspondence issued July 12, 2016.
- On July 1, 2016, the Company filed its DSM Spring Semi-Annual Forecast Report in Docket No. 16-035-30. The Commission acknowledged the report as being compliant with reporting requirements in its correspondence issued August 24, 2016.
- On July 26, 2016, the Company filed for modifications to the Cool Keeper Program in Docket No. 16-035-T10. Key modifications included streamlining the tariff and removing outdated information. The Commission approved these modifications in its order issued November 16, 2016, with an effective date of December 1, 2016.
- On July 28, 2016, the Company circulated its quarterly DSM Balancing Account Report for the second quarter of 2016 to the DSM Steering Committee.

- On July 28, 2016, the Company provided notice to the DSM Steering Committee that the 2013-2014 Home Energy Savings Evaluation Report had been posted to the Company's website.
- On August 5, 2016, the Company filed for modifications to the *watt*smart Business Program in Docket No. 16-035-T11. Key modifications included the reinstatement of the enhanced incentive for small businesses as a restructured small business direct install offering. The Commission approved these modifications in its order issued August 31, 2016, with an effective date of September 5, 2016.
- On September 6, 2016, the Company made a compliance filing to provide supplemental information requested by DSM Steering Committee members regarding DSM program participation and measure data.
- On September 27, 2016, the Company provided notice to the DSM Steering Committee that the 2014-2015 Home Energy Reports Evaluation Report had been posted to the Company's website.
- On November 1, 2016, the Company filed its DSM Fall Semi-Annual Forecast Report in Docket No. 16-035-30. The Commission acknowledged the report as being compliant with reporting requirements in its correspondence issued December 21, 2016.
- On November 1, 2016, the Company filed for modifications to the New Homes and Home Energy Savings Program in Docket No. 16-035-T13. Key modifications included consolidating the New Homes Program within the Home Energy Savings Program, restructuring incentives tables and updating measures within the Home Energy Savings Program, and rename the Home Energy Savings Program as Residential Energy Efficiency with it marketed as *watt*smart Homes to align with the *watt*smart Business Program. The Commission approved these modifications in its order issued November 29, 2016, with an effective date of December 1, 2016.
- On November 10, 2016, the Company circulated its quarterly DSM Balancing Account Report for the third quarter of 2016 to the DSM Steering Committee.
- On November 17, 2016, the Company posted a 45-day notice on its website to make modifications to the *watt*smart Business LED Instant Incentive Program and prescriptive retrofit lighting measures through the "up to" incentive process established in Docket No. 16-035-T03. Key modifications included increasing the incentive for TLED lamps offered through the mid-market channel and lowering the incentive for the TLED lamp prescriptive offering. Notice of these changes was sent to the DSM Steering Committee on November 18, 2016. These modifications went into effect January 1, 2017.
- On November 23, 2016, the Company filed for modifications to the Schedule 193 surcharge rate, specifically to lower the rate from 4.0 percent to 3.68 percent. The Commission approved these modifications in its order issued December 22, 2016, with an effective date of January 1, 2017.
- On December 1, 2016, the Company filed for approval of its 2017 Strategic Communications and Outreach Plan for DSM programs in Docket No. 16-035-49. The Commission approved the plan in its order issued December 28, 2016, with an effective date of January 1, 2017.

Advisory Group and Steering Committee Activities:

Consistent with the discussion in Docket No. 12-035-69, the Company seeks input regarding its energy efficiency programs from both the Utah DSM Steering Committee and the Utah DSM Advisory Group. Both groups include representatives from a variety of constituent organizations. Members of the Steering Committee, who are not already governed by Commission confidentiality rules, signed Confidentiality Agreements with the Company in order to provide input on issues involving sensitive, confidential, or proprietary information.

The Company consulted with the DSM Steering Committee and DSM Advisory Group throughout 2016 on various matters, and held formal meetings on the following matters:

<u>February 4, 2016 – DSM Steering Committee</u>

- Provided updates on the Appliance Recycling Program, and
- Discussed proposed modifications to the *watt*smart Business Program.

<u>June 16, 2016 – DSM Advisory Group</u>

- Reviewed DSM program evaluation reports, and
- Reviewed the 2015 Annual Energy Efficiency and Peak Reduction Report.

<u>June 16, 2016 – DSM Steering Committee</u>

- Discussed DSM Amortization arising from the Sustainable Transportation and Energy Plan Act,
- Discussed upcoming proposed modifications to the New Homes and Home Energy Savings Programs,
- Provided updates on the small business offerings, and
- Discussed upcoming proposed modifications to the Cool Keeper Program.

<u>October 26, 2016 – DSM Steering Committee</u>

- Provided updates on the Low Income Weatherization Program,
- Provided updates on the Home Energy Savings and New Homes Programs,
- Discussed the DSM Fall Semi-Annual Forecast Report,
- Discussed upcoming proposed adjustments to the Schedule 193 surcharge rate,
- Discussed the necessity of future New Homes Program evaluations, and
- Discussed shifting evaluation, measure, and verification costs from program level to sector level.

<u>December 20, 2016 – DSM Advisory Group</u>

- Discussed the 2016 Smart Grid,
- Reviewed the 2017 DSM Strategic Plan, and
- Reviewed completed program evaluations for *watt*smart Business Strategic Energy Management and New Homes.

<u>December 20, 2016 – DSM Steering Committee</u>

- Discussed how the Company communicates with the DSM Steering Committee, and
- Reviewed the Annual Energy Efficiency and Peak Reduction Report requirements.

DSM EXPENDITURES

Energy efficiency and peak reduction activities are funded by revenue collected through Schedule 193. Expenditures are charged as incurred. The DSM balancing account is the mechanism used for managing Schedule 193 revenues collected and tracking the offsetting DSM incurred expenses. The balancing account summary for 2016 is shown in Table 4.

Table 4
Schedule 193 Balancing Account Summary

Month	Monthly Program Costs	Monthly Net Accrued Costs*	Rate Recovery	Carrying Charge	Cash Basis Accumulated Balance	Accrual Based Accumulated Balance
Balance Dec. 2015					$ 8,763,656	$ 14,269,913
Jan-16	$ 3,957,447	$ (640,324)	$ (6,219,137)	$ 49,232	$ 6,551,198	$ 11,417,132
Feb-16	$ 5,502,164	$ (97,141)	$ (5,812,722)	$ 41,254	$ 6,281,894	$ 11,050,687
Mar-16	$ 4,010,643	$ (101,376)	$ (5,114,181)	$ 21,274	$ 5,199,630	$ 9,867,047
Apr-16	$ 3,649,184	$ 1,887,279	$ (5,036,557)	$ 16,710	$ 3,828,967	$ 10,383,663
May-16	$ 4,189,551	$ (1,727,122)	$ (5,313,045)	$ 12,116	$ 2,717,589	$ 7,545,164
Jun-16	$ 7,211,523	$ (962,707)	$ (6,686,875)	$ 11,051	$ 3,253,289	$ 7,118,156
Jul-16	$ 3,541,878	$ 1,301,933	$ (8,541,981)	$ 2,793	$ (1,744,022)	$ 3,422,778
Aug-16	$ 5,719,256	$ (1,630,704)	$ (8,970,591)	$ (12,496)	$ (5,007,852)	$ (1,471,757)
Sep-16	$ 4,877,906	$ 1,748,387	$ (7,603,915)	$ (23,625)	$ (7,757,487)	$ (2,473,004)
Oct-16	$ 5,085,219	$ (1,078,842)	$ (5,966,674)	$ (30,402)	$ (8,669,344)	$ (4,463,703)
Nov-16	$ 7,231,444	$ (769,695)	$ (5,240,777)	$ (28,458)	$ (6,707,135)	$ (3,271,189)
Dec-16	$ 5,685,831	$ (742,558)	$ (6,051,036)	$ (25,549)	$ (7,097,889)	$ (4,404,501)
2016 Total	**$ 60,662,046**	**$ (2,812,870)**	**$ (76,557,491)**	**$ 33,900**		

*December 2016 total accrual was $2,693,388

Column Explanations:

Monthly Program Costs - Monthly expenditures for all DSM program activities posted in 2016.

Monthly Net Accrued Costs - Monthly net change of program costs incurred during the period not yet posted.

Rate Recovery - Revenue collected through Schedule 193.

Carrying Charge - Monthly carrying charge based on "Cash Basis Accumulated Balance" of the account.

Cash Basis Accumulated Balance - A running total of account activities. A negative accumulative balance means cumulative revenue exceeds cumulative expenditures; positive accumulative balance means cumulative expenditures exceed cumulative revenue.

Accrual Based Accumulative Balance: Current balance of account including accrued costs.

PLANNING PROCESS

Integrated Resource Plan

The Company develops a biennial IRP as a means of balancing cost, risk, uncertainty, supply reliability/deliverability and long-run public policy goals.[15] The plan presents a framework of future actions to ensure the Company continues to provide reliable, reasonable-cost service with manageable risks to the Company's customers. Energy efficiency and peak management opportunities are incorporated into the IRP based on their availability, characteristics and costs.

Energy efficiency and peak management resources are divided into four general classes:

- Class 1 DSM (Resources from fully dispatchable or scheduled firm capacity product offerings/programs) – Capacity savings occur as a result of active Company control or advanced scheduling. After customers agree to participate, the timing and persistence of the load reduction is involuntary on their part within the agreed limits and parameters.
- Class 2 DSM (Resources from non-dispatchable, firm energy and capacity product offerings/programs) – Sustainable energy and related capacity savings are achieved through facilitation of technological advancements in equipment, appliances, lighting and structures or repeatable and predictable voluntary actions by customers to manage the energy use at their facility or home, also commonly referred to as energy efficiency resources.
- Class 3 DSM (Resources from price responsive energy and capacity product offerings/programs) – Short-duration energy and capacity savings from actions taken by customers voluntarily based on pricing incentives or signals.
- Class 4 DSM (Resources from non-incented behavioral-based savings achieved through broad energy education and communication efforts) – Energy and/or capacity reduction typically achieved from voluntary actions taken by customers to reduce costs or benefit the environment through education, communication and/or public pleas.

Class, 1, 2 and 3 DSM resources are included as resource options in the resource planning process. Class 4 DSM actions are not considered explicitly in the resource planning process, however, the impacts are captured naturally in long-term load growth patterns and forecasts.

As technical support for the IRP, a third-party demand-side resource potential assessment (Potentials Assessment) is conducted to estimate the magnitude, timing and cost of energy efficiency and peak management resources.[16] The main focus of the Potentials Assessment is on resources with sufficient reliability characteristics that are anticipated to be technically feasible and assumed achievable during the IRP's 20-year planning horizon. The estimated achievable energy efficiency potential identified in the 2015 Potentials Assessment for Utah is 7,454 GWh by

[15] Information on the Company's integrated resource planning process can be found at the following address: http://www.pacificorp.com/es/irp.html

[16] PacifiCorp Demand-Side Resource Potential Assessment For 2015-2034, http://www.pacificorp.com/es/dsm.html.

2034, or 22 percent of projected baseline loads.[17] By definition this is the energy efficiency potential that may be achievable to acquire during the 20-year planning horizon; prior to screening for cost effectiveness through the Company's integrated resource planning process.

The achievable technical potential of Class 2 (energy efficiency) resources for Utah by sector is shown in Table 5. The 2015 Potentials Assessment indicates that approximately 69 percent of the achievable technical potential for the Company, excluding Oregon,[18] is available within its Utah service area.[19]

Table 5
Utah Energy Efficiency Achievable Technical Potential by Sector

Sector	Cumulative GWh in 2034	Percent of Baseline Sales
Residential	2,025	21%
Commercial	4,017	32%
Industrial	1,369	12%
Irrigation	18	10%
Street Lighting	24	32%

Demand-side resources vary in their reliability, load reduction and persistence over time. Based on the significant number of measures and resource options reviewed and evaluated in the Potentials Assessment, it is impractical to incorporate each as a stand-alone resource in the IRP. To address this issue, Class 2 DSM measures and Class 1 DSM programs are bundled by cost for modeling against competing supply-side resource options reducing the number of discrete resource options the IRP must consider to a more manageable number.

The Company evaluates program implementation cost effectiveness (both prospectively and retrospectively) under a variety of tests to identify the relative impact and/or value (e.g. near-term rate impact, program value to participants, etc.) to customers and the Company.

Estimated Peak Contributions

The reported capacity reduction of 65 MW (at generation) for energy efficiency programs during 2016 represents the estimated MW impact of the energy efficiency portfolio during PacifiCorp's system peak period. An energy-to-capacity conversion factor developed from Class 2 DSM selections in the 2015 IRP is used to translate 2016 energy savings to estimated demand reduction during the system peak. The utilization of this factor in the MW calculation assumes that the energy efficiency resources acquired through the Company's programs have the same average load profile as those energy efficiency resources selected in the 2015 IRP. Utilization of this factor in determining the MW contribution of energy efficiency programs for 2016 is detailed in Table 6.

[17] Ibid, Volume 2, page 4-2.
[18] Oregon energy efficiency potentials assessments are performed by the Energy Trust of Oregon.
[19] Volume 1, Page 4-2, PacifiCorp Demand-Side Resource Potential Assessment for 2015-2034.

Table 6
Estimated Peak Contribution

Description	Value
First year energy efficiency program MWh savings acquired during 2016	334,147
Conversion factor: Coincident MW/MWh	0.000195
Estimated coincident peak MW contribution of 2016 energy efficiency acquisitions	65.01

PEAK REDUCTION PROGRAMS

Peak Reduction programs assist the Company in balancing the timing of customer energy requirements during heavy summer use hours. Peak reduction programs are intended to defer the need for higher cost investments in delivery infrastructure and peak generation resources that would otherwise be needed to serve those loads for a few select hours each year. These programs help the Company maximize the efficiency of the Company's existing electrical system and reduce costs for all customers.

Programs targeting capacity related resources are often specific to end use loads most prevalent in a given jurisdiction, such as the agricultural pumping and residential cooling loads in Utah. In 2016, the Company offered the *Irrigation Load Control* program (Schedule 105) for the agricultural sector and the *Air Conditioner Peak Management* Program (Cool Keeper Program, Schedule 114) for the residential and small commercial sectors.

The Peak Reduction Programs achieved a total of 127 MW of maximum realized demand reduction (gross at generation) in 2016. Cost effectiveness results for the reporting period are provided in Table 7.

Table 7
Cost Effectiveness for Load Control Portfolio[20]

Benefit/Cost Test	Benefit/Cost Ratio
PTRC	Pass
TRC	Pass
UCT	Pass
PCT	N/A
RIM	Pass

[20] Decrement values or avoided costs are considered confidential on load control programs. Cost effectiveness ratios and inputs will be available under a protective agreement. A "Pass" designation equates to a benefit to cost ratio of 1.0 or better.

Irrigation Load Control

The *Irrigation Load Control* program is offered to irrigation customers receiving electric service on Schedule 10, Irrigation and Soil Drainage Pumping Power Service. Participants enroll with a third party administrator and allow the curtailment of their electricity usage in exchange for an incentive. Customer incentives are based on a site's average available load during load control program hours adjusted for the number of opt outs or non-participation. The program hours are from 12 pm to 8 pm Mountain Time, Monday through Friday, and do not include holidays. For most participants, their irrigation equipment is set up with a dispatchable two-way control system giving the Company control over their loads. Participants are provided a day-ahead notification of control events and have the choice to opt-out of a limited number of dispatch events per season.

A summary of the program's cost effectiveness results, performance and participation for the reporting period of May 31, 2016 – August 19, 2016 are provided in Tables 8 and 9.

Table 8
Cost Effectiveness for Irrigation Load Control

Benefit/Cost Test	Benefit/Cost Ratio
PTRC	Pass
TRC	Pass
UCT	Pass
PCT	N/A
RIM	Pass

Table 9
Irrigation Load Control Program Performance

Total Enrolled MW (Gross – at Gen)	37
Maximum Potential MW (at Gen)	14
Average Realized load MW (at Gen)	11
Maximum Realized load MW (at Gen)	13
Participation Customers	56
Participation (Sites)	219

Program Management

The program manager who is responsible for the *Irrigation Load Control* programs in Utah is also responsible for the *Irrigation Load Control* program in Idaho and the *Cool Keeper* program in Utah along with *Home Energy Reports* program in Utah, Idaho and Wyoming. For each state the program manager is responsible for managing the program administrator, the cost effectiveness of the program, contracting with program administrator through a competitive bid process,

establishing and monitoring program performance and compliance, and recommending changes to increase participation.

Program Administration

EnerNoc administers and manages the *Irrigation Load Control* program through a pay-for-performance structure and is responsible for all aspects of the program, including

- Customer satisfaction including call center support,
- Marketing to maintain a minimum level of megawatt reductions,
- Field operations including installation and maintenance of the EnerNOC devices,
- Management of participation data and reporting to actively manage the program,
- Quality control of the Irrigation Load Control device infrastructure,
- A platform to dispatch the communication network, and
- Customer incentives.

Irrigation Load Control Events and Performance

There were eight load control events initiated in 2016. The date, time and estimated impact for each event is provided in Table 10.

Table 10
Irrigation Load Control Events

Date	Event	Event Times	Load Reduction - Utah at Gen (MW)
June 21, 2016	1	3pm-7pm MDT	11
June 27, 2016	2	3pm-7pm MDT	13
June 29, 2016	3	3pm-7pm MDT	11
July 21, 2016	4	3pm-7pm MDT	11
July 26, 2016	5	3pm-7pm MDT	12
July 28, 2016	6	3pm-7pm MDT	12
August 15, 2016	7	3pm-7pm MDT	8
August 17, 2016	8	3pm-7pm MDT	8

Program Changes

No program changes occurred during 2016.

Evaluation

No evaluation activities occurred during 2016.

Cool Keeper

The *Cool Keeper* program is an air conditioner direct load management program targeting residential and qualifying commercial customers (equipment size equal to or less than 15 tons) who cool their homes and businesses with electric central air conditioners. On select summer weekday afternoons, when electricity demand is at its highest, the *Cool Keeper* control equipment installed on a participating customer's cooling equipment is sent a signal to cycle the operation of the air conditioners compressor "off and on" for brief periods each hour in coordination with the air conditioners of other participating customers. For their participation, customers receive an annual bill credit of $5 to $40 per air conditioner depending on the size of the air conditioner and when the customer signed up. If the customer signs up prior to June 1, the incentive is $20 or $40 and depends on the size of the A/C unit. After June 1, the incentive is pro-rated.

The Cool Keeper load control system operates through two-way communications equipment with a wireless mesh network for improved control, measurement and verification of program performance.

A summary of the program's cost effectiveness, performance and participation are provided in Tables 11 and 12 below.

Table 11
Cost Effectiveness for Cool Keeper

Benefit/Cost Test	Benefit/Cost Ratio
PTRC	Pass
TRC	Pass
UCT	Pass
PCT	NA
RIM	Pass

Table 12
Program Performance for Cool Keeper

Total Enrolled MW (at Gen)	216
Maximum Potential MW (at Gen)	113
Average Realized Load MW (at Gen)	106
Maximum Realized MW (Gross – at Gen)	113
Total Participation	108,269

Program Management

The program manager who is responsible for the *Cool Keeper* program in Utah is also responsible for the *Irrigation Load Control* programs in Utah and Idaho along with *Home Energy Reports* in Utah, Idaho and Wyoming. The program manager is responsible for managing the program

administrators, the cost effectiveness of the program, identifying and contracting with the program administrator through a competitive bid process, establishing and monitoring program performance and compliance, and recommending changes in the terms and conditions set out in each tariff or state's compliance requirements.

Program Administration

The *Cool Keeper* program is administered by GoodCents and Eaton. GoodCents is responsible for:

- Field operations including trouble calls, installation, and maintenance of the Cool Keeper devices,
- Customer satisfaction including call center support,
- Management of Cool Keeper participation data and reporting to actively manage the program,
- Quality control of the Cool Keeper device infrastructure to ensure a 99% availability of active devices, and
- Marketing to maintain a minimum level of participation and megawatt reductions.

Eaton is responsible for:

- Manufacture and delivery of the Cool Keeper devices,
- Installation, operation, and maintenance of the wireless mesh communication network,
- Quality control of the wireless mesh network,
- A hosted solutions platform to dispatch and monitor the health of the communication network, and
- Program analytics including the ability to gain insight into the system and identify Cool Keeper devices which are no longer communicating.

Cool Keeper Load Control Events and Performance

There were three control events initiated in 2016. The date, time and estimated impact for each event is provided in Table 13.

Table 13
Cool Keeper Load Control Events

Date	Event	Event Times	Estimated Load Reduction - Utah at Gen (MW)
June 20, 2016	1	4:00PM – 7:00PM	105
June 22, 2016	2	4:00PM – 8:00PM	99
July 26, 2016	3	4:00PM – 4:31PM	113

Evaluation

No evaluation activities occurred during 2016.

ENERGY EFFICIENCY PROGRAMS

Energy Efficiency programs are offered to all major customer sectors: residential, commercial, industrial and agricultural. The overall energy efficiency portfolio included six programs: *Home Energy Savings* – Schedule 111, *Residential Refrigerator Recycling* – Schedule 117, *New Homes* – Schedule 110, *Home Energy Reports, Low Income Weatherization* – Schedule 118, and *Non-Residential Energy Efficiency* (*watt*smart Business) – Schedule 140. In addition to the energy efficiency programs, the Company, on behalf of customers, invested in outreach and education for the purpose of promoting the efficient use of electricity and improving program performance.

Energy efficiency savings are reported as ex-ante, gross and at site. In 2016, portfolio savings increased by approximately 7%, from 2015, while program-level expenditures decreased 1%. The portfolio was cost effective from four of the five cost tests. The ratepayer impact test was less than 1.0 indicating that there is near term upward pressure placed on the price per kWh given a reduction in sales. Cost effectiveness results of the 2016 Energy Efficiency Portfolio is provided in Table 14.

Table 14
Cost Effectiveness for Energy Efficiency Portfolio

Benefit/Cost Test	Benefit/Cost Ratio	Net Benefits
PTRC	1.75	$67,742,755
TRC	1.60	$53,425,784
UCT	2.60	$88,127,639
PCT	2.40	$130,370,608
RIM	0.73	($52,739,819)

Table 15 provides a program-level summary of Gross and Net savings acquired in 2016 at site and at generation.

Table 15
Energy Efficiency Gross and Net Savings[21]

Program	Gross kWh Savings at Site	Net kWh Savings at Site	Gross kWh Savings at Gen	Net kWh Savings at Gen
Low Income	210,154	147,108	229,737	160,816
Home Energy Reporting	49,244,502	49,244,502	53,833,105	53,833,105
Home Energy Savings	45,655,622	28,836,987	49,909,813	31,524,017
New Homes	3,290,951	1,950,276	3,597,602	2,132,003
Refrigerator Recycling	154,191	64,760	168,559	70,795
*watt*smart Business	209,941,939	152,055,251	226,408,290	155,310,847
Total	**308,497,359**	**232,298,884**	**334,147,105**	**243,031,582**

[21] Net savings include realization rates and NTG ratios.

The Company, working with its third-party program delivery administrators[22], collaborates with the following number of retailers, contractors and vendors in the delivery of its energy efficiency programs in Utah. Table 16 below lists the energy efficiency infrastructure. See Appendix 4 for a complete of Home Energy Savings retailers and Appendix 5 for the non-residential energy efficiency alliance.

Table 16
Energy Efficiency Infrastructure

Sector	Type	No.
Residential	Lighting Mid/Upstream Retailers	210
	Downstream Retailers	222
	HVAC Trade Allies	160
	Manufactured Homes Trade Allies	1
	Plumbing Contractors	2
	Weatherization Trade Allies	101
	Low Income Agencies	1
Commercial and Industrial	Lighting Trade Allies	173
	HVAC Trade Allies	75
	Motors Trade Allies	91

[22] See program specific information for backgrounds on third party administrators.

RESIDENTIAL PROGRAMS

The residential energy efficiency portfolio was comprised of five programs: *Home Energy Savings, Refrigerator Recycling*, *New Homes*, *Home Energy Reports*, and *Low Income Weatherization.* Residential savings decreased by approximately 40% from 2015. The decrease is largely driven by a reduction in savings in the *Home Energy Savings* program and the cancellation of the *Refrigerator Recycling* program.

The residential portfolio was cost effective based on four of the five standard cost effectiveness tests for the 2016 reporting period. Table 17 shows the cost effectiveness results for the residential portfolio.

Table 17
Cost Effectiveness for Residential Portfolio

Benefit/Cost Test	Benefit/Cost Ratio	Net Benefits
PTRC	1.87	$20,276,985
TRC	1.70	$16,313,425
UCT	2.48	$23,658,723
PCT	2.96	$44,108,028
RIM	0.68	($18,304,204)

Home Energy Savings

The *Home Energy Savings* program is designed to provide access to and incentives for more efficient products and services installed or received by customers in new or existing homes, multi-family housing units or manufactured homes for residential customers under Electric Service Schedules 1, 2, or 3. Landlords who own property where the tenant is billed under Electric Service Schedules 1, 2, or 3 also qualify for the program. Program cost effectiveness is provided in Table 18 below.

Table 18
Cost Effectiveness for Home Energy Savings

Benefit/Cost Test	Benefit/Cost Ratio	Net Benefits
PTRC	2.20	$21,182,692
TRC	2.00	$17,647,829
UCT	3.03	$23,668,611
PCT	2.98	$37,154,856
RIM	0.78	($10,180,461)

Program participation by measure category is provided in Table 19.

Table 19
Eligible Program Measure Categories (Units)

Measure Categories	Total kWh/Yr Savings @ Site	Total Incentive	Total Quantity
Appliances	652,823	$ 246,666	4,905
Building Shell	1,064,568	$ 595,717	3,306,714 (sq ft)
Energy Kits	213,736	$ 20,337	1,082
HVAC	10,191,265	$ 3,789,346	14,073
Lighting	33,518,040	$ 2,164,762	1,127,749
Water Heating	15,191	$ 7,000	11
Grand Total	**45,655,623**	**$ 6,823,828**	**1,147,820**

Program savings significantly decreased in 2016 compared to 2015. The decrease was primarily driven by a 94% decrease in CFL lighting. In 2016 manufacturers began reducing production of CFLS as they will no longer qualify under ENERGY STAR 2.0 specifications beginning in 2017.

Program Management

The program manager who is responsible for the *Home Energy Savings* program in Utah is also responsible for the *Home Energy Savings* program in Idaho and Wyoming. For each program and in each state the program manager is responsible for program cost effectiveness, identifying and contracting with the program administrator through a competitive bid process, establishing and

monitoring program performance and compliance, and recommending tariff changes in the terms and conditions.

Program Administration

The *Home Energy Savings* program is administered by CLEAResult, who is responsible for:

- Retailer and trade ally engagement – CLEAResult identifies, recruits, supports and assists retailers to increase the sale of energy efficient lighting, appliances and electronics. CLEAResult enters into promotion agreements with each lighting manufacturer and retailer for the promotion of discounted CFL and LED bulbs. The agreements include specific retail locations, lighting products receiving incentives and not-to-exceed annual budgets. Weatherization and HVAC trade allies engaged with the program are provided with program materials, training, and regular updates.
- Inspections – CLEAResult recruits and hires inspectors to verify on an on-going basis the installation of measures. A summary of the inspection process is in Appendix 3.
- Manage savings acquisition to targets within budget.
- Continual improvement of program operations and customer satisfaction.
- Incentive processing and call-center operations – CLEAResult receives all requests for incentives, determines whether the applications are completed, works directly with customers when information is incorrect and/or missing from the application and processes the application for payment.
- Program specific customer communication and outreach – A summary of the communication and outreach conducted by CLEAResult on behalf of the Company are outlined in Appendix 7.

The *Home Energy Savings* program administration contract for all states expired in 2016 and a new contract was established on April 1, 2016.

Infrastructure

The total number of retailers and trade allies who participated in the program was 696. The list of participating and non-participating retailers and trade allies by delivery channel and measure is provided in Appendix 4. Some retailers may have participated in more than one delivery type, so the count of unique participating firms may be less than the total count by delivery type.

Program Changes

In 2016, the *Home Energy Savings* program was renamed and restructured. *Home Energy Savings* is now marketed as the *wattsmart Homes* program. In addition, the *New Homes* program, Schedule 110, was canceled and consolidated under the *wattsmart Homes* program effective December 1, 2016. Also effective December 1, 2016, new offerings for smart thermostats were added and incentives for CFL bulbs and fixtures were retired. Effective January 1, 2017 existing offerings with low participation rates and/or high cost were retired:

- Clothes Washers
- Refrigerators

- Freezers
- Air Sealing
- Windows
- Whole Home Upgrade
- Whole-House Ducted Evaporative Coolers
- Best Practice Install and Proper Sizing for Central Air Conditioners
- Duct Sealing
- Duct Sealing with Insulation
- Duct Sealing in New Manufactured Homes

Evaluation

A process and impact evaluation was published for program years 2013-2014. Key findings include:

- High program satisfaction (99%) from non-lighting program participants, with corresponding high satisfaction with their installed measures, contractor and incentive amounts received.
- Non-lighting participants were mainly aware of the program through retailers and bill inserts.
- Overall NTG ratio was 70 percent.
- The program was cost effective over the two-year period, with a UCT of 2.04.

The full evaluation is available on the Company's website at http://www.pacificorp.com/es/dsm/utah.html

Refrigerator Recycling

The *Refrigerator Recycling* program, also known as "*See ya later, refrigerator*®," was designed to decrease electricity use through the voluntary removal and recycling of inefficient refrigerators and freezers. The program was available to residential, business customers and retailers.

On December 4, 2015, the Company filed to suspend the program in Docket No. 15-035-T17 due to the program administrator, JACO Environmental, effectively going out of business. Suspension of the program was granted by the Commission in its order issued December 3, 2015, with an effective date of January 4, 2016.

During December 2015, the Company began an expedited sole source procurement process to contract for remedial or "clean-up" appliance recycling services for customers that had signed up for the program, but were unable to be serviced due to JACO going out of business. A contract with Appliance Recycling Centers of America ("ARCA") was executed December 30, 2015, and customer outreach began in January 2016. ARCA contacted customers who had pick-ups scheduled with JACO that were canceled in late November and December 2015 and, if the customer was still interested, offer the same removal service and incentive. Clean-up services rendered by ARCA were conducted through March 2016.

On February 5, 2016, the Company filed to cancel the program in Docket No. 16-035-T02 due to its inability to administer the program cost effectively. The Commission granted the Company's request to cancel the program in its order issued March 1, 2016, with an effective date of March 6, 2016. Subsequently, the Company did not perform program-level cost effectiveness in this report. However, the costs and benefits are included in the Residential and Portfolio level cost effectiveness analysis.

Customer participation in ARCA's clean-up services for 2016 is provided in Table 20 by measure category.

Table 20
Clean-up Services Participation – Measures (Units)

Measure Categories	Total kWh/Yr Savings @ Site	Total Incentive	Total Quantity
Freezers	26,271	$ 810.00	27
Refrigerators	127,920	$ 3,120.00	104
Grand Total	**154,191**	**$ 3,930.00**	**131**

Evaluation

A process and impact evaluation was published for program years 2013-2014. Key findings include:

- Achieved 25,358,644 kWh evaluated gross savings; 98% of reported gross savings.

- Overall NTG was 44%. The program evaluation found high freeridership levels due to 43% of respondents claiming they would have disposed of their unit without the program.
- High program satisfaction.
- Participants learned of the program primarily through bill inserts, television, word-of-mouth, and the website.

The results of the evaluation can be viewed at http://www.pacificorp.com/es/dsm/utah.html.

New Homes

The *New Homes* program provided incentives for new homes and multi-family units meeting the specific energy efficiency requirements as outlined in the program's tariff. The *New Homes* program has shown success in helping improve building practices in Utah. To be eligible for program incentives, a home must have installed qualifying stand-alone measures, or a residence must meet the minimum standards and certifications set by the program.

The program was not cost effective from four of the five tests in 2016. The program has been cancelled. Cost effectiveness results are provided in Table 21.

Table 21
Cost Effectiveness for New Homes

Benefit/Cost Test	Benefit/Cost Ratio	Net Benefits
PTRC	0.53	($1,299,467)
TRC	0.48	($1,433,899)
UCT	0.92	($109,382)
PCT	1.29	$1,085,410
RIM	0.35	($2,445,872)

Program participation results for 2016 are provided in Table 22 below.

Table 22
New Homes Program Participation

Single Family Measures	Total KWh Saving @ Site	Total Incentives	Total Quantity
High Performance ENERGY STAR Home: Single Family - UT	5,015	$2,500	5
ENERGY STAR Home: Single Family - UT	354,349	$174,750	695
80% ENERGY STAR lighting - Small Home: Single Family - UT	110,619	$9,640	241
80% ENERGY STAR lighting - Medium Home: Single Family - UT	530,005	$47,820	797
80% ENERGY STAR lighting - Large Home: Single Family - UT	382,096	$45,760	572
60% ENERGY STAR lighting - Small Home: Single Family - UT	10,168	$775	31
60% ENERGY STAR lighting - Medium Home: Single Family - UT	76,950	$7,290	162
60% ENERGY STAR lighting - Large Home: Single Family - UT	62,010	$8,450	130
95% AFUE Gas furnace with ECM: Single Family - UT	248,040	$119,250	795
HVAC Quality Installation Contractor Certification: Single Family - UT			
HVAC Quality Installation Rater Certification: Single Family - UT	123,704	$65,800	658
Exterior Wall Upgrade - 2x6 R-20: Single Family - UT	189,441	$97,650	1,953
Geothermal Heat Pump: Single Family - UT	7,052	$3,500	2
High Efficiency Air Conditioning: Single Family - UT	18,357	$8,700	87
Air-Source Heat Pump: Single Family - UT	1,586	$500	2
Above Code Home - Builder Certified: Single Family -UT	165	$125	5
Above Code Home - Rater certified: Single Family - UT	64,258	$42,275	1,691
R-5 Windows: Single Family - UT	75	$24	1
CEE Tier 3 Refrigerator: Single Family - UT			
Premium Evaporative Equipment - Ducted: Single Family - UT			
Premium Evaporative Equipment - Non-Ducted: Single Family - UT	1,406	$500	1
Total for Single Family	**2,185,296**	**$635,309**	**7,828**

Multi Family Measure	Total KWh Saving @ Site	Total Incentives	Total Quantity
High Performance ENERGY STAR Home: Multifamily - UT			
ENERGY STAR Home: Multifamily - UT	210,192	$104,400	696
80% ENERGY STAR lighting - Small Home: Multifamily - UT	221,676	$22,620	1,131
80% ENERGY STAR lighting - Medium Home: Multifamily - UT	388,362	$30,420	1,014
80% ENERGY STAR lighting - Large Home: Multifamily - UT	45,236	$3,440	86
60% ENERGY STAR lighting - Small Home: Multifamily - UT	5,600	$600	40
60% ENERGY STAR lighting - Medium Home: Multifamily - UT	42,588	$3,120	156
60% ENERGY STAR lighting - Large Home: Multifamily - UT	19,552	$1,560	52
95% AFUE Gas furnace with ECM: Multifamily - UT	8,736	$4,200	28
HVAC Quality Installation Contractor Certification: Multifamily - UT			
HVAC Quality Installation Rater Certification: Multifamily - UT	60,514	$38,300	766
Exterior Wall Upgrade - 2x6 R-20: Multifamily - UT	20,741	$11,852	2,963
Geothermal Heat Pump: Multifamily - UT			
High Efficiency Air Conditioning: Multifamily - UT	3,708	$2,700	36
Air-Source Heat Pump: Multifamily - UT			
Above Code Home - Builder Certified: Multifamily - UT			
Above Code Home - Rater certified: Multifamily - UT	78,750	$46,875	1,875
CEE Tier 3 Refrigerator: Multiamily - UT			
Premium Evaporative Equipment - Ducted: Multifamily - UT			
Premium Evaporative Equipment - Non-Ducted: Multifamily - UT			
Total for Multi Family	**1,105,655**	**$270,087**	**8,843**
Grand Total for Single and Multi Family	**3,290,951**	**$905,396**	**16,671**

Program Management

The program manager responsible for the *New Homes* program in Utah is also responsible for new home services found in the *Home Energy Savings* program in Utah, Idaho and Wyoming. For each program and in each state the program manager is responsible for the cost effectiveness of the program, identifying and contracting with the program administrator through a competitive bid process, establishing and monitoring program performance and compliance, and recommending changes in the terms and conditions set in each state's compliance requirements.

Program Administration

The *New Homes* program was administered by Nexant, Inc. ("Nexant"). Nexant's services include design, implementation and evaluation of commercial, industrial, and residential energy efficiency program in the United States. The Company contracts with Nexant to provide coordination and application processing services for the *New Homes* program. Specifically, Nexant is responsible for the following:

- Builder and trade ally engagement – Identifies, recruits, supports and assists builders and their sub-contractors to increase energy efficiency standards in new residential construction.
- Incentive processing and administrative support – Handles incoming inquiries as assigned, processes incentive applications, provide program design services, evaluation and regulatory support upon request.
- Inspections – Verifies on an on-going basis the installation of measures. Summary of the inspection process is in Appendix 3.
- Program specific customer communication and outreach.

The program administrator contract for *New Homes* expired at the end of 2016. The program was transitioned to CLEAResult effective December 1, 2016.

Infrastructure

The program processed 16,671 measures in 5,973 homes in 2016. In addition, the program provided training sessions and promotional support including:

- Program staff participated on the board of directors of the Salt Lake Home Builder Associations and Utah State Home Builders Association.
- Quarterly meetings with home raters.

Program Changes

In 2016, the *New Homes* program was canceled under Schedule 110 and consolidated under the *wattsmart Homes* program, Schedule 111, effective December 1, 2016. The new program includes the following stand-alone measures:

- Central Air Conditioner, $\geq$ 15 SEER
- Gas Furnace, $\geq$ 95% AFUE with ECM

The new qualification for whole home performance is based on a Home Energy Rating System (HERS), a scoring system for home efficiency. The system is based on a software analysis of home plans that takes into consideration all details of the home such as orientation, insulation values, window to wall ratio, HVAC efficiency, water heating efficiency, envelope tightness, duct leakage, and lighting efficiency. This program design allows builders flexibility in reaching measure compliance and all incentive applications are submitted by trained HERS raters, which reduces administrative costs when compared to the previous program design of all stand-alone measures.

Evaluation

A process and impact evaluation for program years 2013 – 2014 was published in 2016. Key findings include:

- High freeridership levels for stand alone measures (52%).
- High program satisfaction amongst active participating builders and home energy raters.
- The program administrator, Nexant, reports that the primary barrier to attracting builders to participate is persuading them to build their homes differently and more efficiently.
- According to the nonparticipant homeowner surveys, the average nonparticipant new home had energy efficient lighting installed in 68% of available sockets, and one-half of these homes had energy efficient lighting installed in at least 80% of available sockets.

The results of the evaluation can be viewed at http://www.pacificorp.com/es/dsm/utah.html.

Home Energy Reports

The *Home Energy Reports* program is a behavioral program designed to decrease participant energy usage by providing comparative energy usage data for similar homes located in the same geographical area. Additionally, the report provides the participant with information on how to decrease their energy usage. Equipped with this information, participants can modify behavior and/or make structural equipment, lighting or appliance modifications to reduce their overall electric energy consumption.

The program's cost effectiveness is provided in Table 23.

Table 23
Cost Effectiveness for Home Energy Reports

Benefit/Cost Test	Benefit/Cost Ratio	Net Benefits
PTRC	1.13	$359,711
TRC	1.03	$76,242
UCT	1.03	$76,242
PCT	N/A	N/A
RIM	0.34	($5,498,773)

In 2016, the program achieved total savings at site of 49,244,502 kWh; 24,433,796 kWh for the legacy group, 22,871,929 kWh for the expansion group and 1,938,777 kWh from the refill group. The "legacy" group is defined as the 2012 initial participant wave, the "expansion" group is defined as the 2014 participant expansion wave and the "refill" group is defined as the additional customers added in August 2016.

Reports were initially provided to approximately 95,000 customers in the legacy group and an additional 220,000 customers were added to the expansion group. In order to address customer attrition, a refill wave of 39,000 customers was added in August 2016. The number of participant's decreased over time due to customer attrition related to general customer churn (customer move-outs) and customers requesting to be removed from the program. To date, only 1.9% of customers have requested to be removed from the program. As of December 2016, 267,084 customers were active recipients of Home Energy Reports. In 2016, 343 customers opted out of the program. Total savings and participation by group is provided in Table 24.

Table 24
Savings and Participation for Home Energy Reports

	Legacy	Expansion	Refill	Total
2016 Savings kWh	24,433,796	22,871,929	1,938,777	49,244,502
Dec. 2016 Participation	68,615	161,423	37,046	267,084

All participating customers may request an electronic version delivered via email and have access to a web portal containing the same information about their usage provided in the report. In addition, all Utah residential customers have access to a web portal which contains other benefits such as a home energy audit tool, the ability for customers to update their home profile (for more accurate comparisons), understand annual usage, see how weather impacts usage, and suggestions on more ways to save energy around their home.

Program Management

The program manager responsible for the *Home Energy Reports* program in Utah is also responsible for the program in Idaho and Wyoming, the *Irrigation Load Control* in Utah and Idaho, and the *Cool Keeper* program in Utah. For each program and in each state the program manager is responsible for the cost effectiveness of the program, identifying and contracting with the program administrator through a competitive bid process, establishing and monitoring program performance and compliance, and recommending changes in the terms and conditions set in each state's compliance requirements.

Program Administration

The *Home Energy Reports* program is administered by Oracle. Oracle's software creates individualized energy reports for utility customers that analyze their energy usage and offers recommendations on how to save energy and money by making small changes to their energy consumption. The Company contracts with Oracle to provide energy savings, software services, and printing and delivery of energy reports to customers.

Oracle is responsible for the following:

- Selecting Qualifying Customers – Oracle conducts an analysis to identify qualifying customers that are then randomly selected into the program's treatment (those who will receive reports) and control groups (for measurement and verification).
- Customer Comparison Analysis – Oracle conducts statistical analysis to perform pattern recognition in order to derive actionable insights to selected customers. Oracle uses information about customers' homes (e.g., size, heat type, home type) to find similar homes for comparison.
- Energy Report Delivery – By mail or email.
- Web Portal Design and Support – Oracle operates and maintains a customer Web portal that participants may visit for additional information about their energy usage and saving opportunities, including an online home energy audit.

Evaluation

A process and impact evaluation for program years 2014 – 2015 was published in 2016. Both the legacy and expansion waves were evaluated. The primary objective of the evaluation report was to determine the extent to which participants in the *Home Energy Reports* program reduced their energy consumption due to the program. Secondary objectives were to report on customer

satisfaction with the program, and on behavioral and information effects of the program. Key findings from the evaluation include:

- Savings remained relatively stable across the two years for the Legacy Wave. Expansion Wave reflect the start of this wave in late 2014 and ramp-up into 2015.
- Savings has leveled off for the Legacy Wave since its inception in 2012. This is common for a mature program. The Expansion Wave demonstrates increasing savings over time as is frequently found with newer waves.
- Total double-counted savings was 0.16% of total savings for SYLR and HES programs which means treatment customers were slightly less likely than control customers to participate in other RMP energy efficiency program, thus, double-counting of energy savings does not appear to be a concern. Additionally, Navigant found no evidence of double-counting in the HES upstream lighting program.
- The program was cost effective across all years with the exception of the RIM test.
- Legacy Wave reported lower satisfaction with HER (54%) compared to Expansion Wave (71%). Legacy group had less confidence that the reports were accurate and cited neighbor comparisons as the least valuable component. It is common with HER programs that higher average usage participants report lower overall satisfaction.

The results of the evaluation can be viewed at http://www.pacificorp.com/es/dsm/utah.html.

Low Income Weatherization

The *Low Income Weatherization* program provides energy efficiency services to income-eligible households through a partnership with the Utah Department of Workforce Services, Housing and Community Development Division ("HCD"). Services are at no cost to the program participants.

In 2016, the program achieved savings at site of 210,154 kWh and served 332 homes. The measures installed through the *Low Income Weatherization* program are limited to those that reduce electricity use in participant's homes. The majority of homes served are not electrically heated and do not have electric water heaters. Therefore, most of the Company funds cover lighting and refrigerator replacement costs.

Cost effectiveness results for 2016 are provided in Table 25.

Table 25
Cost Effectiveness for *Low Income Weatherization*

Benefit/Cost Test	Benefit/Cost Ratio	Net Benefits
PTRC	1.66	$38,906
TRC	1.51	$29,974
UCT	1.51	$29,974
PCT	N/A	N/A
RIM	0.41	($127,437)

Total savings, measure type and the corresponding numbers of homes that installed the measure type are provided in Table 26.

Table 26
Total Savings, Homes Served and Measure Counts

Total kWh Savings @ Site	210,154
Participation – Total number of Homes Served	332
Measure Type Installed in Each Home	**#**
Ceiling Insulation	4
Duct Sealing	1
Furnace Fans	116
Compact Fluorescent Light Bulbs	282
Refrigerator Testing on Models not Replaced	49
Refrigerator Replacements	43
Energy Education	3
Light Emitting Diode Light Bulbs	6
Window Replacement	3

Program Management

The program manager responsible for the *Low Income Weatherization* program in Utah is also responsible for the *Low Income Weatherization* program in California, Idaho, Washington and Wyoming; energy assistance programs in Utah, California, Idaho, Oregon, Washington and Wyoming; and bill discount programs in Utah, California and Washington. The program manager is responsible for the cost effectiveness of the weatherization program in each state, partnerships and agreements in place with agencies that serve income eligible households, establishing and monitoring program performance and compliance, and recommending changes in the terms and conditions set out in the agency contracts and state specific tariffs.

Program Administration

The Company currently has a contract in place with HCD to provide services through the *Low Income Weatherization* program. The state agency receives federal funds and subcontracts with seven non-profit agencies that install energy efficiency measures in the homes of income eligible households throughout the Company's service area. Company funding of 50 percent of the cost of approved measures is leveraged by HCD with the federal funding they receive, allowing more homes to be served each year.

By contract with the Company, HCD and their subcontracting local agencies are responsible for the following:

- Income Verification – The local agencies determine if participants are income eligible based on HCD guidelines. Household's interested in obtaining weatherization services apply through the agencies. The current income guidelines can be viewed at www.benefits.gov/benefits/benefit-details/1884.
- Energy Audit – Agencies use a United States Department of Energy approved audit tool to determine the cost effective measures to install in the participant's homes (audit results must indicate a savings to investment ratio of 1.0 or greater).
- Installation of Measures – Agencies install the energy efficiency measures.
- Post Inspections – Agencies inspect 100 percent of completed homes. HCD also inspects a random sample of homes. See Appendix 3 for verification summary.
- Billing Notification – HCD is required to submit a billing to Company within 60 days after job completion. They include a form indicating the measures installed and associated cost on each completed home along with their invoice.

Program Changes

Effective March 1, 2016, LEDs were added to the list of efficiency measures eligible for funding.

Evaluation

The Company initiated a process and impact evaluation for program years 2013 – 2015 by Opinion Dynamics. The evaluation is anticipated to be published in 2017.

NON-RESIDENTIAL ENERGY EFFICIENCY

The *Non-Residential Energy Efficiency* program is promoted to the Company's customers as *watt*smart Business. The *watt*smart Business program is intended to maximize the efficient utilization of electricity for new and existing non-residential customers through the installation of energy efficiency measures and energy management protocols. Qualifying measures are any measures which, when implemented in an eligible facility, result in verifiable electric energy efficiency improvements.

Total non-residential program savings at site increased 74 percent from 2015, from 120,368,311 kWh in 2015 to 209,941,939 kWh in 2016. Energy savings from the commercial sector had the largest savings increase.

The program was cost effective from every test perspective except the RIM. Cost effectiveness results for 2016 are provided in Table 27.

Table 27
Cost Effectiveness for Non-Residential Energy Efficiency

Benefit/Cost Test	Benefit/Cost Ratio	Net Benefits
PTRC	1.76	$49,030,247
TRC	1.60	$38,676,836
UCT	2.76	$66,033,394
PCT	2.22	$86,262,581
RIM	0.76	($32,871,138)

Total incentives, savings and completed projects are provided in Table 28 by customer sector.

Table 28
Participation by Sector

Project Sector	Total kWh Savings @ Site	Cash Incentive	Bill Credits	Total # of Projects
Agricultural	10,851,979	$1,092,703		47
Commercial	133,500,517	$15,772,961	$1,360,288	3910
Industrial	65,589,443	$6,419,090	$2,110,112	339
Grand Total	**209,941,939**	**$23,284,754**	**$3,470,400**	**4,296**

Services offered through the program include:

- Typical Upgrades: Provides streamlined incentives for lighting, HVAC, compressed air and other equipment upgrades that increase electrical energy efficiency and exceed code requirements.
- Small Business Direct: Provides enhanced incentives and direct installation of lighting retrofits to qualified small business customers (Note: this offer was suspended in July 2015 due to over participation and was re-launched in September 2016).
- Custom Analysis: Offers investment-grade energy analysis studies and recommendations for more complex projects.
- Energy Management: Provides expert facility and process analysis to help lower energy costs by optimizing customer's energy use.
- Energy Project Manager Co-funding: Available to customers who can commit to an energy savings of a minimum of 1,000,000 kWh/year.
- Midstream/LED instant incentive: Provides instant, point-of-purchase incentive for LED lamps and retrofit kits sold through qualifying participating distributors. Customers purchasing lamps from non-participating suppliers can apply for incentives after purchase.

Total savings, projects and incentives by measure category are provided in Table 29 below.

Table 29
Participation by Measure Category

Measure Categories	Total kWh/Yr Savings	Cash Incentive	Bill Credit	Total kW/Yr Savings	Total # of Projects
Additional Measures	6,679,791	$ 811,710	$ -	356	16
Building Shell	1,667,897	$ 529,533	$ -	666	169
Compressed Air	4,587,664	$ 582,506	$ 75,030	255	35
Direct Install	588,199	$ 168,812		1,728	97
Electronics	721,675	$ 40,225	$ -	140	3
Energy Management	20,149,968	$ 402,999	$ -	1,421	57
Energy Manager Co-Funding	-	$ 476,366	$ -	-	7
Farm & Dairy	67,050	$ 3,950	$ -	9	2
Food Service Equipment	5,978,926	$ 610,055	$ -	875	133
HVAC	18,665,056	$ 2,469,514	$ 118,585	3,396	230
Irrigation	761,772	$ 91,872	$ -	200	34
Lighting	128,241,826	$ 14,597,776	$ 2,975,645	16,553	3,399
Motors	18,013,297	$ 1,998,155	$ 283,306	1,880	101
Refrigeration	3,818,818	$ 501,282	$ 17,833	321	13
Grand Total	**209,941,939**	**$ 23,284,754**	**$ 3,470,400**	**27,800**	**4,296**

Program Administration

The program is primarily administered through two delivery channels that are differentiated based upon customer needs: contracted DSM delivery and internal DSM delivery.

Contracted DSM Delivery

The contracted DSM delivery channel generally targets typical opportunities which serves small to medium sized business customers and, to a lesser extent, large business customers. Administration is provided through Company contracts outlined below by contractor and associated tasks:

- Nexant, Inc. ("Nexant") manages trade ally coordination, midstream incentives, trade ally training and application processing services for commercial measures.
- Cascade Energy ("Cascade") manages trade ally coordination, midstream incentives, trade ally training and application processing services for industrial and agricultural measures.
- Willdan Energy Solutions ("Willdan") manages coordination, outreach training and application processing services for the small business direct installation offering.

Nexant and Cascade are responsible for the following:

- Trade ally engagement – includes identification, recruiting, training, supporting and assisting trade allies to increase sales and installation of energy efficient equipment at qualifying business customer facilities.
- Incentive processing and administrative support – includes handling incoming inquiries as assigned, processing incentive applications, developing and maintaining standardized analysis tools, providing program design services, and evaluation and regulatory support upon request.
- Custom analysis and project facilitation for small/medium customer projects.
- Managing savings acquisition to targets within budget.
- Continual improvement of program operations and customer satisfaction.
- Inspections – includes verifying on an on-going basis the installation of measures. A summary of the inspection process is in Appendix 3.

Willdan is responsible for the following:

- Small business engagement - includes identification, outreach, assessing/auditing, installing and inspecting installation of energy efficient equipment at qualifying business customer facilities.
- Administrative support – includes handling incoming inquiries as assigned, processing applications, developing and maintaining standardized analysis tools, providing program design services, and evaluation and regulatory support upon request.
- Managing savings acquisition to targets within budget.
- Continual improvement of program operations and customer satisfaction.

Internal DSM Delivery

The internal DSM delivery channel targets large energy users who generally have multiple opportunities for energy efficiency improvements, such as those that require complex custom analysis. These large projects are administered by internal Company project managers and allows for a single point of contact to assist customers with their various opportunities. In this delivery channel, project managers are responsible for the following:

- Single point of contact for large customers to assist with their energy efficiency projects.
- Provide customer outreach and education of energy efficiency opportunities.
- Facilitate custom energy efficiency analysis, quality assurance and verification of savings through a pre-contracted group of engineering firms. See table 30.
- Manage engineering firms to ensure program compliance, quality of work and customer satisfaction.
- Manage *watt*smart Business projects through the entire project lifecycle.

The contracts for the outsourced delivery channel expired June 30, 2016. Following a competitive bid process, these contracts were awarded to Nexant and Cascade for another 3-year term. A third contract, awarded to Willdan, will administer the Small Business Direct Installation offer within the *watt*smart Business Program. Additional information is included in the Program Changes section.

Infrastructure

Contracted DSM Delivery

To help increase and improve the supplier and installation contractor infrastructure for energy-efficient equipment and services, the Company established and developed trade ally networks for lighting, HVAC, motors/VFDs, and irrigation. This work includes identifying and recruiting trade allies, providing program and technical training and providing sales support on an ongoing basis. The current list of the trade allies who have applied and been approved as participating vendors are posted on the Company website and is included as Appendix 5 to this report. In most cases, customers are not required to select a vendor from these lists to receive an incentive[23].

The current counts of participating trade allies by technology are in Table 30 below.

Table 30
Participating Trade Allies[24]

Lighting	HVAC	Motors and VFD
173	75	91

[23] Customers receiving Small Business Lighting incentives are required to use an approved contractor selected from a competitive request for bid process.
[24] Some trade allies may participate in more than one technology. Therefore, the count of unique participating firms is less than the total count provided above.

Internal DSM Delivery

Given the diversity of the non-residential customers served by the Company, a pre-approved, pre-contracted group of engineering firms are used to perform facility specific energy efficiency analysis, quality assurance and verification services. Each customer's project is directly managed by one of the Company's in-house project managers. The project manager works directly with the customer or through the appropriate Company regional business manager located in Utah.

On October 31, 2016 the contracts for engineering firms providing these services expired. Consequently, the Company initiated a request for proposals in early 2016 to obtain contracts with qualified firms to provide these services to customers. Twelve firms were selected. Table 31 lists the engineering firms under contract with the Company both before this bid cycle and afterward.

Table 31
Energy Engineering Firms

Engineering Firm	Main Office Location	Contracted prior to 10/31/16	Contracted after 11/01/16
Abacus Resource Management Company	Beaverton, OR	X	
Brendle Group	Fort Collins, CO	X	X
Cascade Energy Engineering	Cedar Hills, UT	X	X
Compression Engineering Corp	Salt Lake City, UT	X	
Ecova	Portland, OR	X	
EMP2, Inc	Richland, VA	X	X
Energy Resource Integration, LLC	Sausalito, CA	X	X
Energy and Resource Solutions	North Andover, MA	X	
EnerNOC Inc.	Portland, OR	X	
EnSave, Incorporated	Richmond, VT	X	X
ETC Group, Incorporated	Salt Lake City, UT	X	X
Evergreen Consulting Group	Beaverton, OR	X	X
Fazio Engineering	Weston, OR	X	
kW Engineering, Inc.	Salt Lake City, UT	X	X
Lincus Incorporated	Tempe, AZ	X	
Nexant, Incorporated	Salt Lake City, UT	X	X
QEI Energy Management, Inc.	Beaverton, OR	X	
RM Energy Consulting	Pleasant Grove, UT	X	X
Rick Rumsey, LLC	Ammon, ID	X	X
SBW Consulting, Inc.	Bellevue, WA	X	
Solarc Architecture & Engineering, Inc.	Eugene, OR	X	X
Triple Point Energy	Portland, OR	X	

Program Changes

Several notable changes occurred within the *watt*smart Business Program in 2016 that targeted the small business sector and lighting. These changes include the redesign of the Small Business Lighting offer to the Small Business Direct Installation offer, and a restructuring of LED lighting incentives.

Small Business Lighting was restructured to Small Business Direct Installation. The program change was designed to expand the program offering from lighting to additional energy efficient measures. The intent is to benefit the small business market segment through offering an incentive, in the form of a direct installation of energy efficient measures, by a certified and/or licensed contractor. This program will target specific geographical areas and is intended to include energy audits of customers' facilities identifying qualifying energy savings measures that could be installed, and the associated costs. Project proposals based on completed audits will be provided that fit within customers' operational and budgetary parameters. Customers can then choose to move forward with the entire project installing all qualifying upgrades, or select a portion of qualifying upgrades from the project proposal. Depending on the size and demographics of each area, the following tactics may be used to engage with Small Business customers:

- Direct customer events,
- Community fairs, street fairs, and "Main Street" events,
- Geo-targeted pop-up events and workshops
- City Council and Chamber of Commerce Meetings,
- Trade/Business Association Events,
- Door to door (in person and print)
- Digital (website), and
- Direct-mail, email blasts or print media.

The newly designed Small Business Direct Install offer is structured to increase participation, particularly in rural communities where program participation has historically been lower than urban communities. As mentioned in the Program Administration section, a new outsourced delivery contractor, Willdan, will administer this program.

The Company also restructured LED lighting. LED technology has become the predominant lighting technology in energy efficiency projects, and that trend is anticipated to continue. Long lamp life (30,000 hours+), reduced lifetime maintenance costs, absence of hazardous materials (i.e. mercury), controllability, and higher efficacy (lumens/watt) and decreasing costs relative to traditional technologies have contributed to a shift toward using LED products on most energy efficiency projects.

To address the continuing and rapid shift to more efficient LED technologies, the Company revamped the form and value of lighting incentives listed in the lighting retrofits table on the website. The Company moved away from incenting lighting in technology-specific categories and transitioned to a true pay-for-savings approach. Under the new incentive structure interior, exterior and street/pole lighting are all incentivized at a specific cost per kWh saved, regardless of what

type of technology is installed. Lighting incentives were also lowered proportionately due to decreasing costs for LED technology.

Evaluation

The Strategic Energy Management component of *watt*smart Business was evaluated. The report was published in 2016 and evaluated two projects over the 2014 – 2015 program years. Key findings include:

- Necessary framework exists.
- Refine vetting of potential participants.
- Older billing system does not support automated data collection and reporting.
- Not cost effective for smaller customers with less savings.

The *watt*smart Business program evaluation for program years 2014-2015 was in progress during 2016. It was published in early 2017.

The results of the evaluation can be viewed at http://www.pacificorp.com/es/dsm/utah.html.

COMMUNICATIONS, OUTREACH AND EDUCATION

*watts*mart is an overarching energy efficiency campaign with the overall goal to engage customers in reducing their energy usage through behavioral changes, and pointing them to the programs and information to assist them. “Rocky Mountain Power wants to help you save energy and money” is the key message, and the Company utilizes earned media, customer communications, education and outreach, advertising and program specific marketing to communicate the value of energy efficiency, provide information regarding low-cost, no-cost energy efficiency measures and to educate customers on the availability of programs, services and incentives.

A summary of 2016 (Year 7) “Utah Demand-side Management Outreach and Communications Campaign” is included in Appendix 7.

EVALUATIONS

Evaluations are performed by independent external evaluators to validate energy and demand savings derived from the Company's energy efficiency programs. Industry best practices are adopted by the Company with regards to principles of operation, methodologies, evaluation methods, and protocols including those outlined in the National Action Plan for Energy Efficiency Program Impact Evaluation and the California Evaluation Framework guides.

A component of the overall evaluation efforts is aimed at the reasonable verification of installations of energy efficient measures and associated documentation through review of documentation, surveys and/or ongoing onsite inspections.

Verification of the potential to achieve savings involves regular inspection and commissioning of equipment. The Company engages in programmatic verification activities, including inspections, quality assurance reviews, and tracking checks and balances as part of routine program implementation and may rely upon these practices in the verification of installation information for the purposes of savings verifications in advance of more formal impact evaluation results. A summary of the inspection process is included in Appendix 3.

Evaluation, measurement and verification tasks are segregated within the Company organization to ensure they are performed and managed by personnel who are not directly responsible for program management.

Information on evaluation activities completed or in progress during 2016 is summarized in the chart below. A summary of the recommendations are provided in Appendix 6. The evaluation report is available at www.pacificorp.com/es/dsm/utah.html

Program	Years Evaluated	Evaluator	Progress Status
Home Energy Savings	2013 – 2014	Cadmus	Completed
Home Energy Reports	8/1/2012 - 1/31/2014	Navigant	Completed
New Homes	2013 - 2014	Cadmus	Completed
Refrigerator Recycling	2013 - 2014	Cadmus	Completed
Strategic Energy Management	2014 - 2015	Cadmus	Completed
*watt*smart Business	2014 - 2015	Cadmus	Completed in 2017
Home Energy Savings	2015 - 2016	Cadmus	In Progress
Low Income Weatherization	2013 - 2015	Opinion Dynamics	In Progress

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Appendix 2

Utah Cost Effectiveness

NAVIGANT

Utah Portfolio Level

Navigant estimated the cost-effectiveness for the overall energy efficiency portfolio and component sectors, based on 2016 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall energy efficiency portfolio and the two sector components.

The portfolio passes the cost-effectiveness for all the tests except the RIM test. The memo consists of the following tables.

Table 1 - Utility Inputs

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.32%
Commercial Line Loss	8.71%
Industrial Line Loss	5.85%
Irrigation Line Loss	9.24%
Residential Energy Rate ($/kWh)	$0.1111
Commercial Energy Rate ($/kWh)	$0.0852
Industrial Energy Rate ($/kWh)	$0.0605
Irrigation Energy Rate ($/kWh)	$0.0778
Inflation Rate[1]	1.9%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 – Portfolio Level Costs 2016

Expense	Cost
Outreach & Communications Campaign	$1,317,861
Portfolio Technical Reference Library	$26,223
Portfolio Potential Study	$58,754
Portfolio Training	$36,588
DSM Central	$125,051
Total Costs	**$1,564,477**

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Suite 200 | Boulder, CO 80302
303.728.2500 main
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Table 3 – Benefit/Cost Ratios by Portfolio Type

Measure Group	PTRC	TRC	UCT	RIM	PCT
DSM Portfolio with Load Control Programs	1.89	1.72	1.94	0.89	2.61
Total Energy Efficiency Portfolio	1.75	1.60	2.60	0.73	2.40
C&I Programs	1.76	1.60	2.76	0.76	2.22
Residential Programs	1.87	1.70	2.48	0.68	2.96
Load Control Programs	2.16	1.97	1.38	1.38	n/a

Table 4 – 2016 DSM Portfolio with Load Control Programs Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	n/a	$134,221,176	$253,691,255	$119,470,080	1.89
Total Resource Cost Test (TRC) No Adder	n/a	$134,221,176	$230,628,414	$96,407,238	1.72
Utility Cost Test (UCT)	n/a	$118,631,986	$230,628,414	$111,996,428	1.94
Rate Impact Test (RIM)		$259,499,444	$230,628,414	-$28,871,030	0.89
Participant Cost Test (PCT)		$93,055,904	$242,539,177	$149,483,273	2.61
Lifecycle Revenue Impacts ($/kWh)					$0.0001047011

Table 5 - 2016 Total Energy Efficiency Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0519	$89,743,923	$157,486,678	$67,742,755	1.75
Total Resource Cost Test (TRC) No Adder	$0.0519	$89,743,923	$143,169,707	$53,425,784	1.60
Utility Cost Test (UCT)	$0.0318	$55,042,068	$143,169,707	$88,127,639	2.60
Rate Impact Test (RIM)		$195,909,526	$143,169,707	-$52,739,819	0.73
Participant Cost Test (PCT)		$93,055,904	$223,426,512	$130,370,608	2.40
Lifecycle Revenue Impacts ($/kWh)					$0.0001912614

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Table 6 – 2016 C&I Energy Efficiency Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0471	$64,857,269	$113,887,516	$49,030,247	1.76
Total Resource Cost Test (TRC) No Adder	$0.0471	$64,857,269	$103,534,105	$38,676,836	1.60
Utility Cost Test (UCT)	$0.0272	$37,500,712	$103,534,105	$66,033,394	2.76
Rate Impact Test (RIM)		$136,405,244	$103,534,105	-$32,871,138	0.76
Participant Cost Test (PCT)		$70,572,824	$156,835,404	$86,262,581	2.22
Lifecycle Revenue Impacts ($/kWh)					$0.0001094324

Table 7 – 2016 Residential Energy Efficiency Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0662	$23,322,177	$43,599,162	$20,276,985	1.87
Total Resource Cost Test (TRC) No Adder	$0.0662	$23,322,177	$39,635,601	$16,313,425	1.70
Utility Cost Test (UCT)	$0.0453	$15,976,879	$39,635,601	$23,658,723	2.48
Rate Impact Test (RIM)		$57,939,806	$39,635,601	-$18,304,204	0.68
Participant Cost Test (PCT)		$22,483,080	$66,591,108	$44,108,028	2.96
Lifecycle Revenue Impacts ($/kWh)					$0.0001039341

NAVIGANT

Utah Home Energy Savings Program

Navigant estimated the cost-effectiveness results for the Utah Home Energy Savings Program, based on 2016 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program and for the 7 measure categories.

Cost-effectiveness was tested using the 2015 IRP east residential whole house 31%, east residential lighting 47%, east plug loads 71%, east residential cooling 9% and east residential water heating 53% load factor decrements. The program passes the cost-effectiveness for all the tests except the RIM test. The memo consists of the following tables.

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Table 1 - Home Energy Savings Inputs

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.32%
Residential Energy Rate ($/kWh)	$0.1111
Inflation Rate[1]	1.9%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 – Home Energy Savings Annual Program Costs

Measure Group	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
Appliances	$0	$3,617	$185,006	$2,744	$246,666	$438,032	$1,043,807
Building Shell	$0	$5,898	$301,692	$4,474	$595,717	$907,781	$2,854,272
Energy Kits - DHW	$0	$713	$21,240	$541	$5,913	$28,407	$6,552
Energy Kits - Lighting	$0	$471	$14,037	$357	$14,424	$29,289	$17,687
HVAC	$0	$56,467	$2,888,137	$42,830	$3,789,346	$6,776,780	$435,750
Lighting	$0	$185,713	$998,815	$140,865	$2,164,762	$3,490,154	$14,347,220
Water Heating	$0	$84	$4,305	$64	$7,000	$11,453	$15,396
Total	**$0**	**$252,964**	**$4,413,231**	**$191,875**	**$6,823,828**	**$11,681,897**	**$18,720,683**
Credit - Incentive	-	-	-	-	-$1,886	-	-
Total	**$0**	**$252,964**	**$4,413,231**	**$191,875**	**$6,821,942**	**$11,680,011**	**$18,720,683**

Table 3 – Home Energy Savings – Savings by Measure Category

Measure Group	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Appliances	652,823	100%	652,823	81%	528,787	14
Building Shell	1,064,568	100%	1,064,568	100%	1,064,568	30
Energy Kits - DHW	128,689	100%	128,689	78%	100,377	10
Energy Kits - Lighting	85,048	100%	85,048	78%	66,337	10
HVAC	10,191,265	100%	10,191,265	83%	8,458,750	16
Lighting	33,518,040	91%	30,501,416	61%	18,605,864	12
Water Heating	15,191	100%	15,191	81%	12,305	15
Total	**45,655,623**	**93%**	**42,638,999**	**68%**	**28,836,987**	**13**

Table 4 - Benefit/Cost Ratios by Measure Category

Measure Group	PTRC	TRC	UCT	RIM	PCT
Appliances	0.30	0.28	0.65	0.27	0.99
Building Shell	0.57	0.52	1.81	0.56	0.91
Energy Kits - DHW	1.83	1.67	1.62	0.38	19.17
Energy Kits - Lighting	1.32	1.20	1.18	0.38	5.29
HVAC	7.24	6.58	3.25	1.23	39.45
Lighting	1.23	1.12	3.24	0.48	2.43
Water Heating	0.52	0.47	0.70	0.30	1.70
Total	**2.20**	**2.00**	**3.03**	**0.78**	**2.98**

Table 5 – Home Energy Savings Program Level Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0623	$17,700,793	$38,883,484	$21,182,692	2.20
Total Resource Cost Test (TRC) No Adder	$0.0623	$17,700,793	$35,348,622	$17,647,829	2.00
Utility Cost Test (UCT)	$0.0411	$11,680,011	$35,348,622	$23,668,611	3.03
Rate Impact Test (RIM)		$45,529,083	$35,348,622	-$10,180,461	0.78
Participant Cost Test (PCT)		$18,720,683	$55,875,539	$37,154,856	2.98
Lifecycle Revenue Impacts ($/kWh)					$0.0000313290
Discounted Participant Payback (years)					n/a

Table 6 through Table 12 provides cost-effectiveness results for all 7 measures.

Table 6 - Home Energy Savings Appliance Cost-Effectiveness Results (Decrement - East Plug Load- 71%, Load Shape – Plug Loads)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1951	$1,036,850	$314,206	-$722,644	0.30
Total Resource Cost Test (TRC) No Adder	$0.1951	$1,036,850	$285,642	-$751,208	0.28
Utility Cost Test (UCT)	$0.0824	$438,032	$285,642	-$152,390	0.65
Rate Impact Test (RIM)		$1,071,535	$285,642	-$785,893	0.27
Participant Cost Test (PCT)		$1,043,807	$1,028,768	-$15,039	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0000022496
Discounted Participant Payback (years)					n/a

Table 7 - Home Energy Savings Building Shell Cost-Effectiveness Results
(Decrement - East Residential Whole House - 31%, Load Shape – Cooling)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1882	$3,166,336	$1,802,970	-$1,363,366	0.57
Total Resource Cost Test (TRC) No Adder	$0.1882	$3,166,336	$1,639,063	-$1,527,272	0.52
Utility Cost Test (UCT)	$0.0540	$907,781	$1,639,063	$731,282	1.81
Rate Impact Test (RIM)		$2,921,866	$1,639,063	-$1,282,803	0.56
Participant Cost Test (PCT)		$2,854,272	$2,609,802	-$244,470	0.91
Lifecycle Revenue Impacts ($/kWh)					$0.0000017446
Discounted Participant Payback (years)					n/a

Table 8 - Home Energy Savings Energy Kits – DHW Cost-Effectiveness Results
(Decrement - East Residential Water Heating - 53%, Load Shape – Water Heating)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0352	$27,604	$50,577	$22,973	1.83
Total Resource Cost Test (TRC) No Adder	$0.0352	$27,604	$45,979	$18,375	1.67
Utility Cost Test (UCT)	$0.0362	$28,407	$45,979	$17,572	1.62
Rate Impact Test (RIM)		$121,738	$45,979	-$75,759	0.38
Participant Cost Test (PCT)		$6,552	$125,569	$119,017	19.17
Lifecycle Revenue Impacts ($/kWh)					$0.0000003018
Discounted Participant Payback (years)					0.06

Table 9 - Home Energy Savings Energy Kits – Lighting Cost-Effectiveness Results
(Decrement - East Residential Lighting - 47%, Load Shape – Lighting)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0553	$28,661	$37,914	$9,253	1.32
Total Resource Cost Test (TRC) No Adder	$0.0553	$28,661	$34,468	$5,806	1.20
Utility Cost Test (UCT)	$0.0565	$29,289	$34,468	$5,179	1.18
Rate Impact Test (RIM)		$90,970	$34,468	-$56,502	0.38
Participant Cost Test (PCT)		$17,687	$93,501	$75,814	5.29
Lifecycle Revenue Impacts ($/kWh)					$0.0000002251
Discounted Participant Payback (years)					0.43

Table 10 - Home Energy Savings HVAC Cost-Effectiveness Results
(Decrement - East Residential Cooling - 9%, Load Shape – Cooling)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0359	$3,349,107	$24,243,197	$20,894,090	7.24
Total Resource Cost Test (TRC) No Adder	$0.0359	$3,349,107	$22,039,270	$18,690,163	6.58
Utility Cost Test (UCT)	$0.0727	$6,776,780	$22,039,270	$15,262,490	3.25
Rate Impact Test (RIM)		$17,898,813	$22,039,270	$4,140,457	1.23
Participant Cost Test (PCT)		$435,750	$17,189,385	$16,753,635	39.45
Lifecycle Revenue Impacts ($/kWh)					-$0.0000104084
Discounted Participant Payback (years)					n/a

Table 11 - Home Energy Savings Lighting Cost-Effectiveness Results
(Decrement - East Residential Lighting - 47%, Load Shape – Lighting)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0603	$10,077,196	$12,425,782	$2,348,586	1.23
Total Resource Cost Test (TRC) No Adder	$0.0603	$10,077,196	$11,296,166	$1,218,969	1.12
Utility Cost Test (UCT)	$0.0209	$3,490,154	$11,296,166	$7,806,011	3.24
Rate Impact Test (RIM)		$23,399,118	$11,296,166	-$12,102,952	0.48
Participant Cost Test (PCT)		$14,347,220	$34,802,407	$20,455,187	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0000402924
Discounted Participant Payback (years)					n/a

Table 12 - Home Energy Savings Water Heating Cost-Effectiveness Results
(Decrement - East Water Heating - 53%, Load Shape – Water Heating)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1304	$16,924	$8,838	-$8,086	0.52
Total Resource Cost Test (TRC) No Adder	$0.1304	$16,924	$8,035	-$8,889	0.47
Utility Cost Test (UCT)	$0.0882	$11,453	$8,035	-$3,418	0.70
Rate Impact Test (RIM)		$26,930	$8,035	-$18,895	0.30
Participant Cost Test (PCT)		$15,396	$26,107	$10,711	1.70
Lifecycle Revenue Impacts ($/kWh)					$0.0000000506
Discounted Participant Payback (years)					6.87

NAVIGANT

Utah New Homes Program

Navigant estimated the cost-effectiveness results for the Utah New Homes Program, based on 2016 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program.

Cost-effectiveness was tested using the 2015 IRP east residential whole house 31% load factor decrement. The program passes only the PCT cost-effectiveness test.

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Table 1 – New Homes Program Inputs

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.32%
Residential Energy Rate ($/kWh)	$0.1111
Inflation Rate[1]	1.9%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 – New Homes Annual Program Costs

Measure Group	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
New Homes	$0	$20,408	$520,511	$7,631	$905,146	$1,453,696	$3,762,397
Total	**$0**	**$20,408**	**$520,511**	**$7,631**	**$905,146**	**$1,453,696**	**$3,762,397**

Table 3 – New Homes Savings by Measure Category

Measure Group	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
New Homes	3,290,951	100%	3,290,951	59%	1,950,276	14
Total	**3,290,951**	**100%**	**3,290,951**	**59%**	**1,950,276**	**14**

Table 4 - New Homes Program Level Cost-Effectiveness Results
(Decrement - East Residential Whole House - 31%, Load Shape – Whole House)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1417	$2,778,213	$1,478,745	-$1,299,467	0.53
Total Resource Cost Test (TRC) No Adder	$0.1417	$2,778,213	$1,344,314	-$1,433,899	0.48
Utility Cost Test (UCT)	$0.0742	$1,453,696	$1,344,314	-$109,382	0.92
Rate Impact Test (RIM)		$3,790,186	$1,344,314	-$2,445,872	0.35
Participant Cost Test (PCT)		$3,762,397	$4,847,807	$1,085,410	1.29
Lifecycle Revenue Impacts ($/kWh)					$0.0000070012
Discounted Participant Payback (years)					n/a

NAVIGANT

Utah Home Energy Reporting Program

Navigant estimated the cost-effectiveness results for the Utah Home Energy Reporting Program, based on 2016 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program.

Cost-effectiveness was tested using the 2015 IRP east residential whole house 31% load factor decrement. The program passes the cost-effectiveness for all the tests except the RIM and PCT tests.

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Table 1 – Home Energy Reporting Inputs

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.32%
Residential Energy Rate ($/kWh)	$0.1111
Inflation Rate[1]	1.9%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 – Home Energy Reporting Annual Program Costs

Measure Group	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
HER	$0	$42,322	$2,627,845	$88,289	$0	$2,758,456	$0
Total	**$0**	**$42,322**	**$2,627,845**	**$88,289**	**$0**	**$2,758,456**	**$0**

Table 3 – Home Energy Reporting Savings by Measure Category

Measure Group	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
HER	49,244,502	100%	49,244,502	100%	49,244,502	1
Total	**49,244,502**	**100%**	**49,244,502**	**100%**	**49,244,502**	**1**

Table 4 – Home Energy Reporting Program Level Cost-Effectiveness Results (Decrement – Residential Whole House - 31%, Load Shape – Whole House)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0587	$2,758,456	$3,118,167	$359,711	1.13
Total Resource Cost Test (TRC) No Adder	$0.0587	$2,758,456	$2,834,697	$76,242	1.03
Utility Cost Test (UCT)	$0.0587	$2,758,456	$2,834,697	$76,242	1.03
Rate Impact Test (RIM)		$8,333,470	$2,834,697	-$5,498,773	0.34
Participant Cost Test (PCT)		$0	$5,575,014	$5,575,014	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0002167685
Discounted Participant Payback (years)					n/a

NAVIGANT

Utah Low Income Weatherization Program

Navigant estimated the cost-effectiveness results for the Utah Low Income Weatherization Program, based on 2016 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program.

Cost-effectiveness was tested using the 2015 IRP east residential lighting 47% load factor decrement. The program passes cost-effectiveness for all the tests except RIM and PCT tests.

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Table 1 - Low Income Weatherization Inputs

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.32%
Residential Energy Rate ($/kWh)	$0.1111
Inflation Rate[1]	1.9%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 - Low Income Weatherization Annual Program Costs

Measure Group	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
Low Income Weatherization	$0	$17,586	$2,648	$11,268	$27,837	$59,339	$0
Total	**$0**	**$17,586**	**$2,648**	**$11,268**	**$27,837**	**$59,339**	**$0**

Table 3 - Low Income Weatherization Savings by Measure Category

Measure Group	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Low Income Weatherization	210,154	70%	147,108	100%	147,108	12
Total	**210,154**	**70%**	**147,108**	**100%**	**147,108**	**12**

Table 4 - Low Income Weatherization Program Level Cost-Effectiveness Results (Decrement - East Residential Lighting - 47%, Load Shape – Lighting)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0449	$59,339	$98,245	$38,906	1.66
Total Resource Cost Test (TRC) No Adder	$0.0449	$59,339	$89,314	$29,974	1.51
Utility Cost Test (UCT)	$0.0449	$59,339	$89,314	$29,974	1.51
Rate Impact Test (RIM)		$216,750	$89,314	-$127,437	0.41
Participant Cost Test (PCT)		$0	$185,248	$185,248	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0000004243
Discounted Participant Payback (years)					n/a

NAVIGANT

Utah wattsmart Business Program

Navigant estimated the cost-effectiveness results for the Utah Wattsmart Business Program, based on 2016 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program and for the 14 measure categories.

Cost-effectiveness was tested using the 2016 IRP east industrial 40%, east commercial lighting 53%, east commercial cooling 14% and east plug loads 71% load factor decrements. The program passes PTRC, TRC and UCT cost-effectiveness tests. The memo consists of the following tables.

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Table 1 – Utility Inputs

Parameter	Value
Discount Rate	6.66%
Commercial Line Loss	8.71%
Industrial Line Loss	5.85%
Irrigation Line Loss	9.24%
Commercial Energy Rate ($/kWh)	6.10%
Industrial Energy Rate ($/kWh)	$0.0778
Irrigation Energy Rate ($/kWh)	$0.0736
Inflation Rate[1]	1.9%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 – Annual Wattsmart Business Program Costs by Measure Category

Measure Group	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Bill Credits	Total Utility Costs	Gross Customer Costs
Additional Measures	$231,201	$24,089	$402,115	$23,100	$811,710	$0	$1,492,215	$2,800,317
Building Shell	$57,729	$6,015	$100,405	$5,768	$529,533	$0	$699,450	$1,347,436
Compressed Air	$158,788	$16,544	$276,172	$15,865	$582,506	$75,030	$1,124,905	$1,813,338
Direct Install-Lighting	$0	$2,121	$414,768	$2,034	$168,812	$0	$587,735	$0
Electronics	$24,979	$2,602	$43,444	$2,496	$40,225	$0	$113,746	$97,100
Energy Management	$697,431	$72,665	$1,213,004	$69,681	$402,999	$0	$2,455,780	$508,212
Energy Man. Co-Funding	$0	$0	$0	$0	$476,366	$0	$476,366	$0
Farm & Dairy	$2,321	$242	$4,036	$232	$3,950	$0	$10,781	$41,930
Food Ser. Equip.	$206,943	$21,561	$359,924	$20,676	$610,055	$0	$1,219,159	$1,195,107
HVAC	$646,035	$67,310	$1,123,614	$64,546	$2,469,514	$118,585	$4,489,604	$9,699,989
Irrigation	$26,366	$2,747	$45,858	$2,634	$91,872	$0	$169,477	$245,586
Lighting	$835,972	$462,465	$321,432	$443,478	$14,597,776	$2,975,645	$19,636,768	$46,799,732
Motors	$623,476	$64,959	$1,084,379	$62,293	$1,998,155	$283,306	$4,116,568	$4,593,972
Refrigeration	$132,177	$13,771	$229,888	$13,206	$501,282	$17,833	$908,158	$1,430,104
Total	**$3,643,418**	**$757,091**	**$5,619,039**	**$726,009**	**$23,284,754**	**$3,470,400**	**$37,500,712**	**$70,572,824**

Table 3 – Annual Wattsmart Business Program Savings by Measure Category

Measure Group	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Additional Measures	6,679,791	74%	4,943,045	76%	3,756,714	20
Building Shell	1,667,897	74%	1,234,244	76%	938,025	15
Compressed Air	4,587,664	74%	3,394,871	76%	2,580,102	15
Direct Install-Lighting	588,199	90%	529,379	90%	476,441	12
Electronics	721,675	74%	534,040	76%	405,870	5
Energy Management	20,149,968	84%	16,925,973	76%	12,863,740	3
Energy Manager Co-Funding	0	0%	0	0%	0	0
Farm & Dairy	67,050	81%	54,311	76%	41,276	15
Food Service Equipment	5,978,926	74%	4,424,405	76%	3,362,548	5
HVAC	18,665,056	93%	17,358,502	76%	13,192,462	14
Irrigation	761,772	81%	617,035	76%	468,947	12
Lighting	128,241,826	100%	128,241,826	76%	97,463,788	13
Motors	18,013,297	100%	18,013,297	76%	13,690,106	14
Refrigeration	3,818,818	97%	3,704,253	76%	2,815,233	13
Total	**209,941,939**	**95%**	**199,975,182**	**76%**	**152,055,251**	**12**

Table 4 – Benefit/Cost Ratios by Measure Category

Measure Group	PTRC	TRC	UCT	RIM	PCT
Additional Measures	1.06	0.96	1.81	0.58	1.77
Building Shell	0.67	0.61	1.03	0.53	1.04
Compressed Air	1.04	0.94	1.55	0.54	1.88
Direct Install-Lighting	0.79	0.72	0.51	0.35	0.00
Electronics	0.50	0.45	0.59	0.32	1.69
Energy Management	0.98	0.89	0.88	0.43	7.45
Energy Manager Co-Funding	0.00	0.00	0.00	0.00	0.00
Farm & Dairy	0.84	0.76	2.74	0.64	1.21
Food Service Equipment	0.82	0.75	0.93	0.48	1.75
HVAC	2.03	1.85	3.82	1.18	1.62
Irrigation	1.75	1.59	2.48	0.94	1.85
Lighting	1.91	1.74	3.33	0.78	2.20
Motors	2.01	1.83	2.36	0.61	3.87
Refrigeration	1.46	1.33	2.16	0.65	2.30
Total	**1.76**	**1.60**	**2.76**	**0.76**	**2.22**

Table 5 – Wattsmart Business Program Level Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0471	$64,857,269	$113,887,516	$49,030,247	1.76
Total Resource Cost Test (TRC) No Adder	$0.0471	$64,857,269	$103,534,105	$38,676,836	1.60
Utility Cost Test (UCT)	$0.0272	$37,500,712	$103,534,105	$66,033,394	2.76
Rate Impact Test (RIM)		$136,405,244	$103,534,105	-$32,871,138	0.76
Participant Cost Test (PCT)		$70,572,824	$156,835,404	$86,262,581	2.22
Lifecycle Revenue Impacts ($/kWh)					$0.0001094324

Table 6 through Table 19 provide cost-effectiveness results for all 14 measures.

Table 6 – Wattsmart Business Additional Measures Cost-Effectiveness Results (Decrement – East Industrial – 40%, Load Shape – Machinery General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0709	$2,808,746	$2,976,242	$167,496	1.06
Total Resource Cost Test (TRC) No Adder	$0.0709	$2,808,746	$2,705,674	-$103,071	0.96
Utility Cost Test (UCT)	$0.0377	$1,492,215	$2,705,674	$1,213,460	1.81
Rate Impact Test (RIM)		$4,645,605	$2,705,674	-$1,939,931	0.58
Participant Cost Test (PCT)		$2,800,317	$4,960,909	$2,160,592	1.77
Lifecycle Revenue Impacts ($/kWh)					$0.0000039252
Discounted Participant Payback (years)					9.07

Table 7 – Wattsmart Business Building Shell Cost-Effectiveness Results (Decrement – East Industrial - 40%, Load Shape – HVAC)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1198	$1,193,968	$795,684	-$398,285	0.67
Total Resource Cost Test (TRC) No Adder	$0.1198	$1,193,968	$723,349	-$470,620	0.61
Utility Cost Test (UCT)	$0.0702	$699,450	$723,349	$23,899	1.03
Rate Impact Test (RIM)		$1,366,378	$723,349	-$643,029	0.53
Participant Cost Test (PCT)		$1,347,436	$1,407,069	$59,634	1.04
Lifecycle Revenue Impacts ($/kWh)					$0.0000017210
Discounted Participant Payback (years)					20.80

Table 8 – Wattsmart Business Compressed Air Cost-Effectiveness Results
(Decrement – East Industrial – 40%, Load Shape – Machinery General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0712	$1,845,506	$1,913,443	$67,937	1.04
Total Resource Cost Test (TRC) No Adder	$0.0712	$1,845,506	$1,739,493	-$106,013	0.94
Utility Cost Test (UCT)	$0.0434	$1,124,905	$1,739,493	$614,588	1.55
Rate Impact Test (RIM)		$3,222,427	$1,739,493	-$1,482,933	0.54
Participant Cost Test (PCT)		$1,813,338	$3,417,433	$1,604,094	1.88
Lifecycle Revenue Impacts ($/kWh)					$0.0000039690
Discounted Participant Payback (years)					6.61

Table 9 – Wattsmart Business Direct-Install Lighting Cost-Effectiveness Results
(Decrement – East Commercial Lighting – 53%, Load Shape – Lighting)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0979	$418,923	$330,010	-$88,913	0.79
Total Resource Cost Test (TRC) No Adder	$0.0979	$418,923	$300,009	-$118,914	0.72
Utility Cost Test (UCT)	$0.1373	$587,735	$300,009	-$287,726	0.51
Rate Impact Test (RIM)		$867,649	$300,009	-$567,640	0.35
Participant Cost Test (PCT)		$0	$479,828	$479,828	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0000018897
Discounted Participant Payback (years)					n/a

Table 10 – Wattsmart Business Electronics Cost-Effectiveness Results
(Decrement – East Plug Loads – 71%, Load Shape – Plug Load)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1018	$147,317	$73,508	-$73,808	0.50
Total Resource Cost Test (TRC) No Adder	$0.1018	$147,317	$66,826	-$80,491	0.45
Utility Cost Test (UCT)	$0.0786	$113,746	$66,826	-$46,920	0.59
Rate Impact Test (RIM)		$208,103	$66,826	-$141,277	0.32
Participant Cost Test (PCT)		$97,100	$164,379	$67,279	1.69
Lifecycle Revenue Impacts ($/kWh)					$0.0000011224
Discounted Participant Payback (years)					2.33

Table 11 – Wattsmart Business Energy Management Cost-Effectiveness Results (Decrement – East Industrial – 40%, Load Shape – Machinery General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0693	$2,439,022	$2,384,464	-$54,558	0.98
Total Resource Cost Test (TRC) No Adder	$0.0693	$2,439,022	$2,167,694	-$271,327	0.89
Utility Cost Test (UCT)	$0.0698	$2,455,780	$2,167,694	-$288,086	0.88
Rate Impact Test (RIM)		$5,028,294	$2,167,694	-$2,860,600	0.43
Participant Cost Test (PCT)		$508,212	$3,787,886	$3,279,675	7.45
Lifecycle Revenue Impacts ($/kWh)					$0.0000378371
Discounted Participant Payback (years)					0.12

Table 12 – Wattsmart Business Energy Manager Co-Funding Cost-Effectiveness Results (Decrement – None, Load Shape – None)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	n/a	$476,366	$0	-$476,366	n/a
Total Resource Cost Test (TRC) No Adder	n/a	$476,366	$0	-$476,366	n/a
Utility Cost Test (UCT)	n/a	$476,366	$0	-$476,366	n/a
Rate Impact Test (RIM)		$476,366	$0	-$476,366	n/a
Participant Cost Test (PCT)		$0	$476,366	$476,366	n/a
Lifecycle Revenue Impacts ($/kWh)					n/a
Discounted Participant Payback (years)					n/a

Table 13 – Wattsmart Business Farm and Dairy Cost-Effectiveness Results (Decrement – East Industrial – 40%, Load Shape – Machinery General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0889	$38,697	$32,534	-$6,163	0.84
Total Resource Cost Test (TRC) No Adder	$0.0889	$38,697	$29,576	-$9,121	0.76
Utility Cost Test (UCT)	$0.0248	$10,781	$29,576	$18,796	2.74
Rate Impact Test (RIM)		$46,403	$29,576	-$16,826	0.64
Participant Cost Test (PCT)		$41,930	$50,821	$8,891	1.21
Lifecycle Revenue Impacts ($/kWh)					$0.0000000450
Discounted Participant Payback (years)					16.00

Table 14 – Wattsmart Business Food Service Equipment Cost-Effectiveness Results (Decrement – East Industrial – 40%, Load Shape – Machinery General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0883	$1,517,385	$1,247,456	-$269,929	0.82
Total Resource Cost Test (TRC) No Adder	$0.0883	$1,517,385	$1,134,051	-$383,334	0.75
Utility Cost Test (UCT)	$0.0709	$1,219,159	$1,134,051	-$85,108	0.93
Rate Impact Test (RIM)		$2,341,619	$1,134,051	-$1,207,568	0.48
Participant Cost Test (PCT)		$1,195,107	$2,086,976	$891,869	1.75
Lifecycle Revenue Impacts ($/kWh)					$0.0000095935
Discounted Participant Payback (years)					2.93

Table 15 – Wattsmart Business HVAC Cost-Effectiveness Results (Decrement – East Comm. Cooling – 14%, Load Shape – HVAC)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0666	$9,273,497	$18,863,710	$9,590,213	2.03
Total Resource Cost Test (TRC) No Adder	$0.0666	$9,273,497	$17,148,827	$7,875,330	1.85
Utility Cost Test (UCT)	$0.0323	$4,489,604	$17,148,827	$12,659,223	3.82
Rate Impact Test (RIM)		$14,473,801	$17,148,827	$2,675,026	1.18
Participant Cost Test (PCT)		$9,699,989	$15,725,200	$6,025,211	1.62
Lifecycle Revenue Impacts ($/kWh)					-$0.0000076571
Discounted Participant Payback (years)					9.55

Table 16 – Wattsmart Business Irrigation Cost-Effectiveness Results (Decrement – East Comm. Cooling – 14%, Load Shape – Irrigation)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0756	$264,251	$462,849	$198,598	1.75
Total Resource Cost Test (TRC) No Adder	$0.0756	$264,251	$420,772	$156,521	1.59
Utility Cost Test (UCT)	$0.0485	$169,477	$420,772	$251,295	2.48
Rate Impact Test (RIM)		$445,675	$420,772	-$24,903	0.94
Participant Cost Test (PCT)		$245,586	$455,290	$209,704	1.85
Lifecycle Revenue Impacts ($/kWh)					$0.0000000829
Discounted Participant Payback (years)					4.76

Table 17 – Wattsmart Business Lighting Cost-Effectiveness Results
(Decrement – East Comm. Lighting – 53%, Load Shape – Lighting)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0405	$37,631,144	$71,952,238	$34,321,094	1.91
Total Resource Cost Test (TRC) No Adder	$0.0405	$37,631,144	$65,411,126	$27,779,982	1.74
Utility Cost Test (UCT)	$0.0211	$19,636,768	$65,411,126	$45,774,358	3.33
Rate Impact Test (RIM)		$84,379,290	$65,411,126	-$18,968,165	0.78
Participant Cost Test (PCT)		$46,799,732	$102,760,950	$55,961,218	2.20
Lifecycle Revenue Impacts ($/kWh)					$0.0000583719
Discounted Participant Payback (years)					4.96

Table 18 – Wattsmart Business Motors Cost-Effectiveness Results
(Decrement – East Industrial – 40%, Load Shape – Machinery General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0369	$5,326,526	$10,695,074	$5,368,548	2.01
Total Resource Cost Test (TRC) No Adder	$0.0369	$5,326,526	$9,722,795	$4,396,269	1.83
Utility Cost Test (UCT)	$0.0285	$4,116,568	$9,722,795	$5,606,227	2.36
Rate Impact Test (RIM)		$15,893,758	$9,722,795	-$6,170,963	0.61
Participant Cost Test (PCT)		$4,593,972	$17,777,764	$13,183,791	3.87
Lifecycle Revenue Impacts ($/kWh)					$0.0000176641
Discounted Participant Payback (years)					2.25

Table 19 – Wattsmart Business Refrigeration Cost-Effectiveness Results
(Decrement – East Industrial – 40%, Load Shape – Refrigeration)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0523	$1,475,922	$2,160,303	$684,381	1.46
Total Resource Cost Test (TRC) No Adder	$0.0523	$1,475,922	$1,963,912	$487,990	1.33
Utility Cost Test (UCT)	$0.0322	$908,158	$1,963,912	$1,055,754	2.16
Rate Impact Test (RIM)		$3,009,876	$1,963,912	-$1,045,964	0.65
Participant Cost Test (PCT)		$1,430,104	$3,284,533	$1,854,429	2.30
Lifecycle Revenue Impacts ($/kWh)					$0.0000032188
Discounted Participant Payback (years)					5.04

CERTIFICATE OF SERVICE

Docket No. 17-035-32

I hereby certify that on June 15, 2017, a true and correct copy of the foregoing was served by electronic mail to the following:

Utah Office of Consumer Services
Cheryl Murray - cmurray@utah.gov
Michele Beck - mbeck@utah.gov
Gavin Mangelson – gmangelson@utah.gov

Division of Public Utilities
Chris Parker - ChrisParker@utah.gov
William Powell - wpowell@utah.gov
Erika Tedder - etedder@utah.gov
Brenda Salter – bsalter@utah.gov

Jennifer Angell
Supervisor, Regulatory Operations