

***Final Evaluation Report for PacifiCorp wattsmart Homes
Program in Idaho***

Final Evaluation Report, Program Years 2017-2018

Prepared for:
Rocky Mountain Power

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1 Executive Summary

This report provides results of the ADM Associates, Inc. (ADM) impact and process evaluation of the PacifiCorp 2017-2018 wattsmart Homes Program in Idaho. The wattsmart Homes Program in the state of Idaho provides incentives for PacifiCorp (also referred to as Rocky Mountain Power in this report) residential customers who purchase various eligible products or services.

During the 2017 and 2018 program years, the wattsmart Homes Program claimed gross energy savings of 5,908,836 kWh. The wattsmart Homes Program provided incentives for the following measure categories:

- **Appliances:** clothes washers and heat pump water heaters
- **Building Shell:** insulation and windows
- **Electronics:** advanced power strips (APS)
- **Energy Kits:** mailed energy kits containing combinations of LEDs, bathroom and kitchen faucet aerators, and showerheads
- **Heating, ventilation, and air conditioning (HVAC):** central air conditioners, evaporative coolers, duct sealing and insulation, furnace fans, heat pumps, and smart thermostats
- **Lighting:** LED bulbs and fixtures and CFL bulbs (2017 only)
- **Water Heating:** heat pump water heaters
- **Whole Home:** whole home new homes projects

For the impact evaluation, ADM determined the ex-post verified energy (kWh) savings that are achieved through Rocky Mountain Power's 2017-2018 wattsmart Homes Program in Idaho. Rocky Mountain Power contracted with Navigant to assess program cost-effectiveness. The results of the cost-effectiveness assessment are also included in this report. For the process evaluation, ADM attempted to gain an in-depth understanding of program operations, challenges and evaluation needs through Rocky Mountain Power and implementation contractor key staff interviews, complemented with program documentation review and program participant surveys.

1.1 Evaluation Results

1.1.1 Impact Evaluation Results

Table 1-1 and Figure 1-1 present the impact evaluation results, including the claimed savings, evaluated gross savings, realization rates, evaluated net savings and net-to-gross (NTG) values for each measure category across both program years, 2017 and 2018. Table 1-2 and Table 1-3 present this information for each year 2017 and 2018 individually.

Table 1-1: Idaho wattsmart Homes Program Claimed and Evaluated Savings by Measure Category, 2017-2018

Year	Measure Category	Claimed Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate	Evaluated Net Savings (kWh/yr)	Net to Gross
2017-2018	Appliances	27,796	27,796	100%	24,998	90%
	Building Shell	31,271	31,271	100%	28,415	91%
	Electronics	676,512	676,512	100%	621,810	92%
	Energy Kits	996,968	864,952	87%	841,158	97%
	HVAC	1,884,012	1,696,068	90%	1,674,995	99%
	Lighting	2,232,111	1,478,940	66%	1,154,823	78%
	Water Heating	15,504	15,504	100%	14,031	90%
	Whole Home	44,661	44,661	100%	40,687	91%
2017-2018 TOTAL		5,908,836	4,835,705	82%	4,400,917	91%

Figure 1-1: Idaho wattsmart Homes Program Energy Savings, 2017-2018

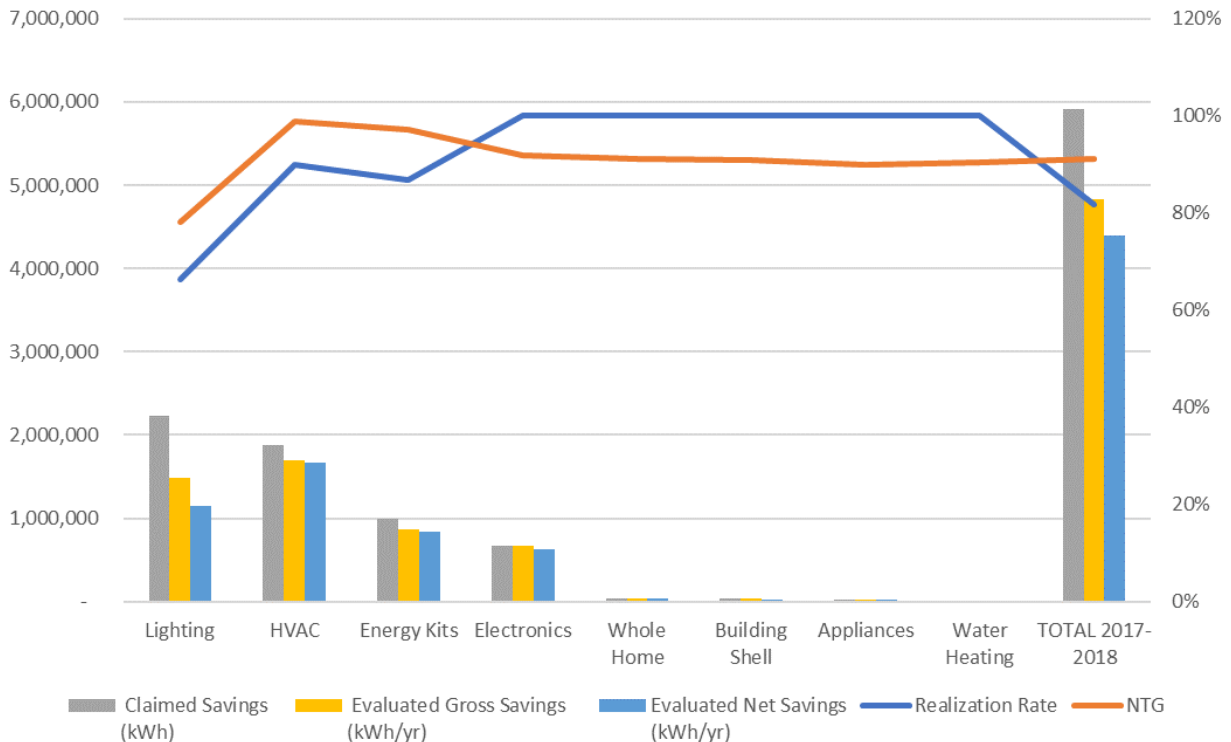


Table 1-2: Idaho wattsmart Homes Program Claimed and Evaluated Savings by Measure Category, 2017

Year	Measure Category	Claimed Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate	Evaluated Net Savings (kWh/yr)	Net to Gross
2017	Appliances	21,005	21,005	100%	18,756	89%
	Building Shell	12,475	12,475	100%	11,139	89%
	Electronics	-	-	-	-	-
	Energy Kits	341,016	295,079	87%	286,961	97%
	HVAC	683,139	617,155	90%	606,272	98%
	Lighting	1,057,371	700,879	66%	547,125	78%
	Water Heating	8,379	8,379	100%	7,482	89%
	Whole Home	13,816	13,816	100%	12,336	89%
2017 TOTAL		2,137,201	1,668,788	78%	1,490,072	89%

Table 1-3: Idaho wattsmart Homes Program Claimed and Evaluated Savings by Measure Category, 2018

Year	Measure Category	Claimed Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate	Evaluated Net Savings (kWh/yr)	Net to Gross
2018	Appliances	6,791	6,791	100%	6,242	92%
	Building Shell	18,796	18,796	100%	17,276	92%
	Electronics	676,512	676,512	100%	621,810	92%
	Energy Kits	655,953	569,873	87%	554,196	97%
	HVAC	1,200,873	1,078,913	90%	1,068,723	99%
	Lighting	1,174,740	778,061	66%	607,698	78%
	Water Heating	7,125	7,125	100%	6,549	92%
	Whole Home	30,845	30,845	100%	28,351	92%
2018 TOTAL		3,771,635	3,166,917	84%	2,910,845	92%

1.1.2 Process Evaluation Results

Key process evaluation results include the following:

- **Survey respondents are satisfied with Rocky Mountain Power as their electricity provider.** The large majority of survey respondents reported being either very satisfied or satisfied with Rocky Mountain Power (RMP) as their electricity service provider, with approximately 86% of General Population Survey respondents, 78% of Energy Kits Survey respondents and 85% of HVAC Survey respondents reporting that they were either very satisfied or satisfied.
- **Program participants are satisfied with Rocky Mountain Power’s wattsmart Homes Program.** Approximately 89% of Energy Kit Survey respondents and 83% of HVAC Survey respondents reported being either satisfied or very satisfied with the wattsmart Homes Program overall.

- **Bill inserts and the Rocky Mountain Power website were the top ways participants learned of Rocky Mountain Power energy kits.** Program participant survey respondents that received energy kits most commonly reported learning about the energy kits through bill inserts (42%) or the Rocky Mountain Power website (34%).
- **Rocky Mountain Power representatives, the program website and retailers were the top ways participants obtained information regarding Rocky Mountain Power incentives for HVAC equipment.** Program participant survey respondents that received incentives for HVAC equipment most commonly reported learning about the HVAC incentives through Rocky Mountain Power representatives (45%), the program website (16%), or retailers (12%).
- **Energy efficiency, price and lifetime of bulbs were important to customers when purchasing light bulbs.** General population survey respondents reported that the most important characteristics considered when purchasing light bulbs were energy efficiency (69%), price (68%), and length of the bulb's life (62%).
- **Saving money on utility bills was most important to participants receiving energy kits.** Approximately 66% of Energy Kits Survey respondents reported that "saving money on utility bills" was the most important reason for requesting an energy kit and 22% reported this as the second most important reason. Additionally, 14% of survey respondents reported that "curiosity about energy efficiency products" was the most important reason for requesting an energy kit and 29% reported this as the second most important reason.
- **Program incentives were important drivers of participants' decisions to install new HVAC equipment.** HVAC Survey respondents reported that the HVAC incentive was important or extremely important in driving their decision to install HVAC equipment 83% of the time.

1.1.3 Cost-Effectiveness Results

The Idaho wattsmart Homes Program was cost-effective during the combined 2017-2018 evaluation period, across all cost-effectiveness tests except for the Ratepayer Impact Measure (RIM) test. Table 1-4 (without Non-Energy Impacts (NEIs)) and Table 1-5 (including NEIs) below show the results for the overall program for the combination of program years 2017 and 2018, based on the Idaho evaluated net savings.

Table 1-4: 2017-2018 Idaho wattsmart Homes Program Level Cost-Effectiveness Results, without NEIs

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PacifiCorp Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0537	\$2,240,587	\$2,554,646	\$314,059	1.14
Total Resource Cost Test (TRC) No Adder	\$0.0537	\$2,240,587	\$2,322,405	\$81,819	1.04
Utility Cost Test (UCT)	\$0.0317	\$1,323,937	\$2,322,405	\$998,468	1.75
Rate Impact Test (RIM)		\$5,873,500	\$2,322,405	-\$3,551,095	0.40
Participant Cost Test (PCT)		\$1,834,659	\$5,590,977	\$3,756,318	3.05
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000029759
Discounted Participant Payback (years)					2.77

Table 1-5: 2017-2018 Idaho wattsmart Homes Program Level Cost-Effectiveness Results, including NEIs

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PacifiCorp Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0537	\$2,240,587	\$3,626,759	\$1,386,173	1.62
Total Resource Cost Test (TRC) No Adder	\$0.0537	\$2,240,587	\$3,394,519	\$1,153,932	1.52
Utility Cost Test (UCT)	\$0.0317	\$1,323,937	\$2,322,405	\$998,468	1.75
Rate Impact Test (RIM)		\$5,873,500	\$2,322,405	-\$3,551,095	0.40
Participant Cost Test (PCT)		\$1,834,659	\$6,663,090	\$4,828,431	3.63
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000043595
Discounted Participant Payback (years)					2.77

Table 1-6 and Table 1-7 below show the Idaho wattsmart Homes Program cost effectiveness results for 2017 and Table 1-8 and Table 1-9 show cost-effectiveness results for 2018, based on the Idaho evaluated net savings. The 2017 and 2018 program pass the cost-effectiveness for all tests except the RIM test.

Table 1-6: 2017 Idaho wattsmart Homes Program Level Cost-Effectiveness Results, without NEIs

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0601	\$900,725	\$1,034,909	\$134,184	1.15
Total Resource Cost Test (TRC) No Adder	\$0.0601	\$900,725	\$940,826	\$40,101	1.04
Utility Cost Test (UCT)	\$0.0318	\$477,192	\$940,826	\$463,635	1.97
Rate Impact Test (RIM)		\$2,140,084	\$940,826	-\$1,199,257	0.44
Participant Cost Test (PCT)		\$772,402	\$2,062,234	\$1,289,832	2.67
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000020212				
Discounted Participant Payback (years)	3.78				

Table 1-7: 2017 Idaho wattsmart Homes Program Level Cost-Effectiveness Results, including NEIs

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0601	\$900,725	\$1,494,434	\$593,709	1.66
Total Resource Cost Test (TRC) No Adder	\$0.0601	\$900,725	\$1,400,352	\$499,626	1.55
Utility Cost Test (UCT)	\$0.0318	\$477,192	\$940,826	\$463,635	1.97
Rate Impact Test (RIM)		\$2,140,084	\$940,826	-\$1,199,257	0.44
Participant Cost Test (PCT)		\$772,402	\$2,521,759	\$1,749,357	3.26
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000020212				
Discounted Participant Payback (years)	3.78				

Table 1-8: 2018 Idaho wattsmart Homes Program Level Cost-Effectiveness Results, without NEIs

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0501	\$1,339,861	\$1,519,737	\$179,876	1.13
Total Resource Cost Test (TRC) No Adder	\$0.0501	\$1,339,861	\$1,381,579	\$41,718	1.03
Utility Cost Test (UCT)	\$0.0316	\$846,746	\$1,381,579	\$534,833	1.63
Rate Impact Test (RIM)		\$3,733,416	\$1,381,579	-\$2,351,837	0.37
Participant Cost Test (PCT)		\$1,062,258	\$3,528,743	\$2,466,486	3.32
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000039202				
Discounted Participant Payback (years)	2.24				

Table 1-9: 2018 Idaho wattsmart Homes Program Level Cost-Effectiveness Results, including NEIs

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0501	\$1,339,861	\$2,132,325	\$792,464	1.59
Total Resource Cost Test (TRC) No Adder	\$0.0501	\$1,339,861	\$1,994,167	\$654,306	1.49
Utility Cost Test (UCT)	\$0.0316	\$846,746	\$1,381,579	\$534,833	1.63
Rate Impact Test (RIM)		\$3,733,416	\$1,381,579	-\$2,351,837	0.37
Participant Cost Test (PCT)		\$1,062,258	\$4,141,331	\$3,079,074	3.90
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000106310				
Discounted Participant Payback (years)	2.24				

1.2 Conclusions and Recommendations

ADM provides the following conclusions and recommendations to improve the program and the evaluation of the program in future years.

- **Lighting Measure Category:**

Conclusion: ADM’s calculation of a 6.3% leakage rate for lighting in Idaho is on the low end of leakage rates for lighting even though the Rocky Mountain Power territory in Idaho is relatively small and fragmented. This is likely due to the effective or strategic placement of participating retailer locations and the partnership with the Simple Steps Program. The implementation contractor has indicated that the Retail Sales Allocation Tool (RSAT) may be a predictor of bulb leakage in Rocky Mountain Power territories and is used to determine allocations of bulbs to participating stores.

Recommendation: To understand further how the RSAT tool accounts for leakage and how the store allocations relate to the Program Tracking Data, ADM recommends that the next evaluation of subsequent program years includes a full life-cycle review of the lighting contracts, including the participation agreements with the implementation contractor and a sample of all associated invoices. This would allow the evaluation to follow the life-cycle of the bulbs from the original agreement to final installation.

- **Energy Kits Measure Category:**

Conclusion: The installation rate (ISR) for the first showerhead was 71% and the second showerhead was 52%. Respondents to the Energy Kits survey who did not

install showerheads indicated that they disliked the pressure/water volume (37%), already had high-efficiency showerheads installed (26%) or disliked the way it looked (16%).

Recommendation: ADM recommends that Rocky Mountain Power consider including only one showerhead in the Best Kit – 2 Bath Energy Kits. Additionally, if not already done, Rocky Mountain Power could ask qualifying questions regarding showerheads during the energy kit request process.

- **Electronics Measure Category:**

Conclusion: The Advanced Power Strip (APS) measure was a new offering in 2018. The claimed savings value of 216 kWh/yr is based off a study that employed two methodologies, including simulation and post installation monitoring.

Recommendation: ADM recommends that if the APS measure is to be continued in subsequent program years and is expected to follow the participation trend from 2018, the next evaluation cycle includes primary data collection for this measure (e.g. installation rates and removal rates) that can be used to verify and supplement the previous completed studies.

- **Whole Homes Measure Category:**

Conclusion: The whole homes measure category accounted for approximately 0.8% of overall claimed savings in 2017-2018. ADM conducted a deemed savings review for this measure category and verified the proper application of the TRL values for the whole homes measures. ADM did not have the modeling files supporting the ex-ante claimed savings values.

Recommendation: If the whole homes measure category is expected to grow in subsequent program years, ADM will request the modeling files to further verify the savings values.

2 Introduction and Purpose of Study

ADM Associates, Inc. (ADM) is under contract with PacifiCorp to perform evaluation, measurement and verification (EM&V) services to determine the ex-post verified energy (kWh) savings that are achieved through PacifiCorp's 2017-2018 Home Energy Savings Program in the states of California and Washington; and wattsmart Homes Program in Idaho, Utah and Wyoming.

This document is the Final Evaluation Report for the 2017-2018 wattsmart Homes Program in Idaho. Henceforth in this document, ADM may refer to the Idaho wattsmart Homes Program as "the Program." Program year 2017 (PY 2017) and program year 2018 (PY 2018) coincide with the respective calendar years. The purpose of this report is to present the results of the impact evaluation effort undertaken by ADM to verify the energy savings that resulted from the Program, as further described in subsequent sections. Additionally, this report presents the results of the process evaluation of the Program completed by ADM focusing on participant and program staff perspectives regarding the Program's implementation.

2.1 Description of the Programs

The Program in the state of Idaho provides incentives for Rocky Mountain Power residential customers who purchase various eligible products or measures. Measures include energy-efficient appliances, lighting such as ENERGY STAR® light emitting diodes (LEDs), building shell measures, electronics, energy kits, heating, ventilation, and air conditioning (HVAC) equipment, heat pump water heaters, and whole home measures.

The Program is promoted by marketing teams at Rocky Mountain Power and CLEAResult (the program implementer) and cross-promoted with participating retailers and trade allies. There is also significant effort to provide information and educational opportunities to customers and participating market partners. The Program leverages relationships with manufacturers, distributors, and retailers to ensure effective program implementation and optimize participation.

Program incentives are provided to Rocky Mountain Power customers either at the point-of-sale as an instant incentive, or as a mail-in incentive application that upon approval is paid post-purchase. Point-of-sale incentives are also known as upstream or midstream incentives. A typical upstream incentive or 'upstream distribution method' is the instant incentive that the program provides for ENERGY STAR LEDs (this is also called an upstream measure). The LED incentive is provided to the LED manufacturer. Consumers benefit from upstream incentives by buying LEDs at discounted prices made possible by

the incentive that was funded upstream. A point-of-sale incentive usually does not require the consumer to use a coupon or provide an incentive form. This is an efficient and cost-effective means to provide consumers instant incentives for relatively high-volume, low-cost measures such as LEDs.

The ‘downstream distribution method’ pays the specified incentive amount per energy-efficiency measure directly to the Rocky Mountain Power customer after the customer completes an application form for an eligible measure. The application form is usually completed online or mailed in. Typical downstream measures include energy-efficient appliances and relatively high-cost HVAC equipment and services.

2.2 Distribution Methods and Measure Categories

An overview of measure categories and measure types in the 2017-2018 Programs is shown in Table 2-1. For each measure type, the distribution method is indicated: upstream, midstream, or downstream.

Table 2-1: 2017-2018 Idaho Measure Categories and Distribution Methods

Measure Category and Measure Type	Distribution Method	
	Upstream	Downstream
Appliances		
Clothes Washers		Yes
Heat Pump Water Heaters		Yes
Building Shell		
Insulation		Yes
Windows		Yes
Electronics		
Advanced Power Strips		Yes
Energy Kits		
Lighting		Yes
Lighting and Plumbing		Yes
HVAC		
Controls and Thermostats		Yes
Cooling		Yes
Ducting		Yes
Heat Pump		Yes
Ventilation		Yes
Lighting		
General Service Fixtures	Yes	
General Service Lamps	Yes	
Specialty Lamps	Yes	
Water Heating		
Heat Pump Water Heater		Yes
Whole Home		
Whole Home		Yes

2.3 Program Participation

During the 2017-2018 program years, Rocky Mountain Power provided incentives to residential customers that resulted in the quantity of measures shown in Table 2-2 and Table 2-3. Rocky Mountain Power also provided upstream discounts for 382 lighting fixtures and 60,923 lighting bulbs in 2017 and 502 lighting fixtures and 66,428 lighting bulbs in 2018. Table 2-2 and Table 2-3 also show the associated claimed savings for each measure during 2017 and 2018.

Table 2-2: 2017 Claimed Program Quantity and Savings by Measure in Idaho

Measure Category	Measure Type ¹	Claimed Quantity	Quantity Type	Claimed kWh Savings
Appliances	Clothes Washers	69	Measures	8,538
	Heat Pump Water Heater	7	Measures	12,467
Building Shell	Insulation	15,546	Square Feet	10,987
	Windows	1,621	Square Feet	1,488
Energy Kits	Lighting	466	Kits	15,266
	Lighting and Plumbing	605	Kits	325,750
HVAC	Controls and Thermostats	28	Measures	38,948
	Cooling	3	Measures	1,104
	Ducting	178	Measures	581,526
	Heat Pump	18	Measures	59,449
	Ventilation	4	Measures	2,112
Lighting	General Service Fixtures	382	Fixtures	15,639
	General Service Lamps	52,960	Bulbs	816,669
	Specialty Lamps	7,963	Bulbs	225,063
Water Heating	Heat Pump Water Heater	5	Measures	8,379
Whole Home	Whole Home	4	Measures	13,816
2017 TOTAL				2,137,201

¹ Due to a TRL update in 2017, heat pump water heating measures were categorized in both the Appliance Measure Category and in the Water Heating Measure Category in 2017, before moving entirely to the Water Heating Measure Category in 2018.

Table 2-3: 2018 Claimed Program Quantity and Savings by Measure in Idaho

Measure Category	Measure Type	Claimed Quantity	Quantity Type	Claimed kWh Savings
Appliances	Clothes Washers	61	Measures	6,791
Building Shell	Insulation	29,158	Square Feet	14,855
	Windows	3,733	Square Feet	3,941
Electronics	Advanced Power Strips	3,132	Measures	676,512
Energy Kits	Lighting	1,181	Kits	38,690
	Lighting and Plumbing	1,132	Kits	617,263
HVAC	Controls and Thermostats	74	Measures	103,755
	Cooling	10	Measures	2,286
	Ducting	329	Measures	1,074,843
	Heat Pump	7	Measures	15,237
	Ventilation	9	Measures	4,752
Lighting	General Service Fixtures	502	Fixtures	20,552
	General Service Lamps	59,292	Bulbs	952,927
	Specialty Lamps	7,136	Bulbs	201,262
Water Heating	Heat Pump Water Heater	4	Measures	7,125
Whole Home	Whole Home	7	Measures	30,845
2018 TOTAL				3,771,635

2.4 Impact Evaluation Objectives

The primary objective of the impact evaluation is to determine ex-post verified gross energy (kWh) savings and net kWh savings. ADM executed the following steps to determine ex-post verified gross and net kWh savings.

- Reviewed and reconciled program tracking data to the claimed participation counts and ex-ante savings in the 2017 and 2018 annual reports.
- Administered participant surveys to determine actual installation rates at the measure level. Surveys were administered online and by phone in Idaho.
- Determined gross unit energy savings (“UES”), which incorporate verified measure installation rates and employ engineering analyses for lighting and energy kits; or employ deemed savings reviews for appliances, electronics, HVAC, building shell, and whole homes measures.
- Determined net savings by applying survey results for the upstream lighting, energy kits and HVAC measure categories.
 - Net-to-gross and realization values used to determine net savings by measure category and program level.
- Achieved a minimum precision of better than $\pm 10\%$ with 90% statistical confidence (“90/10 precision”) for gross realized savings estimates by program.
- Provided comprehensive documentation and transparency for all evaluation tasks.
- Estimated leakage impacts utilizing geospatial analysis (i.e., ArcGIS or similar).

- Provided inputs for cost benefit analyses.
- Provided ongoing technical reviews and guidance throughout the evaluation cycle.
- There was no on-site verification or equipment monitoring.

2.5 Process Evaluation Objectives

The overarching approach to process evaluation is the following.

- To gain an in-depth understanding of program operations and the challenges and evaluation needs through Rocky Mountain Power and implementation contractor key staff interviews, complemented with program documentation review and program participant surveys.

Specifically, the process evaluation was designed to answer the following research questions.

- How well did Rocky Mountain Power staff, implementation staff, participants, and trade allies work together?
- How do participants learn about the program? What percentage is contacted directly by Rocky Mountain Power or implementation staff? What percentage hears about the program through another avenue and then contacts Rocky Mountain Power?
- Were program participants satisfied with their experiences? What was the level of satisfaction with the work performed, the scheduling/application process, and other aspects of program participation? What are the perceived energy and non-energy impacts associated with the program?
- What are key barriers and drivers to program success within Rocky Mountain Power's service territories? How can those be addressed to improve program operations in the future.

3 Impact Evaluation

This chapter presents the findings of the impact evaluation for the Idaho wattsmart Homes Program. Table 3-1 and Figure 3-1 present the impact evaluation results, including the claimed savings, evaluated gross savings, realization rates, evaluated net savings and net-to-gross (NTG) values for each measure category across both program years, 2017 and 2018. Table 3-2 presents the same information for each individual year, 2017 and 2018.

Table 3-1: Idaho wattsmart Homes Program Claimed and Evaluated Savings for 2017-2018

Year	Measure Category	Measure Type	Claimed Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate	Evaluated Net Savings (kWh/yr)	NTG
2017-2018	Appliances	Clothes Washers	15,329	15,329	100%	13,866	90%
		Heat Pump Water Heater	12,467	12,467	100%	11,132	89%
	Building Shell	Insulation	25,842	25,842	100%	23,464	91%
		Windows	5,429	5,429	100%	4,951	91%
	Electronics	Advanced Power Strips	676,512	676,512	100%	621,810	92%
	Energy Kits	LED Only	53,956	52,853	98%	51,399	97%
		Best Kit - 1 Bathroom	123,829	98,395	80%	95,689	97%
		Best Kit - 2 Bathroom	819,184	713,704	87%	694,070	97%
	HVAC	Controls and Thermostats	142,703	142,703	100%	130,142	91%
		Cooling	3,390	3,390	100%	3,087	91%
		Ducting	1,656,369	1,468,424	89%	1,468,424	100%
		Heat Pump	74,686	74,686	100%	67,087	90%
		Ventilation	6,864	6,864	100%	6,254	91%
	Lighting	General Service Fixtures	36,191	21,782	60%	20,617	95%
		General Service Lamps	1,769,596	1,174,281	66%	914,024	78%
		Specialty Lamps	426,325	282,877	66%	220,183	78%
	Water Heating	Heat Pump Water Heater	15,504	15,504	100%	14,031	90%
Whole Home	Whole Home	44,661	44,661	100%	40,687	91%	
2017-2018 Total			5,908,836	4,835,705	82%	4,400,917	91%

Figure 3-1: ID wattsmart Homes Program Energy Savings, 2017-2018

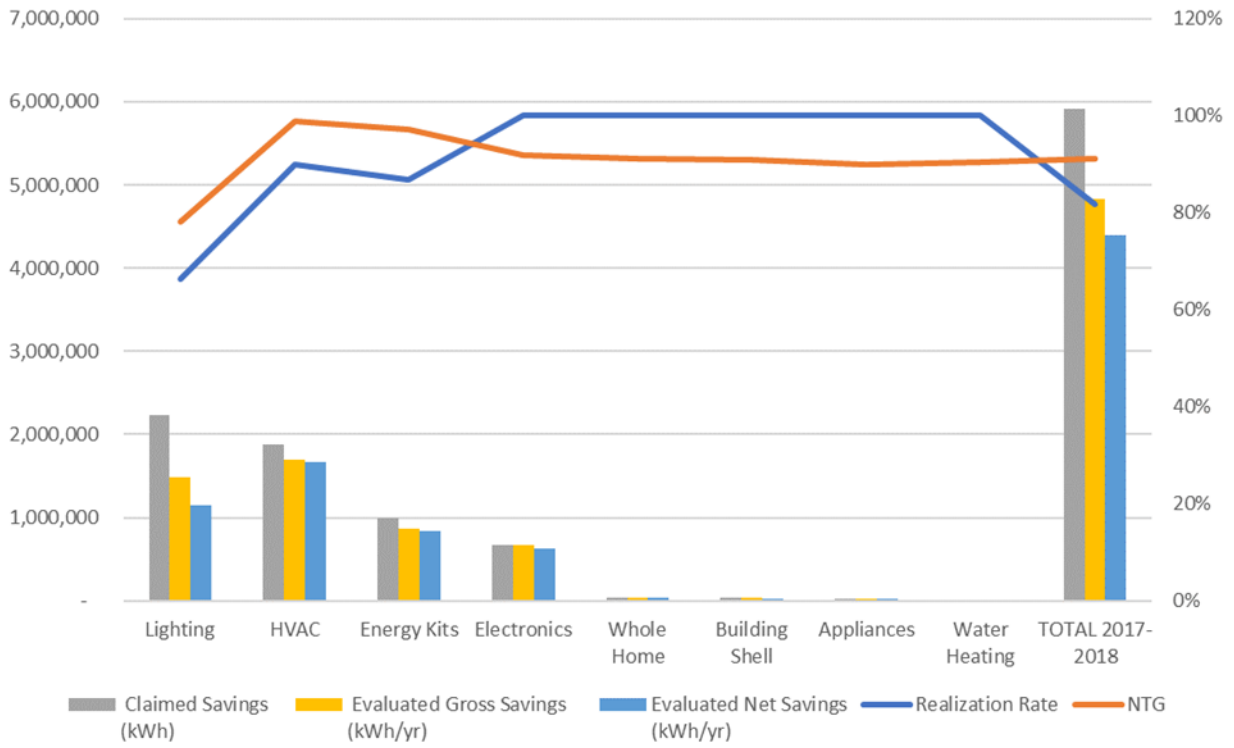


Table 3-2: Idaho wattsmart Homes Program Claimed and Evaluated Savings for 2017 and 2018

Year	Measure Category	Measure Type	Claimed Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate	Evaluated Net Savings (kWh/yr)	NTG
2017	Appliances	Clothes Washers	8,538	8,538	100%	7,624	89%
		Heat Pump Water Heater	12,467	12,467	100%	11,132	89%
	Building Shell	Insulation	10,987	10,987	100%	9,810	89%
		Windows	1,488	1,488	100%	1,329	89%
	Electronics	Advanced Power Strips	-	-	-	-	-
	Energy Kits	LED Only	15,266	14,954	98%	14,543	97%
		Best Kit - 1 Bathroom	48,031	38,166	80%	37,116	97%
		Best Kit - 2 Bathroom	277,719	241,959	87%	235,303	97%
	HVAC	Controls and Thermostats	38,948	38,948	100%	34,777	89%
		Cooling	1,104	1,104	100%	986	89%
		Ducting	581,526	515,542	89%	515,542	100%
		Heat Pump	59,449	59,449	100%	53,082	89%
		Ventilation	2,112	2,112	100%	1,886	89%
	Lighting	General Service Fixtures	15,639	9,412	60%	8,909	95%
		General Service Lamps	816,669	542,124	66%	421,972	78%
		Specialty Lamps	225,063	149,343	66%	116,244	78%
	Water Heating	Heat Pump Water Heater	8,379	8,379	100%	7,482	89%
Whole Home	Whole Home	13,816	13,816	100%	12,336	89%	
2017 Total			2,137,201	1,668,788	78%	1,490,072	89%
2018	Appliances	Clothes Washers	6,791	6,791	100%	6,242	92%
		Heat Pump Water Heater	-	-	-	-	-
	Building Shell	Insulation	14,855	14,855	100%	13,654	92%
		Windows	3,941	3,941	100%	3,622	92%
	Electronics	Advanced Power Strips	676,512	676,512	100%	621,810	92%
	Energy Kits	LED Only	38,690	37,899	98%	36,856	97%
		Best Kit - 1 Bathroom	75,798	60,230	80%	58,573	97%
		Best Kit - 2 Bathroom	541,465	471,745	87%	458,767	97%
	HVAC	Controls and Thermostats	103,755	103,755	100%	95,366	92%
		Cooling	2,286	2,286	100%	2,101	92%
		Ducting	1,074,843	952,883	89%	952,883	100%
		Heat Pump	15,237	15,237	100%	14,005	92%
		Ventilation	4,752	4,752	100%	4,368	92%
	Lighting	General Service Fixtures	20,552	12,369	60%	11,708	95%
		General Service Lamps	952,927	632,157	66%	492,052	78%
		Specialty Lamps	201,262	133,534	66%	103,939	78%
	Water Heating	Heat Pump Water Heater	7,125	7,125	100%	6,549	92%
Whole Home	Whole Home	30,845	30,845	100%	28,351	92%	
2018 Total			3,771,635	3,166,917	84%	2,910,845	92%

3.1 Impact Evaluation Approach

3.1.1 Data Collection and Measure Verification

During the period of this evaluation, ADM reviewed and reconciled program tracking data to the participation counts and ex-ante savings indicated in the 2017 and 2018 annual reports. ADM reviewed a census of program tracking data. In concert with tracking data reviews, ADM also reviewed the savings values and measure savings assumptions and calculations contained in the Technical Resource Library (TRL) files provided by Rocky Mountain Power. ADM issued data requests as needed to ensure that all data was collected that could be reasonably expected or required for this evaluation.

ADM conducted surveys to verify measure installation and collected additional primary data from program participants, including data related to purchasing decisions which was utilized in the freeridership and spillover analyses. ADM surveyed a representative sample of known participants and employed a general population survey for unknown participants (those who purchased upstream measures).

The following provides additional detail regarding data collection and measure verification activities.

- **Review of the program tracking database** is an essential first step for verifying data integrity. ADM assessed the program data management system DSMC – which facilitates data collection and organization. ADM reviewed a census of program tracking data contained in DSMC. Each program year’s dataset was reviewed for completeness, consistency, and compliance with the provided TRL files.
- **Review of measure savings assumptions and calculations** occurred concurrent with the DSMC data reviews mentioned above. Savings values are maintained in the Technical Reference Library (TRL). The TRL files sometimes include measure savings assumptions, calculations, source papers or files (e.g. Regional Technical Forum file versions), and additional documentation that together comprise the generally accepted rules and guidance for evaluating the Programs. ADM reviewed all TRL documentation and included in this report any errors, omissions, or inconsistencies identified during ADM’s review.
- **Data requests** related to EM&V activities occurred throughout the period of this evaluation. ADM provided Rocky Mountain Power various data requests for DSMC and TRL data pulls and reports, and other program data and verification, as necessary.

- **Online and phone surveys were developed/administered** to verify measure installation and collect additional primary data from program participants. ADM surveyed a representative sample of known participants, i.e., customers who implemented downstream measures, for which incentives are provided to specific Rocky Mountain Power customers. ADM also employed a general population survey for Rocky Mountain Power customers to survey the unknown upstream customers. A general population survey is an effective tool to identify the upstream participants. Surveys were administered online and by phone in Idaho.

3.1.2 Sample Design

A representative participant sample was developed for each of the following major measure categories in Idaho: energy kits, HVAC, and lighting. These measures account for approximately 87% of total claimed savings in Idaho during the program years 2017 and 2018. ADM achieved a sampling precision of $\pm 10\%$ or better with 90% statistical confidence – or “90/10 precision” – for gross realized savings estimates at the measure category level for the energy kits, HVAC, and lighting measure categories.

For measure categories for which program participants are known – i.e., downstream measures, including energy kit and HVAC measures – the sampling frame is the population of participants for a given measure category/state.

For upstream measure categories, including lighting measures, participants are not known. Therefore, for lighting measures in Idaho, ADM employed a General Population Survey where the sampling frame is the population of Rocky Mountain Power residential customers in Idaho excluding known participants in 2017-2018 Programs and known participants in other energy efficiency programs that Rocky Mountain Power implemented in 2017 or 2018.

Actual sample sizes were dependent on participant counts and specific measures installed. For the verification and evaluation activities listed below, ADM utilized the following sample sizes.

- Census review for all measures listed in the DSMC program tracking database to ensure appropriate use of deemed savings values (described in detail above).
- Review of a stratified sample of 45 lighting invoices associated with upstream lighting measures. The sampling precision was 7.39% at the 90% confidence interval.
- A sample of known program participants were surveyed for measure installation rates, net-to-gross (NTG) analyses, and process evaluation questions regarding the specific measures they implemented according to DSMC datasets. A sample

of all other residential customers were surveyed using a general population survey. Survey sample sizes per measure category are provided in the following Table 3-3.

Table 3-3: 2017-2018 ID Impact Evaluation Survey Sample Size

Survey	Number of Survey Invites Sent	Number of Completed Surveys	Response Rate	Impact Evaluation Survey Sample (n)
General Population Survey	2,400	313	13%	313
Energy Kits Survey	1,011	71	7%	71
HVAC Survey	363	59	16%	58

3.1.3 Impact Evaluation Approach by Measure Category

Table 3-4 shows the methodology approach for each gross and net savings evaluation step for each measure. For the measure types with no adjustment made to the gross evaluated savings, ADM performed a review of the deemed savings values, savings assumptions and calculations, modeling files, and other information contained in the applicable TRL files, Regional Technical Forum (RTF) files and other sources of savings values. For the measures in which ADM did not have a NTG value resulting from participant surveys, ADM applied the program level NTG values for each year. The program level NTG values are representative of approximately 83% of overall claimed program savings and thus are used as an approximation for a value for the measures that did not have a unique NTG value. This approach results in a more conservative net evaluated savings value than using an assumed NTG value of 1.

Table 3-4: 2017-2018 ID Impact Evaluation Methodology Approach by Measure

Measure Category	Measure Type	Impact Evaluation Methodologies	Inputs to Gross Evaluated Savings	Inputs to Evaluated NTG
Appliances	Clothes Washers and Heat Pump Water Heaters	Deemed Savings Review	No adjustment	Program-level NTG
Building Shell	Insulation and Windows	Deemed Savings Review	No adjustment	Program-level NTG
Electronics	Advanced Power Strips	Deemed Savings Review / Literature Review	No adjustment	Program-level NTG
Energy Kits	Lighting, and Lighting and Plumbing	Engineering Analysis / Energy Kits Survey	Energy Kits Survey	Energy Kits Survey
HVAC	Controls and Thermostats, Cooling, Heat Pump and Ventilation	Deemed Savings Review	No adjustment	Program-level NTG
	Ducting	Engineering Analysis / HVAC Survey / Primary Data Collection	HVAC Survey / Primary Data Collection	HVAC Survey
Lighting	General Service Lamps and Fixtures and Specialty Lamps	Engineering Analysis / General Population Survey	General Population Survey	General Population Survey
Water Heating	Heat Pump Water Heater	Deemed Savings Review	No adjustment	Program-level NTG
Whole Home	Whole Home	Deemed Savings Review	No adjustment	Program-level NTG

3.2 Evaluated Savings

ADM determined gross unit energy savings (“UES”) and evaluated net energy savings by incorporating verified measure installation rates, including installation rates by room, freeridership scores, and spillover from participant surveys together with engineering analyses for lighting and energy kits; and deemed savings reviews and literature reviews for appliances, electronics, HVAC, building shell and water heating measures. The deemed savings reviews for HVAC measures were supplemented with participant surveys to benchmark installation rates and net savings values.

ADM’s estimation of verified UES per measure takes into consideration Idaho’s deemed savings values and the measure savings assumptions and calculations contained in the provided TRL files. Idaho deemed savings values often refer to the Regional Technical Forum (RTF), which maintains a library of UES measures.

3.2.1 Lighting

For lighting measure categories, Rocky Mountain Power claimed the following gross energy savings detailed in Table 3-5 for Idaho in 2017 and 2018.

Table 3-5: 2017-2018 Idaho Claimed Gross Energy Savings for Lighting Measures

Measure Category	Measure Type	2017 Quantity	2017 Savings (kWh)	2018 Quantity	2018 Savings (kWh)
Lighting	General Service Fixtures	382	15,639	502	20,552
	General Service Lamps	52,960	816,669	59,292	952,927
	Specialty Lamps	7,963	225,063	7,136	201,262
TOTAL		61,305	1,057,371	66,930	1,174,740

3.2.1.1 Database Review

For all lighting measures in Idaho in 2017 and 2018, ADM reviewed and reconciled the program tracking data to the claimed participation counts and ex-ante savings in the 2017 and 2018 annual reports. Further, ADM conducted the review activities detailed below for lighting measures.

3.2.1.1.1 General Service Lamps and Specialty Lamps (ENERGY STAR® LEDs)

ADM conducted an ex-ante review of the Program’s 2017 and 2018 lighting measure data for general service lamps and specialty lamps. In this review, the following activities were performed:

- Verification of measure incentive requirements (e.g. ENERGY STAR® qualified status)

- Review of a sample of retailer and distributor invoices
- Verification that the program tracking dataset does not include duplicate or erroneous data entries
- Confirmed data entries in the program tracking dataset include all necessary fields for savings calculations
- Verification that all energy savings are claimed in accordance with the applicable TRL source documents and calculations

ADM reviewed each of the 33 individual lighting lamp measures for 2017 and 31 individual lighting lamp measures for 2018, including both general service lamps and specialty lamps. ADM verified for all lighting measures that the claimed savings per measure and the savings assumptions and calculations were supported by the applicable TRL documents. Using the deemed values in conjunction with the total number of measures incentivized as provided in the program tracking database results in the claimed program energy savings.

3.2.1.1.2 General Service Fixtures

ADM conducted an ex-ante review of the Program's 2017 and 2018 lighting data for general service fixtures. In this review, the following activities were performed:

- Verification of measure incentive requirements (e.g. ENERGY STAR® qualified status)
- Verification that the program tracking dataset does not include duplicate or erroneous data entries
- Confirmed data entries in the program tracking dataset include all necessary fields for savings calculations
- Verification that all energy savings are claimed in accordance with the applicable TRL documents and calculations

ADM reviewed the one individual lighting fixture measure for 2017 and the one individual lighting fixture measure for 2018. ADM verified for the general service fixtures that the claimed savings per measure and the savings assumptions and calculations were supported by the applicable TRL documents. Using the deemed values in conjunction with the total number of measures incentivized as provided in the program tracking database results in the claimed program energy savings.

3.2.1.2 Inputs to Savings Calculation

ADM acquired information from the General Population survey in order to calculate an ex-post installation rate (ISR) factor and hours-of-use (HOU) value to generate the evaluated gross lighting program energy savings for both lamps and fixtures. The resulting ISR factor of 84.2% for lamps and 94.6% for fixtures and the daily HOU value of 1.93 for lamps and 1.49 for fixtures are shown in Table 3-6 below. The HOU values are based on results derived from the General Population survey regarding installation percentage by room type and HOU values by room type contained in a KEMA Study on Residential Lighting End-Use Consumption.² Because ADM collected installation percentages by room type through the General Population survey, a study that includes HOU values by room type is appropriate to use in this case. Additionally, this is the most recent lighting study of its magnitude. The overall HOU values in the study are within the range of other HOU values and studies reviewed by ADM.

Table 3-6: Ex-post ISR factor and HOU value for Idaho

Measure Type	Evaluated ISR	Evaluated Daily HOU
Lamps	84.2%	1.93
Fixtures	94.6%	1.49

ADM also determined the fraction of lighting measures that are installed in commercial premises or other non-residential premises (e.g., small medical or dental offices or schools, houses of worship, etc.). Although the Program is designed to encourage residential customers to purchase discounted LEDs in participating retail outlets, a fraction of residential customers may purchase an additional quantity for a small office or school or various non-residential premises. The fraction of upstream lighting measures installed in non-residential premises is also called “cross-sector sales.” ADM determined the fraction of cross-sector sales in Idaho in the 2017-2018 Programs as 0.2% for lamps and 0.0% for fixtures through the General Population Survey.

3.2.1.3 Leakage Analysis

Leakage refers to cross-territory sales that occur when program discounted bulbs are installed outside of Rocky Mountain Power’s service territory. When this occurs, the energy and demand impacts from the discounted bulbs are not being realized within the territory that paid for and claimed the savings. Leakage was estimated for each of the retailers in the program. Table 3-7 shows the number of stores in Idaho by retail channel that were included in the leakage analysis. Discount stores would include stores like Dollar Tree, while Do-it-Yourself stores include stores like Ace Hardware or Home Depot,

² Residential Lighting End-Use Consumption Study: Estimation Framework and Initial Estimates; DNV KEMA Energy and Sustainability, Pacific Northwest National Laboratory; December 2012.

and Mass Merchant stores would include stores like Walmart and Costco. Additionally, there are nine senior centers that participate in the lighting program in Idaho.

Table 3-7: Participating Idaho Stores by Channel

Retail Channel	Number of Stores
Discount	6
DIY	7
Mass Merchant	8
Senior Center	9
TOTAL	30

Estimates of leakage were assessed using an approach that combined online survey responses with Geo-mapping. The leakage analysis centered on the following approach:

- First, ADM developed a mapping of concentric circles (drive times) surrounding each participating retailer. The initial modeling assumed the “reach” of a retailer is a 60-minute drive. If drive times overlap between one or more retailer locations, the drive times are split between the stores with the assumption that customers will drive to the nearest store.
- Second, ADM used 2010 Census block data from Environmental System Research Institute (ESRI) to determine the proportion of the population that falls within each drive time circle (from Step 1), as well as the proportion of the population that falls within the Rocky Mountain Power territory and within the state of the participating retailer. Thus, for each drive time circle for each retail location, the Evaluators determined the proportion of the population within the Rocky Mountain Power territory and within state, outside of Rocky Mountain Power territory and within state, and outside of the state of the participating retailer. ADM utilized a shapefile (a format commonly used in GIS that geographically displays the underlying tabular data) showing the service areas of Rocky Mountain Power in the analyzed states from Platts/McGraw-Hill.³
- Third, ADM used the General Population Survey to assess the shopping habits of customers within the radius of participating retailers. This was used to assess the total and maximum drive time that consumers accepted when shopping for products incentivized by the retail channel. This was used in modifying the initial 60-minute drive assumption established in Step 1. An online survey was performed for Rocky Mountain Power in 2019 and the results of this survey are shown in Table 3-8. This approach uses a log transformation of the drive times to smooth the data and estimates the cumulative percent via a second order polynomial

³ Source: http://www.platts.com/IM.Platts.Content/ProductsServices/Products/gismetadata/iou_terr.pdf.

regression. The log transformation takes the log of the drive time and uses that as the independent variable in the regression. A log transformation is common when the relationship between the variables is logarithmic and linear regression is being used, since linear regression assumes the data are linearly related.

- Lastly, ADM calculated the percentage of bulbs that leaked out of Rocky Mountain Power territory.

Table 3-8: Online Survey Drive Time Estimates in Idaho

Channel/ Drive time (minutes)	0-4	5-9	10-14	15-19	20-24	25-29	30-39	40-49	50-59	60+	N
Discount	1%	15%	22%	17%	18%	3%	16%	2%	1%	2%	207
DIY	6%	26%	31%	12%	11%	2%	11%	1%	0%	1%	196
Mass Merchant	4%	15%	31%	16%	14%	3%	12%	1%	0%	2%	201
TOTAL	4%	19%	28%	15%	14%	3%	13%	1%	0%	2%	207

Table 3-9 shows the leakage estimate of 6.3% for Idaho overall across all retailer channels and Table 3-10 provides leakage estimates by retail channel. In Rocky Mountain Power’s Idaho Program, there are certain retailers that participate in Bonneville Power Administration’s Simple Steps Program, which provides regional coordination for retail promotion of lighting and other energy efficiency measures. Based on ADM’s understanding that Rocky Mountain Power’s claimed ex-ante savings for these lighting retailers is based on their allocation for a given store in the Simple Steps Program, ADM applied a leakage value of 0.0% to the RMP retailers that also participated in the Simple Steps Program. The RMP retailers that also participated in the Simple Steps Program accounted for approximately 12% of the lighting bulb sales in the leakage analysis.

Table 3-9: Leakage Estimate in Idaho

Quantity Sold	Leakage Quantity	Leakage Rate
52,072	3,276	6.3%

Table 3-10: Leakage Estimate by Retailer Type in Idaho

Retailer Type	Quantity Sold	Leakage Quantity	Leakage Rate
Discount	692	56	8.1%
DIY	4,362	39	0.9%
Mass Merchant	38,290	3,181	8.3%
Senior Center	8,728	0	0.0%
TOTAL	52,072	3,276	6.3%

Table 3-11 provides a benchmark comparison of the estimated Idaho leakage rates with other leakage estimates for utilities ADM has evaluated in the past couple of years. The leakage estimates for these other states vary from a low of 10% overall leakage for OG&E Arkansas to a high of 50% for SWEPCO Arkansas. Rocky Mountain Power’s leakage rate of 6.3% in Idaho is on the low end even though the Rocky Mountain Power territory in Idaho is relatively small and fragmented. This is likely due to the effective or strategic

placement of participating retailer locations and the partnership with the Simple Steps Program.

Table 3-11: Leakage Benchmarking

Utility	State	Year	Leakage (Overall)	Leakage (Discount)	Leakage (DIY)	Leakage (Mass Merchant)
SWEPCO	AR	2018	50%	41%	65%	48%
Cleco	LA	2018	33%	33%	-	-
OG&E	AR	2018	10%	28%	0%	10%
RMP	UT	2018	8%	11%	5%	10%
PP	WA	2018	6%	14%	4%	7%
RMP	WY	2018	5%	5%	2%	9%
RMP	ID	2018	6%	8%	1%	8%

3.2.1.4 Gross Energy Savings

3.2.1.4.1 Engineering Calculation for Lighting Measure

For lamps and fixtures, the following formula is used to calculate annual energy (kWh) savings per measure:

Formula 3.1 Energy Savings for LEDs

$$LED\ kWh\ savings = \left(\frac{\Delta Watts}{1000} \right) * ISR * Hours * IEF_E$$

Where:

$\Delta Watts$ = Watts, baseline bulb - Watts, LED

ISR = “In Service Rate” or installation rate for LEDs purchased in 2017-2018 were determined from the TRL files for claimed savings and from ADM’s analysis of Rocky Mountain Power customers’ responses to lighting-related questions in the general population survey for evaluated savings; specifically, the general population survey contains various questions related to LED installation, including installation by room type

$Hours$ = Hours of use were determined from the TRL files for claimed savings and from ADM’s analysis of Rocky Mountain Power’s customers’ responses to lighting-related questions in the general population survey for evaluated savings; the hours input is hours of use per year or the product of 365.25 days per year and the average daily hours of use for lighting

IEF_E = Interactive Effects Factor to account for cooling energy savings and heating energy penalties (a deemed value from the TRL files)

Example Calculation for Lighting Measure:

The following is an example of a retail 10 watt LED downlight bulb in 2017. The TRL source document for this measure indicates a UES of 39.2 kWh/yr. The TRL file specifies an hours of use value of 2.34, an installation rate of 98%, and a heat exchange factor of 85.1%. Inserting these inputs into the equation above verifies the claimed UES value. ADM verified the UES values for each individual lighting measure in 2017 and 2018.

Example 3.1 Energy Savings for LEDs

$$39.2 \text{ kWh} = \left(\frac{65-55}{1000} \right) * (1 - 2.0) * (2.34 * 365.25) * (1 - 0.149)$$

Using the deemed UES values from the TRL source documents in conjunction with the total quantity of measures incentivized as provided in the program tracking database results in the ex-ante program energy savings. For this example of a 10 watt LED downlight bulb in 2017, the program tracking data indicates that this measure was incentivized 856 times in 2017. This results in ex-ante energy savings of 33,358.08 kWh/Yr for 2017. Appendix Table 7-1 shows the input values and UES savings for 2017 lighting measures.

3.2.1.4.2 Evaluated Gross Energy Savings for Lighting Measures

Table 3-12 below shows the claimed and evaluated gross savings by lighting measure category in addition to the realization rates. Appendix Table 7-2 and Table 7-3 provide the claimed and evaluated gross savings for each individual lighting measure in 2017 and 2018 in addition to the realization rates. The realization rates for general service and specialty LED lamps in 2017 and 2018 were driven by a lower evaluated ISR of 84.2% compared to the TRL ISR assumption of 98% and a lower evaluated daily HOU of 1.93 compared to the TRL HOU assumption of 2.34. The realization rate for general service fixtures was driven by a lower evaluated ISR of 94.6% compared to the TRL ISR assumption of 100% and a lower evaluated daily HOU of 1.49 compared to the TRL ISR assumption of 2.34.

Table 3-12: 2017-2018 Claimed and Evaluated Idaho wattsmart Homes Program Gross Lighting Savings

Measure Category	Year	Measure Type	Claimed Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate
Lighting	2017	General Service Fixtures	15,639	9,412	60.2%
		General Service Lamps	816,669	542,124	66.4%
		Specialty Lamps	225,063	149,343	66.4%
	2018	General Service Fixtures	20,552	12,369	60.2%
		General Service Lamps	952,927	632,157	66.3%
		Specialty Lamps	201,262	133,534	66.3%
2017-2018 TOTAL			2,232,111	1,478,940	66.3%

3.2.1.5 Evaluated Net Energy Savings

3.2.1.5.1 Free Ridership and Spillover Survey Results

ADM calculated freeridership and non-participant spillover (NPSO) from the General Population survey results to arrive at the net program energy savings and the overall net-to-gross ratio presented in this section. Table 3-13 shows the freeridership and NPSO results for lighting measures in 2017 and 2018. Table 3-14 shows the net savings evaluation results, including the evaluated gross savings, evaluated net savings and the NTG for each lighting measure category in 2017 and 2018. The same information for each individual lighting measure in 2017 and 2018 is included in Appendix Table 7-4 and Table 7-5. The methodology for calculating NTG for lighting measures is discussed in Appendix C.

Table 3-13: 2017-2018 Idaho Lighting Freeridership and Spillover

Measure Type	Free Ridership	Non-Participant Spillover	NTG
Lamps	22.2%	0.0%	77.8%
Fixtures	5.4%	0.0%	94.7%

Table 3-14: 2017-2018 Idaho wattsmart Homes Program Net Lighting Savings and NTG

Measure Category	Year	Measure Type	Evaluated Gross Savings (kWh/yr)	Evaluated Net Savings (kWh/yr)	NTG
Lighting	2017	General Service Fixtures	9,412	8,909	94.7%
		General Service Lamps	542,124	421,972	77.8%
		Specialty Lamps	149,343	116,244	77.8%
	2018	General Service Fixtures	12,369	11,708	94.7%
		General Service Lamps	632,157	492,052	77.8%
		Specialty Lamps	133,534	103,939	77.8%
2017-2018 TOTAL			1,478,940	1,154,823	78.1%

3.2.2 Energy Kits

Rocky Mountain Power made wattsmart Energy Kits available to customers in Idaho who requested them. Energy Kit configurations varied according to the characteristics of customer’s homes and include ENERGY STAR® and WaterSense® certified products. All Kits included four 9.5 W LED light bulbs. If the customer’s home utilized an electric water heater, kits also included energy saving faucet aerator and showerheads.

Table 3-15 details the kit configurations and Rocky Mountain Power claimed savings for each kit type offered in 2017 and 2018 and Table 3-16 shows the quantity of Energy Kits and the total Rocky Mountain Power claimed savings attributed to each kit type in 2017 and 2018.

Table 3-15: 2017-2018 Idaho wattsmart Energy Kit Configurations and Claimed Gross Energy Savings per Energy Kit

Configuration	Measure	Quantity per Energy Kit	2017 and 2018 (kWh/yr)
LED Only	9.5 W LED A-Lamp	4	32.8
Best Kit - 1 Bathroom	9.5 W LED A-Lamp	4	375.2
	1.5GPM Aerator Kitchen	1	
	0.5GPM Aerator Bath	1	
	1.5GPM Showerhead	1	
Best Kit - 2 Bathroom	9.5 W LED A-Lamp	4	582.2
	1.5GPM Aerator Kitchen	1	
	0.5GPM Aerator Bath	2	
	1.5GPM Showerhead	2	

Table 3-16: 2017-2018 Idaho wattsmart Energy Kit Quantities and Total Claimed Gross Savings

Kit Type	2017 Quantity	2017 Total Claimed Savings (kWh/yr)	2018 Quantity	2018 Total Claimed Savings (kWh/yr)
LED Only	466	15,266	1,181	38,690
Best Kit – 1 Bathroom	128	48,031	202	75,798
Best Kit – 2 Bathroom	477	277,719	930	541,465
TOTAL	1,071	341,016	2,313	655,953

3.2.2.1 Database Review

ADM conducted an ex-ante review of the Program’s 2017 and 2018 energy kits measure data. In this review, the following activities were performed:

- Verification of measure incentive requirements (e.g. model numbers)
- Verification that the program tracking dataset does not include duplicate or erroneous data entries
- Confirmed data entries in the program tracking data include all necessary fields for savings calculations
- Verification that all energy savings are claimed in accordance with the applicable TRL source documents and calculations
- Calculate energy savings for individual components of each Energy Kit measure

ADM reviewed each energy kit component in each energy kit measure. ADM verified that the Rocky Mountain Power claimed savings were based on the applicable TRL source documents. Using the UES values in the TRL documents in conjunction with the total number of measures incentivized as provided in the program tracking database results in the total claimed program energy savings shown in Table 3-16.

3.2.2.2 Inputs to Savings Calculation

ADM acquired information from the Energy Kits survey in order to calculate ex-post ISR factors to generate the evaluated gross program energy savings for Energy Kits. The resulting installation rates for each kit component are shown in Table 3-17 below.

Table 3-17: 2017-2018 Ex-Post Installation Rates for Idaho Kit Components

Energy Kit Component	Installation Rate
LED Lamps	82.6%
Showerheads	61.2%
Bathroom Aerator	62.5%
Kitchen Aerator	57.6%

3.2.2.3 Gross Energy Savings

3.2.2.3.1 Engineering Calculation for Energy Kit Measures

Ex-ante and ex-post energy savings can be calculated for the individual components of each measure using engineering formulas, inputs from the savings source documents and inputs gathered from primary surveying. Appendix B includes Table 7-6 and Table 7-7 that list the TRL, RTF, or other source documents or primary data used for each input in the formula for both ex-ante and ex-post evaluated savings. LED annual energy (kWh) savings per lamp are calculated using the same formulas as provided above for lighting lamps and fixtures.

Faucet aerator annual energy (kWh) savings are calculated using the following formula:

Formula 3.4 Energy Savings for Aerators

$$\text{Savings (kWh)} = \text{ISR} \times (\text{F}_B - \text{F}_P) \times \text{T}_{\text{Person-Day}} \times \text{N}_{\text{Persons}} \times 365.25 \times \Delta T_L \times U_H \times U_E \times \text{WH}_E \div \text{Eff} \div (\text{F/home})$$

Where:

ISR = In-Service Rate determined from Energy Kits surveys

F_B = Average Baseline Flow Rate of aerator, (gallons per minute)

F_P = Average Post Measure Flow Rate, (gallons per minute)

$T_{\text{Person-Day}}$ = Average time of hot water usage per person per day (minutes)

N_{Persons} = Average number of persons per household (state-specific values)

ΔT = Average temperature differential between hot and cold water (°F)

U_H = Unit Conversion: 8.33BTU/(Gallons-°F)

U_E = Unit Conversion: 1 kWh/3413 BTU

WH_E = Fraction of Homes with Electric Water Heaters

Eff = Efficiency of Electric Water Heater

F/home = Average number of faucets in the home

Showerhead annual energy (kWh) savings are calculated using the following formula:

Formula 3.5 Energy Savings for Showerheads

$$\text{Savings (kWh)} = \text{ISR} \times [(\text{F}_B - \text{F}_P) \div \text{F}_B] \times G_{\text{Shower}} \times \text{N}_{\text{Persons}} \times 365 \times \Delta T \times U_H \times U_E \div \text{Eff} \div S$$

Where:

ISR = In-Service Rate determined from Energy Kits surveys

F_B = Average Baseline Flow Rate, (gallons per minute)

F_P	= Average Post Measure Flow Rate, (gallons per minute)
G_{Shower}	= Average gallons of hot water used per person per shower per day
N_{Persons}	= Average number of persons per household (state-specific values)
ΔT	= Average temperature differential between hot and cold water (°F)
U_H	= Unit Conversion: 8.33BTU/(Gallons-°F)
U_E	= Unit Conversion: 1 kWh/3413 BTU
Eff	= Efficiency of Electric Water Heater
S	= Average number of showers in the home

Example Ex-Ante Calculation for Energy Kits Measures:

The following example demonstrates the energy savings calculations for aerators and showerheads in the ‘Best Kit – 1 Bathroom’ wattsmart Energy Kit that includes four 9.5 W LED A-Lamps, one 1.5 GPM Kitchen Aerator, one 0.5 GPM Bathroom Aerator, and one 1.5 GPM Showerhead. ADM’s calculations are based on inputs obtained from the applicable TRL and RTF source documents.

LED Energy Savings in Best Kit – 1 Bathroom wattsmart Energy Kit:

$$32.76 \text{ (per kit)} = 8.19 \text{ kWh (per bulb)} * 4$$

Aerator Energy Savings in Best Kit – 1 Bathroom wattsmart Energy Kit:

$$137.21 \text{ kWh (kitchen)} = 0.49 * (2.2 - 1.5) * 4.5 * 2.85 * 365.25 * (93 - 50.65) * 8.345 * \left(\frac{1}{3413.14}\right) * 0.808 \div .98 \div 1$$

and

$$45.68 \text{ kWh (bathroom)} = 0.55 * (2.2 - 0.5) * 1.6 * 2.85 * 365.25 * (86 - 50.65) * 8.345 * \left(\frac{1}{3413.14}\right) * 0.808 \div .98 \div 2.43$$

Showerhead Energy Savings in Best Kit – 1 Bathroom wattsmart Energy Kit:

$$171.60 \text{ kWh} = 0.60 * [(2.3-1.35)/2.3] * 7.76 * 2.37 * 365.25 * (128 - 53) * 8.345 * \left(\frac{1}{3413.14}\right) \div 1 \div 1.78$$

Total Energy Savings in Best Kit – 1 Bathroom wattsmart Energy Kit:

$$387.3 \text{ kWh} = 32.8 + 137.2 + 45.7 + 171.6$$

ADM’s calculated ex-ante savings values for some individual energy kit components were not exactly matched to the deemed UES values found in the Energy Kits TRL source documents. For instance, ADM was not able to reverse engineer the ex-ante values for showerheads contained in the TRL source documents. All of the inputs for the deemed UES values for showerheads are not specified in the savings source documents and thus,

ADM was not able to determine what is driving the difference in ex-ante calculated savings values. ADM calculated an ex-ante UES value of 171.6 kWh/yr for showerheads compared to the deemed ex-ante UES value of 161.68 kWh/yr. ADM was able to reverse engineer the ex-ante values for aerators with the inputs found in the savings source documents. For the example of the ‘Best Kit – 1 Bathroom’ Energy Kit calculated above, the ADM calculated ex-ante savings of 387.3 kWh/Yr does not exactly match the Energy Kits TRL UES value and the Rocky Mountain Power claimed savings value of 375.2 kWh/Yr. Appendix B includes Table 7-6 and Table 7-7 that list the TRL, RTF, or other source documents or primary data used to calculate the ex-ante and evaluated savings for each individual component of the Energy Kits.

3.2.2.3.2 Evaluated Gross Energy Savings for Energy Kits Measures

Table 3-18 below shows claimed and evaluated gross savings as well as realization rates for each Energy Kit component. Table 3-19 shows claimed and evaluated gross savings for all Energy Kits in 2017 and 2018, as well as realization rates on the Energy Kit level. To calculate ex-post evaluated gross savings, ADM incorporated the ISR obtained through the Energy Kits Survey and utilized vetted inputs from the most recent TRL and RTF files for each kit component available prior to the evaluation cycle.

The drivers of realization rates for the lighting Energy Kit component are the ISR and the HOU inputs. In 2017 and 2018, both the evaluated ISR of 83.0% and the evaluated HOU of 1.93 for LED lamps are similar to the claimed input values, leading to a realization rate of 98.0%. For the showerheads Energy Kit component, the evaluated ISR was 61.2%, compared to the 60.0% ISR input to the claimed savings value. For both the kitchen and bathroom aerator Energy Kit components, the respective evaluated ISRs of 58% and 63% impact the realization rates compared to the ISR inputs of 49% and 55% to the claimed savings values. A main driver of the low realization rate of 42.1% for kitchen aerators is the input for average time of hot water usage. The average time of hot water usage input to the ex-ante claimed savings was 4.5 minutes, based on the 2013-2014 Idaho HES Evaluation Report compared to the evaluated savings input of 1.8 minutes, which was based on the Aerators RTF file version 1.1.

Table 3-18: 2017-2018 Energy Kits Claimed and Evaluated Per-Component Gross Savings and Realization Rates in Idaho

Year	Energy Kit Component	Claimed Gross Savings Per Unit (kWh)	Evaluated Gross Savings Per Unit (kWh)	Realization Rate
2017 - 2018	LED Lamps	8.19	8.02	98.0%
	Showerheads	161.68	163.71	101.3%
	Bathroom Aerator	45.30	45.37	100.2%
	Kitchen Aerator	135.50	56.99	42.1%

Table 3-19: 2017-2018 Energy Kits Claimed and Evaluated Gross Savings and Realization Rates in Idaho

Year	Configuration	Claimed Gross Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate
2017	LED Only	15,266	14,954	98.0%
	Best Kit - 1 Bathroom	48,031	38,166	79.5%
	Best Kit - 2 Bathroom	277,719	241,959	87.1%
2018	LED Only	38,690	37,899	98.0%
	Best Kit - 1 Bathroom	75,798	60,230	79.5%
	Best Kit - 2 Bathroom	541,465	471,745	87.1%
2017-2018 TOTAL		996,968	864,952	86.8%

3.2.2.4 Evaluated Net Energy Savings

ADM calculated freeridership and spillover from the Energy Kits Survey results to arrive at the net program energy savings and the overall net-to-gross ratio presented in this section. Table 3-20 shows the freeridership, spillover and NTG results for Energy Kits measures and Table 3-21 shows the net savings evaluation results, including the evaluated gross savings, evaluated net savings and NTG for each Energy Kit configuration. The methodology for calculating NTG for Energy Kit measures is discussed in Appendix C.

Table 3-20: 2017-2018 Freeridership, Spillover and NTG for Energy Kits in ID

Measure Category	Free Ridership	Spillover	Non-Participant Spillover	NTG
Energy Kits	10.9%	8.2%	0.0%	97.3%

Table 3-21: 2017-2018 ID Energy Kits Evaluated Net Energy Savings and NTG

Year	Configuration	Evaluated Gross Savings (kWh/yr)	Evaluated Net Savings (kWh/yr)	NTG
2017	LED Only	14,954	14,543	97.2%
	Best Kit - 1 Bathroom	38,166	37,116	97.2%
	Best Kit - 2 Bathroom	241,959	235,303	97.2%
2018	LED Only	37,899	36,856	97.2%
	Best Kit - 1 Bathroom	60,230	58,573	97.2%
	Best Kit - 2 Bathroom	471,745	458,767	97.2%
2017-2018 TOTAL		864,952	841,158	97.2%

3.2.3 Electronics

The electronics measure category included an advanced power strip (APS) measure in Program year 2018 only and consisted of 3,132 advanced power strips incentivized for a total of 676,512 kWh of savings in 2018. This represented approximately 11% of overall claimed program savings in 2018.

3.2.3.1 Database Review

ADM conducted an ex-ante review of the Program's 2018 electronics measure data. In this review, the following activities were performed:

- Verification that the program tracking dataset does not include duplicate or erroneous data entries
- Confirmed data entries in the program tracking dataset include all necessary fields for savings calculations
- Verification that all energy savings are claimed in accordance with the applicable TRL source document

ADM reviewed the one individual electronics measure in 2018. ADM verified that the UES values claimed by Rocky Mountain Power were supported by the applicable TRL documents. Further, ADM verified that the total claimed savings for the measure accurately reflected the quantity of the measure installed in 2018.

3.2.3.2 Inputs to Savings Calculation

The APS measure was a new offering in 2018 and ADM did not collect primary data to verify an ISR for this measure. ADM applied a 100% ISR for the electronics measure category because there was not a measure-specific ISR for this measure in Idaho. ADM recommends that if the APS measure is to be continued in subsequent program years and is expected to follow the participation trend from 2018, the next evaluation cycle includes primary data collection for this measure (e.g. installation rates and removal rates) that can be used to verify and supplement the savings values.

3.2.3.3 Evaluated Gross Energy Savings

ADM conducted a deemed savings review and literature review of the electronics measure claimed savings value in Idaho, including the TRL files provided, the RTF source savings documents and the studies informing the savings values. The new electronics measure in Idaho was for an infrared (IR)-sensing advanced power strip and the claimed savings value of 216 kWh/yr is sourced from the RTF version 1.3 file for IR-sensing APS. The savings value is a weighted average of two estimates from studies that use two different methodologies. The first methodology used a CalPlug approved method that simultaneously collected baseline data and simulated the controlled state of 42 residential sites for an average of 13 days and produced a savings value of 234 kWh/yr. The second methodology was based on post-installation monitoring performed at 9 residential sites and was designed to gain insight into the behavioral effects not entirely captured by the

CalPlug methodology. This methodology produced a savings value of 134 kWh/yr.⁴ While each methodology has uncertainties, with either behavioral uncertainties or with varying use patterns between the pre and post installation, the methodologies do complement each other to potentially account for the uncertainties. Thus, ADM concludes that the UES values in the TRL files for electronics measures are within the bounds of reasonable estimates and thus did not adjust the savings values. This results in a 100% realization rate and the evaluated gross energy savings for 2018 shown in Table 3-22.

Table 3-22: 2018 ID Evaluated Gross Energy Savings and Realization Rates for Electronics Measures

Measure	Claimed Gross Savings (kWh)	Evaluated Gross Savings (kWh)	Realization Rate
2018 Advanced Power Strips	676,512	676,512	100%
2018 TOTAL	676,512	676,512	100%

3.2.3.4 Evaluated Net Energy Savings

To determine net savings, ADM applied the 2018 program-level NTG value of 91.9% to the 2018 electronics measure. Table 3-23 shows the evaluated net savings and NTG for the electronics measure in 2018.

Table 3-23: 2018 ID Net Energy Savings and NTG for Electronics Measures

Measure	Evaluated Gross Savings (kWh)	Evaluated Net Savings (kWh)	NTG
2018 Advanced Power Strips	676,512	621,810	91.9%
2018 TOTAL	676,512	621,810	91.9%

3.2.4 HVAC

The HVAC measure category included controls and thermostats, cooling, ducting, heat pump, and ventilation measures across the Program years 2017 and 2018. The following Table 3-24 shows the quantity of HVAC measures installed and the claimed savings attributed to each HVAC measure in 2017 and 2018. The ducting measures accounted for 85% of total HVAC measure savings in 2017 and 90% of total HVAC measure savings in 2018.

⁴ AESC, 2014, Valmiki, M., and A. Corradini, (AESC, Inc.), 2014. *Tier 2 Advanced Power Strips in Residential and Commercial Applications*, Prepared for SDG&E Emerging Technologies Program. Available at: http://www.aesc-inc.com/download/Tier2_Adv_%20Pow_Strips_Res_and_Com_Apps.pdf

Table 3-24: 2017-2018 ID HVAC Measure Quantities and Claimed Savings

Measure Type	2017 Quantity	2017 Claimed Savings (kWh)	2018 Quantity	2018 Claimed Savings (kWh)
Controls and Thermostats	28	38,948	74	103,755
Cooling	3	1,104	10	2,286
Ducting	178	581,526	329	1,074,843
Heat Pump	18	59,449	7	15,237
Ventilation	4	2,112	9	4,752
TOTAL	231	683,139	429	1,200,873

3.2.4.1 Database Review

ADM conducted an ex-ante review of the Program’s 2017 and 2018 HVAC measure data. In this review, the following activities were performed:

- Verification of measure incentive requirements for a sample of HVAC measure items (e.g. AHRI numbers and model numbers)
- Verification that the program tracking dataset does not include duplicate or erroneous data entries
- Confirmed data entries in the program tracking dataset include all necessary fields for savings calculations
- Verification that all energy savings are claimed in accordance with the applicable TRL source documents and calculations

ADM reviewed all 12 individual HVAC measures in 2017 and all 10 individual HVAC measures in 2018 and verified for all individual measures that the UES values claimed by Rocky Mountain Power were supported by the applicable TRL documents. Further, ADM verified that the total claimed savings for each of these measures accurately reflected the quantity of that measure installed in 2017 and 2018.

3.2.4.2 Inputs to Savings Calculation

ADM applied a 100% ISR for the HVAC measure categories, supported by the results obtained through the Idaho HVAC survey.

3.2.4.3 Evaluated Gross Energy Savings

ADM conducted a deemed savings review of the controls and thermostats, cooling, heat pump, and ventilation HVAC measure claimed savings values in Idaho, including the TRL files provided, the RTF source savings documents and any additional documentation informing the savings values. ADM concludes that the UES values in the TRL files for these HVAC measures are within the bounds of reasonable estimates based on the engineering review and thus did not adjust the savings values. This results in a 100%

realization rate and the evaluated gross energy savings for 2017 and 2018 shown in Table 3-25 for the controls and thermostats, cooling, heat pump, and ventilation HVAC measures. The ducting measures accounted for 85% of total HVAC measure savings in 2017 and 90% of total HVAC measure savings in 2018 and thus ADM’s evaluation of these measure included a deemed savings review and primary data collection through the Idaho HVAC Survey and additional county assessor data. Each measure type is discussed in more detail below.

Table 3-25: 2017-2018 ID HVAC Measure Gross Evaluation Results

Year	Measure Category	Claimed Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate ¹
2017	Controls and Thermostats	38,948	38,948	100.0%
	Cooling	1,104	1,104	100.0%
	Ducting	581,526	515,542	88.7%
	Heat Pump	59,449	59,449	100.0%
	Ventilation	2,112	2,112	100.0%
2018	Controls and Thermostats	103,755	103,755	100.0%
	Cooling	2,286	2,286	100.0%
	Ducting	1,074,843	952,883	88.7%
	Heat Pump	15,237	15,237	100.0%
	Ventilation	4,752	4,752	100.0%
2017-2018 TOTAL		1,884,012	1,696,068	90.0%

3.2.4.3.1 Ducting

For ducting measures in Idaho, ADM conducted a deemed savings review and collected primary data through the Idaho HVAC Survey and additional county assessor data in order to verify and calculate evaluated gross savings. The deemed savings review of the ducting measure claimed savings values included a review of the TRL files provided, the RTF source savings document and the savings modeling documentation and results. The ducting measures in Idaho were duct sealing measures specific to manufactured homes. The claimed savings values for the manufactured homes measures are sourced from the RTF version 2.4 for manufactured homes duct sealing. The measure covered improvements made to ducts in existing manufactured homes to reduce air leakage and must be carried out in accordance with Performance Tested Comfort Sealing specifications. The savings values in the RTF source document for manufactured homes are based off of simulations run in the Simplified Energy Enthalpy Model (SEEM). Simulations were run for baseline and efficient case scenarios developed using a large dataset from BPA and The Energy Trust of Oregon. Simulations were run across five cities in three climate zones based on three house floor areas and three heating/cooling system types. ADM utilized the SEEM model outputs for Climate Zone 3 in the RTF file in conjunction with primary data that ADM collected through the HVAC Survey and additional county assessor data on house size and heating type to evaluate the savings

for Idaho duct sealing measures. This methodology results in a realization rate of 88.7%, as shown in Table 3-25 above.

3.2.4.3.2 Controls and Thermostats

ADM conducted a deemed savings review of the smart thermostat measures claimed savings values, including the TRL files provided and any additional documentation provided. The claimed savings values are sourced from the TRL file provided and assume a baseline of a standard manual or programmable thermostat and an efficient case of wi-fi enabled smart thermostats with occupancy technology. ADM did not adjust the savings values for this measure type.

3.2.4.3.3 Cooling

ADM conducted a deemed savings review of the cooling measure claimed savings values, including the TRL files provided. ADM did not adjust the savings values for this measure type. ADM verified the proper application of TRL savings values.

3.2.4.3.4 Heat Pump

ADM conducted a deemed savings review of the heat pump measure claimed savings values, including the TRL files provided and the RTF source savings documents. The claimed savings values are sourced from the appropriate TRL source file, which based its savings assumptions from the Heat Pump RTF version 3.2 and uses SEEM modeling of baseline and efficient case conditions. The RTF file includes the results of multiple runs of calibrated SEEM simulations that are used in combination with prototype house weightings to generate heating energy use for baseline and efficient cases for each heating system type and heating zone within the analysis. The baseline case is electric resistance heat with a coefficient of performance (COP) of 1.0 and the efficient case is an inverter-driven ductless air source heat pump with a Heating Seasonal Performance Factor (HSPF) of 9.0. ADM did not adjust the savings values for this measure type.

3.2.4.3.5 Ventilation

ADM conducted a deemed savings review of the ventilation measure claimed savings values, including the TRL files provided. ADM did not adjust the savings values for this measure type. ADM verified the proper application of TRL savings values.

3.2.4.4 Evaluated Net Energy Savings

Table 3-27 shows the evaluated net savings and NTG for HVAC measures in 2017 and 2018. To determine net savings for the ducting HVAC measures, ADM calculated a net-to-gross value of 100% using responses from 38 duct sealing participants in the Idaho

HVAC survey. ADM calculated no freeridership and no spillover from the survey results in Idaho to arrive at a net-to-gross ratio of 100% for duct sealing measures. The methodology for calculating NTG for HVAC measures is discussed in Appendix C.

For the other HVAC measures, there were not sufficient responses from the HVAC survey to calculate freeridership and spillover. Thus, ADM applied the 2017 program-level NTG value of 89.3% to the 2017 HVAC measures and the 2018 program-level NTG value of 91.9% to the 2018 HVAC measures. ADM used information from the Pacific Power Washington HVAC survey shown in Table 3-26 in order to benchmark the yearly program-level NTG values applied to this measure category. The calculated NTG value of 94.1% from the Washington HVAC survey is not a direct comparison to the program-level NTG values applied to these HVAC measure in Idaho, however it does show that the program-level NTG values are likely a conservative estimate for HVAC measures in Idaho.

Table 3-26: 2017-2018 Washington Freeridership, Spillover and NTG for HVAC Measures

Measure Category	Free Ridership	Spillover	Non-Participant Spillover	NTG
HVAC	6.9%	0.5%	0.5%	94.1%

Table 3-27: 2017-2018 ID HVAC Measure Gross and Net Evaluation Results

Year	Measure Category	Evaluated Gross Savings (kWh/yr)	Evaluated Net Savings (kWh/yr)	NTG
2017	Controls and Thermostats	38,948	34,777	89.3%
	Cooling	1,104	986	89.3%
	Ducting	515,542	515,542	100.0%
	Heat Pump	59,449	53,082	89.3%
	Ventilation	2,112	1,886	89.3%
2018	Controls and Thermostats	103,755	95,366	91.9%
	Cooling	2,286	2,101	91.9%
	Ducting	952,883	952,883	100.0%
	Heat Pump	15,237	14,005	91.9%
	Ventilation	4,752	4,368	91.9%
2017-2018 TOTAL		1,696,068	1,674,995	98.8%

3.2.5 Appliances

The appliance measure category included clothes washers and heat pump water heater measures across the Program years 2017 and 2018. Due to a TRL update in 2017, heat pump water heating measures were categorized in both the Appliance Measure Category and in the Water Heating Measure Category in 2017, before moving entirely to the Water Heating Measure Category in 2018. The following Table 3-28 shows the quantity of appliance measures installed and the claimed savings attributed to each appliance

measure in 2017 and 2018. The appliance measure category represented 0.5% of overall claimed program savings in 2017 and 2018.

Table 3-28: 2017-2018 Idaho Appliance Measure Quantities and Total Claimed Savings

Measure Type	2017 Quantity	2017 Claimed Savings (kWh)	2018 Quantity	2018 Claimed Savings (kWh)
Clothes Washers	69	8,538	61	6,791
Heat Pump Water Heaters	7	12,467	-	-
TOTAL	76	21,005	61	6,791

3.2.5.1 Database Review

ADM conducted an ex-ante review of the Program’s 2017 and 2018 appliances measure data. In this review, the following activities were performed:

- Verification of measure incentive requirements for a sample of appliances (e.g. model numbers)
- Verification that the program tracking dataset does not include duplicate or erroneous data entries
- Confirmed data entries in the program tracking dataset include all necessary fields for savings calculations
- Verification that all energy savings are claimed in accordance with the applicable TRL source documents and calculations

ADM reviewed each of the seven individual appliance measures incentivized in 2017 and the six individual appliance measures incentivized in 2018. ADM verified that the UES values claimed by Rocky Mountain Power were supported by the applicable TRL documents. Further, ADM verified that the total claimed savings for each measure accurately reflected the quantity of that measure installed in 2017 and 2018.

3.2.5.2 Inputs to Savings Calculation

Due to the low savings attributed to appliance measures, ADM did not survey these program participants separately to calculate an ISR. ADM applied a 100% ISR for the appliance measure category. It is uncommon for participants to not install or remove large appliance purchases.

3.2.5.3 Evaluated Gross Energy Savings

ADM conducted a deemed savings review of the appliance measure claimed savings values, including the TRL files provided and the source savings documents, including the Clothes Washers RTF version 5.2. ADM reviewed the baseline Modified Energy Factor

(MEF) of 2.36, which is a weighted value from the California Energy Commission (CEC) database and the efficient case requirement of an MEF of 2.75 or higher. ADM also benchmarked the RTF assumption of an average of 295 laundry cycles a year to the average of 293 laundry cycles a year acquired from the General Population Survey in Idaho.

Additionally, ADM reviewed the water heating measures that were categorized as appliance measures in 2017 as part of the water hearing measure category, which is discussed in Section 3.2.6 below.

ADM concludes that the UES values in the TRL files for appliance measures are within the bounds of reasonable estimates and did not adjust the savings values for appliance measures. This results in a 100% realization rate for appliance measures and the evaluated gross energy savings for 2017 and 2018 shown in Table 3-29.

Table 3-29: 2017-2018 Idaho Evaluated Gross Energy Savings and Realization Rates for Appliance Measures

Year	Measure	Claimed Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate
2017	Clothes Washers	8,538	8,538	100.0%
	Water Heaters	12,467	12,467	100.0%
2018	Clothes Washers	6,791	6,791	100.0%
2017-2018 TOTAL		27,796	27,796	100.0%

3.2.5.4 Evaluated Net Energy Savings

To determine net savings, ADM applied the 2017 program-level NTG value of 89.3% to 2017 appliance measures and the 2018 program-level NTG value of 91.9% to 2018 appliance measures. Table 3-30 shows the evaluated net savings and NTG for appliance measures in 2017 and 2018.

Table 3-30: 2017-2018 Idaho Appliance Measure Net Savings and NTG

Year	Measure	Evaluated Gross Savings (kWh/yr)	Evaluated Net Savings (kWh/yr)	NTG
2017	Clothes Washers	8,538	7,624	89.3%
	Water Heaters	12,467	11,132	89.3%
2018	Clothes Washers	6,791	6,242	91.9%
2017-2018 TOTAL		27,796	24,998	89.9%

3.2.6 Water Heating

The following Table 3-31 shows the quantity of water heating measures installed and the claimed savings in each year 2017 and 2018. Due to a TRL update in 2017, heat pump water heating measures were categorized in both the Appliance Measure Category and in the Water Heating Measure Category in 2017, before moving entirely to the Water Heating Measure Category in 2018. The water heating measure category represented approximately 0.3% of overall claimed program savings in 2017 and 2018.

Table 3-31: 2017-2018 Idaho Water Heating Quantities and Claimed Savings

Measure Category	Quantity	Claimed Savings (kWh)
2017 Water Heating	5	8,379
2018 Water Heating	4	7,125
TOTAL	9	15,504

3.2.6.1 Database Review

ADM conducted an ex-ante review of the Program’s 2017 and 2018 water heating measure data. In this review, the following activities were performed:

- Verification that the program tracking dataset does not include duplicate or erroneous data entries
- Confirmed data entries in the program tracking dataset include all necessary fields for savings calculations
- Verification that all energy savings are claimed in accordance with the applicable TRL source documents and calculations

ADM reviewed the three individual water heating measures in 2017 and the three individual water heating measures in 2018. ADM verified that the UES values claimed by Rocky Mountain Power were supported by the applicable TRL documents. Further, ADM verified that the total claimed savings for each measure accurately reflected the quantity of that measure installed in 2017 and 2018.

3.2.6.2 Inputs to Savings Calculation

Due to the low savings attributed to water heating measures, ADM did not survey these program participants separately to calculate an ISR. ADM applied a 100% ISR for the water heating measure category. It is uncommon for participants to not install or remove large water heater purchases.

3.2.6.3 Evaluated Gross Energy Savings

ADM conducted a deemed savings review of the water heating measure claimed savings values, including the TRL files provided and the RTF source savings documents, including the heat pump water heater RTF file version 3.0. ADM’s review included an analysis of the baseline and efficient case conditions for the heat pump water heater measures. The baseline is established by estimates of electric resistance heater (weighted at 98%) and heat pump water heater (2%) penetration. The TRL and RTF savings values are estimated for three tiers of 0-55 gallon tanks and tier levels are based on minimum Energy Factors. A heating interaction factor of 65% is applied to interior installation locations, as the garage and basement locations are not subject to HVAC interaction. There is also an exhaust ducting identifier for Tiers 2 and 3 that are installed in interior spaces, as ducted units have the capability of rejecting exhaust air to the outside of the building. The RTF uses an hourly water heater simulation model to estimate water heater energy use for the baseline and efficient case. ADM concludes that the assumptions and UES values in the TRL files for water heating measures are within the bounds of reasonable estimates and did not adjust the savings values for water heating measures. This results in a 100% realization rate for water heating measures and the evaluated gross energy savings for 2017 and 2018 shown in Table 3-32.

Table 3-32: 2017-2018 Idaho Evaluated Gross Energy Savings and Realization Rates for Water Heating Measures

Measure Category	Claimed Gross Savings (kWh)	Evaluated Gross Savings (kWh)	Realization Rate
2017 Water Heating Measures	8,379	8,379	100.0%
2018 Water Heating Measures	7,125	7,125	100.0%
2017-2018 TOTAL	15,504	15,504	100.0%

3.2.6.4 Evaluated Net Energy Savings

To determine net savings, ADM applied the 2017 program-level NTG value of 89.3% to 2017 water heating measures and the 2018 program-level NTG value of 91.9% to 2018 water heating measures. Table 3-33 shows the evaluated net savings and NTG for water heating measures in 2017 and 2018.

Table 3-33: 2017-2018 Idaho Net Energy Savings and NTG for Water Heating Measures

Measure Category	Evaluated Gross Savings (kWh)	Evaluated Net Savings (kWh)	NTG
2017 Water Heating Measures	8,379	7,482	89.3%
2018 Water Heating Measures	7,125	6,549	91.9%
2017-2018 TOTAL	15,504	14,031	90.5%

3.2.7 Building Shell

The building shell measure category included insulation and windows measures across the Program years 2017 and 2018. The following Table 3-34 shows the quantity of building shell measures installed and the claimed savings attributed to each building shell measure in 2017 and 2018. The building shell measure category represented approximately 0.5% of overall claimed program savings in 2017 and 2018.

Table 3-34: 2017-2018 ID Building Shell Measure Quantities and Claimed Savings

Measure Type	2017 Quantity (sq. ft.)	2017 Claimed Savings (kWh)	2018 Quantity (sq. ft.)	2018 Claimed Savings (kWh)
Insulation	15,546	10,987	29,158	14,855
Windows	1,621	1,488	3,733	3,941
TOTAL	17,167	12,475	32,891	18,796

3.2.7.1 Database Review

ADM conducted an ex-ante review of the Program’s 2017 and 2018 building shell measure data. In this review, the following activities were performed:

- Verification that the program tracking dataset does not include duplicate or erroneous data entries
- Confirmed data entries in the program tracking dataset include all necessary fields for savings calculations
- Verification that all energy savings are claimed in accordance with the applicable TRL source documents and calculations

ADM reviewed each of the eight individual building shell measures incentivized in 2017 and the seven individual building shell measures incentivized in 2018. ADM verified that the UES values claimed by Rocky Mountain Power were supported by the applicable TRL documents. Further, ADM verified that the total claimed savings for each measure accurately reflected the quantity of that measure installed in 2017 and 2018.

3.2.7.2 Inputs to Savings Calculation

Due to the low savings attributed to building shell measures, ADM did not survey these program participants separately to calculate an ISR. ADM applied a 100% ISR for the building shell measure category. It is uncommon for participants to not install or remove building shell measures.

3.2.7.3 Evaluated Gross Energy Savings

ADM conducted a deemed savings review of the building shell measure claimed savings values, including the TRL files provided and the RTF source savings documents and any additional documentation provided. ADM’s review included an analysis of the baseline and efficient case conditions for each building shell measure. The insulation baselines and efficient cases vary for each type of insulation. For attic insulation, the baseline is R-11 insulation and the efficient case is R-49 insulation. For wall insulation, the baseline is no insulation and the efficient case is R-13 insulation. ADM concludes that the baseline and efficient case assumptions and the UES values in the TRL files for building shell measures are within the bounds of reasonable estimates and did not find any reasons to adjust the savings values for building shell measures. This results in a 100% realization rate for building shell measures and the evaluated gross energy savings for 2017 and 2018 shown in Table 3-35.

Table 3-35: 2017-2018 ID Evaluated Gross Energy Savings and Realization Rates for Building Shell Measures

Year	Measure	Claimed Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate
2017	Insulation	10,987	10,987	100.0%
	Windows	1,488	1,488	100.0%
2018	Insulation	14,855	14,855	100.0%
	Windows	3,941	3,941	100.0%
2017-2018 TOTAL		31,271	31,271	100.0%

3.2.7.4 Evaluated Net Energy Savings

To determine net savings, ADM applied the 2017 program-level NTG value of 89.3% to 2017 building shell measures and the 2018 program-level NTG value of 91.9% to 2018 building shell measures. Table 3-36 shows the evaluated net savings and NTG for building shell measures in 2017 and 2018.

Table 3-36: 2017-2018 ID Net Energy Savings and NTG for Building Shell Measures

Year	Measure	Evaluated Gross Savings (kWh/yr)	Evaluated Net Savings (kWh/yr)	NTG
2017	Insulation	10,987	9,810	89.3%
	Windows	1,488	1,329	89.3%
2018	Insulation	14,855	13,654	91.9%
	Windows	3,941	3,622	91.9%
2017-2018 TOTAL		31,271	28,415	90.9%

3.2.8 Whole Homes

The following Table 3-37 shows the quantity of whole homes measures installed and the claimed savings in each year 2017 and 2018. The whole homes measure category represented approximately 0.8% of overall claimed program savings in 2017 and 2018.

Table 3-37: 2017-2018 Idaho Whole Homes Quantities and Claimed Savings

Measure Category	Quantity	Claimed Savings (kWh)
2017 Whole Homes	4	13,816
2018 Whole Homes	7	30,845
TOTAL	11	44,661

3.2.8.1 Database Review

ADM conducted an ex-ante review of the Program’s 2017 and 2018 whole homes measure data. In this review, the following activities were performed:

- Verification that the program tracking dataset does not include duplicate or erroneous data entries
- Confirmed data entries in the program tracking dataset include all necessary fields for savings calculations
- Verification that all energy savings are claimed in accordance with the applicable TRL source documents and calculations

ADM reviewed the one individual whole homes measure in 2017 and the three individual whole homes measures in 2018. ADM verified that the UES values claimed by Rocky Mountain Power were supported by the applicable TRL documents. Further, ADM verified that the total claimed savings for each measure accurately reflected the quantity of that measure installed in 2017 and 2018.

3.2.8.2 Inputs to Savings Calculation

Due to the low savings attributed to whole homes measures, ADM did not survey these program participants separately to calculate an ISR. ADM applied a 100% ISR for the whole homes measure category.

3.2.8.3 Evaluated Gross Energy Savings

ADM conducted a deemed savings review of the whole homes measure claimed savings values, including the TRL files provided, the source savings documents indicated and any modeling files provided. ADM’s review included an analysis of the new home whole home performance path and new manufactured homes whole homes measures, which account for all of the whole homes measure category savings in 2017 and 2018. For the new homes whole home performance path measures, the UES values for Tier 2 are for a new home that exceeded the Idaho 2012 IECC State Energy Code by 30%. For the new manufactured homes whole homes measures, savings are claimed to be the difference between a code built manufactured home and one built to ENERGY STAR manufactured home standards. The provided workbooks for both whole homes measure types indicate that the modeling tool to determine energy savings is called SEEM (Simplified Energy Enthalpy Model). ADM’s review indicates that the assumptions, modeling tools, and UES values in the TRL files for whole homes measures are within the bounds of reasonable estimates and ADM did not adjust the savings values for whole homes measures. Thus, ADM applied a 100% ISR to all whole homes measures resulting in a 100% realization rate and the evaluated gross energy savings in 2017 and 2018 shown in Table 3-37Table 3-38. If this measure category is expected to grow in subsequent program years, ADM will request the modeling files to further verify the savings values.

Table 3-38: 2017-2018 Idaho Evaluated Gross Energy Savings and Realization Rates for Whole Homes Measures

Measure Category	Claimed Gross Savings (kWh)	Evaluated Gross Savings (kWh)	Realization Rate
2017 Whole Homes Measures	13,816	13,816	100.0%
2018 Whole Homes Measures	30,845	30,845	100.0%
2017-2018 TOTAL	44,661	44,661	100.0%

3.2.8.4 Evaluated Net Energy Savings

To determine net savings, ADM applied the 2017 program-level NTG value of 89.3% to 2017 whole homes measures and the 2018 program-level NTG value of 91.9% to 2018 whole homes measures. Table 3-39 shows the evaluated net savings and NTG for whole homes measures in 2017 and 2018.

Table 3-39: 2017-2018 Idaho Net Energy Savings and NTG for Whole Homes Measures

Measure Category	Evaluated Gross Savings (kWh)	Evaluated Net Savings (kWh)	NTG
2017 Whole Homes Measures	13,816	12,336	89.3%
2018 Whole Homes Measures	30,845	28,351	91.9%
2017-2018 TOTAL	44,661	40,687	91.1%

4 Process Evaluation

This chapter presents the findings of the process evaluation for the Idaho wattsmart Homes Program. ADM's process evaluation included a review of the program materials, in-depth interviews with program staff, and general population and participant surveys.

4.1 Review of Program Materials and In-depth Interviews with Program Staff

4.1.1 Roles and Responsibilities

ADM evaluators interviewed program staff from Rocky Mountain Power, which included the wattsmart Homes Program manager. The wattsmart Homes program manager is responsible for overseeing the program in Utah, Wyoming and Idaho, which includes assessing cost effectiveness of the program, regulatory recovery, review and approving marketing campaigns, program participation and procedures, and design and implementation of procedures. ADM evaluators also spoke with a senior account manager and marketing account manager from CLEARResult. The program manager's responsibilities included implementation, contract management, client management, and overseeing day-to-day operations.

4.1.2 Program Design and Goals

The program saving goals and spend targets vary for each state and channel (lighting and non-lighting). Each implementer has individual goals for each channel. The program in Idaho is implemented and managed by CLEARResult.

The following key findings are related to the wattsmart Homes Program performance and changes to the program:

- Rocky Mountain Power program staff indicated they were not able to hit all the goals in Idaho in PY 2017. There were no changes to the savings target. There was also a lot of changes in personnel.
- In PY 2018, Rocky Mountain Power program staff indicated that the program hit all lighting and non-lighting targets in Idaho.
- The Rocky Mountain Power website (<https://www.wattsmarthomes.com/state/ID>) was enhanced in 2018 and there will be further improvements in 2019.
- CFLs were eliminated from the program in 2017, with Rocky Mountain Power program staff indicating that LEDs have demonstrated savings and good participation.

- CLEAResult staff believed there is a need for additional customer education about LEDs and their benefits, especially in rural areas.
- CLEAResult staff indicated there were changes to the participating lighting retailers between 2017 and 2018. They also stated they may try to recruit online retailers (e.g., Amazon) since all brick and mortar stores have an agreement.
- CLEAResult staff indicated that customer satisfaction is high.

The following key findings are related to wattsmart Homes Program participation:

- Rocky Mountain Power staff reported that participation in Idaho dropped possibly due to the small service territory. Specifically, there has been a drop in lighting in Idaho because there is only one “big box” retailer who meets the program requirements.
- CLEAResult staff indicated they are continuing to move away from paper applications and towards self-validation tools at the point-of-purchase.

4.1.3 Tracking and Reporting

Rocky Mountain Power tracks program activity for the wattsmart Homes Program, including the following data indicators:

- Non-lighting measures are captured through customer application (e.g. account number, address);
- Builder and/or contractor information;
- Technical requirements (appliance model and specifications);
- Lighting sales data (weekly or monthly) from retailers.

Rocky Mountain Power staff indicated that they are collecting all the necessary information and that the information is kept current enough to effectively manage the program. No significant improvements were suggested. One staff member stated they would like to collect email addresses from customers.

4.1.4 Communication

Rocky Mountain Power staff have regularly scheduled weekly conference calls with implementation staff. Topics include program status and performance, field operations, changes to the website, program enhancements, marketing and outreach activities, customer issues, barriers to participation, and program enhancements. There are also monthly meetings where program staff discuss forecasts, budgets, and future program

adjustments to hit targets. There were no concerns raised about the current communication structure.

4.1.5 Marketing and Outreach

Rocky Mountain Power provides a marketing budget to CLEAResult, which is designed to be measure-specific. CLEAResult's marketing team designs the marketing campaigns and presents a proposal to Rocky Mountain Power for approval. Rocky Mountain Power will conduct email blasts and manages social media posts and CLEAResult provides content.

Marketing activities in Idaho for 2017 and 2018 included:

- Bill inserts and postal mailers
- Email campaigns
- Social media (Facebook, Instagram, and Twitter)
- Program website (<https://www.wattsmarthomes.com/state/ID>)
- Mass media advertisement
- Monthly newsletters (print or electronic)
- Cross promotion
- Outreach events (e.g., home shows)
- Policy interactions/referrals with relevant agencies
- Point-of-purchase signage

Program staff did not express any immediate concerns about marketing. There are no planned changes to the marketing approach for the upcoming program year.

4.2 General Population Survey Results

This section presents key findings from surveys administered online by ADM Associates from April to May 2019 completed by 313 Rocky Mountain Power customers in Idaho State. The surveys gathered information regarding these customers' energy efficient lighting purchases, incentive program awareness, measures installed and in-service rates, decision making and satisfaction. Survey efforts were designed to collect data for both the process evaluation and impact analyses.

4.2.1 Respondent LED Purchases

Survey respondents were surveyed on multiple aspects of their LED purchases. Approximately 79% of survey respondents indicated that they or someone in their household purchased LED light bulbs in 2017 or 2018 and approximately 21% of respondents indicated that they or a member of their household purchased an LED fixture

in 2017 or 2018. Approximately 17% of respondents reported that no one in their household purchased LED light bulbs or LED fixtures in 2017 or 2018 or they did not recall whether a purchase had been made.

Almost half of survey respondents (45%) reported making their LED lighting purchase from The Home Depot. Approximately one-third (35%) reported purchasing their LED lighting at Walmart. Lowe’s and Costco were also popular retailers among survey respondents. Table 4-1 summarizes which retailers survey respondents reported purchasing LED lighting from in 2017 or 2018.

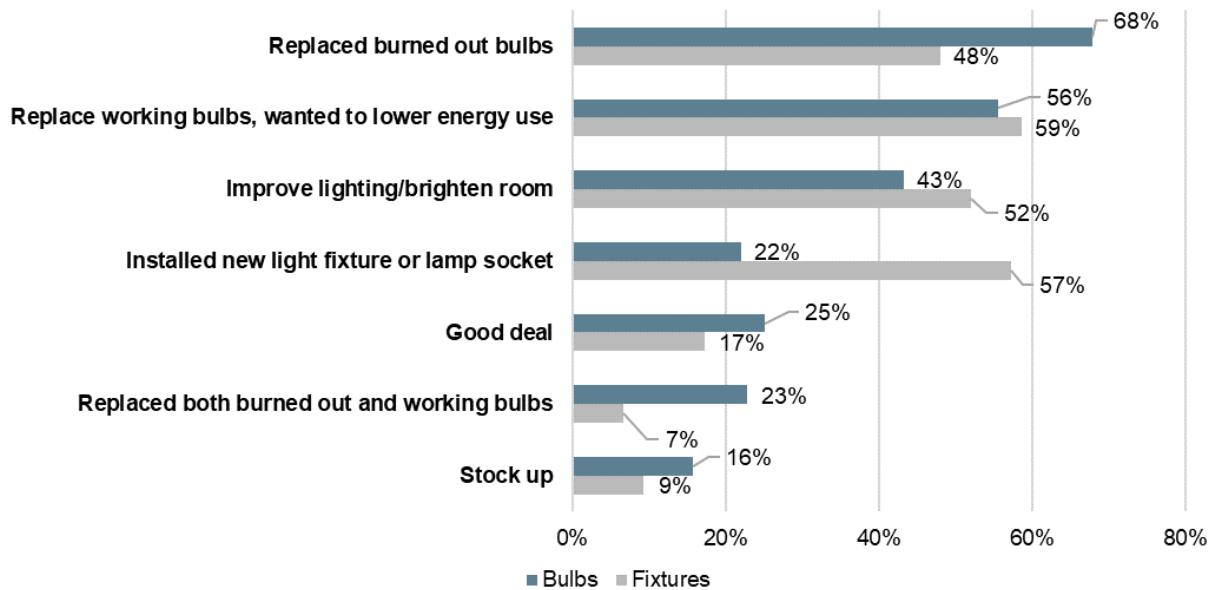
Table 4-1: Where did respondents purchase LED lighting?

From which of the following retail stores did you purchase your LED lighting?	Response	Percent of Responses (n = 288)
	The Home Depot	45%
Walmart	35%	
Lowe’s	30%	
Costco	22%	
Other	14%	
Ace Hardware	10%	
Sam’s Club	7%	
Target	4%	
I do not recall	3%	
Batteries Plus	1%	

Note: The sum of percentages may not be 100% because respondents could choose more than one response.

Respondents provided information regarding their decision to purchase an LED bulb or fixture. Survey respondents provided the reasons they purchased LED lighting (LED light bulbs and LED fixtures). Figure 4-1 summarizes survey respondents’ reported reasons for purchasing LED lighting in 2017 or 2018. LED bulb respondents had a variety of reasons for purchasing LED lighting, including to replace burned out bulbs (68%), to reduce energy use (56%) and the desire to improve the lighting in a room (43%). LED fixture respondents also had a variety of reasons for purchasing LED lighting, including to reduce energy use (59%), because they installed a new light fixture (57%), the desire to improve the lighting in a room (52%) and to replace burned out bulbs (48%).

Figure 4-1: Why did respondents purchase LED lighting?

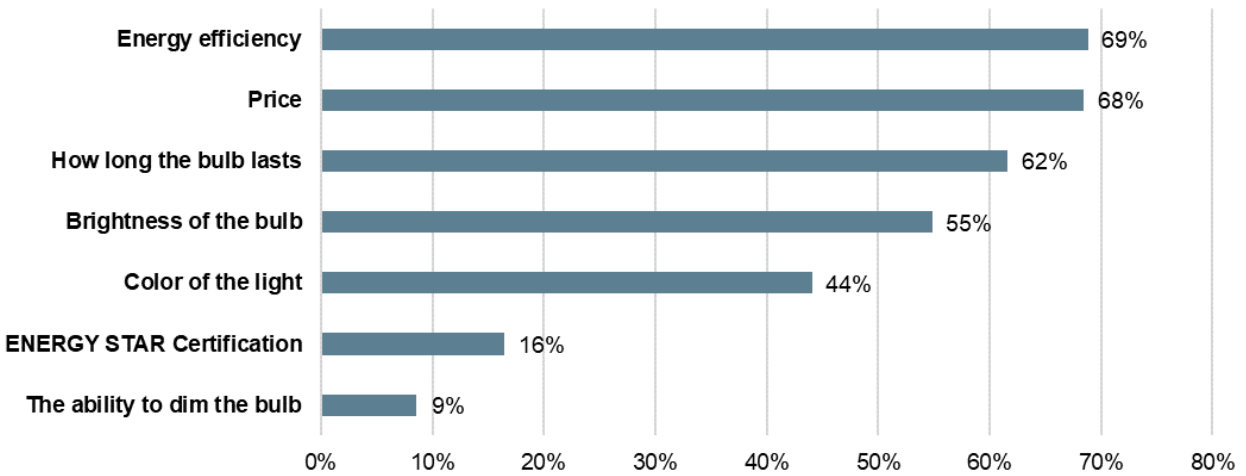


n (bulbs) = 268; n (fixtures) = 75

Note: The sum of percentages is not 100% because respondents could choose more than one response.

Respondents also reported the most important characteristics they consider when they purchase light bulbs. About three-quarters of respondents reported that energy efficiency (69%) and price (68%) were important characteristics. A significant portion of respondents also indicated that the length of the bulb’s life (62%), brightness of the bulb (55%), color of the light (44%) are important characteristics in their decision to purchase a bulb. Whether the light bulbs had an ENERGY STAR certification impacted purchasing decisions of only 16% of participants. Figure 4-2 displays the reasons respondents gave for purchasing LED bulbs.

Figure 4-2: What are the most important characteristics when purchasing light bulbs?



n = 279

Respondents were surveyed on the types of bulbs and fixtures that their new LED bulbs replaced, or if they were for a new fixture/socket. Approximately 47% of survey respondents indicated that at least one of the new LED bulbs they purchased was bought to replace a traditional incandescent bulb and 46% of respondents indicated that at least one of the new LED fixtures they purchased was bought to replace a traditional incandescent bulb or fixture. Approximately one quarter (24%) of LED bulb respondents responded they were to replace other LEDs.

4.2.2 Respondent Awareness of Incentives

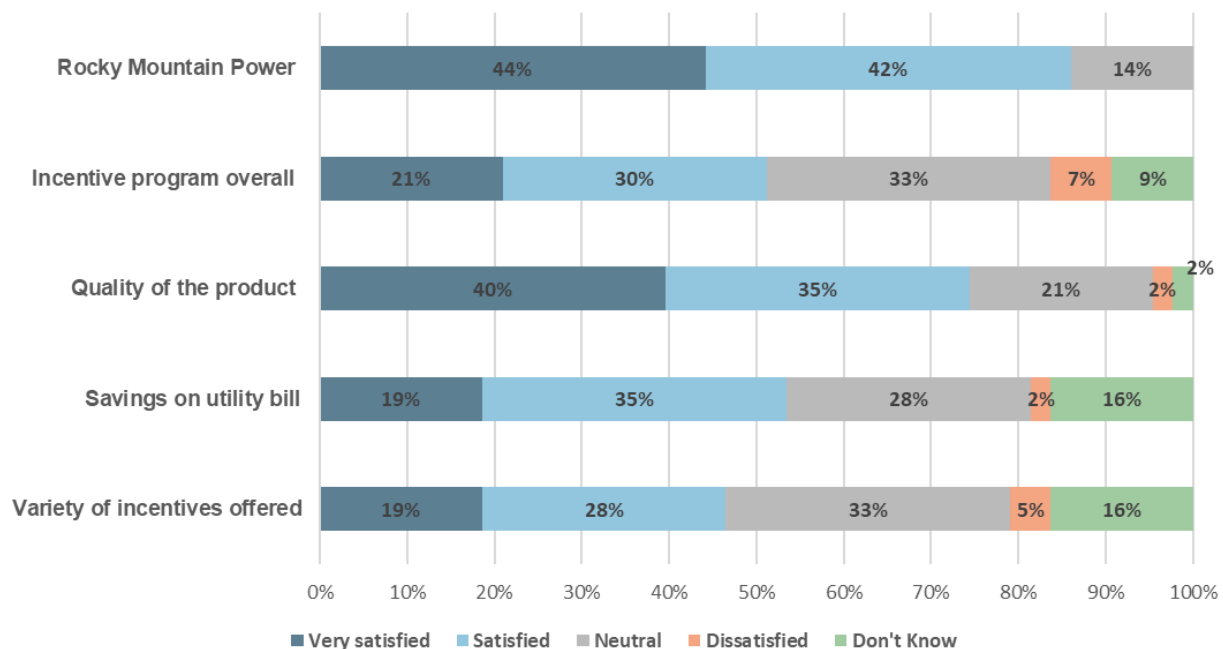
ADM asked survey respondents about LED pricing and whether they recalled whether their LED bulb or LED fixture purchase was discounted. Most respondents reported that they did not recall whether the LED bulbs (80%) or LED fixtures (87%) they purchased were discounted. Approximately 16% of respondents were aware that Rocky Mountain Power provided discounts on certain LED bulbs or fixtures.

Survey respondents who indicated they were aware of Rocky Mountain Power's discount on LED lighting were about the importance of the discount. More than three quarters of survey respondents (76%) that recalled purchasing discounted LEDs stated that the discount was important (40%) or extremely important (36%).

4.2.3 Respondent Satisfaction

ADM asked survey respondents who were aware of the lighting program about their satisfaction with different aspects of the incentive program and with their utility provider overall. The majority of respondents (51%) reported they were either very satisfied (21%) or satisfied (30%) with the incentive program overall. Respondents reported large levels of satisfaction with the quality of the product (75% were “satisfied” or “very satisfied”). More than half of participants (54%) were satisfied or very satisfied with the resulting savings on their utility bill since participating in the program. A large share of respondents (86%) were either very satisfied (44%) or satisfied (42%) with Rocky Mountain Power overall. Figure 4-3 displays the responses to the satisfaction questions.

Figure 4-3: Respondent satisfaction



n = 43

4.2.4 Survey Respondent Home Characteristics

ADM gathered information from respondents regarding their home characteristics which is summarized in Table 4-2. Approximately 56% of respondents report living in single-family detached homes. The majority (73%) of respondents indicated that they owned their home. Respondents’ reported approximate household income was roughly even across the possible survey response options. The majority of respondents reported that electricity was their primary fuel for home heating (61%), and water heating purposes (75%). The typical number of residents in respondents’ homes were 2.7 (average) and 2

(median). Survey respondents reported their square footage of the home was on average about 1,844 square feet, and the median was 1,750 square feet.

Table 4-2: General Population Home Characteristics

Home Characteristics	Percentage of Respondents (n = 313)
Single Family, detached from any other house	67%
Apartment in a building with 4 or more units	15%
Single Family Home, mobile home	10%
Apartment in building with 2 to 3 units	3%
Single Family Home, factory manufactured/modular	2%
Other	1%
Own or Rent	
Own	81%
Rent	19%
Year Built	
Before 1950	12%
1950 to 1959	4%
1960 to 1969	5%
1970 to 1979	14%
1980 to 1989	10%
1990 to 1999	11%
2000 to 2009	21%
2010 to 2018	14%
Don't know	9%
What is the main fuel used for heating your home?	
Natural Gas	64%
Electricity	22%
Propane	9%
Other - Please Write In:	3%
Don't know	2%
What fuel does your main water heater use?	
Natural Gas	24%
Electricity	63%
Propane	5%
Other	0%
Don't know	7%
What is your approximate household income?	
Less than \$10,000	3%
\$10,000 to \$29,999	12%
\$30,000 to \$49,999	18%
\$50,000 to \$69,999	20%
\$70,000 to \$89,999	12%
\$90,000 to \$99,999	5%
\$100,000 to \$149,999	14%
\$150,000 or more	8%
Don't know	6%

4.3 Energy Kits Participant Survey Results

This section presents key findings from energy kit surveys, which were administered online by ADM. The surveys were completed by 71 customers who received energy kits in 2017 or 2018. Of these respondents, three reported that they had not received an energy kit or did not recall receiving an energy kit. The survey gathered information regarding program awareness, measures installed and in-service rates, decision making and overall satisfaction.

4.3.1 Program Awareness

Respondents provided information and feedback regarding how they learned about the energy kits. Approximately 42% of participants reported hearing about the program through a utility bill insert and 34% of participants through the Rocky Mountain Power website. A summary of survey responses appears in Table 4-3.

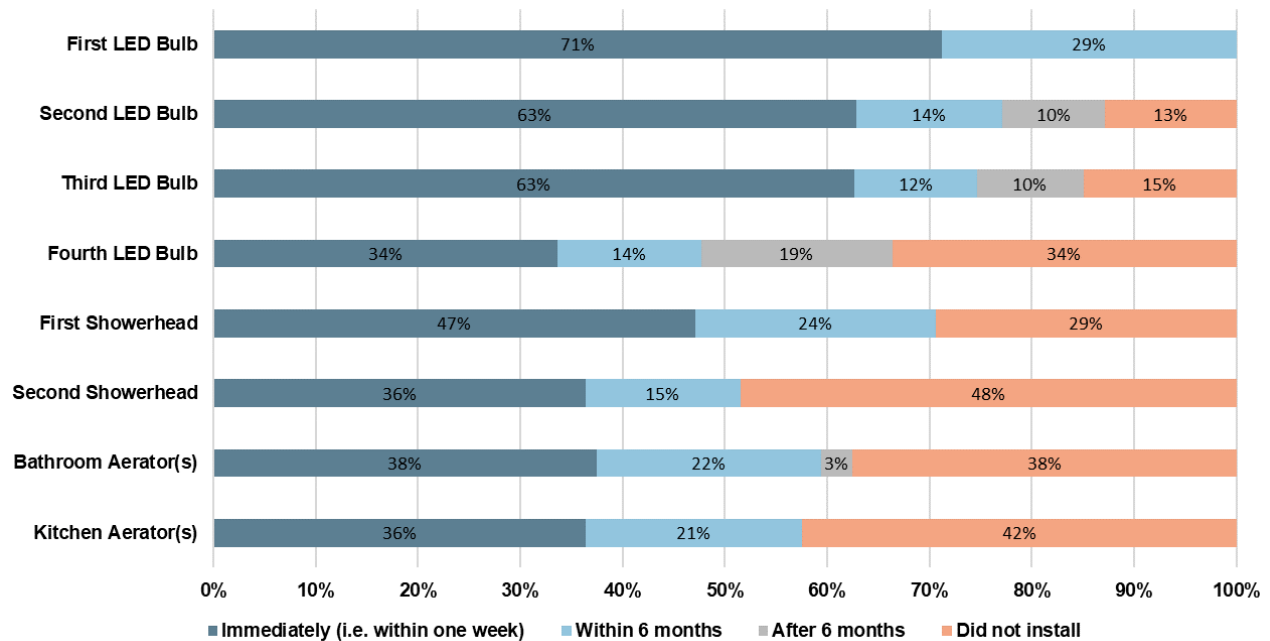
Table 4-3: How did respondents learn about the program?

How did you hear about the energy kits?	Percent of Responses (n = 71)
Utility bill insert	42%
Website	34%
Newsletter	15%
Message printed on your bill	8%
Don't know	7%
TV ad	3%
Social networking site (e.g. Facebook, Twitter)	1%
Other	4%

4.3.2 Participant Experience and Installation of Measures

Survey respondents answered questions regarding if and when they installed the energy kit components. Most respondents reported installing the first LED light bulb (71%), the second LED light bulb (63%) and the third LED bulb (63%) immediately (within one week). No customers reported that they had not installed their first LED light bulb and approximately 13% of survey respondents reported that they had not installed their second LED light bulb and approximately 15% for the third LED light bulb. Approximately 58% of respondents reported installing kitchen aerators and 63% reported installing bathroom aerators. Approximately 71% of respondents reported installing the first showerhead and 52% reported installing the second showerhead. Figure 4-4 displays respondents' timeline for installing various energy kit measures.

Figure 4-4: Respondent Timeline for Installing Energy Kit Measures



Energy kit recipients who reported that they had not installed certain measures provided the reasons that these measures were not installed. See Table 4-4 for complete results. Of the respondents that reported they did not install one or more of the LED bulbs they received in their kit, the most common reason why was that they are waiting for their current lights to burn out, with 88% reporting this reason. Regarding uninstalled high efficiency showerheads, respondents frequently cited disliking the pressure/water volume (37%). Approximately 26% reported already having high efficiency showerheads installed throughout their home and approximately 16% disliked the way it looked. Of the respondents who reported having uninstalled faucet aerators, approximately 37% reported that the faucet aerators did not integrate well with their plumbing and 26% mentioned they already had aerators installed in all of their sinks.

Table 4-4: Reasons for not Installing Energy Kit Components

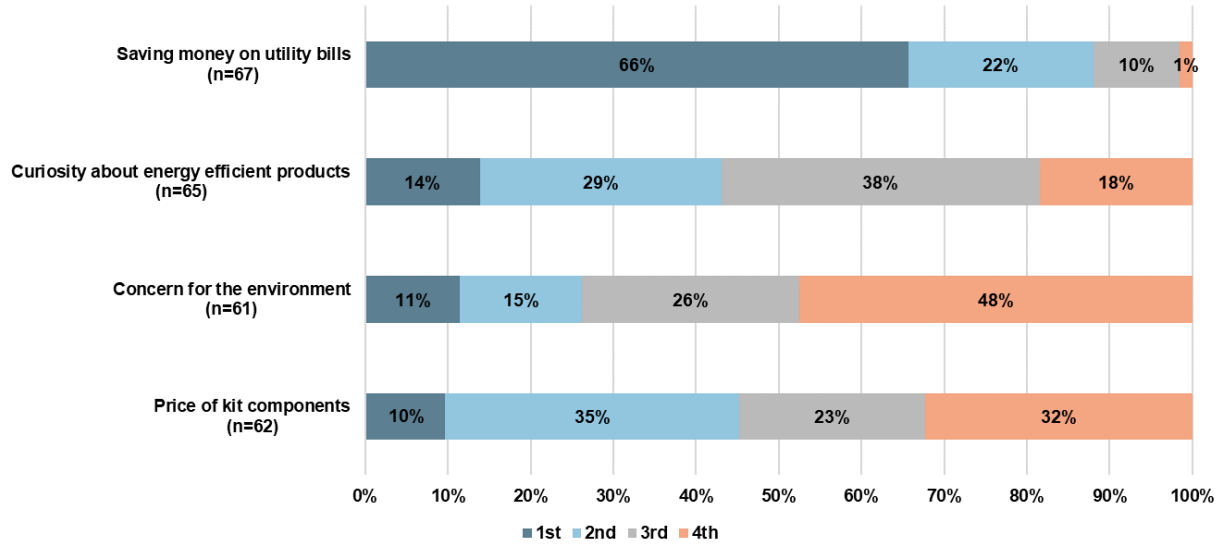
Reason for not installing measure	Percentage of Responses
LEDs (n = 17)	
Waiting for current lights to burn out	88%
Disliked the color tone/quality of the emitted light	6%
Don't Know	6%
Showerheads (n = 19)	
Disliked the pressure/water volume	37%
High-efficiency shower-heads already installed in all showers	26%
Disliked the way it looked	16%
Did not integrate well with current plumbing	11%
Other	16%
Don't know	5%
Faucet Aerators (n = 19)	
Did not integrate well with current plumbing	37%
Faucet aerators already installed in all sinks	26%
Misplaced	5%
Disliked the pressure/water volume	5%
Disliked the way it looked	5%
Other	16%
Don't know	5%

Note: The sum of percentages is not always 100% because respondents could choose more than one response.

4.3.3 Participant Motivations

Respondents provided feedback regarding what influenced them to request the energy kit. Approximately two-thirds (66%) of respondents ranked “saving money on utility bills” as their strongest motivation to request a kit, while a further 22% ranked it as their second strongest motivation. Figure 4-5 displays respondents’ ranking of different reasons for requesting an energy kit.

Figure 4-5: Survey Respondents' Ranking of Reasons for Requesting an Energy Kit



Most respondents also indicated that they did not have plans to purchase and install aerators (85%) or high-efficiency showerheads (78%) before participating in the program, but most respondents did plan to purchase and install LED bulbs (81%). A summary of participant responses as to whether they were already planning on purchasing energy kit components appears in Table 4-5.

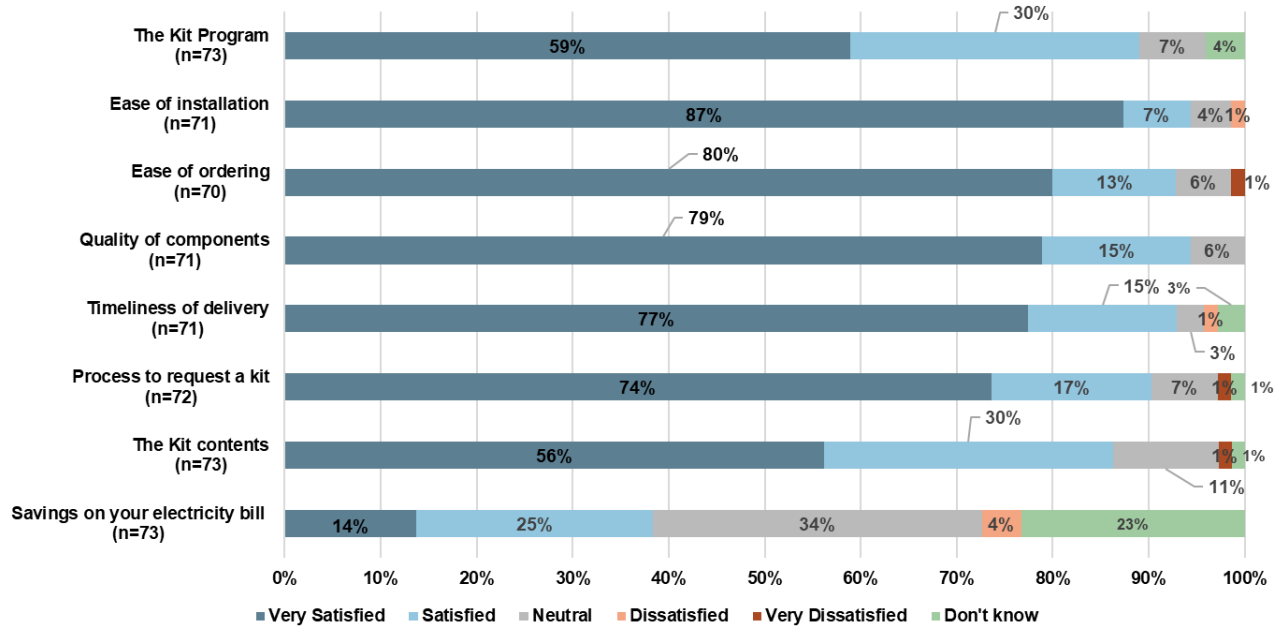
Table 4-5: Were Respondents Already Planning on Purchasing Energy Kit Components?

Before you learned that the Kits were available, were you planning to purchase and install the following energy efficient measures?	Measure	Yes	No	Don't Know
	Faucet Aerator(s)	7%	85%	8%
	Showerhead(s)	19%	78%	3%
	LED Light Bulbs	81%	15%	4%

4.3.4 Participant Satisfaction

Respondents provided feedback regarding their level of satisfaction with specific aspects of the program, as well as their overall experience with the program. Respondents found that the most satisfying aspects (i.e. either satisfied or very satisfied) of the program were the ease of installation (89%), the ease of ordering (93%), and the quality of the kit components (94%). Overall satisfaction with the program was 89%, and overall satisfaction with Rocky Mountain Power was 78%, with approximately 32% reporting they were very satisfied and approximately 47% reporting they were satisfied with Rocky Mountain Power as their electricity provider. Figure 4-6 displays survey respondents' satisfaction with the program as well as their satisfaction with specific aspects of their experience with the program.

Figure 4-6: Customer Satisfaction with Energy Kit Program



4.3.5 Home Characteristics

Respondents’ home characteristics are summarized in Table 4-6. Respondents most often reported living in single-family, detached homes (80%) and most often owned their home (89%). The decade in which respondents’ homes were built are spread across each time interval included in the survey, with the largest segments of respondents’ homes being built between 1970-1979 (21%) and 2000-2009 (25%). Approximately 57% of respondents indicated natural gas is their primary home heating fuel and 48% indicated natural gas is their primary water heating fuel. The average home size was approximately three people and survey respondents reported their square footage of the home was on average about 2,400 square feet.

Table 4-6: Energy Kit Participants Home Characteristics

Home Characteristics	Percentage of Respondents (n = 75)
Single Family, factory manufactured/modular	80%
Single Family, factory manufactured/modular	12%
Apartment in building with 4 or more units	4%
Single Family, mobile home	3%
Single Family, attached to one or more other houses (e.g. duplex, row house)	1%
Own or Rent	
Own	89%
Rent	9%
Own and rent to someone else	1%
Year Built	
Before 1950	8%
1950 to 1959	5%
1960 to 1969	5%
1970 to 1979	21%
1980 to 1989	7%
1990 to 1999	16%
2000 to 2009	25%
2010 to 2018	11%
Don't know	3%
What is the main fuel used for heating your home?	
Natural Gas	57%
Electricity	32%
Propane	11%
What fuel does your main water heater use?	
Natural Gas	48%
Electricity	45%
Propane	7%
What is your approximate household income?	
Less than \$10,000	1%
\$10,000 to \$29,999	12%
\$30,000 to \$49,999	16%
\$50,000 to \$69,999	16%
\$70,000 to \$89,999	16%
\$90,000 to \$99,999	7%
\$100,000 to \$149,999	13%
\$150,000 or more	7%
Don't know	13%

4.4 HVAC Participant Survey Results

This section presents key findings from HVAC and appliance program surveys administered by ADM, completed by 51 participants who reported receiving an incentive for HVAC measures in 2017 or 2018 through Rocky Mountain Power's wattsmart Homes

Program. The survey gathered information regarding program awareness, decision making and overall satisfaction.

4.4.1 Program Awareness

Respondents provided information regarding sources of information they utilized while they were making the decision to purchase the HVAC equipment. Regarding where respondents found information about the incentives offered by Rocky Mountain Power when they were deciding to implement the energy saving equipment, most respondents found information through representatives (45%), the program website (16%), or a retailer (12%). A summary of responses to this question appears in Table 4-7.

Table 4-7: How did respondents get information about the incentive?

When you were deciding to implement the energy saving equipment, from where did you get information about the incentives offered by Rocky Mountain Power?	Percent of Responses (n = 51)
Representative	45%
Program website	16%
Retailer	12%
Friend, neighbor, relative or co-worker	6%
Did not look for any information about	4%
Radio	2%
Installation contractor	2%
Other	4%
I don't know	10%

4.4.2 Participant Motivation

Survey respondents provided feedback regarding their decision-making process. Approximately 80% of respondents indicated they did not have plans to integrate the HVAC measures before they learned about Rocky Mountain Power's Program, with the remaining 20% reporting that they did have plans to purchase the HVAC equipment.

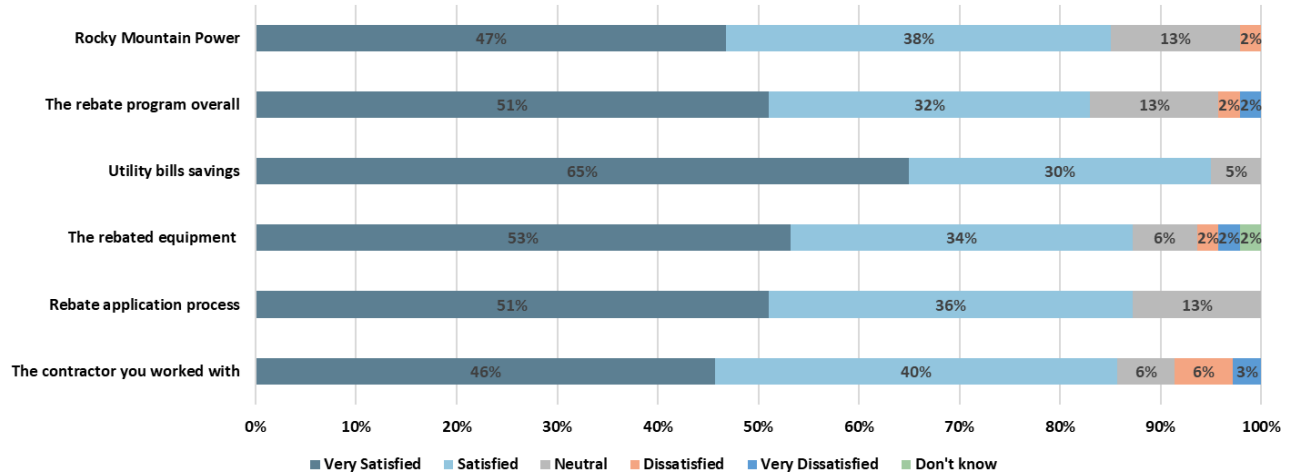
Respondents reported that the incentive was important or extremely important in driving their decision to install the energy efficiency equipment 83% of the time. Only seven percent of survey participants reported that the incentive was "not important" or "not important at all." These results corroborate earlier results that the incentive was influential in driving program participation.

4.4.3 Participant Satisfaction

Survey respondents provided feedback regarding their level of satisfaction with specific aspects of Rocky Mountain Power's wattsmart Homes Program as well as the program

overall. Approximately 83% of respondents reported being satisfied (32%) or very satisfied (51%) with the program and 85% of respondents reported being satisfied (38%) or very satisfied (47%) with Rocky Mountain Power overall. Only 2% of respondents reported being dissatisfied with Rocky Mountain Power. Respondents were satisfied or very satisfied with all aspects of the program. Figure 4-7 displays survey respondents' overall satisfaction with Rocky Mountain Power and the wattsmart Homes Program, as well as their satisfaction with specific aspects of their experience with the program.

Figure 4-7: Customer Satisfaction with Rocky Mountain Power's HVAC Program



n = 47

4.4.4 Home Characteristics

Respondents' home characteristics are summarized in Table 4-8. Most participants reported living in a single-family home. All respondents (100%) reported owning their home. Electricity was the most common type of fuel used for heating homes (76%) and for fueling the homes' main water heaters (83%). The average size of respondents' homes was 2,077 square feet, and the average number of inhabitants was approximately 3.5 people.

Table 4-8: HVAC Participant Home Characteristics

Home Characteristics	Percentage of Respondents (n = 47)
Single Family, detached from any other house	57%
Single Family, factory manufactured/modular	23%
Single Family, mobile home	17%
Other	2%
Own or Rent	
Own	100%
Rent	0%
Year Built	
Before 1950	2%
1950 to 1959	0%
1960 to 1969	2%
1970 to 1979	19%
1980 to 1989	21%
1990 to 1999	17%
2000 to 2009	23%
2010 to 2018	11%
Don't know	4%
What is the main fuel used for heating your	
Electricity	76%
Natural Gas	24%
What fuel does your main water heater use?	
Electricity	83%
Natural Gas	17%
What is your approximate household income?	
Less than \$10,000	0%
\$10,000 to \$29,999	0%
\$30,000 to \$49,999	0%
\$50,000 to \$69,999	4%
\$70,000 to \$89,999	11%
\$90,000 to \$99,999	4%
\$100,000 to \$149,999	4%
\$150,000 or more	2%
Don't know	74%

5 Cost-Effectiveness

Rocky Mountain Power contracted with Navigant to calculate the Program cost-effectiveness based on the net savings evaluated by ADM. ADM also provided the measure life and incremental cost inputs needed to calculate the cost-effectiveness of the Program. Measure life and incremental cost values were assigned on an individual measure basis and came from the TRL files provided by Rocky Mountain Power.

Table 5-1 provides the cost-effectiveness analysis inputs for each year, including evaluated net energy savings, discount rate, residential line loss, residential energy rate, inflation rate, total utility costs and gross customer costs.

Table 5-1: ID wattsmart Homes Program Cost-Effectiveness Inputs

Parameter	2017	2018
Evaluated Net Savings (kWh/year)	1,490,072	2,910,845
Discount Rate	6.66%	6.57%
Residential Line Loss	11.47%	11.47%
Residential Energy Rate (\$/kWh)	\$0.1034	\$0.1006
Inflation Rate	1.90%	2.20%
Total Utility Costs	\$477,192	\$846,746
Gross Customer Costs	\$772,402	\$1,062,258

Table 5-2 (without NEIs) and Table 5-3 (including NEIs) show the cost-effectiveness results for the overall program for the combination of program years 2017 and 2018, based on the Idaho evaluated net savings. The Idaho wattsmart Homes Program was cost-effective during the combined 2017-2018 evaluation period, across all cost-effectiveness tests except for the RIM test. The overall program achieved a 1.75 benefit/cost ratio for the combined years using the Utility Cost Test (UCT).

Table 5-2: 2017-2018 ID wattsmart Homes Program Level Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0537	\$2,240,587	\$2,554,646	\$314,059	1.14
Total Resource Cost Test (TRC) No Adder	\$0.0537	\$2,240,587	\$2,322,405	\$81,819	1.04
Utility Cost Test (UCT)	\$0.0317	\$1,323,937	\$2,322,405	\$998,468	1.75
Rate Impact Test (RIM)		\$5,873,500	\$2,322,405	-\$3,551,095	0.40
Participant Cost Test (PCT)		\$1,834,659	\$5,590,977	\$3,756,318	3.05
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000029759
Discounted Participant Payback (years)					2.77

Table 5-3: 2017-2018 ID wattsmart Homes Program Level Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0537	\$2,240,587	\$3,626,759	\$1,386,173	1.62
Total Resource Cost Test (TRC) No Adder	\$0.0537	\$2,240,587	\$3,394,519	\$1,153,932	1.52
Utility Cost Test (UCT)	\$0.0317	\$1,323,937	\$2,322,405	\$998,468	1.75
Rate Impact Test (RIM)		\$5,873,500	\$2,322,405	-\$3,551,095	0.40
Participant Cost Test (PCT)		\$1,834,659	\$6,663,090	\$4,828,431	3.63
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000043595				
Discounted Participant Payback (years)	2.77				

Table 5-4 (without NEIs) and Table 5-5 (including NEIs) show the Idaho wattsmart Homes Program cost-effectiveness results for 2017 and Table 5-6 and Table 5-7 show cost-effectiveness results for 2018, based on the Idaho evaluated net savings. The 2017 and 2018 program pass the cost-effectiveness for all tests except the RIM test.

Table 5-4: 2017 ID wattsmart Homes Program Level Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0601	\$900,725	\$1,034,909	\$134,184	1.15
Total Resource Cost Test (TRC) No Adder	\$0.0601	\$900,725	\$940,826	\$40,101	1.04
Utility Cost Test (UCT)	\$0.0318	\$477,192	\$940,826	\$463,635	1.97
Rate Impact Test (RIM)		\$2,140,084	\$940,826	-\$1,199,257	0.44
Participant Cost Test (PCT)		\$772,402	\$2,062,234	\$1,289,832	2.67
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000020212				
Discounted Participant Payback (years)	3.78				

Table 5-5: 2017 ID wattsmart Homes Program Level Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0601	\$900,725	\$1,494,434	\$593,709	1.66
Total Resource Cost Test (TRC) No Adder	\$0.0601	\$900,725	\$1,400,352	\$499,626	1.55
Utility Cost Test (UCT)	\$0.0318	\$477,192	\$940,826	\$463,635	1.97
Rate Impact Test (RIM)		\$2,140,084	\$940,826	-\$1,199,257	0.44
Participant Cost Test (PCT)		\$772,402	\$2,521,759	\$1,749,357	3.26
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000020212				
Discounted Participant Payback (years)	3.78				

Table 5-6: 2018 ID wattsmart Homes Program Level Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0501	\$1,339,861	\$1,519,737	\$179,876	1.13
Total Resource Cost Test (TRC) No Adder	\$0.0501	\$1,339,861	\$1,381,579	\$41,718	1.03
Utility Cost Test (UCT)	\$0.0316	\$846,746	\$1,381,579	\$534,833	1.63
Rate Impact Test (RIM)		\$3,733,416	\$1,381,579	-\$2,351,837	0.37
Participant Cost Test (PCT)		\$1,062,258	\$3,528,743	\$2,466,486	3.32
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000039202				
Discounted Participant Payback (years)	2.24				

Table 5-7: 2018 ID wattsmart Homes Program Level Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0501	\$1,339,861	\$2,132,325	\$792,464	1.59
Total Resource Cost Test (TRC) No Adder	\$0.0501	\$1,339,861	\$1,994,167	\$654,306	1.49
Utility Cost Test (UCT)	\$0.0316	\$846,746	\$1,381,579	\$534,833	1.63
Rate Impact Test (RIM)		\$3,733,416	\$1,381,579	-\$2,351,837	0.37
Participant Cost Test (PCT)		\$1,062,258	\$4,141,331	\$3,079,074	3.90
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000106310				
Discounted Participant Payback (years)	2.24				

Table 5-8 presents the benefit/cost ratio results for the Program for each cost-effectiveness test by program year.

Table 5-8: ID wattsmart Homes Program Benefit/Cost Ratios by Program Year

Program Year	PTRC	TRC	UCT	RIM	PCT
2017 (without NEIs)	1.15	1.04	1.97	0.44	2.67
2017 (with NEIs)	1.66	1.55	1.97	0.44	3.26
2018 (without NEIs)	1.13	1.03	1.63	0.37	3.32
2018 (with NEIs)	1.59	1.49	1.63	0.37	3.90
2017-2018 (without NEIs)	1.14	1.04	1.75	0.40	3.05
2017-2018 (with NEIs)	1.62	1.52	1.75	0.40	3.63

Navigant also completed cost-effectiveness tests at the measure-category level for each individual program year. The benefit/cost ratio results by measure-category are presented in Table 5-9 and Table 5-10, based on the Idaho evaluated net savings. Further information on the cost-effectiveness test results for each measure category is presented in Appendix D.

Table 5-9: Idaho wattsmart Homes Program Benefit/Cost Ratios by Measure Category, 2017

Measure Group	PTRC	TRC	UCT	RIM	PCT
Appliances with NEIs	1.56	1.49	1.05	0.36	2.98
Appliances	0.77	0.70	1.05	0.36	2.10
Building Shell	0.81	0.74	1.13	0.38	2.00
Energy Kits with NEIs - DHW	4.39	4.17	2.17	0.43	49.20
Energy Kits - DHW	2.39	2.17	2.17	0.43	33.46
Energy Kits with NEIs - Lighting	3.08	2.90	1.78	0.46	8.97
Energy Kits - Lighting	1.98	1.80	1.78	0.46	6.85
HVAC	1.91	1.74	2.12	0.43	6.25
Lighting with NEIs	1.26	1.20	1.94	0.46	1.91
Lighting	0.68	0.62	1.94	0.46	1.36
Water Heating	0.95	0.86	1.10	0.37	2.70
Whole Home	1.11	1.01	1.08	0.39	2.75
Total with NEIs	1.66	1.55	1.97	0.44	3.26
Total	1.15	1.04	1.97	0.44	2.67

Table 5-10: Idaho wattsmart Homes Program Benefit/Cost Ratios by Measure Category, 2018

Measure Group	PTRC	TRC	UCT	RIM	PCT
Appliances with NEIs	1.86	1.82	0.71	0.26	2.93
Appliances	0.40	0.36	0.71	0.26	1.40
Building Shell	0.77	0.70	1.08	0.40	1.75
Electronics	0.39	0.36	0.46	0.18	2.50
Energy Kits with NEIs - DHW	5.02	4.82	2.00	0.31	49.36
Energy Kits - DHW	2.22	2.01	2.00	0.31	33.42
Energy Kits with NEIs - Lighting	2.84	2.70	1.37	0.31	8.95
Energy Kits - Lighting	1.53	1.39	1.37	0.31	6.82
HVAC	2.56	2.33	2.44	0.48	8.61
Lighting with NEIs	1.03	0.99	1.31	0.30	1.91
Lighting	0.44	0.40	1.31	0.30	1.36
Water Heating	0.77	0.70	0.81	0.27	3.13
Whole Home	1.80	1.64	2.12	0.49	3.85
Total with NEIs	1.59	1.49	1.63	0.37	3.90
Total	1.13	1.03	1.63	0.37	3.32

6 Conclusions and Recommendations

The results from this evaluation study of Rocky Mountain Power’s 2017-2018 wattsmart Homes Program in Idaho are summarized by measure category in Table 6-1:

Table 6-1: Idaho wattsmart Homes Program Claimed and Evaluated Savings by Measure Category, 2017-2018

Year	Measure Category	Claimed Savings (kWh)	Evaluated Gross Savings (kWh/yr)	Realization Rate	Evaluated Net Savings (kWh/yr)	Net to Gross
2017-2018	Appliances	27,796	27,796	100%	24,998	90%
	Building Shell	31,271	31,271	100%	28,415	91%
	Electronics	676,512	676,512	100%	621,810	92%
	Energy Kits	996,968	864,952	87%	841,158	97%
	HVAC	1,884,012	1,696,068	90%	1,674,995	99%
	Lighting	2,232,111	1,478,940	66%	1,154,823	78%
	Water Heating	15,504	15,504	100%	14,031	90%
	Whole Home	44,661	44,661	100%	40,687	91%
2017-2018 TOTAL		5,908,836	4,835,705	82%	4,400,917	91%

ADM provides the following conclusions and recommendations to improve the program and the evaluation of the program in future years.

- **Lighting Measure Category:**

Conclusion: ADM’s calculation of a 6.3% leakage rate for lighting in Idaho is on the low end of leakage rates for lighting even though the Rocky Mountain Power territory in Idaho is relatively small and fragmented. This is likely due to the effective or strategic placement of participating retailer locations and the partnership with the Simple Steps Program. The implementation contractor has indicated that the Retail Sales Allocation Tool (RSAT) may be a predictor of bulb leakage in Rocky Mountain Power territories and is used to determine allocations of bulbs to participating stores.

Recommendation: To understand further how the RSAT tool accounts for leakage and how the store allocations relate to the Program Tracking Data, ADM recommends that the next evaluation of subsequent program years includes a full life-cycle review of the lighting contracts, including the participation agreements with the implementation contractor and a sample of all associated invoices. This would allow the evaluation to follow the life-cycle of the bulbs from the original agreement to final installation.

- **Energy Kits Measure Category:**

Conclusion: The ISR for the first showerhead was 71% and the second showerhead was 52%. Respondents to the Energy Kits survey who did not install showerheads indicated that they disliked the pressure/water volume (37%), already had high-efficiency showerheads installed (26%), or disliked the way it looked (16%).

Recommendation: ADM recommends that Rocky Mountain Power consider including only one showerhead in the Best Kit – 2 Bath Energy Kits. Additionally, if not already done, Rocky Mountain Power could ask qualifying questions regarding showerheads during the energy kit request process.

- **Electronics Measure Category:**

Conclusion: The APS measure was a new offering in 2018. The claimed savings value of 216 kWh/yr is based off a study that employed two methodologies, including simulation and post installation monitoring.

Recommendation: ADM recommends that if the APS measure is to be continued in subsequent program years and is expected to follow the participation trend from 2018, the next evaluation cycle includes primary data collection for this measure (e.g. installation rates and removal rates) that can be used to verify and supplement the previous completed studies.

- **Whole Homes Measure Category:**

Conclusion: The whole homes measure category accounted for approximately 0.8% of overall claimed savings in 2017-2018. ADM conducted a deemed savings review for this measure category and verified the proper application of the TRL values for the whole homes measures. ADM did not have the modeling files supporting the ex-ante claimed savings values.

Recommendation: If the whole homes measure category is expected to grow in subsequent program years, ADM will request the modeling files to further verify the savings values.

7 Appendices

The following appendices accompany this Final Evaluation Report:

APPENDIX A: Lighting Tables

APPENDIX B: Energy Kits Individual Component Savings Calculations

APPENDIX C: NTG Analysis Approaches

APPENDIX D: Measure Category Cost-Effectiveness Results

7.1 Appendix A: Lighting Tables

Table 7-1: TRL Input Values and Engineering Calculation Ex-Ante UES Savings for 2017 ID Lighting Measures

Lighting Measures	Upgrade Wattage	Baseline Wattage	ΔWatts	ISR	HOU	IEF	Engineering Calculation Savings
CFL General Purpose - Spiral: 10 watts - Retail - ID	10	29	19	0.73	2.34	0.85	10.09
CFL General Purpose - Spiral: 13 watts - Retail - ID	13	43	30	0.73	2.34	0.85	15.93
CFL General Purpose - Spiral: 14 watts - Retail - ID	14	43	29	0.73	2.34	0.85	15.40
CFL Specialty - Daylight: 14 watts - Retail - ID	14	43	29	0.73	2.34	0.85	15.40
LED Downlight: 10 watts - Retail - ID	10	65	55	0.98	2.34	0.85	39.20
LED Downlight: 11 watts - Retail - ID	11	75	64	0.98	2.34	0.85	45.62
LED Downlight: 12 watts - Retail - ID	12	65	53	0.98	2.34	0.85	37.78
LED Downlight: 13 watts - Retail - ID	13	65	52	0.98	2.34	0.85	37.07
LED Downlight: 14 watts - Retail - ID	14	65	51	0.98	2.34	0.85	36.35
LED Downlight: 15 watts - Retail - ID	15	65	50	0.98	2.34	0.85	35.64
LED Downlight: 16 watts - Retail - ID	16	75	59	0.98	2.34	0.85	42.05
LED Downlight: 7 watts - Retail - ID	7	30	23	0.98	2.34	0.85	16.39
LED Downlight: 8 watts - Retail - ID	8	45	37	0.98	2.34	0.85	26.37
LED Downlight: 9 watts - Retail - ID	9	65	56	0.98	2.34	0.85	39.92
LED General Purpose: 10 watts - Retail - ID	10	43	33	0.98	2.34	0.85	23.52
LED General Purpose: 11 watts - Retail - ID	11	43	32	0.98	2.34	0.85	22.81
LED General Purpose: 12 watts - Retail - ID	12	43	31	0.98	2.34	0.85	22.10
LED General Purpose: 13 watts - Retail - ID	13	43	30	0.98	2.34	0.85	21.38
LED General Purpose: 14 watts - Retail - ID	14	43	29	0.98	2.34	0.85	20.67
LED General Purpose: 15 watts - Retail - ID	15	43	28	0.98	2.34	0.85	19.96
LED General Purpose: 16 watts - Retail - ID	16	53	37	0.98	2.34	0.85	26.37
LED General Purpose: 17 watts - Retail - ID	17	72	55	0.98	2.34	0.85	39.20
LED General Purpose: 18 watts - Retail - ID	18	72	54	0.98	2.34	0.851	38.49
LED General Purpose: 5 watts - Retail - ID	5	43	38	0.98	2.34	0.851	27.09
LED General Purpose: 6 watts - Retail - ID	6	29	23	0.98	2.34	0.851	16.39
LED General Purpose: 7 watts - Retail - ID	7	29	22	0.98	2.34	0.851	15.68
LED General Purpose: 8 watts - Retail - ID	8	29	21	0.98	2.34	0.851	14.97
LED General Purpose: 9 watts - Retail - ID	9	29	20	0.98	2.34	0.851	14.26
LED Specialty - Candelabra: 4 watts - Retail - ID	4	25	21	0.98	2.34	0.851	14.97
LED Specialty - Candelabra: 5 watts - Retail - ID	5	40	35	0.98	2.34	0.851	24.95
LED Specialty - Globe: 4 watts - Retail - ID	4	25	21	0.98	2.34	0.851	14.97
LED Specialty - Globe: 5 watts - Retail - ID	5	40	35	0.98	2.34	0.851	24.95
LED Specialty - Globe: 6 watts - Retail - ID	6	40	34	0.98	2.34	0.851	24.23

Table 7-2: 2017 Idaho Homes Energy Savings Program Claimed and Evaluated Gross Lighting Savings

Lighting Measures	Reported Savings (kWh)	Evaluated Gross Savings (kWh)	Realization Rate
CFL General Purpose - Spiral: 10 watts - Retail - ID	212	189	89.1%
CFL General Purpose - Spiral: 13 watts - Retail - ID	1,401	1,248	89.1%
CFL General Purpose - Spiral: 14 watts - Retail - ID	15	14	89.1%
CFL Specialty - Daylight: 14 watts - Retail - ID	62	55	89.1%
LED Downlight: 10 watts - Retail - ID	33,538	22,251	66.3%
LED Downlight: 11 watts - Retail - ID	4,878	3,237	66.3%
LED Downlight: 12 watts - Retail - ID	79,011	52,428	66.4%
LED Downlight: 13 watts - Retail - ID	3,963	2,630	66.4%
LED Downlight: 14 watts - Retail - ID	1,780	1,181	66.3%
LED Downlight: 15 watts - Retail - ID	1,140	756	66.3%
LED Downlight: 16 watts - Retail - ID	1,723	1,143	66.3%
LED Downlight: 7 watts - Retail - ID	12,138	8,055	66.4%
LED Downlight: 8 watts - Retail - ID	40,858	27,105	66.3%
LED Downlight: 9 watts - Retail - ID	4,029	2,673	66.4%
LED Fixture - ENERGY STAR - ID	15,639	9,412	60.2%
LED General Purpose: 10 watts - Retail - ID	100,505	66,676	66.3%
LED General Purpose: 11 watts - Retail - ID	8,751	5,808	66.4%
LED General Purpose: 12 watts - Retail - ID	7,088	4,703	66.4%
LED General Purpose: 13 watts - Retail - ID	128	85	66.3%
LED General Purpose: 14 watts - Retail - ID	13,698	9,087	66.3%
LED General Purpose: 15 watts - Retail - ID	16,112	10,693	66.4%
LED General Purpose: 16 watts - Retail - ID	343	227	66.3%
LED General Purpose: 17 watts - Retail - ID	1,646	1,092	66.3%
LED General Purpose: 18 watts - Retail - ID	346	230	66.4%
LED General Purpose: 5 watts - Retail - ID	3,925	2,604	66.3%
LED General Purpose: 6 watts - Retail - ID	30,188	20,034	66.4%
LED General Purpose: 7 watts - Retail - ID	4,983	3,306	66.4%
LED General Purpose: 8 watts - Retail - ID	15	10	66.3%
LED General Purpose: 9 watts - Retail - ID	627,314	416,119	66.3%
LED Specialty - Candelabra: 4 watts - Retail - ID	21,886	14,520	66.3%
LED Specialty - Candelabra: 5 watts - Retail - ID	1,271	844	66.4%
LED Specialty - Globe: 4 watts - Retail - ID	344	228	66.3%
LED Specialty - Globe: 5 watts - Retail - ID	13,961	9,263	66.4%
LED Specialty - Globe: 6 watts - Retail - ID	4,481	2,973	66.3%
TOTAL	1,057,371	700,879	66.3%

Table 7-3: 2018 Idaho Homes Energy Savings Program Claimed and Evaluated Gross Lighting Savings

Lighting Measures	Reported Savings (kWh)	Evaluated Gross Savings (kWh)	Realization Rate
LED Downlight: 10 watts - Retail - ID	32,833	21,783	66.3%
LED Downlight: 11 watts - Retail - ID	22,658	15,033	66.3%
LED Downlight: 12 watts - Retail - ID	14,609	9,694	66.4%
LED Downlight: 13 watts - Retail - ID	15,335	10,175	66.4%
LED Downlight: 14 watts - Retail - ID	13,551	8,991	66.3%
LED Downlight: 15 watts - Retail - ID	677	449	66.3%
LED Downlight: 16 watts - Retail - ID	1,051	697	66.3%
LED Downlight: 5 watts - Retail - ID	399	265	66.4%
LED Downlight: 6 watts - Retail - ID	5,505	3,652	66.4%
LED Downlight: 7 watts - Retail - ID	13,202	8,762	66.4%
LED Downlight: 8 watts - Retail - ID	32,054	21,264	66.3%
LED Downlight: 9 watts - Retail - ID	917	609	66.4%
LED Fixture - ENERGY STAR - ID	20,552	12,369	60.2%
LED General Purpose: 10 watts - Retail - ID	158,340	105,044	66.3%
LED General Purpose: 11 watts - Retail - ID	14,494	9,619	66.4%
LED General Purpose: 12 watts - Retail - ID	16,472	10,930	66.4%
LED General Purpose: 13 watts - Retail - ID	43	28	66.3%
LED General Purpose: 14 watts - Retail - ID	496	329	66.3%
LED General Purpose: 15 watts - Retail - ID	13,838	9,184	66.4%
LED General Purpose: 16 watts - Retail - ID	19,322	12,818	66.3%
LED General Purpose: 18 watts - Retail - ID	8,461	5,615	66.4%
LED General Purpose: 5 watts - Retail - ID	17,298	11,476	66.3%
LED General Purpose: 6 watts - Retail - ID	36,921	24,502	66.4%
LED General Purpose: 7 watts - Retail - ID	33,706	22,366	66.4%
LED General Purpose: 8 watts - Retail - ID	209	139	66.3%
LED General Purpose: 9 watts - Retail - ID	633,327	420,108	66.3%
LED Specialty - Candelabra: 4 watts - Retail - ID	15,469	10,263	66.3%
LED Specialty - Candelabra: 5 watts - Retail - ID	20,119	13,349	66.4%
LED Specialty - Candelabra: 7 watts - ID	141	94	66.3%
LED Specialty - Globe: 4 watts - Retail - ID	2,064	1,370	66.3%
LED Specialty - Globe: 5 watts - Retail - ID	6,706	4,450	66.4%
LED Specialty - Globe: 6 watts - Retail - ID	3,972	2,635	66.3%
TOTAL	1,174,740	778,061	66.2%

Table 7-4: 2017 Idaho wattsmart Homes Program Net Lighting Savings and NTG

Lighting Measures	Evaluated Gross Savings (kWh)	Evaluated Net Savings (kWh)	NTG
CFL General Purpose - Spiral: 10 watts - Retail - ID	189	147	77.8%
CFL General Purpose - Spiral: 13 watts - Retail - ID	1,248	971	77.8%
CFL General Purpose - Spiral: 14 watts - Retail - ID	14	11	77.8%
CFL Specialty - Daylight: 14 watts - Retail - ID	55	43	77.8%
LED Downlight: 10 watts - Retail - ID	22,251	17,320	77.8%
LED Downlight: 11 watts - Retail - ID	3,237	2,519	77.8%
LED Downlight: 12 watts - Retail - ID	52,428	40,808	77.8%
LED Downlight: 13 watts - Retail - ID	2,630	2,047	77.8%
LED Downlight: 14 watts - Retail - ID	1,181	919	77.8%
LED Downlight: 15 watts - Retail - ID	756	589	77.8%
LED Downlight: 16 watts - Retail - ID	1,143	890	77.8%
LED Downlight: 7 watts - Retail - ID	8,055	6,270	77.8%
LED Downlight: 8 watts - Retail - ID	27,105	21,098	77.8%
LED Downlight: 9 watts - Retail - ID	2,673	2,081	77.8%
LED Fixture - ENERGY STAR - ID	9,412	8,909	94.7%
LED General Purpose: 10 watts - Retail - ID	66,676	51,898	77.8%
LED General Purpose: 11 watts - Retail - ID	5,808	4,520	77.8%
LED General Purpose: 12 watts - Retail - ID	4,703	3,661	77.8%
LED General Purpose: 13 watts - Retail - ID	85	66	77.8%
LED General Purpose: 14 watts - Retail - ID	9,087	7,073	77.8%
LED General Purpose: 15 watts - Retail - ID	10,693	8,323	77.8%
LED General Purpose: 16 watts - Retail - ID	227	177	77.8%
LED General Purpose: 17 watts - Retail - ID	1,092	850	77.8%
LED General Purpose: 18 watts - Retail - ID	230	179	77.8%
LED General Purpose: 5 watts - Retail - ID	2,604	2,027	77.8%
LED General Purpose: 6 watts - Retail - ID	20,034	15,594	77.8%
LED General Purpose: 7 watts - Retail - ID	3,306	2,574	77.8%
LED General Purpose: 8 watts - Retail - ID	10	8	77.8%
LED General Purpose: 9 watts - Retail - ID	416,119	323,894	77.8%
LED Specialty - Candelabra: 4 watts - Retail - ID	14,520	11,302	77.8%
LED Specialty - Candelabra: 5 watts - Retail - ID	844	657	77.8%
LED Specialty - Globe: 4 watts - Retail - ID	228	178	77.8%
LED Specialty - Globe: 5 watts - Retail - ID	9,263	7,210	77.8%
LED Specialty - Globe: 6 watts - Retail - ID	2,973	2,314	77.8%
TOTAL	700,879	547,125	78.1%

Table 7-5: 2018 Idaho wattsmart Homes Program Net Lighting Savings and NTG

Lighting Measures	Evaluated Gross Savings (kWh)	Evaluated Net Savings (kWh)	NTG
LED Downlight: 10 watts - Retail - ID	21,783	16,955	77.8%
LED Downlight: 11 watts - Retail - ID	15,033	11,701	77.8%
LED Downlight: 12 watts - Retail - ID	9,694	7,546	77.8%
LED Downlight: 13 watts - Retail - ID	10,175	7,920	77.8%
LED Downlight: 14 watts - Retail - ID	8,991	6,998	77.8%
LED Downlight: 15 watts - Retail - ID	449	349	77.8%
LED Downlight: 16 watts - Retail - ID	697	543	77.8%
LED Downlight: 5 watts - Retail - ID	265	206	77.8%
LED Downlight: 6 watts - Retail - ID	3,652	2,843	77.8%
LED Downlight: 7 watts - Retail - ID	8,762	6,820	77.8%
LED Downlight: 8 watts - Retail - ID	21,264	16,552	77.8%
LED Downlight: 9 watts - Retail - ID	609	474	77.8%
LED Fixture - ENERGY STAR - ID	12,369	11,708	94.7%
LED General Purpose: 10 watts - Retail - ID	105,044	81,763	77.8%
LED General Purpose: 11 watts - Retail - ID	9,619	7,487	77.8%
LED General Purpose: 12 watts - Retail - ID	10,930	8,508	77.8%
LED General Purpose: 13 watts - Retail - ID	28	22	77.8%
LED General Purpose: 14 watts - Retail - ID	329	256	77.8%
LED General Purpose: 15 watts - Retail - ID	9,184	7,149	77.8%
LED General Purpose: 16 watts - Retail - ID	12,818	9,977	77.8%
LED General Purpose: 18 watts - Retail - ID	5,615	4,370	77.8%
LED General Purpose: 5 watts - Retail - ID	11,476	8,933	77.8%
LED General Purpose: 6 watts - Retail - ID	24,502	19,072	77.8%
LED General Purpose: 7 watts - Retail - ID	22,366	17,409	77.8%
LED General Purpose: 8 watts - Retail - ID	139	108	77.8%
LED General Purpose: 9 watts - Retail - ID	420,108	326,999	77.8%
LED Specialty - Candelabra: 4 watts - Retail - ID	10,263	7,988	77.8%
LED Specialty - Candelabra: 5 watts - Retail - ID	13,349	10,391	77.8%
LED Specialty - Candelabra: 7 watts - ID	94	73	77.8%
LED Specialty - Globe: 4 watts - Retail - ID	1,370	1,066	77.8%
LED Specialty - Globe: 5 watts - Retail - ID	4,450	3,464	77.8%
LED Specialty - Globe: 6 watts - Retail - ID	2,635	2,051	77.8%
TOTAL	778,061	607,698	78.1%

7.2 Appendix B: Energy Kits Individual Component Savings Calculations

Table 7-6: Energy Kits Individual Component Savings Calculation Inputs, Aerators

Energy Kit Component	Input to Savings Calculation	Input Value for Calculated Ex-Ante Savings	Source for Calculated Ex-Ante Savings	Input Value for Evaluated Savings	Source for Evaluated Savings Calculation
Kitchen Aerator	In-Service Rate (%)	49.0%	2013-2014 Idaho HES Evaluation Report	58%	ADM Energy Kits Survey
	Average Baseline Flow Rate (GPM)	2.2	2013-2014 Idaho HES Evaluation Report	2.2	Federal rated max flow rate
	Average Post Measure Flow Rate (GPM)	1.5	2013-2014 Idaho HES Evaluation Report	1.5	Program materials
	Average time of hot water usage per person per day (minutes)	4.5	2013-2014 Idaho HES Evaluation Report	1.8073	Aerators_v1_1
	Average number of persons per household (state-specific values)	2.85	2013-2014 Idaho HES Evaluation Report	2.59	Aerators_v1_1
	Average temperature differential between hot and cold water (degrees)	42.35	2013-2014 Idaho HES Evaluation Report	75	Aerators_v1_1
	Unit Conversion (BTU/gallon)	8.345	N/A	8.345	N/A
	Unit Conversion (BTU/kWh)	3,412.14	N/A	3,412.14	N/A
	Fraction of Homes with Electric Water Heaters (%)	80.8%	2013-2014 Idaho HES Evaluation Report	48.7%	Aerators_v1_1
	Efficiency of Electric Water Heaters (%)	98%	2013-2014 Idaho HES Evaluation Report	100%	Aerators_v1_1
	Average number of faucets in the home	1	2013-2014 Idaho HES Evaluation Report	1.08	Aerators_v1_1
Bathroom Aerator	In-Service Rate (%)	55.0%	2013-2014 Idaho HES Evaluation Report	63%	ADM Energy Kits Survey
	Average Baseline Flow Rate (GPM)	2.2	2013-2014 Idaho HES Evaluation Report	2.2	Federal rated max flow rate
	Average Post Measure Flow Rate (GPM)	0.5	2013-2014 Idaho HES Evaluation Report	0.5	Program materials
	Average time of hot water usage per person per day (minutes)	1.6	2013-2014 Idaho HES Evaluation Report	1.2936	Aerators_v1_1
	Average number of persons per household (state-specific values)	2.85	2013-2014 Idaho HES Evaluation Report	2.59	Aerators_v1_1
	Average temperature differential between hot and cold water (degrees)	35.35	2013-2014 Idaho HES Evaluation Report	75	Aerators_v1_1
	Unit Conversion (BTU/gallon)	8.345	N/A	8.345	N/A
	Unit Conversion (BTU/kWh)	3,412.14	N/A	3,412.14	N/A
	Fraction of Homes with Electric Water Heaters (%)	80.8%	2013-2014 Idaho HES Evaluation Report	48.7%	Aerators_v1_1
	Efficiency of Electric Water Heaters (%)	98%	2013-2014 Idaho HES Evaluation Report	100%	Aerators_v1_1
	Average number of faucets in the home	2.43	2013-2014 Idaho HES Evaluation Report	2.56	Aerators_v1_1

Table 7-7: Energy Kits Individual Component Savings Calculation Inputs, Showerheads

Energy Kit Component	Input to Savings Calculation	Input Value for Calculated Ex-Ante Savings	Source for Calculated Ex-Ante Savings	Input Value for Evaluated Savings	Source for Evaluated Savings Calculation
Showerhead	In-Service Rate (%)	60.0%	ResShowerheads_v3.0	61.2%	ADM Energy Kits surveys
	Average Baseline Flow Rate (GPM)	2.3	Federal rated max flow rate	2.2	ResShowerheads_v3.0
	Average Post Measure Flow Rate (GPM)	1.35	Program materials	1.35	Program materials
	Average gallons of hot water usage per person per day	7.76	ResShowerheads_v3.0	7.76	ResShowerheads_v3.0
	Average number of persons per household (state-specific values)	2.37	ResShowerheads_v3.0	2.37	ResShowerheads_v3.0
	Average temperature differential between hot and cold water	75	ResShowerheads_v3.0	75	ResShowerheads_v3.0
	Unit Conversion (BTU/gallon)	8.345	N/A	8.345	N/A
	Unit Conversion (BTU/kWh)	3,412.14	N/A	3,412.14	N/A
	Fraction of Homes with Electric Water Heaters (%)	62.0%	ResShowerheads_v3.0	62%	ResShowerheads_v3.0
	Efficiency of Electric Water Heaters	100%	ResShowerheads_v3.0	100.0%	ResShowerheads_v3.0
	Average number of showers in the home	1.78	ResShowerheads_v3.0	1.78	ResShowerheads_v3.0

7.3 Appendix C: NTG Analysis Approaches

7.3.1 General Population Survey and Lighting NTG Methodology

Rocky Mountain Power customers were surveyed by ADM through the General Population survey to determine a program attribution estimation for the NTG calculation. The attribution scoring system for this survey is broken down into two components: free-ridership score and non-participant spillover score. Each component is described individually in the subsequent subsections.

An objective of the net-to-gross analysis is to estimate the share of program activity that would have occurred in the absence of the program. To accomplish this, the Evaluators administered survey questions to program participants that contained questions regarding the participants' plans to implement the lighting measures and the likelihood of implementing those measures had they not been provided through the program.

7.3.1.1 Freeridership

First, the percentage of light types replaced was found by using the question:

Did the [LED BULB/LED FIXTURE] replace traditional incandescent, old LED, some other type of bulb/fixture, or a combination? Please provide an estimate of the number of LED light bulbs that replaced each bulb type.

Each light type was divided by the total number reported replaced.

The importance score was calculated by averaging the responses to this question:

How important was the discount on your decision to purchase [LED BULBS/LED FIXTURES] at [STORE NAME]?

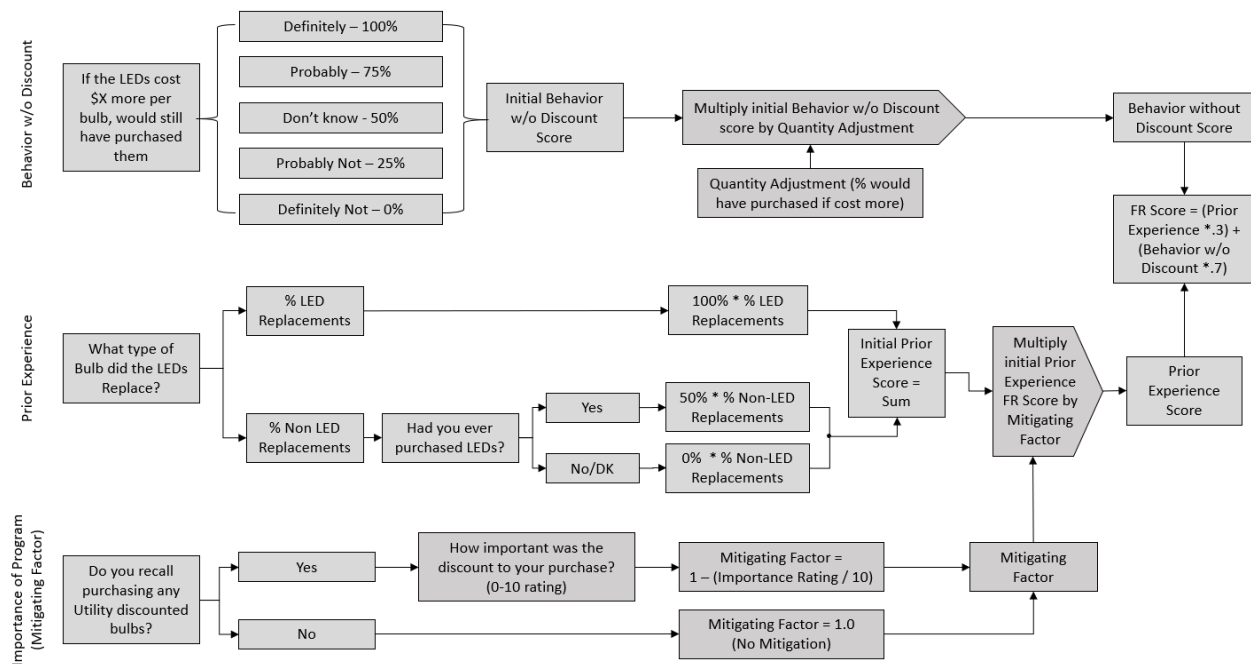
The total LED bulbs was calculated using the following questions:

How many of those [LED Bulbs/LED Fixtures] would you estimate you installed within one week of purchase?

How many of those [LED Bulbs/LED Fixtures] did you save to install at a later date?

Approximately how many do you have left?

Figure 7-1: Freeridership Methodology for Lighting



7.3.1.2 Spillover

Rocky Mountain Power customers may implement additional energy saving measures without receiving a program incentive because of their participation in the lighting program or because of the utility’s general and program marketing efforts. In both cases, the energy savings resulting from these additional measures constitute program non-participant spillover effects.

To assess non-participant spillover savings, survey respondents were asked whether they implemented any additional energy saving measures for which they did not receive a program incentive. Respondents were also asked to provide information on the attributes of the measures implemented for use in estimating the associated energy savings.

Participants who report implementing one or more efficiency measures are then asked two questions for use in developing a spillover score:

SO1: On a scale of 1 to 5, where 1 represents “not important” and 5 represents “very important”, how important was your experience with the wattsmart program (if a lighting participant) or how important were sources of information such as emails from the utility, television or radio advertisements, information on the utility’s website, bill inserts, or information from friends or family (if not a lighting participant) in your decision to purchase the items you just mentioned?

SO2: On a scale of 1 to 5, where 1 represents “very unlikely” and 5 represents “very likely” how likely would you have been to make the additional purchases you just mentioned even if you had not participated in the wattsmart program (if a lighting participant) or even if you had not received that information (if not a lighting participant)?

The response to these questions were used to develop a spillover score as follows:

Spillover = Average (SO1, 5 – SO2)

All of the associated measure savings were considered attributable to the program if the resulting score was equal or greater than 4.

7.3.2 Energy Kit Survey and NTG Methodology

Rocky Mountain Power customers who receive energy kits through the wattsmart Homes Program were surveyed by ADM to determine a program attribution estimation for the NTG calculation. The attribution scoring system is broken down into two components: free-ridership score and spillover score. Each component is described individually in the subsequent subsection, followed by a paragraph discussing how the scores will be weighted to extrapolate the survey results to the program level.

The objective of the net-to-gross analysis is to estimate the share of program activity that would have occurred in the absence of the program. To accomplish this, the Evaluators administered a survey to program participants that contained questions regarding the participants’ plans to implement the energy kit items and the likelihood of implementing those measures had they not been provided through the program. Program participants were asked questions regarding:

- Whether they had plans to purchase and install the energy kit item;
- When would they have implemented the energy kit item in the absence of the program;
- The likelihood of purchasing and installing the energy kit item had they not received it for free.

Participant responses to these questions will be used to calculate two scores corresponding to the presence of prior plans and the likelihood of installing the items in the absence of the program.

7.3.2.1 Prior Plans Score

The prior plans score was calculated as follows:

- Respondents who indicated that they did not have plans to install the energy kit item were scored as 0.
- Respondents who indicated that they did have plans to install the energy kit item were scored as 1.

This score is adjusted based on the timing of the planned installation. The timing adjustment is based on when they will have likely installed the items. For respondents that say they would have likely installed the items immediately, no timing adjustment is made. Respondents who indicate that they would have likely installed the item within 6 months, the plans score is multiplied by 0.5. For those that would install after 6 months, the plan score is set to 0.

7.3.2.2 Likelihood of Project Completion Score

The score reflecting the likelihood of completing the project in the absence of the program was based on the following question:

- Using a scale where 1 is “very unlikely” and 5 is “very likely” how likely is it that you would have purchased and installed one of the below items had it not been in your energy kit?

A score was assigned to each response for this question as follows:

- Very likely: 1
- Slightly likely: 0.75
- Either: 0.5
- Slightly unlikely: 0.25
- Very unlikely: 0

7.3.2.3 Final Freeridership Score

The final free ridership score is equal to the following:

Free Ridership = Average (Plans Score, Likelihood Score) * Previous experience adjustment

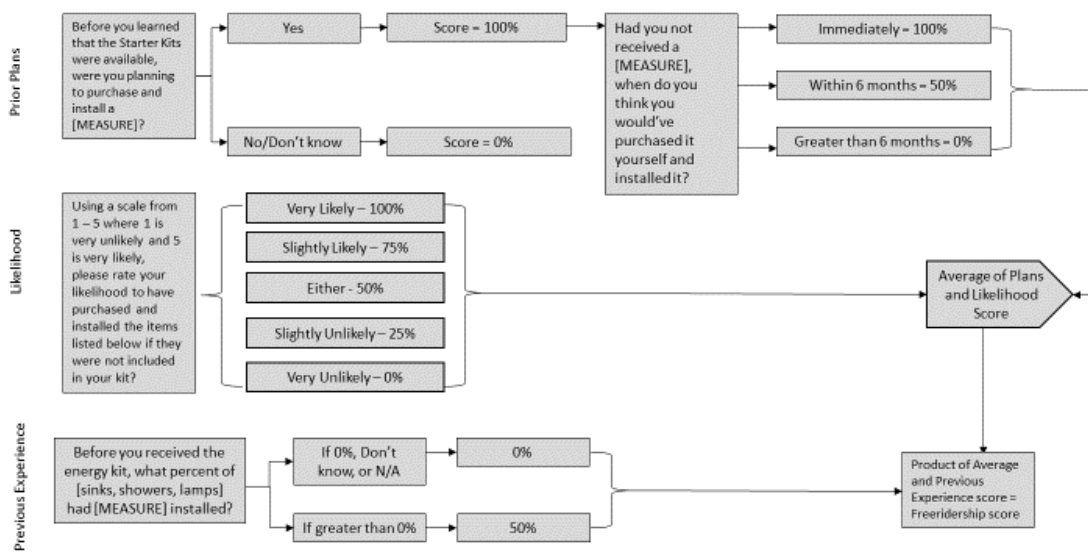
The previous experience adjustment was based on a question about whether the respondent had similar items currently installed in the home. The freeridership score for those that answer zero percent, “Not Applicable” or “Don’t know” to this question was multiplied by 0. The freeridership score for those that answer greater than zero percent to this question was multiplied by 0.5.

The free ridership questions are arranged as follows:

1. Indicator one: prior planning
2. Indicator two: stated likelihood in absence of program incentives
3. Mitigating factor one: reported prior experience with energy conservation measure

How these questions work together to determine a measure level free ridership score is displayed in Figure 7-2 on the following page. Note that the scoring algorithm requires the respondent to indicate a “burden of proof” that they are a free rider. They must state that either 1) they had prior plans to install the measure or 2) they would have likely installed the measure in the absence of the program.

Figure 7-2: Freeridership Methodology for wattsmart Energy Kit Program



7.3.2.4 Methodology for Estimating Spillover

Program participants may implement additional energy saving measures without receiving a program incentive because of their participation in the program. The energy savings resulting from these additional measures constitute program participant spillover effects.

To assess participant spillover savings, survey respondents were asked whether they implemented any additional energy saving measures for which they did not receive a program incentive. Respondents were also asked to provide information on the attributes of the measures implemented for use in estimating the associated energy savings.

Participants who report implementing on one or more efficiency measures are then asked two questions for use in developing a spillover score:

SO1: On a scale of 1 to 5, where 1 represents “not important” and 5 represents “very important”, how important was your experience with *wattsmart* in your decision to purchase the items you just mentioned?

SO2: On a scale of 1 to 5, where 1 represents “very unlikely” and 5 represents “very likely” how likely would you have been to make the additional purchases you just mentioned even if you had not participated in the *wattsmart* program?

The response to these questions were used to develop a spillover score as follows:

Spillover = Average(SO1, 5 – SO2)

All of the associated measure savings were considered attributable to the program if the resulting score was equal or greater than 3.

7.3.2.5 Determination of Program Level NTG

The free ridership scores for each respondent will be weighted by the ex-ante kWh savings per energy kit type to determine the final weighted average free-ridership estimate per customer in the sample. This estimate will be applied to the program level verified gross savings to determine net savings.

7.3.3 HVAC Survey and NTG Methodology

The following section presents the methodology that was used for estimating the net energy impacts resulting from the HVAC measures in 2017 and 2018.

7.3.3.1 Survey Data Collection

A survey of program participants was administered to collect data for use in estimating participant free ridership and spillover. Responses to the free ridership questions were collected through an online survey.

7.3.3.2 Methodology for Estimating Ex-Post Net Energy Savings

The net savings analysis is used to determine what part of the gross energy savings achieved by program participants can be attributed to the effects of the program. The net savings attributable to program participants are the gross savings less free ridership, plus spillover. ADM estimated free ridership and participant spillover through a survey of

program participants. Non-participant spillover was estimated through a survey of non-participants.

7.3.3.3 Methodology for Estimating Freeridership

Survey respondents were asked a series of questions designed to elicit information regarding the following factors:

- Financial ability and plans and intentions to implement the efficiency measure;
- The program influence on the decision to implement the efficiency measure;
- The program's influence on the timing of the measure installation.

The calculation of a free ridership score was based on the responses to questions about the participants' prior plans and intentions, program influence on measure selection, and program influence on timing of measure implementation.

7.3.3.3.1 Financial Ability and Plans and Intentions

Two indicator variables were developed based on responses to the survey questions on plans and intentions. The first corresponds to financial ability. Respondents were considered to have not been financially able to install the efficient equipment if they answer "no" to the question below:

FR1: Would you have been able to afford to purchase the efficient [EFF_MEASURE1] if the rebate was not available from the program?

The second indicator variable is related to whether the customer had plans to implement the efficiency measure. Respondents were considered to have had plans if they answer "yes" to the following question:

FR2: Were you planning to purchase [EFF_MEASURE1] before you learned of [UTILITY] wattsmart rebate program?

Respondents who were found to not have plans or the financial ability to implement the measures were deemed to not be free riders.

7.3.3.3.2 Program Influence on Decision to Implement Energy Efficiency Measure

Participants were asked about the direct influence of the program on their decision to implement the energy efficiency measures. Specifically, participants were asked:

FR3: On a scale of 1-5 where 1 is "not at all likely" and 5 is "very likely", how likely is it that you would have purchased and installed the [EFF_MEASURE1] if you had not received the financial or information assistance through the program?

A program influence score was developed based on this response in the following manner:

- A response of “1” = 0% Free Ridership
- A response of “2” = 25% Free Ridership
- A response of “3” = 50% Free Ridership
- A response of “4” = 75% Free Ridership
- A response of “5” = 100% Free Ridership

7.3.3.3.3 Program Influence on Project Timing

To account for deferred free ridership due to the program’s effect on the timing of the implementation of the efficiency measure, respondents were asked the following two questions:

FR4: Did you purchase and install the [EFF_MEASURE] sooner than you would have if the information and financial assistance from the program had not been available?

FR5: When might you have purchased or installed the same [EFF_MEASURE] if you had not participated in the program?

If the survey participant responds “yes” to question FR4 then a timing adjustment was calculated based on the answer to FR5 as shown in Table 7-8.

Table 7-8: Timing Adjustment Score

Likely Timing of Project in Absence of the Program	Timing Score
Within 6 months	1
Between 6 months and 1 year	0.67
In more than 1 year to 2 years	0.33
In two years or more	0

7.3.3.3.4 Freeridership Scoring

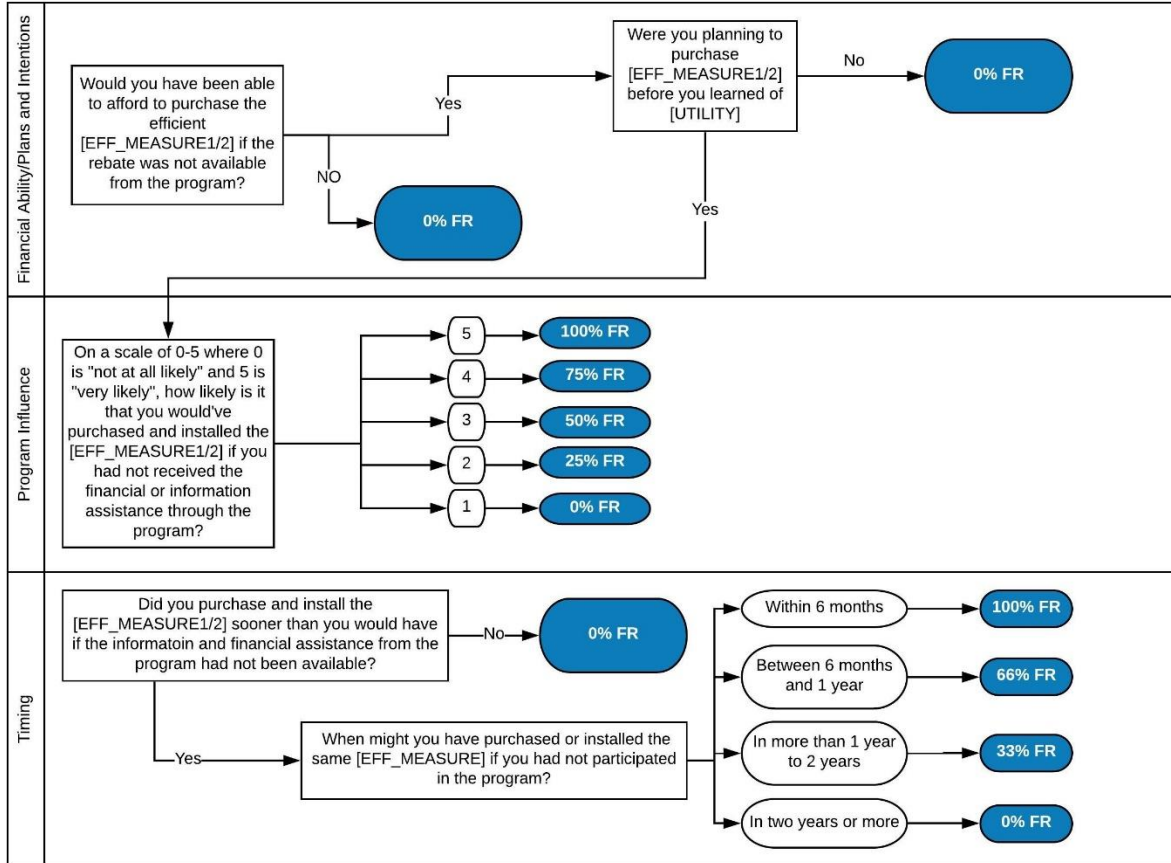
For respondents that did not have plans or intentions, an overall free ridership score was developed based on the program influence score and timing score. An overall project free ridership score is based by combining the scores described above using the following equation:

$$\text{Free Ridership} = \text{Program Influence} * \text{Timing Score}$$

The flowchart illustrating the methodology used to calculate free ridership can be found in the diagram in Figure 7-3.

Figure 7-3: Freeridership Methodology for wattsmart Homes HVAC and Appliance Measures

Free Ridership Scoring for wattsmart Appliance/HVAC Survey



7.3.3.4 Methodology for Estimating Spillover

Program participants may implement additional energy saving measures without receiving a program incentive because of their participation in the program. The energy savings resulting from these additional measures constitute program participant spillover effects.

To assess participant spillover savings, survey respondents were asked whether they implemented any additional energy saving measures for which they did not receive a program incentive. Respondents were also asked to provide information on the attributes of the measures implemented for use in estimating the associated energy savings.

Participants who report implementing on one or more efficiency measures are then asked two questions for use in developing a spillover score:

SO1: On a scale of 1 to 5, where 1 represents “not important” and 5 represents “very important”, how important was your experience with *wattsmart* in your decision to purchase the items you just mentioned?

SO2: On a scale of 1 to 5, where 1 represents “extremely likely” and 5 represents “extremely likely” how likely would you have been to make the additional purchases you just mentioned even if you had not participated in the *wattsmart* program?

The response to these questions were used to develop a spillover score as follows:

- $\text{Spillover} = \text{Average}(\text{SO1}, 5 - \text{SO2})$

All of the associated measure savings were considered attributable to the program if the resulting score was equal to or greater than 3.

7.4 Appendix D: Measure Category Cost-Effectiveness Results

The following tables show the cost-effectiveness results for each measure category in the Program for each program year (both without NEIs and including NEIs), based on the Idaho evaluated net savings. The 2017 cost-effectiveness was tested using the 2015 IRP east residential whole house 31%, east residential lighting 47%, and east water heating – 53% decrements. The 2018 cost-effectiveness was tested using the 2017 IRP decrement for all measure categories.

Table 7-9: 2017 ID wattsmart Homes Program Appliances Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0879	\$15,721	\$12,120	-\$3,602	0.77
Total Resource Cost Test (TRC) No Adder	\$0.0879	\$15,721	\$11,018	-\$4,703	0.70
Utility Cost Test (UCT)	\$0.0585	\$10,456	\$11,018	\$562	1.05
Rate Impact Test (RIM)		\$30,277	\$11,018	-\$19,259	0.36
Participant Cost Test (PCT)		\$14,072	\$29,499	\$15,426	2.10
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000004244				
Discounted Participant Payback (years)	3.65				

Table 7-10: 2017 ID wattsmart Homes Program Appliances Measure Category Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0879	\$15,721	\$24,532	\$8,811	1.56
Total Resource Cost Test (TRC) No Adder	\$0.0879	\$15,721	\$23,431	\$7,709	1.49
Utility Cost Test (UCT)	\$0.0585	\$10,456	\$11,018	\$562	1.05
Rate Impact Test (RIM)		\$30,277	\$11,018	-\$19,259	0.36
Participant Cost Test (PCT)		\$14,072	\$41,911	\$27,839	2.98
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000004244				
Discounted Participant Payback (years)	3.65				

Table 7-11: 2017 ID wattsmart Homes Program Building Shell Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0861	\$17,660	\$14,358	-\$3,301	0.81
Total Resource Cost Test (TRC) No Adder	\$0.0861	\$17,660	\$13,053	-\$4,607	0.74
Utility Cost Test (UCT)	\$0.0562	\$11,530	\$13,053	\$1,523	1.13
Rate Impact Test (RIM)		\$34,458	\$13,053	-\$21,405	0.38
Participant Cost Test (PCT)		\$17,678	\$35,333	\$17,655	2.00
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000001348				
Discounted Participant Payback (years)	7.97				

Table 7-12: 2017 ID wattsmart Homes Program Energy Kits - DHW Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0276	\$63,286	\$151,287	\$88,002	2.39
Total Resource Cost Test (TRC) No Adder	\$0.0276	\$63,286	\$137,534	\$74,248	2.17
Utility Cost Test (UCT)	\$0.0277	\$63,507	\$137,534	\$74,027	2.17
Rate Impact Test (RIM)		\$317,431	\$137,534	-\$179,897	0.43
Participant Cost Test (PCT)		\$8,045	\$269,152	\$261,107	33.46
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000046927				
Discounted Participant Payback (years)	n/a				

Table 7-13: 2017 ID wattsmart Homes Program Energy Kits - DHW Measure Category Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0276	\$63,286	\$277,955	\$214,670	4.39
Total Resource Cost Test (TRC) No Adder	\$0.0276	\$63,286	\$264,202	\$200,916	4.17
Utility Cost Test (UCT)	\$0.0277	\$63,507	\$137,534	\$74,027	2.17
Rate Impact Test (RIM)		\$317,431	\$137,534	-\$179,897	0.43
Participant Cost Test (PCT)		\$8,045	\$395,820	\$387,775	49.20
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000046927				
Discounted Participant Payback (years)	n/a				

Table 7-14: 2017 ID wattsmart Homes Program Energy Kits - Lighting Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0377	\$5,228	\$10,360	\$5,133	1.98
Total Resource Cost Test (TRC) No Adder	\$0.0377	\$5,228	\$9,418	\$4,191	1.80
Utility Cost Test (UCT)	\$0.0383	\$5,302	\$9,418	\$4,116	1.78
Rate Impact Test (RIM)		\$20,671	\$9,418	-\$11,252	0.46
Participant Cost Test (PCT)		\$2,703	\$18,506	\$15,804	6.85
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000002480				
Discounted Participant Payback (years)	n/a				

Table 7-15: 2017 ID wattsmart Homes Program Energy Kits - Lighting Measure Category Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0377	\$5,228	\$16,085	\$10,858	3.08
Total Resource Cost Test (TRC) No Adder	\$0.0377	\$5,228	\$15,143	\$9,916	2.90
Utility Cost Test (UCT)	\$0.0383	\$5,302	\$9,418	\$4,116	1.78
Rate Impact Test (RIM)		\$20,671	\$9,418	-\$11,252	0.46
Participant Cost Test (PCT)		\$2,703	\$24,231	\$21,529	8.97
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000002480				
Discounted Participant Payback (years)	n/a				

Table 7-16: 2017 ID wattsmart Homes Program HVAC Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0346	\$241,097	\$460,602	\$219,504	1.91
Total Resource Cost Test (TRC) No Adder	\$0.0346	\$241,097	\$418,729	\$177,632	1.74
Utility Cost Test (UCT)	\$0.0284	\$197,484	\$418,729	\$221,245	2.12
Rate Impact Test (RIM)		\$970,166	\$418,729	-\$551,437	0.43
Participant Cost Test (PCT)		\$140,938	\$881,391	\$740,453	6.25
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000092639				
Discounted Participant Payback (years)	0.72				

Table 7-17: 2017 ID wattsmart Homes Program Lighting Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1093	\$537,459	\$364,560	-\$172,899	0.68
Total Resource Cost Test (TRC) No Adder	\$0.1093	\$537,459	\$331,418	-\$206,041	0.62
Utility Cost Test (UCT)	\$0.0348	\$170,828	\$331,418	\$160,591	1.94
Rate Impact Test (RIM)		\$715,697	\$331,418	-\$384,278	0.46
Participant Cost Test (PCT)		\$569,993	\$776,310	\$206,317	1.36
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000091808				
Discounted Participant Payback (years)	10.51				

Table 7-18: 2017 ID wattsmart Homes Program Lighting Measure Category Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1093	\$537,459	\$679,280	\$141,821	1.26
Total Resource Cost Test (TRC) No Adder	\$0.1093	\$537,459	\$646,138	\$108,679	1.20
Utility Cost Test (UCT)	\$0.0348	\$170,828	\$331,418	\$160,591	1.94
Rate Impact Test (RIM)		\$715,697	\$331,418	-\$384,278	0.46
Participant Cost Test (PCT)		\$569,993	\$1,091,029	\$521,036	1.91
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000091808				
Discounted Participant Payback (years)	10.51				

Table 7-19: 2017 ID wattsmart Homes Program Water Heating Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0714	\$5,092	\$4,835	-\$258	0.95
Total Resource Cost Test (TRC) No Adder	\$0.0714	\$5,092	\$4,395	-\$697	0.86
Utility Cost Test (UCT)	\$0.0562	\$4,009	\$4,395	\$386	1.10
Rate Impact Test (RIM)		\$11,916	\$4,395	-\$7,521	0.37
Participant Cost Test (PCT)		\$4,293	\$11,605	\$7,312	2.70
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000001657				
Discounted Participant Payback (years)	2.00				

Table 7-20: 2017 ID wattsmart Homes Program Whole Homes Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0668	\$15,183	\$16,787	\$1,604	1.11
Total Resource Cost Test (TRC) No Adder	\$0.0668	\$15,183	\$15,261	\$78	1.01
Utility Cost Test (UCT)	\$0.0620	\$14,076	\$15,261	\$1,185	1.08
Rate Impact Test (RIM)		\$39,469	\$15,261	-\$24,208	0.39
Participant Cost Test (PCT)		\$14,679	\$40,438	\$25,760	2.75
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000001525
Discounted Participant Payback (years)					2.12

Table 7-21: 2018 ID wattsmart Homes Program Appliances Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1233	\$7,936	\$3,139	-\$4,797	0.40
Total Resource Cost Test (TRC) No Adder	\$0.1233	\$7,936	\$2,854	-\$5,082	0.36
Utility Cost Test (UCT)	\$0.0622	\$4,005	\$2,854	-\$1,151	0.71
Rate Impact Test (RIM)		\$10,947	\$2,854	-\$8,093	0.26
Participant Cost Test (PCT)		\$7,595	\$10,602	\$3,007	1.40
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000001645
Discounted Participant Payback (years)					8.20

Table 7-22: 2018 ID wattsmart Homes Program Appliances Measure Category Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1233	\$7,936	\$14,767	\$6,831	1.86
Total Resource Cost Test (TRC) No Adder	\$0.1233	\$7,936	\$14,482	\$6,546	1.82
Utility Cost Test (UCT)	\$0.0622	\$4,005	\$2,854	-\$1,151	0.71
Rate Impact Test (RIM)		\$10,947	\$2,854	-\$8,093	0.26
Participant Cost Test (PCT)		\$7,595	\$22,230	\$14,635	2.93
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000001645
Discounted Participant Payback (years)					8.20

Table 7-23: 2018 ID wattsmart Homes Program Building Shell Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0994	\$33,560	\$25,825	-\$7,735	0.77
Total Resource Cost Test (TRC) No Adder	\$0.0994	\$33,560	\$23,477	-\$10,082	0.70
Utility Cost Test (UCT)	\$0.0641	\$21,654	\$23,477	\$1,823	1.08
Rate Impact Test (RIM)		\$58,388	\$23,477	-\$34,911	0.40
Participant Cost Test (PCT)		\$33,635	\$58,975	\$25,341	1.75
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000002188
Discounted Participant Payback (years)					9.85

Table 7-24: 2018 ID wattsmart Homes Program Electronics Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0911	\$249,653	\$97,963	-\$151,691	0.39
Total Resource Cost Test (TRC) No Adder	\$0.0911	\$249,653	\$89,057	-\$160,596	0.36
Utility Cost Test (UCT)	\$0.0713	\$195,403	\$89,057	-\$106,346	0.46
Rate Impact Test (RIM)		\$489,893	\$89,057	-\$400,836	0.18
Participant Cost Test (PCT)		\$168,063	\$420,620	\$252,557	2.50
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000229698
Discounted Participant Payback (years)					1.06

Table 7-25: 2018 ID wattsmart Homes Program Energy Kits - DHW Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0194	\$86,399	\$191,423	\$105,024	2.22
Total Resource Cost Test (TRC) No Adder	\$0.0194	\$86,399	\$174,021	\$87,622	2.01
Utility Cost Test (UCT)	\$0.0195	\$86,817	\$174,021	\$87,204	2.00
Rate Impact Test (RIM)		\$565,554	\$174,021	-\$391,533	0.31
Participant Cost Test (PCT)		\$15,184	\$507,464	\$492,280	33.42
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000101492
Discounted Participant Payback (years)					n/a

Table 7-26: 2018 ID wattsmart Homes Program Energy Kits - DHW Measure
Category Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0194	\$86,399	\$433,478	\$347,078	5.02
Total Resource Cost Test (TRC) No Adder	\$0.0194	\$86,399	\$416,076	\$329,676	4.82
Utility Cost Test (UCT)	\$0.0195	\$86,817	\$174,021	\$87,204	2.00
Rate Impact Test (RIM)		\$565,554	\$174,021	-\$391,533	0.31
Participant Cost Test (PCT)		\$15,184	\$749,519	\$734,334	49.36
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000101492				
Discounted Participant Payback (years)	n/a				

Table 7-27: 2018 ID wattsmart Homes Program Energy Kits - Lighting Measure
Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0310	\$11,151	\$17,045	\$5,894	1.53
Total Resource Cost Test (TRC) No Adder	\$0.0310	\$11,151	\$15,496	\$4,344	1.39
Utility Cost Test (UCT)	\$0.0315	\$11,340	\$15,496	\$4,156	1.37
Rate Impact Test (RIM)		\$50,129	\$15,496	-\$34,634	0.31
Participant Cost Test (PCT)		\$6,850	\$46,737	\$39,887	6.82
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000007585				
Discounted Participant Payback (years)	n/a				

Table 7-28: 2018 ID wattsmart Homes Program Energy Kits - Lighting Measure
Category Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0310	\$11,151	\$31,617	\$20,466	2.84
Total Resource Cost Test (TRC) No Adder	\$0.0310	\$11,151	\$30,068	\$18,917	2.70
Utility Cost Test (UCT)	\$0.0315	\$11,340	\$15,496	\$4,156	1.37
Rate Impact Test (RIM)		\$50,129	\$15,496	-\$34,634	0.31
Participant Cost Test (PCT)		\$6,850	\$61,309	\$54,459	8.95
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000007585				
Discounted Participant Payback (years)	n/a				

Table 7-29: 2018 ID wattsmart Homes Program HVAC Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0274	\$346,039	\$887,480	\$541,441	2.56
Total Resource Cost Test (TRC) No Adder	\$0.0274	\$346,039	\$806,800	\$460,761	2.33
Utility Cost Test (UCT)	\$0.0262	\$331,103	\$806,800	\$475,697	2.44
Rate Impact Test (RIM)		\$1,695,649	\$806,800	-\$888,850	0.48
Participant Cost Test (PCT)		\$178,775	\$1,539,708	\$1,360,933	8.61
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000148411
Discounted Participant Payback (years)					0.15

Table 7-30: 2018 ID wattsmart Homes Program Lighting Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1037	\$578,793	\$253,459	-\$325,334	0.44
Total Resource Cost Test (TRC) No Adder	\$0.1037	\$578,793	\$230,418	-\$348,376	0.40
Utility Cost Test (UCT)	\$0.0315	\$175,731	\$230,418	\$54,687	1.31
Rate Impact Test (RIM)		\$777,504	\$230,418	-\$547,086	0.30
Participant Cost Test (PCT)		\$629,322	\$858,939	\$229,617	1.36
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000129900
Discounted Participant Payback (years)					10.47

Table 7-31: 2018 ID wattsmart Homes Program Lighting Measure Category Cost-Effectiveness Results (including NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1037	\$578,793	\$597,793	\$18,999	1.03
Total Resource Cost Test (TRC) No Adder	\$0.1037	\$578,793	\$574,751	-\$4,042	0.99
Utility Cost Test (UCT)	\$0.0315	\$175,731	\$230,418	\$54,687	1.31
Rate Impact Test (RIM)		\$777,504	\$230,418	-\$547,086	0.30
Participant Cost Test (PCT)		\$629,322	\$1,203,273	\$573,950	1.91
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000129900
Discounted Participant Payback (years)					10.47

Table 7-32: 2018 ID wattsmart Homes Program Water Heating Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0609	\$3,892	\$2,991	-\$902	0.77
Total Resource Cost Test (TRC) No Adder	\$0.0609	\$3,892	\$2,719	-\$1,173	0.70
Utility Cost Test (UCT)	\$0.0524	\$3,352	\$2,719	-\$634	0.81
Rate Impact Test (RIM)		\$10,245	\$2,719	-\$7,526	0.27
Participant Cost Test (PCT)		\$3,144	\$9,849	\$6,705	3.13
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000001648				
Discounted Participant Payback (years)	1.19				

Table 7-33: 2018 ID wattsmart Homes Program Whole Homes Measure Category Cost-Effectiveness Results (without NEIs)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0422	\$22,437	\$40,412	\$17,975	1.80
Total Resource Cost Test (TRC) No Adder	\$0.0422	\$22,437	\$36,738	\$14,301	1.64
Utility Cost Test (UCT)	\$0.0326	\$17,340	\$36,738	\$19,398	2.12
Rate Impact Test (RIM)		\$75,106	\$36,738	-\$38,368	0.49
Participant Cost Test (PCT)		\$19,690	\$75,848	\$56,159	3.85
Lifecycle Revenue Impacts (\$/kWh)	\$0.0000002706				
Discounted Participant Payback (years)	2.37				