



1407 W. North Temple, Suite 330  
Salt Lake City, Utah 84116

July 16, 2019

**VIA ELECTRONIC FILING**

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

Attn: Gary Widerburg  
Commission Secretary

RE: Advice No. 19-11  
Proposed Changes to Schedule 111, Residential Energy Efficiency Program  
Docket No. 19-035-T10

Enclosed for electronic filing are the proposed tariff sheets associated with Tariff P.S.C.U. No. 50 of PacifiCorp, d.b.a. Rocky Mountain Power (the “Company”), applicable to electric service in the State of Utah. Pursuant to the requirement of Rule R746-405-2(D), the Company states that the proposed tariff sheets do not constitute a violation of state law or Commission rule. The Company respectfully requests an effective date of August 15, 2019 for these changes.

Fourth Revision of Sheet No. 111.4	Schedule 111	Residential Energy Efficiency
Fourth Revision of Sheet No. 111.5	Schedule 111	Residential Energy Efficiency
Third Revision of Sheet No. 111.6	Schedule 111	Residential Energy Efficiency

The purpose of this filing is to propose changes to the Residential Energy Efficiency Program (“Program”) administered through Electric Service Schedule No. 111, specifically to retire, adjust, and add new measures. The Company’s Semi-Annual Demand Side Management Forecast Report was filed July 1, 2019, in Docket No. 19-035-28 (“Semi-Annual Report”), and showed the Program was forecast to exceed its originally forecasted budget of \$14,696,479<sup>1</sup> by \$618,600. The forecasted overage is mainly due to the 2019 calendar being a transition year for program delivery contracts, which created start-up and transition costs. The proposed changes in this filing are not expected to contribute to the increased expenditures forecasted in the Semi-Annual Report, and also align with the savings forecast for 2019,<sup>2</sup> illustrated in Figure 1 below. Proposed changes to the Schedule 111 tariff sheets are included as Exhibit A.

**Figure 1 – 2019 Budget and Savings Forecast**

<b>Program</b>	<b>2019 MWH Savings Forecast</b>	<b>Nov. 1<sup>st</sup> Forecast Report for 2019</b>	<b>July 1<sup>st</sup> Semi-Annual Forecast Report for 2019</b>
<i>wattsmart</i> Homes	61,365	\$14,696,479	\$15,315,079

<sup>1</sup> November 1<sup>st</sup> Demand Side Management Deferred Account and Forecast Report filed November 1, 2018, in Docket No. 18-035-27.

<sup>2</sup> *Id.*

## DESCRIPTION OF CHANGES

Proposed adjustments are listed below, with further explanation provided in subsequent sections.

1. Retire offerings for advanced power strips, low-flow showerheads with thermostatic valves, insulation, and gas furnaces with electronically commutated motors (“ECM”);
2. Add new offerings for evaporative coolers, ground source heat pumps, whole house ventilation fans, rooftop heat tape timers, and new homes; and
3. Adjust/streamline offerings for smart thermostats, evaporative coolers, central air conditioners, and heat pumps.

## RETIRED OFFERINGS

As summarized in Table 1, the Company proposes to retire the following offerings from the Program:

- **Advanced Power Strips** – The Company proposes to retire this offering due to failing cost-effectiveness testing. As a stand along measure, excluding administrative costs, Advanced Power Strips had a Utility Cost Test result of 0.5.
- **Low Flow Showerhead with Thermostatic Valve** – The Company proposes to retire this offering due to market availability. This equipment is unavailable to purchase at retail stores, resulting in no participation. Incentives for Low Flow Showerheads without thermostatic valves will continue to be offered. If Low Flow Showerheads with thermostatic valves become readily available in the market for retail purchase, the Company will re-assess and consider adding this offering back into the Program.
- **Wall and Floor Insulation** – On April 7, 2017, the Company posted a notice<sup>3</sup> to its website to reduce wall and floor insulation incentives to \$0 due to low participation and high cost per kilowatt hour saved. The reduced incentive levels became effective June 1, 2017, per the posted noticed, and have not been offered since. The Company proposes to remove these offerings from the tariff as a clean-up item.
- **New Gas Furnaces with ECMs** – The Company proposes to retire this offering due to minimum standard changes. Effective July 3, 2019, new fan energy rating standards require ECMs on new furnaces. Incentives for ECMs installed on existing furnaces will still be offered.

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<sup>3</sup> “Up to” incentive levels were established in Docket No. 15-035-T13, and may be adjusted with a minimum 45-days’ notice prominently displayed on the associated program website.

**Table 1 – Retired Offerings**

Measure	Sub-Category	Equipment Type	Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”	
Low Flow Showerhead	With Thermostatic Valve	-	Flow Rate $\leq$ 1.5 GPM	\$54	
Advanced Power Strip	Load Sensing	-	-	\$10	
	Occupancy Sensing	-		\$32	
	Infrared Sensing	-		\$32	
Insulation	Residences with Electric Heat	Wall Insulation	Existing R-10 or less, add R-13	\$0.65/sq. ft. (non-self install)	\$0.65/sq. ft. (self-install)
		Floor Insulation	Existing R-18 or less, Final R-30 or greater	\$0.65/sq. ft. (non-self install)	\$0.65/sq. ft. (self-install)
	Residences with Electric Cooling	Wall Insulation	Existing R-10 or less, add R-13	\$0.25/sq. ft. (non-self install)	\$0.65/sq. ft. (self-install)
Gas Furnace (Existing Homes)	-	-	$\geq$ 95% AFUE gas furnace with ECM	\$300	
Gas Furnace (New Homes)	-	-	$\geq$ 95% AFUE gas furnace with ECM	\$150 (electrically cooled single family)	\$100 (electrically cooled multi-family)

**NEW OFFERINGS**

The Company proposes to add the offerings listed below, and summarized in Table 2. Note that the maximum “up to” amounts listed in Table 2 and Schedule 111 will also be the initially offered incentive amounts.

- Evaporative Coolers** – The Company proposes to add an offering for evaporative coolers with a CFM range of 500 – 1,900. This offering will benefit customers by adding a wider array of products into the program that are specifically designed to provide cooling for smaller spaces and bonus rooms. This new offering will be delivered through the Mid-Market channel.
- Ground Source Heat Pump Conversion** – The Company proposes to add an offering for ground source heat pump conversions in existing single family residences. Ground source heat pumps work by installing an underground pipe system that accesses the constant temperature of the ground to heat or cool a home. In the summertime, the earth is cooler than a house, so excess heat from the house can be transferred to the ground, with cooler water returning from the ground through the pipe system to cool the home. In the wintertime, the earth is warmer than the outside air, so heat from the ground can be transferred to the house through the underground water pipe system. Ground source heat pumps are quieter and 3-4 times more efficient to operate, are emissions free, safer to operate with no combustion, last longer with less maintenance, and cost less to operate. This offering will provide customers an additional efficient option and associated benefits to heat and cool their homes, and will be delivered through a post-purchase application process.

- **Whole House Ventilation Fan** – The Company proposes to add an offering for whole house ventilation fans with a CFM range of greater than or equal to 2,000. Whole house fans are situated in a home’s top floor between the ceiling and attic. When the outside air is cooler than the house, the fan can pull in outside air from open windows and exhaust it through the attic and roof, which will provide cooling and fresh air changes. This offering will provide low-cost, energy efficient supplemental cooling for customers with central air conditioners and even act as a cooling alternative altogether when the outside air is cooler than the inside air, typically in the evenings, certain times of the year, or depending on where a customer’s house is geographically located. This new offering will be delivered through a post-purchase application process.
- **Rooftop Heat Tape Timer** – The Company proposes to add an offering for rooftop heat tape timers. Many customers use heat tape during the winter to mitigate potential structural damage to their homes by melting ice dams that can build up during wintertime freeze/thaw cycles. Heat tape timers are a cost-effective way to reduce the runtime of energy intensive heat tape, resulting in significant energy savings. This offering will be delivered through a post-purchase application process, but must be installed by a licensed electrician.
- **Smart Thermostats in New Homes** – The Company proposes to add an offering for smart thermostats in new homes that are ENERGY STAR rated. Currently, this offering is only available outside of the New Construction Program. Adding this offering for new homes is expected to increase participation in the New Construction program by including a wider array of qualified products and increase builder satisfaction. With builders installing smart thermostats, this will bring additional savings to the Program.

**Table 2 – New Offerings**

Measure Type	Minimum Requirements	Customer/Mid-Market Incentive “up to”
Evaporative Cooler	500 – 1,999 CFM	\$50
Ground Source Heat Pump Conversion	ENERGY STAR	\$3,000
Whole House Ventilation Fan	≥ 2,000 CFM	\$125
Rooftop Heat Tape Timer	Installed by licensed electrician	\$100
Smart Thermostats (New Homes)	ENERGY STAR	\$50

### **REVISED OFFERINGS / MISCELLANEOUS CLEANUP**

The program continuously reviews measures and qualifications to ensure that assumptions, incentive levels, eligibility, and savings are aligned with current measure research and market conditions. Accordingly, some measures within Schedule 111 are being updated, as specified below.

- Schedule 111 – Table 3
  - *Smart Thermostats* – The minimum efficiency requirement is being streamlined to allow smart thermostats that are ENERGY STAR certified.

- Schedule 111 – Table 4
  - *Evaporative Cooler* (existing homes) – This measure is being streamlined to focus solely on CFM rating. Accordingly, the sub-categories for first time install, replacement, premium, multi-family, portable, self-install, and non-self install are being consolidated into tiers for CFM ratings of 2,000-3,499 and greater than or equal to 3,500, with maximum incentives set at \$100 and \$200, respectively. The initially offered incentive amounts for these tiers will be set at \$100 and \$175, respectively. The lowest tier for a CFM rating of 500-1,999 is new and included in the New Offerings section above.
  
- Schedule 111 – Table 5
  - *Central Air Conditioner* (New Homes) – The current offering is for units with a SEER rating of 15 or greater. This offering is being expanded into three tiers to leverage the success of the same tiered offerings for existing homes, and will give customers a wider array of options and price points to reduce cooling energy. The tiered offerings will include SEER ratings of 15-16.9, 17-19.9, and greater than or equal to 20, with maximum incentives set at \$100, \$200, and \$350, respectively. The initially offered incentive amounts for these three tiers will be set at the maximum amounts.
  
  - *Multi-Family Incentives* (New Homes) – Multi-Family properties are eligible for Table 5 incentives, however all participation from Multi-Family properties is currently done through the Custom Multi-Family Program via Table 7. Accordingly, the multi-family columns in Table 5 are being removed for cleanup purposes.

In addition, the notes for Schedule 111, Table 5 have been updated to account for the multi-family cleanup and addition of smart thermostats.

## **Heat Pumps**

Heat pumps are a highly cost-effective offering, particularly when converting from resistance heat to achieve significant energy savings. Heat pump technology has also advanced and is better suited for Utah's climate than in previous years. The current offerings for heat pumps were approved in 2016 in Docket No. 16-035-T13, with Utility Cost Test ("UCT") scores of up to 24.8. The current incentive levels however, have proven to not be enough to spark participation due to equipment and installation costs. Given the lack of participation and high UCT scores, it is proposed to increase the maximum amounts for these offerings as shown in Table 3 below. The initially offered amounts are also included in Table 3. The Company believes that the increased incentives and technology advancements will help increase participation for this cost-effective measure. It should be noted however, that the maximum incentive for the higher tiered offering for heat pump upgrades is actually decreasing due to decreased incremental costs for this specific measure. It should also be noted that the multi-family specific heat pump offering will be removed from the HVAC table in the tariff as participation for this offering will be done through the Custom Multi-Family Program via Table 7 of Schedule 111, consistent with other multi-family offerings.

**Table 3 – Existing Heat Pump Offering Revisions**

Measure Type	Sub-Category	Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”	Initially Offered Incentive	
Heat Pump	Upgrade	≥ 9.0 HSPF, ≥ 15 SEER	\$300	\$300	
		≥ 9.5 HSPF, ≥ 16 SEER	\$500	\$500	
	Conversion	≥ 9.0 HSPF, ≥ 15 SEER	\$3,500	\$1,400	
		≥ 9.5 HSPF, ≥ 16 SEER	\$4,000	\$1,600	
	Ductless	Supplemental Heat	≥ 9.5 HSPF, ≥ 16 SEER	\$700	\$700
		Single-Head	≥ 9.5 HSPF, ≥ 16 SEER	\$1,900	\$1,600
Multi-Head		≥ 9.5 HSPF, ≥ 16 SEER	\$2,500	\$2,200	

### STAKEHOLDER FEEDBACK

The Company discussed changes to the Program proposed in this filing with the DSM Steering Committee at a meeting held June 25, 2019. A draft advice letter for these changes was also shared with Steering Committee members July 2, 2019, requesting initial feedback and concerns prior to submission. Some clarifying questions were asked and answered with Steering Committee members via email, and a call was also held July 11, 2019 to discuss initial feedback and concerns. The advice letter was updated to incorporate the feedback and concerns received, however not all outstanding concerns could be timely addressed, and the Company anticipates party comments as well as additional discussion to take place at future Steering Committee meetings.

### COST-EFFECTIVENESS

The cost-effective analysis for the wattsmart Homes program is attached hereto as Exhibit B, and was based on the maximum “up to” incentive levels. Table 5 below, pulled from Exhibit B, presents the expected cost-effectiveness of the wattsmart Homes program for 2019 and 2020 assuming the proposed changes in this filing. Additional details and inputs are included in Exhibit B. Sensitivity analyses for the wattsmart Homes program are also included as Exhibits C and D. The wattsmart Homes program is expected to remain cost-effective from the Utility Cost Test perspective under all scenarios.

**Table 5 – Residential Portfolio Level Cost-Effectiveness Results - PY2019 and PY2020  
 (Expected Participation)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0548	\$47,423,588	\$54,549,569	\$7,125,981	1.15
Total Resource Cost Test (TRC) No Adder	\$0.0548	\$47,423,588	\$49,590,517	\$2,166,929	1.05
Utility Cost Test (UCT)	\$0.0365	\$31,611,920	\$49,590,517	\$17,978,597	1.57
Rate Impact Test (RIM)		\$134,572,047	\$49,590,517	-\$84,981,531	0.37
Participant Cost Test (PCT)		\$44,628,775	\$143,855,283	\$99,226,508	3.22
Lifecycle Revenue Impacts (\$/kWh)					\$0.000089310
Discounted Participant Payback (years)					2.70

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It is respectfully requested that all formal correspondence and staff requests regarding this matter be addressed to:

By E-mail (preferred):        [datarequest@pacificorp.com](mailto:datarequest@pacificorp.com)  
   [michael.snow@pacificorp.com](mailto:michael.snow@pacificorp.com)

By regular mail:                Data Request Response Center  
   PacifiCorp  
   825 NE Multnomah Blvd., Suite 2000  
   Portland, OR 97232

Informal inquiries regarding this matter may be directed to me at (801) 220-4214.

Sincerely,

A handwritten signature in blue ink that reads "Michael S. Snow". The signature is written in a cursive style with a long horizontal flourish extending to the right.

Michael S. Snow  
Manager, DSM Regulatory Affairs

Enclosures

# **Exhibit A**



**ELECTRIC SERVICE SCHEDULE NO. 111 - Continued**
**Table 2 – Appliance Incentives**

Equipment Type	Sub-Category	Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”
Room Air Conditioner	--	ENERGY STAR Qualified	\$20
Heat Pump Water Heater	Non-Self Install	AWHS Tier 1 ≤ 55 gallons	\$575
		AWHS Tier 2 and above ≤ 55 gallons	\$700
	Self-Install	AWHS Tier 1 ≤ 55 gallons	\$400
		AWHS Tier 2 and above ≤ 55 gallons	\$550
Low Flow Showerhead	--	Flow Rate ≤ 2.0 GPM	\$31
Low Flow Aerator	--	Flow Rate ≤ 1.5 GPM	\$5

**Table 3 – Building Envelope Incentives**

Measure Type	Sub-Category	Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”
Smart Thermostat	Electric Heat	ENERGY STAR Certified	\$100
	Electric Cooling		\$50

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**ELECTRIC SERVICE SCHEDULE NO. 111 – Continued**
**Table 4 – HVAC Incentives**

Measure Type	Sub-Category		Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”
Gas Furnace	ECM on Existing furnace		--	\$150
Evaporative Cooler	--		500 – 1,999 CFM	\$50
			2,000 – 3,499 CFM	\$100
			≥ 3,500 CFM	\$200
Central Air Conditioner	--		≥ 15 SEER	\$125
	--		≥ 17 SEER	\$200
	--		≥ 20 SEER	\$400
Heat Pump	Upgrade		≥ 9.0 HSPF, ≥15 SEER	\$300
			≥ 9.5 HSPF, ≥ 16 SEER	\$500
	Conversion		≥ 9.0 HSPF, ≥15 SEER	\$3,500
			≥ 9.5 HSPF, ≥ 16 SEER	\$4,000
	Ground Source Heat Pump Conversion		ENERGY STAR Certified	\$3,000
	Ductless	Supplemental Heat		≥ 9.5 HSPF, ≥ 16 SEER
Single-Head		≥ 9.5 HSPF, ≥ 16 SEER	\$1,900	
Multi-Head		≥ 9.5 HSPF, ≥ 16 SEER	\$2,500	
Duct Sealing	Electric Heat	Existing Manufactured Home	--	\$500
Whole House Ventilation Fan	--		≥ 2,000 CFM	\$125
Rooftop Heat Tape Timer	--		--	\$100

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**ELECTRIC SERVICE SCHEDULE NO. 111 - Continued**
**Table 5 – New Construction Incentives**

Measure Type	Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”	
		Electrically Heated Single-Family	Electrically Cooled Single-Family
		Smart Thermostat	ENERGY STAR Certified
Central Air Conditioner	15 to 16.9 SEER	\$100	\$100
	17 to 19.9 SEER	\$200	\$200
	≥ 20 SEER	\$350	\$350
Whole Home	ENERGY STAR 3.0 Certification	\$25	\$25
	HERS Index 56-62	\$350	\$175
	HERS Index 49-55	\$600	\$300
	HERS Index 48 or lower	\$1,000	\$500

Notes for Table 5:

1. Qualifying equipment receiving incentives within this table may not receive equipment purchase and installation incentives within other tables in this Schedule.
2. Customers that receive an incentive for the Whole Home offering may not receive an incentive for the Central Air Conditioner or Gas Furnace stand-alone offerings.
3. Participation in Central Air Conditioner or Whole Home offering does not disqualify a customer from receiving a Smart Thermostat incentive.
4. To be eligible for electric heat incentives, natural gas must not be available at customers' property.

**Table 6 – Insulation Incentives**

Measure Type	Sub-Category	Equipment Type	Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”	
				Non-Self Install	Self-Install
Insulation	Residences with Electric Heat	Attic/Ceiling Insulation	Existing R-20 or less, final R-38 or greater	\$0.65/square foot	\$0.40/square foot
	Residences with Electric Cooling	Attic/Ceiling Insulation	Existing R-20 or less, final R-38 or greater	\$0.10/square foot	\$0.10/square foot

**ELECTRIC SERVICE SCHEDULE NO. 111 - Continued**
**Table 2 – Appliance Incentives**

Equipment Type	Sub-Category	Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”
Room Air Conditioner	--	ENERGY STAR Qualified	\$20
Heat Pump Water Heater	Non-Self Install	AWHS Tier 1 ≤ 55 gallons	\$575
		AWHS Tier 2 and above ≤ 55 gallons	\$700
	Self-Install	AWHS Tier 1 ≤ 55 gallons	\$400
		AWHS Tier 2 and above ≤ 55 gallons	\$550
Low Flow Showerhead	--	Flow Rate ≤ 2.0 GPM	\$31
	<del>With Thermostatic Valve</del>	<del>Flow Rate ≤ 1.5 GPM</del>	<del>\$54</del>
Low Flow Aerator	--	Flow Rate ≤ 1.5 GPM	\$5
<del>Advanced Power Strip</del>	<del>Load Sensing</del>	--	<del>\$10</del>
	<del>Occupancy Sensing</del>	--	<del>\$32</del>
	<del>Infrared Sensing</del>	--	<del>\$32</del>

**Table 3 – Building Envelope Incentives**

Measure Type	Sub-Category	Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”
Smart Thermostat	Electric Heat	<del>ENERGY STAR Certified</del> <del>Smart thermostats must be Wi-Fi enabled, programmable, online dashboard and/or mobile device app, with occupancy sensor enabled.</del>	\$100
	Electric Cooling		\$50

(continued)

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**ELECTRIC SERVICE SCHEDULE NO. 111 – Continued**
**Table 4 – HVAC Incentives**

Measure Type	Sub-Category		Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”
Gas Furnace	–		$\geq 95\%$ AFUE gas furnace with ECM	\$300
	ECM on Existing furnace		--	\$150
Evaporative Cooler	First-time install	Non-Self Install	$\geq 3,500$ CFM	\$500
		Self Install	$\geq 3,500$ CFM	\$400
	Replacement	Non-Self Install	$\geq 3,500$ CFM	\$500
		Self Install	$\geq 3,500$ CFM	\$400
	Premium	Non-Self Install	$\geq 3,500$ CFM	\$650
		Self Install	$\geq 3,500$ CFM	\$500
	Multi-Family		$\geq 2,000$ CFM	\$100
	Portable		$\geq 2,000$ CFM	\$200
	::		500 – 1,999 CFM	\$50
			2,000 – 3,499 CFM	\$100
$> 3,500$ CFM			\$200	
Central Air Conditioner	--		$\geq 15$ SEER	\$125
	--		$\geq 17$ SEER	\$200
	--		$\geq 20$ SEER	\$400
Heat Pump	Upgrade		$\geq 9.0$ HSPF, $\geq 15$ SEER	<del>\$250</del> \$300
			$\geq 9.5$ HSPF, $\geq 16$ SEER	<del>\$600</del> \$500
	Conversion		$\geq 9.0$ HSPF, $\geq 15$ SEER	<del>\$750</del> \$3,500
			$\geq 9.5$ HSPF, $\geq 16$ SEER	<del>\$850</del> \$4,000
	<u>Ground Source Heat Pump Conversion</u>		<u>ENERGY STAR Certified</u>	<u>\$3,000</u>
	Ductless	Supplemental Heat	$\geq 9.5$ HSPF, $\geq 16$ SEER	<del>\$500</del> \$700
	<del>Ductless</del>	Single-Head	$\geq 9.5$ HSPF, $\geq 16$ SEER	<del>\$1,300</del> \$1,900
	<del>Ductless</del>	Multi-Head	$\geq 9.5$ HSPF, $\geq 16$ SEER	<del>\$1,800</del> \$2,500
<del>Multi-Family Ductless</del>	<del>Single/Multi-Head</del>	<del><math>\geq 9.5</math> HSPF, <math>\geq 16</math> SEER</del>	<del>\$400</del>	
Duct Sealing	Electric Heat	Existing Manufactured Home	--	\$500
<u>Whole House Ventilation Fan</u>	::		$\geq 2,000$ CFM	<u>\$125</u>
<u>Rooftop Heat Tape Timer</u>	::		--	<u>\$100</u>

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**ELECTRIC SERVICE SCHEDULE NO. 111 - Continued**
**Table 5 – New Construction Incentives**

Measure Type	Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”			
		Electrically Heated		Electrically Cooled	
		Single-Family	Multi-Family	Single-Family	Multi-Family
<u>Smart Thermostat</u>	<u>ENERGY STAR Certified</u>	\$50		\$50	
Central Air Conditioner	<u>≥ 15 SEER</u>	\$100	\$75	\$100	\$75
	<u>15 to 16.9 SEER</u>	\$100		\$100	
	<u>17 to 19.9 SEER</u>	\$200		\$200	
	<u>≥ 20 SEER</u>	\$350		\$350	
<u>Gas Furnace</u>	<u>≥ 95% AFUE gas furnace with ECM</u>	–	–	\$150	\$100
Whole Home	ENERGY STAR 3.0 Certification	\$25	\$20	\$25	\$20
	HERS Index 56-62	\$350	\$200	\$175	\$100
	HERS Index 49-55	\$600	\$400	\$300	\$200
	HERS Index 48 or lower	\$1,000	\$600	\$500	\$300

Notes for Table 5:

1. Qualifying equipment receiving incentives within this table may not receive equipment purchase and installation incentives within other tables in this Schedule.
2. 1. Whole Home incentives for multi-family are on a per apartment/unit basis.
2. Customers that receive an incentive for the Whole Home offering may not receive an incentive for the Central Air Conditioner or Gas Furnace stand-alone offerings.
3. Participation in Central Air Conditioner or Whole Home offering does not disqualify a customer from receiving a Smart Thermostat incentive.
4. To be eligible for electric heat incentives, natural gas must not be available at customers’ property.

**Table 6 – Insulation Incentives**

Measure Type	Sub-Category	Equipment Type	Minimum Efficiency Requirement	Customer/Mid-Market Incentive “up to”	
				Non-Self Install	Self-Install
Insulation	Residences with Electric Heat	Attic/Ceiling Insulation	Existing R-20 or less, final R-38 or greater	\$0.65/square foot	\$0.40/square foot
		<u>Wall Insulation</u>	<u>Existing R-10 or less, add R-13</u>	\$0.65/square foot	\$0.45/square foot
		<u>Floor Insulation</u>	<u>Existing R-18 or less, Final R-30 or greater</u>	\$0.65/square foot	\$0.25/square foot
	Residences with Electric Cooling	Attic/Ceiling Insulation	Existing R-20 or less, final R-38 or greater	\$0.10/square foot	\$0.10/square foot
		<u>Wall Insulation</u>	<u>Existing R-10 or less, add R-13</u>	\$0.25/square foot	\$0.20/square foot

# **Exhibit B**



**Memorandum**

To: Angela Long, PacifiCorp  
From: David Basak, Navigant  
Date: June 12, 2019  
Re: Cost Effectiveness for the Utah Residential Portfolio – Expected Participation

Navigant has developed this memo in response to PacifiCorp's proposed Residential Portfolio cost-effectiveness modeling needs in the state of Utah. Each scenario is analyzed using modeled assumptions provided by PacifiCorp. These scenarios utilize the following assumptions:

- **Scenarios:** Ran cost-effectiveness for program years 2019 and 2020.
- **Avoided Costs:** Utilized the 2017 decrement along with the Utah Residential load shapes to calculate avoided costs.
- **Modeling Inputs:** Measure category savings provided by PacifiCorp in the file *UT 2019\_2020 targets and budgets by channel\_implementer.xlsx*.
- **Energy Rates:** Utilized the 2018 rates provided by PacifiCorp and applied an escalation of 2.28% to arrive at estimated energy rates PY2019 and PY2020.
- **Line Loss Factors:** Residential line loss factor utilized throughout the analysis.

This memo will begin by addressing the inputs used in the analysis of the Utah Residential Portfolio. The program passes cost effectiveness for all the tests except the RIM test. The cost-effectiveness inputs are as follows:

**Table 1 - Utility Inputs**

Parameter	2019	2020
Discount Rate	6.92%	6.92%
Residential Line Loss	9.32%	9.32%
Residential Energy Rate (\$/kWh) <sup>1</sup>	\$0.1093	\$0.1118
Inflation Rate	2.28%	2.28%

<sup>1</sup> Future rates determined using a 2.28% annual escalator.



**Table 2 – Program Costs by Scenario and Program Year (Expected Participation)**

Program Year	Utility Admin	Program Delivery	Incentives	Total Utility Costs	Gross Customer Costs
2019 Portfolio	\$357,109	\$4,865,994	\$10,091,976	\$15,315,079	\$22,327,188
2020 Portfolio	\$365,251	\$4,704,902	\$11,226,688	\$16,296,841	\$22,301,587
<b>2019-2020 Portfolio</b>	<b>\$722,360</b>	<b>\$9,570,896</b>	<b>\$21,318,664</b>	<b>\$31,611,920</b>	<b>\$44,628,775</b>

**Table 3 – Program Savings by Scenario and Program Year (Expected Participation)**

Program Year	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
2019 Portfolio	67,558,317	86%	58,219,064	81%	47,366,051	13
2020 Portfolio	50,463,025	92%	46,645,585	86%	40,121,269	14
<b>2019-2020 Portfolio</b>	<b>118,021,342</b>	<b>89%</b>	<b>104,864,648</b>	<b>83%</b>	<b>87,487,319</b>	<b>14</b>

**Table 4 - Benefit/Cost Ratios by Measure Category (Expected Participation)**

Program Year	PTRC	TRC	UCT	RIM	PCT
2019 Portfolio	1.14	1.04	1.61	0.36	3.39
2020 Portfolio	1.16	1.06	1.53	0.38	3.05
<b>2019-2020 Portfolio</b>	<b>1.15</b>	<b>1.05</b>	<b>1.57</b>	<b>0.37</b>	<b>3.22</b>

The following tables provide cost-effectiveness results for the combination of program year 2019 and 2020, followed by the individual program year results.

**Table 5 – Residential Portfolio Level Cost-Effectiveness Results - PY2019 and PY2020 (Expected Participation)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0548	\$47,423,588	\$54,549,569	\$7,125,981	1.15
Total Resource Cost Test (TRC) No Adder	\$0.0548	\$47,423,588	\$49,590,517	\$2,166,929	1.05
Utility Cost Test (UCT)	\$0.0365	\$31,611,920	\$49,590,517	\$17,978,597	1.57
Rate Impact Test (RIM)		\$134,572,047	\$49,590,517	-\$84,981,531	0.37
Participant Cost Test (PCT)		\$44,628,775	\$143,855,283	\$99,226,508	3.22
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000089310
Discounted Participant Payback (years)					n/a

**Table 6 – Residential Portfolio Level Cost-Effectiveness Results - PY2019  
(Expected Participation)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0521	\$23,795,467	\$27,113,357	\$3,317,889	1.14
Total Resource Cost Test (TRC) No Adder	\$0.0521	\$23,795,467	\$24,648,506	\$853,039	1.04
Utility Cost Test (UCT)	\$0.0335	\$15,315,079	\$24,648,506	\$9,333,427	1.61
Rate Impact Test (RIM)		\$69,089,351	\$24,648,506	-\$44,440,845	0.36
Participant Cost Test (PCT)		\$22,327,188	\$75,756,447	\$53,429,259	3.39
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000096271
Discounted Participant Payback (years)					n/a

**Table 7 – Residential Portfolio Level Cost-Effectiveness Results - PY2020  
(Expected Participation)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0579	\$23,628,121	\$27,436,212	\$3,808,091	1.16
Total Resource Cost Test (TRC) No Adder	\$0.0579	\$23,628,121	\$24,942,011	\$1,313,890	1.06
Utility Cost Test (UCT)	\$0.0399	\$16,296,841	\$24,942,011	\$8,645,170	1.53
Rate Impact Test (RIM)		\$65,482,697	\$24,942,011	-\$40,540,686	0.38
Participant Cost Test (PCT)		\$22,301,587	\$68,098,836	\$45,797,249	3.05
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000082750
Discounted Participant Payback (years)					n/a

The following tables provide the cost-effectiveness results for each delivery channel.

**Table 8 – Residential Portfolio Delivery Channel Level Cost-Effectiveness Results - PY2019  
 (Expected Participation)**

Delivery Channel	P-TRC Benefits (\$)	P-TRC Costs (\$)	P-TRC Test	TRC Benefits (\$)	TRC Costs (\$)	TRC Test	Utility PV Benefits (\$)	Utility PV Costs (\$)	Utility Cost Test	Ratepayer PV Benefits (\$)	Ratepayer PV Costs (\$)	RIM Test	Participant PV Benefits (\$)	Participant PV Cost (\$)	Participant Cost Test
UT wH - Lighting	\$8,272,302	\$6,945,569	1.19	\$7,520,275	\$6,945,569	1.08	\$7,520,275	\$2,872,872	2.62	\$7,520,275	\$22,872,105	0.33	\$30,136,000	\$8,508,117	3.54
UT wH - Non-Lighting	\$6,119,437	\$3,633,799	1.68	\$5,563,125	\$3,633,799	1.53	\$5,563,125	\$5,053,087	1.10	\$5,563,125	\$16,540,082	0.34	\$14,802,295	\$649,717	22.78
UT wH - New Homes	\$3,395,339	\$3,177,587	1.07	\$3,086,672	\$3,177,587	0.97	\$3,086,672	\$1,832,444	1.68	\$3,086,672	\$7,406,771	0.42	\$7,513,697	\$2,961,271	2.54
UT wH - Kits	\$180,444	\$108,774	1.66	\$164,040	\$108,774	1.51	\$164,040	\$72,785	2.25	\$164,040	\$528,773	0.31	\$564,313	\$72,699	7.76
UT wH - Multifamily	\$5,943,491	\$6,813,144	0.87	\$5,403,173	\$6,813,144	0.79	\$5,403,173	\$3,215,359	1.68	\$5,403,173	\$13,945,605	0.39	\$14,672,495	\$7,053,094	2.08
UT wH - Midstream HVAC	\$3,202,343	\$3,116,594	1.03	\$2,911,221	\$3,116,594	0.93	\$2,911,221	\$2,268,533	1.28	\$2,911,221	\$7,796,014	0.37	\$8,067,646	\$3,082,291	2.62
<b>Total Sector with Admin Costs</b>	<b>\$27,113,357</b>	<b>\$23,795,467</b>	<b>1.14</b>	<b>\$24,648,506</b>	<b>\$23,795,467</b>	<b>1.04</b>	<b>\$24,648,506</b>	<b>\$15,315,079</b>	<b>1.61</b>	<b>\$24,648,506</b>	<b>\$69,089,351</b>	<b>0.36</b>	<b>\$75,756,447</b>	<b>\$22,327,188</b>	<b>3.39</b>

**Table 9 – Residential Portfolio Delivery Channel Level Cost-Effectiveness Results - PY2020  
 (Expected Participation)**

Delivery Channel	P-TRC Benefits (\$)	P-TRC Costs (\$)	P-TRC Test	TRC Benefits (\$)	TRC Costs (\$)	TRC Test	Utility PV Benefits (\$)	Utility PV Costs (\$)	Utility Cost Test	Ratepayer PV Benefits (\$)	Ratepayer PV Costs (\$)	RIM Test	Participant PV Benefits (\$)	Participant PV Cost (\$)	Participant Cost Test
UT wH - Lighting	\$3,372,207	\$6,606,391	0.51	\$3,065,643	\$6,606,391	0.46	\$3,065,643	\$1,101,286	2.78	\$3,065,643	\$8,756,463	0.35	\$30,136,000	\$8,508,117	1.33
UT wH - Non-Lighting	\$5,943,879	\$3,332,659	1.78	\$5,403,526	\$3,332,659	1.62	\$5,403,526	\$5,242,474	1.03	\$5,403,526	\$16,018,783	0.34	\$14,802,295	\$649,717	20.89
UT wH - New Homes	\$5,356,154	\$3,451,334	1.55	\$4,869,231	\$3,451,334	1.41	\$4,869,231	\$2,786,190	1.75	\$4,869,231	\$11,424,708	0.43	\$7,513,697	\$2,961,271	3.92
UT wH - Multifamily	\$9,403,649	\$7,125,104	1.32	\$8,548,772	\$7,125,104	1.20	\$8,548,772	\$4,902,320	1.74	\$8,548,772	\$21,364,664	0.40	\$564,313	\$72,699	3.18
UT wH - Midstream HVAC	\$3,360,324	\$3,112,633	1.08	\$3,054,840	\$3,112,633	0.98	\$3,054,840	\$2,264,571	1.35	\$3,054,840	\$7,918,079	0.39	\$14,672,495	\$7,053,094	2.66
<b>Total Sector with Admin Costs</b>	<b>\$27,436,212</b>	<b>\$23,628,121</b>	<b>1.16</b>	<b>\$24,942,011</b>	<b>\$23,628,121</b>	<b>1.06</b>	<b>\$24,942,011</b>	<b>\$16,296,841</b>	<b>1.53</b>	<b>\$24,942,011</b>	<b>\$65,482,697</b>	<b>0.38</b>	<b>\$8,067,646</b>	<b>\$3,082,291</b>	<b>3.05</b>

# **Exhibit C**



## Memorandum

To: Angela Long, PacifiCorp  
From: David Basak, Navigant  
Date: June 12, 2019  
Re: Cost Effectiveness for the Utah Residential Portfolio – High Participation (+10%)

Navigant has developed this memo in response to PacifiCorp's proposed Residential Portfolio cost-effectiveness modeling needs in the state of Utah. Each scenario is analyzed using modeled assumptions provided by PacifiCorp. These scenarios utilize the following assumptions:

- **Scenarios:** Ran cost-effectiveness for program years 2019 and 2020.
- **Avoided Costs:** Utilized the 2017 decrement along with the Utah Residential load shapes to calculate avoided costs.
- **Modeling Inputs:** Measure category savings provided by PacifiCorp in the file *UT 2019\_2020 targets and budgets by channel\_implementer.xlsx*.
- **Energy Rates:** Utilized the 2018 rates provided by PacifiCorp and applied an escalation of 2.28% to arrive at estimated energy rates PY2019 and PY2020.
- **Line Loss Factors:** Residential line loss factor utilized throughout the analysis.

This memo will begin by addressing the inputs used in the analysis of the Utah Residential Portfolio. The program passes cost effectiveness for all the tests except the RIM test. The cost-effectiveness inputs are as follows:

**Table 1 - Utility Inputs**

Parameter	2019	2020
Discount Rate	6.92%	6.92%
Residential Line Loss	9.32%	9.32%
Residential Energy Rate (\$/kWh) <sup>1</sup>	\$0.1093	\$0.1118
Inflation Rate	2.28%	2.28%

<sup>1</sup> Future rates determined using a 2.28% annual escalator.

**Table 2 –Program Costs by Scenario and Program Year (High Participation +10%)**

Program Year	Utility Admin	Program Delivery	Incentives	Total Utility Costs	Gross Customer Costs
2019 Portfolio	\$357,109	\$4,865,994	\$11,101,174	\$16,324,276	\$24,559,907
2020 Portfolio	\$365,251	\$4,704,902	\$12,349,357	\$17,419,510	\$24,531,745
<b>2019-2020 Portfolio</b>	<b>\$722,360</b>	<b>\$9,570,896</b>	<b>\$23,450,530</b>	<b>\$33,743,786</b>	<b>\$49,091,652</b>

**Table 3 – Program Savings by Scenario and Program Year (High Participation +10%)**

Program Year	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
2019 Portfolio	74,314,149	86%	64,040,970	81%	52,102,656	13
2020 Portfolio	55,509,328	92%	51,310,143	86%	44,133,396	14
<b>2019-2020 Portfolio</b>	<b>129,823,476</b>	<b>89%</b>	<b>115,351,113</b>	<b>83%</b>	<b>96,236,051</b>	<b>14</b>

**Table 4 - Benefit/Cost Ratios by Measure Category (High Participation +10%)**

Program Year	PTRC	TRC	UCT	RIM	PCT
2019 Portfolio	1.16	1.06	1.66	0.36	3.39
2020 Portfolio	1.18	1.08	1.58	0.38	3.05
<b>2019-2020 Portfolio</b>	<b>1.17</b>	<b>1.07</b>	<b>1.62</b>	<b>0.37</b>	<b>3.22</b>

The following tables provide cost-effectiveness results for the combination of program year 2019 and 2020, followed by the individual program year results.

**Table 5 – Residential Portfolio Level Cost-Effectiveness Results - PY2019 and PY2020 (High Participation +10%)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0537	\$51,136,621	\$60,004,525	\$8,867,904	1.17
Total Resource Cost Test (TRC) No Adder	\$0.0537	\$51,136,621	\$54,549,569	\$3,412,948	1.07
Utility Cost Test (UCT)	\$0.0355	\$33,743,786	\$54,549,569	\$20,805,783	1.62
Rate Impact Test (RIM)		\$146,999,927	\$54,549,569	-\$92,450,358	0.37
Participant Cost Test (PCT)		\$49,091,652	\$158,240,811	\$109,149,159	3.22
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000097159
Discounted Participant Payback (years)					n/a

**Table 6 – Residential Portfolio Level Cost-Effectiveness Results - PY2019  
 (High Participation +10%)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0510	\$25,652,704	\$29,824,692	\$4,171,989	1.16
Total Resource Cost Test (TRC) No Adder	\$0.0510	\$25,652,704	\$27,113,357	\$1,460,653	1.06
Utility Cost Test (UCT)	\$0.0325	\$16,324,276	\$27,113,357	\$10,789,080	1.66
Rate Impact Test (RIM)		\$75,475,975	\$27,113,357	-\$48,362,619	0.36
Participant Cost Test (PCT)		\$24,559,907	\$83,332,091	\$58,772,185	3.39
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000104766
Discounted Participant Payback (years)					n/a

**Table 7 – Residential Portfolio Level Cost-Effectiveness Results - PY2020  
 (High Participation +10%)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0567	\$25,483,917	\$30,179,833	\$4,695,916	1.18
Total Resource Cost Test (TRC) No Adder	\$0.0567	\$25,483,917	\$27,436,212	\$1,952,295	1.08
Utility Cost Test (UCT)	\$0.0388	\$17,419,510	\$27,436,212	\$10,016,702	1.58
Rate Impact Test (RIM)		\$71,523,951	\$27,436,212	-\$44,087,739	0.38
Participant Cost Test (PCT)		\$24,531,745	\$74,908,719	\$50,376,974	3.05
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000089991
Discounted Participant Payback (years)					n/a

The following tables provide the cost-effectiveness results for each delivery channel.

**Table 8 – Residential Portfolio Delivery Channel Level Cost-Effectiveness Results - PY2019  
 (High Participation +10%)**

Delivery Channel	P-TRC Benefits (\$)	P-TRC Costs (\$)	P-TRC Test	TRC Benefits (\$)	TRC Costs (\$)	TRC Test	Utility PV Benefits (\$)	Utility PV Costs (\$)	Utility Cost Test	Ratepayer PV Benefits (\$)	Ratepayer PV Costs (\$)	RIM Test	Participant PV Benefits (\$)	Participant PV Cost (\$)	Participant Cost Test
UT wH - Lighting	\$9,099,532	\$7,549,646	1.21	\$8,272,302	\$7,549,646	1.10	\$8,272,302	\$3,069,678	2.69	\$8,272,302	\$25,068,835	0.33	\$33,149,600	\$9,358,928	3.54
UT wH - Non-Lighting	\$6,731,381	\$3,702,628	1.82	\$6,119,437	\$3,702,628	1.65	\$6,119,437	\$5,263,845	1.16	\$6,119,437	\$17,899,540	0.34	\$16,282,524	\$714,689	22.78
UT wH - New Homes	\$3,734,873	\$3,444,102	1.08	\$3,395,339	\$3,444,102	0.99	\$3,395,339	\$1,964,444	1.73	\$3,395,339	\$8,096,204	0.42	\$8,265,067	\$3,257,398	2.54
UT wH - Kits	\$198,488	\$114,405	1.73	\$180,444	\$114,405	1.58	\$180,444	\$74,818	2.41	\$180,444	\$576,404	0.31	\$620,745	\$79,969	7.76
UT wH - Multifamily	\$6,537,840	\$7,447,922	0.88	\$5,943,491	\$7,447,922	0.80	\$5,943,491	\$3,490,359	1.70	\$5,943,491	\$15,293,630	0.39	\$16,139,745	\$7,758,403	2.08
UT wH - Midstream HVAC	\$3,522,578	\$3,394,000	1.04	\$3,202,343	\$3,394,000	0.94	\$3,202,343	\$2,461,133	1.30	\$3,202,343	\$8,541,362	0.37	\$8,874,411	\$3,390,520	2.62
<b>Total Sector with Admin Costs</b>	<b>\$29,824,692</b>	<b>\$25,652,704</b>	<b>1.16</b>	<b>\$27,113,357</b>	<b>\$25,652,704</b>	<b>1.06</b>	<b>\$27,113,357</b>	<b>\$16,324,276</b>	<b>1.66</b>	<b>\$27,113,357</b>	<b>\$75,475,975</b>	<b>0.36</b>	<b>\$83,332,091</b>	<b>\$24,559,907</b>	<b>3.39</b>

**Table 9 – Residential Portfolio Delivery Channel Level Cost-Effectiveness Results - PY2020  
 (High Participation +10%)**

Delivery Channel	P-TRC Benefits (\$)	P-TRC Costs (\$)	P-TRC Test	TRC Benefits (\$)	TRC Costs (\$)	TRC Test	Utility PV Benefits (\$)	Utility PV Costs (\$)	Utility Cost Test	Ratepayer PV Benefits (\$)	Ratepayer PV Costs (\$)	RIM Test	Participant PV Benefits (\$)	Participant PV Cost (\$)	Participant Cost Test
UT wH - Lighting	\$3,709,427	\$7,210,467	0.51	\$3,372,207	\$7,210,467	0.47	\$3,372,207	\$1,154,852	2.92	\$3,372,207	\$9,575,546	0.35	\$33,149,600	\$9,358,928	1.33
UT wH - Non-Lighting	\$6,538,266	\$3,405,680	1.92	\$5,943,879	\$3,405,680	1.75	\$5,943,879	\$5,506,477	1.08	\$5,943,879	\$17,360,417	0.34	\$16,282,524	\$714,689	20.89
UT wH - New Homes	\$5,891,769	\$3,717,848	1.58	\$5,356,154	\$3,717,848	1.44	\$5,356,154	\$2,986,190	1.79	\$5,356,154	\$12,488,560	0.43	\$8,265,067	\$3,257,398	3.92
UT wH - Multifamily	\$10,344,014	\$7,759,883	1.33	\$9,403,649	\$7,759,883	1.21	\$9,403,649	\$5,314,820	1.77	\$9,403,649	\$23,423,398	0.40	\$620,745	\$79,969	3.18
UT wH - Midstream HVAC	\$3,696,356	\$3,390,039	1.09	\$3,360,324	\$3,390,039	0.99	\$3,360,324	\$2,457,171	1.37	\$3,360,324	\$8,676,030	0.39	\$16,139,745	\$7,758,403	2.66
<b>Total Sector with Admin Costs</b>	<b>\$30,179,833</b>	<b>\$25,483,917</b>	<b>1.18</b>	<b>\$27,436,212</b>	<b>\$25,483,917</b>	<b>1.08</b>	<b>\$27,436,212</b>	<b>\$17,419,510</b>	<b>1.58</b>	<b>\$27,436,212</b>	<b>\$71,523,951</b>	<b>0.38</b>	<b>\$8,874,411</b>	<b>\$3,390,520</b>	<b>3.05</b>



# **Exhibit D**



## Memorandum

To: Angela Long, PacifiCorp  
From: David Basak, Navigant  
Date: June 12, 2019  
Re: Cost Effectiveness for the Utah Residential Portfolio – Low Participation (-10%)

Navigant has developed this memo in response to PacifiCorp's proposed Residential Portfolio cost-effectiveness modeling needs in the state of Utah. Each scenario is analyzed using modeled assumptions provided by PacifiCorp. These scenarios utilize the following assumptions:

- **Scenarios:** Ran cost-effectiveness for program years 2019 and 2020.
- **Avoided Costs:** Utilized the 2017 decrement along with the Utah Residential load shapes to calculate avoided costs.
- **Modeling Inputs:** Measure category savings provided by PacifiCorp in the file *UT 2019\_2020 targets and budgets by channel\_implementer.xlsx*.
- **Energy Rates:** Utilized the 2018 rates provided by PacifiCorp and applied an escalation of 2.28% to arrive at estimated energy rates PY2019 and PY2020.
- **Line Loss Factors:** Residential line loss factor utilized throughout the analysis.

This memo will begin by addressing the inputs used in the analysis of the Utah Residential Portfolio. The program passes cost effectiveness for all the tests except the RIM test. The cost-effectiveness inputs are as follows:

**Table 1 - Utility Inputs**

Parameter	2019	2020
Discount Rate	6.92%	6.92%
Residential Line Loss	9.32%	9.32%
Residential Energy Rate (\$/kWh) <sup>1</sup>	\$0.1093	\$0.1118
Inflation Rate	2.28%	2.28%

<sup>1</sup> Future rates determined using a 2.28% annual escalator.

**Table 2 –Program Costs by Scenario and Program Year (Low Participation -10%)**

Program Year	Utility Admin	Program Delivery	Incentives	Total Utility Costs	Gross Customer Costs
2019 Portfolio	\$357,109	\$4,865,994	\$9,082,778	\$14,305,881	\$20,094,469
2020 Portfolio	\$365,251	\$4,704,902	\$10,104,019	\$15,174,172	\$20,071,428
<b>2019-2020 Portfolio</b>	<b>\$722,360</b>	<b>\$9,570,896</b>	<b>\$19,186,797</b>	<b>\$29,480,053</b>	<b>\$40,165,897</b>

**Table 3 – Program Savings by Scenario and Program Year (Low Participation -10%)**

Program Year	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
2019 Portfolio	60,802,485	86%	52,397,157	81%	42,629,446	13
2020 Portfolio	45,416,723	92%	41,981,026	86%	36,109,142	14
<b>2019-2020 Portfolio</b>	<b>106,219,208</b>	<b>89%</b>	<b>94,378,183</b>	<b>83%</b>	<b>78,738,588</b>	<b>14</b>

**Table 4 - Benefit/Cost Ratios by Measure Category (Low Participation -10%)**

Program Year	PTRC	TRC	UCT	RIM	PCT
2019 Portfolio	1.11	1.01	1.55	0.35	3.39
2020 Portfolio	1.13	1.03	1.48	0.38	3.05
<b>2019-2020 Portfolio</b>	<b>1.12</b>	<b>1.02</b>	<b>1.51</b>	<b>0.37</b>	<b>3.22</b>

The following tables provide cost-effectiveness results for the combination of program year 2019 and 2020, followed by the individual program year results.

**Table 5 – Residential Portfolio Level Cost-Effectiveness Results - PY2019 and PY2020 (Low Participation -10%)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0561	\$43,710,555	\$49,094,612	\$5,384,057	1.12
Total Resource Cost Test (TRC) No Adder	\$0.0561	\$43,710,555	\$44,631,465	\$920,911	1.02
Utility Cost Test (UCT)	\$0.0379	\$29,480,053	\$44,631,465	\$15,151,412	1.51
Rate Impact Test (RIM)		\$122,144,168	\$44,631,465	-\$77,512,703	0.37
Participant Cost Test (PCT)		\$40,165,897	\$129,469,754	\$89,303,857	3.22
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000081460
Discounted Participant Payback (years)					n/a

**Table 6 – Residential Portfolio Level Cost-Effectiveness Results - PY2019  
 (Low Participation -10%)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0534	\$21,938,231	\$24,402,021	\$2,463,790	1.11
Total Resource Cost Test (TRC) No Adder	\$0.0534	\$21,938,231	\$22,183,655	\$245,425	1.01
Utility Cost Test (UCT)	\$0.0348	\$14,305,881	\$22,183,655	\$7,877,774	1.55
Rate Impact Test (RIM)		\$62,702,726	\$22,183,655	-\$40,519,070	0.35
Participant Cost Test (PCT)		\$20,094,469	\$68,180,802	\$48,086,333	3.39
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000087775
Discounted Participant Payback (years)					n/a

**Table 7 – Residential Portfolio Level Cost-Effectiveness Results - PY2020  
 (Low Participation -10%)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0592	\$21,772,324	\$24,692,591	\$2,920,267	1.13
Total Resource Cost Test (TRC) No Adder	\$0.0592	\$21,772,324	\$22,447,810	\$675,486	1.03
Utility Cost Test (UCT)	\$0.0413	\$15,174,172	\$22,447,810	\$7,273,638	1.48
Rate Impact Test (RIM)		\$59,441,442	\$22,447,810	-\$36,993,633	0.38
Participant Cost Test (PCT)		\$20,071,428	\$61,288,952	\$41,217,524	3.05
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000075510
Discounted Participant Payback (years)					n/a

The following tables provide the cost-effectiveness results for each delivery channel.

**Table 8 – Residential Portfolio Delivery Channel Level Cost-Effectiveness Results - PY2019  
 (Low Participation -10%)**

Delivery Channel	P-TRC Benefits (\$)	P-TRC Costs (\$)	P-TRC Test	TRC Benefits (\$)	TRC Costs (\$)	TRC Test	Utility PV Benefits (\$)	Utility PV Costs (\$)	Utility Cost Test	Ratepayer PV Benefits (\$)	Ratepayer PV Costs (\$)	RIM Test	Participant PV Benefits (\$)	Participant PV Cost (\$)	Participant Cost Test
UT wH - Lighting	\$7,445,072	\$6,341,493	1.17	\$6,768,247	\$6,341,493	1.07	\$6,768,247	\$2,676,065	2.53	\$6,768,247	\$20,675,376	0.33	\$27,122,400	\$7,657,305	3.54
UT wH - Non-Lighting	\$5,507,494	\$3,564,969	1.54	\$5,006,812	\$3,564,969	1.40	\$5,006,812	\$4,842,328	1.03	\$5,006,812	\$15,180,624	0.33	\$13,322,065	\$584,745	22.78
UT wH - New Homes	\$3,055,805	\$2,911,073	1.05	\$2,778,005	\$2,911,073	0.95	\$2,778,005	\$1,700,444	1.63	\$2,778,005	\$6,717,338	0.41	\$6,762,327	\$2,665,144	2.54
UT wH - Kits	\$162,400	\$103,142	1.57	\$147,636	\$103,142	1.43	\$147,636	\$70,753	2.09	\$147,636	\$481,142	0.31	\$507,882	\$65,429	7.76
UT wH - Multifamily	\$5,349,141	\$6,178,365	0.87	\$4,862,856	\$6,178,365	0.79	\$4,862,856	\$2,940,359	1.65	\$4,862,856	\$12,597,581	0.39	\$13,205,246	\$6,347,784	2.08
UT wH - Midstream HVAC	\$2,882,109	\$2,839,188	1.02	\$2,620,099	\$2,839,188	0.92	\$2,620,099	\$2,075,933	1.26	\$2,620,099	\$7,050,666	0.37	\$7,260,882	\$2,774,062	2.62
<b>Total Sector with Admin Costs</b>	<b>\$24,402,021</b>	<b>\$21,938,231</b>	<b>1.11</b>	<b>\$22,183,655</b>	<b>\$21,938,231</b>	<b>1.01</b>	<b>\$22,183,655</b>	<b>\$14,305,881</b>	<b>1.55</b>	<b>\$22,183,655</b>	<b>\$62,702,726</b>	<b>0.35</b>	<b>\$68,180,802</b>	<b>\$20,094,469</b>	<b>3.39</b>

**Table 9 – Residential Portfolio Delivery Channel Level Cost-Effectiveness Results - PY2020  
 (Low Participation -10%)**

Delivery Channel	P-TRC Benefits (\$)	P-TRC Costs (\$)	P-TRC Test	TRC Benefits (\$)	TRC Costs (\$)	TRC Test	Utility PV Benefits (\$)	Utility PV Costs (\$)	Utility Cost Test	Ratepayer PV Benefits (\$)	Ratepayer PV Costs (\$)	RIM Test	Participant PV Benefits (\$)	Participant PV Cost (\$)	Participant Cost Test
UT wH - Lighting	\$3,034,986	\$6,002,315	0.51	\$2,759,078	\$6,002,315	0.46	\$2,759,078	\$1,047,721	2.63	\$2,759,078	\$7,937,379	0.35	\$27,122,400	\$7,657,305	1.33
UT wH - Non-Lighting	\$5,349,491	\$3,259,637	1.64	\$4,863,173	\$3,259,637	1.49	\$4,863,173	\$4,978,471	0.98	\$4,863,173	\$14,677,149	0.33	\$13,322,065	\$584,745	20.89
UT wH - New Homes	\$4,820,539	\$3,184,819	1.51	\$4,382,308	\$3,184,819	1.38	\$4,382,308	\$2,586,190	1.69	\$4,382,308	\$10,360,856	0.42	\$6,762,327	\$2,665,144	3.92
UT wH - Multifamily	\$8,463,284	\$6,490,326	1.30	\$7,693,895	\$6,490,326	1.19	\$7,693,895	\$4,489,820	1.71	\$7,693,895	\$19,305,929	0.40	\$507,882	\$65,429	3.18
UT wH - Midstream HVAC	\$3,024,291	\$2,835,226	1.07	\$2,749,356	\$2,835,226	0.97	\$2,749,356	\$2,071,971	1.33	\$2,749,356	\$7,160,128	0.38	\$13,205,246	\$6,347,784	2.66
<b>Total Sector with Admin Costs</b>	<b>\$24,692,591</b>	<b>\$21,772,324</b>	<b>1.13</b>	<b>\$22,447,810</b>	<b>\$21,772,324</b>	<b>1.03</b>	<b>\$22,447,810</b>	<b>\$15,174,172</b>	<b>1.48</b>	<b>\$22,447,810</b>	<b>\$59,441,442</b>	<b>0.38</b>	<b>\$7,260,882</b>	<b>\$2,774,062</b>	<b>3.05</b>

**CERTIFICATE OF SERVICE**

Docket No. 19-035-T10

I hereby certify that on July 16, 2019, a true and correct copy of the foregoing was served by electronic mail to the following:

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