Evaluation, Verification and Measurement Report
Residential Home Energy Savings Program
Utah

PROGRAM YEARS 2019-2020

Prepared for:

Rocky Mountain Power

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1 Executive Summary

ADM Associates, Inc. (ADM) is under contract with PacifiCorp to perform evaluation, measurement, and verification (EM&V) services to determine the energy savings (kWh) that resulted from Rocky Mountain Power's 2019-2020 Home Energy Savings Program in Utah. This report documents ADM's findings.

Program year 2019 (PY 2019) and program year 2020 (PY 2020) coincide with the respective calendar years. The purpose of this report is to present ADM's impact evaluation of the energy savings (kWh) that resulted from the program and ADM's process evaluation of the program, focusing on participant and program staff perspectives regarding the program's implementation and ADM's observations about the program.

1.1 Description of Programs

The program provides financial incentives (discounts, rebates, and free products) for Rocky Mountain Power residential customers to purchase and install energy efficient products. The Program leverages relationships with manufacturers, distributors, and retailers to ensure effective program implementation and optimize participation. Products included in the program are reported in Table 1-1.

ADM determined the evaluated energy (kWh) savings achieved through Rocky Mountain Power's 2019-2020 Home Energy Savings Program in Utah. Rocky Mountain Power contracted with Guidehouse to assess program cost-effectiveness. The results of the cost-effectiveness assessment are also included in this report. For the process evaluation, ADM gained 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.

Table 1-1: Quantities of Product Incentives Delivered through Program by Measure Category

Measure Category	2019	2020	2019-2020
Appliances	**77**	**210**	**287**
Clothes Washer	-	10	10
Dishwasher	24	100	124
Refrigerator	53	100	153
Building Shell (sq ft)	**2,063,157**	**2,559,883**	**4,623,040**
Attic Insulation (sq ft)	1,952,064	2,481,514	4,433,578
Ceiling Insulation (sq ft)	110,622	13,755	124,377
Roof/Attic Insulation (sq ft)	-	64,382	64,382
Window Upgrade (sq ft)	471	232	703
Energy Kits	**2,179**	**138**	**2,317**
Best Kit	651	40	691
LED Kit	1,528	98	1,626
HVAC	**24,462**	**22,014**	**46,476**
Air Source Heat Pump	-	1	1
Central Air Conditioner	4,554	5,667	10,221
Controls and Thermostats	3,079	5,042	8,121
Duct Sealing and/or Insulation	4	-	4
Ductless Heat Pump	6	93	99
Evaporative Cooler	3,229	3,524	6,753
Furnace Blower Motor	-	33	33
Furnace Fan	3,205	5	3,210
Heat Pump - Air Source	255	277	532
Heat Pump - Ductless	73	141	214
Residential Room Air Conditioner	60	562	622
Rooftop Snow Melt Devices	-	17	17
Room AC	-	(1)	(1)
Split-System Air Conditioner	10	20	30
Thermostat	9,963	6,411	16,374
Whole-House Fan	24	222	246
Lighting	**1,878,456**	**2,062,506**	**3,940,962**
Custom	18,801	24,025	42,826
LED	1,859,655	2,038,481	3,898,136
Plumbing	**2**	**-**	**2**
Pool Pump	2	-	2
Water Heating	**31,042**	**40,261**	**71,303**
Faucet Aerators	15,750	757	16,507
Heat Pump Water Heater	6	10	16
Low Flow Shower Head	15,286	39,478	54,764
Water Heater Replacement	-	16	16
Whole Building	**2,807**	**9,709**	**12,516**
Custom	52	65	117
Energy Modeling	2,244	6,268	8,512
HERS	511	3,376	3,887
Whole Home	**3,218**	**901**	**4,119**
New Homes - Energy Star	633	834	1,467
New Homes HERS	2,585	67	2,652
Total	**4,005,400**	**4,695,622**	**8,701,022**

1.2 Impact Evaluation Results

The Wattsmart program resulted in a net evaluated savings of 81,316,954 kWh during the evaluation period with an 83 percent realization rate and an overall net-to-gross ratio of 75 percent. Gross and net evaluated savings (kWh) are presented in Table 1-2 through Table 1-4.[1]

Table 1-2: Total Program Savings by Measure Category 2019-2020

Measure Category	Quantity	Claimed Saving (kWh)	Gross Evaluated Savings (kWh)	Realiza-tion Rate	NTG	Net Evaluated Savings (kWh)	% Total Program Savings
Lighting	3,940,962	76,479,353	57,567,400	75%	69%	39,564,234	49%
Whole Building	12,516	25,283,359	24,930,875	99%	95%	23,696,138	29%
HVAC	46,476	21,707,710	21,605,804	100%	67%	14,549,780	18%
Water Heating	71,303	4,424,220	1,439,303	33%	100%	1,433,914	2%
Whole Home	4,119	1,543,324	1,543,324	100%	80%	1,226,943	2%
Building Shell	4,623,040	733,294	732,993	100%	75%	551,211	0.7%
Energy Kits	2,317	559,174	352,580	63%	84%	294,735	0.4%
Appliances	287	0	0			0	0.0%
Plumbing	2	0	0			0	0.0%
Grand Total	**8,701,022**	**130,730,435**	**108,172,279**	**83%**	**75%**	**81,316,954**	**100%**

Table 1-3: Total Program Savings by Measure Category 2019

Measure Category	Quantity	Claimed Saving (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)	% Total Program Savings
Lighting	1,878,456	36,214,803	27,334,280	75%	69%	18,860,525	52%
Whole Building	2,807	8,601,974	8,419,762	98%	96%	8,123,139	23%
HVAC	24,462	10,360,134	10,260,579	99%	67%	6,889,962	19%
Whole Home	3,218	1,441,843	1,441,843	100%	80%	1,146,265	3%
Water Heating	31,042	1,362,726	452,877	33%	100%	450,620	1%
Energy Kits	2,179	527,378	332,236	63%	84%	277,737	0.8%
Building Shell	2,063,157	298,624	301,456		75%	226,695	0.6%
Appliances	77	0	0				
Plumbing	2	0	0				
Total	4,005,400	**58,807,482**	**48,543,032**	**83%**	**74%**	**35,974,943**	**100%**

[1] Measures reported with 0 kWh savings in Tables 1-2 through 1-4 were installed in multifamily projects. Their savings are reported at the project level in Section 3.2.

Table 1-4: Total Program Savings by Measure Category 2020

Measure Category	Quantity	Claimed Saving (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)	% Total Program Savings
Lighting	2,062,506	40,264,550	30,233,120	75%	68%	20,703,709	46%
Whole Building	9,709	16,681,385	16,511,113	99%	94%	15,572,999	34%
HVAC	22,014	11,347,576	11,345,225	100%	68%	7,659,818	17%
Water Heating	40,261	3,061,494	986,427	32%	100%	983,294	2%
Building Shell	2,559,883	434,670	431,537	99%	75%	324,516	0.7%
Whole Home	901	101,481	101,481	100%	80%	80,677	0.2%
Energy Kits	138	31,797	20,344	64%	84%	16,998	0.04%
Appliances	210	-	0			-	0%
Total	**4,695,622**	**71,922,953**	**59,629,247**	**83%**	**76%**	**45,342,011**	**100%**

1.3 Process Evaluation Results

ADM made the following key findings during its process analysis.

- The technical reference library (TRL) is a key program reference resource that documents ex ante savings values for all versions of all measures included in the program. Maintaining TRL version control, timeliness and completeness is a challenge for which opportunities for process improvement are available.
- Rocky Mountain Power receives and maintains program tracking data from the implementer. Additional information, such as upstream sales details, downstream product model specifications, and new home model details, are maintained by the implementer.
- Some data elements were missing from the program tracking dataset that impacted some measure category realization rates.
- Rocky Mountain Power attribution for upstream program discounts is relatively low: 27 percent of customers who reported purchasing discounted standard LED light bulbs from participating retailers recalled that the discount was provided by Rocky Mountain Power.[2]
- Survey responses suggest that there may be an opportunity to increase the number of participants in the upstream room air conditioning program if more participating retailers were recruited.

[2] ADM 2020 General Population Survey.

- Over thirty percent of Rocky Mountain Power non-participating customers who responded to the survey indicated they had not received any information about energy saving from the utility.
- General satisfaction with the Rocky Mountain Power as their utility company was high.
- Nineteen percent of general customer survey respondents indicated their income was below the federal poverty level.

1.4 Cost Effectiveness Results

Guidehouse estimated the cost-effectiveness results for the program based on 2019 and 2020 costs and savings estimates provided by PacifiCorp. Cost-effectiveness was tested using the 2019 and 2020 IRP decrement for all measure categories. The program passes the cost-effectiveness for the UCT and PCT tests.

The onset of the covid-19 pandemic occurred 15 months into the 24-month evaluation period. In response, Rocky Mountain Power increased its distribution of energy saving products through foodbanks to target its customers who were hardest hit by the economic downturn to help them reduce their energy costs. The foodbank distributions were a quick-response approach to assisting customers during an acute crisis.

Cost effectiveness results are presented separately for:

- Total program excluding measures distributed through foodbanks
- Measures distributed through foodbanks
- Total program

Program cost effectiveness results are reported in Table 1-5 through Table 1-7.

Table 1-5: Program Cost-Effectiveness Results – PY2019-2020
Excluding Measures Distributed through Foodbanks

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0666	$50,504,335	$45,498,330	-$5,006,005	0.90
Total Resource Cost Test (TRC) No Adder	$0.0666	$50,504,335	$41,362,118	-$9,142,217	0.82
Utility Cost Test (UCT)	$0.0347	$26,287,002	$41,362,118	$15,075,116	1.57
Rate Impact Test (RIM)		$113,193,993	$41,362,118	-$71,831,875	0.37
Participant Cost Test (PCT)		$53,243,266	$132,784,276	$79,541,010	2.49
Lifecycle Revenue Impacts ($/kWh)					$0.0000095747
Discounted Participant Payback (years)					5.08

Table 1-6: Program Cost-Effectiveness Results – PY2019-2020 for Measures Distributed through Foodbanks

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0419	$2,186,744	$2,631,666	$444,922	1.20
Total Resource Cost Test (TRC) No Adder	$0.0419	$2,186,744	$2,392,424	$205,680	1.09
Utility Cost Test (UCT)	$0.0293	$1,530,093	$2,392,424	$862,331	1.56
Rate Impact Test (RIM)		$7,507,908	$2,392,424	-$5,115,484	0.32
Participant Cost Test (PCT)		$1,384,534	$6,705,698	$5,321,164	4.84
Lifecycle Revenue Impacts ($/kWh)					$0.0000045722
Discounted Participant Payback (years)					1.47

Table 1-7: Total Program Cost-Effectiveness Results – PY2019-2020

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0650	$52,666,489	$48,129,996	-$4,536,493	0.91
Total Resource Cost Test (TRC) No Adder	$0.0650	$52,666,489	$43,754,542	-$8,911,948	0.83
Utility Cost Test (UCT)	$0.0343	$27,817,095	$43,754,542	$15,937,447	1.57
Rate Impact Test (RIM)		$120,701,901	$43,754,542	-$76,947,360	0.36
Participant Cost Test (PCT)		$54,627,800	$139,489,974	$84,862,174	2.55
Lifecycle Revenue Impacts ($/kWh)					$0.0000102566
Discounted Participant Payback (years)					4.73

1.5 Conclusions and Recommendations

ADM makes the following conclusions and recommendations from its evaluation.

1.5.1 Conclusions

Rocky Mountain Power's 2019-2020 Home Energy Savings program in Utah resulted in 81,316,954 kWh of net savings with a 83 percent realization rate and a net-to-gross ratio of 75 percent as reported in Table 1-8.

Table 1-8: Total Program Savings by Year

Program Year	Claimed Saving (kWh)	Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
2019	58,807,482	48,543,032	83%	74%	35,974,943
2020	71,922,953	59,629,247	83%	76%	45,342,011
Total	**130,730,435**	**108,172,279**	**83%**	**75%**	**81,316,954**

Lighting measures accounted for 49 percent of program savings; Whole Building and Whole Home measure categories accounted for 31 percent of savings, and HVAC measures accounted for 18 percent. The remaining measure categories — water heating, building shell and energy kits (starter kits) — account for 3 percent collectively. This represents the growing importance of construction projects, both multifamily projects and new homes, as well as the increased importance of HVAC measures in the residential efficiency program portfolio. The portion of savings resulting from LED lighting measures is declining as the market transformation continues. A comparison of savings during this and the previous evaluation are reported in Table 1-9.

Table 1-9:Total 2019-2020 Program Savings Compared to 2017-2018

Measure Category	2019-2020					2017-2018		
	Claimed Saving (kWh)	Gross Evaluated Savings (kWh)	RR	Net Evaluated Savings (kWh)	% Total Program Savings	RR	Net Evaluated Savings (kWh)	% Total Program Savings
Lighting	76,479,353	57,567,400	75%	39,564,234	49%	69%	70,964,280	80%
Whole Building	25,283,359	24,930,875	99%	23,696,138	29%	99%	4,107,132	4.6%
HVAC	21,707,710	21,605,804	100%	14,549,780	18%	52%	9,759,308	11%
Water Heating	4,424,220	1,439,303	33%	1,433,914	2%	100%	12,690	0.01%
Whole Home	1,543,324	1,543,324	100%	1,226,943	2%	100%	1,402,824	1.6%
Building Shell	733,294	732,993	100%	551,211	0.7%	105%	649,598	0.7%
Energy Kits	559,174	352,580	63%	294,735	0.4%	104%	1,522,334	1.7%
Appliances	0	0	0	0	0%	100%	110,306	0.1%
Total	**130,730,435**	**108,172,279**	**83%**	**81,316,954**	**100%**	**83%**	**88,528,472**	**100%**

RR – Realization Rate

1.5.2 Recommendations

ADM recommends that Rocky Mountain Power consider the following actions.

Create separate measures definitions for products distributed through alternative distribution channels

ADM recommends that Rocky Mountain Power track measures that are distributed through foodbanks and similar channels as separate measures that identify the channel appropriately. This allows for different variables, such as installation rates, that vary by distribution channel.

Update ex ante savings to reflect electric water heater market saturation rate

Ex ante savings for water saving measures include the percentage of electric water heaters as a key variable. Customer surveys and the US Energy Information Administration Residential Energy Consumption Survey all point to a lower percentage of electric water heaters than the ex ante percentage in RTF reference files.

Consider repeat recipients of kits distributed through foodbanks and community centers

Rocky Mountain Power implemented a program to distribute aerators, low-flow showerheads and LED light bulbs through foodbanks and community centers. Staff at community distribution sites indicate that there is a high degree of client retention at food assistance programs resulting in households receiving more than one kit.

Add data elements to tracking and reporting

Rocky Mountain Power relies on implementation partners to collect and store critical data that is required to evaluate the program and verify the resulting energy savings. ADM recommends that Rocky Mountain Power adds the following data elements to its internal program tracking datasets:

- Product manufacturer and model numbers, or minimally efficiency specifications
- Sales or distribution location for all upstream measures
- Baseline conditions (specifics varies by measure)

Add process controls to program implementation

ADM recommends that Rocky Mountain Power work with program implementers to revise program controls to ensure that all data elements required to verify savings are included in the dataset and that program eligibility requirements are met for all measures.

Evaluate program on an annual basis

Annual evaluations would allow Rocky Mountain Power to monitor program controls and data collection throughout the program year, allowing the utility to respond to program performance midcycle. ADM recommends that Rocky Mountain Power implement annual rather than biannual program evaluations.

Collect baseline data for evaporative coolers

Baseline data assumptions for evaporative coolers distributed through upstream channels is not able to be corroborated through current program design. ADM recommends that Rocky Mountain Power identify a process for collecting evaporative cooler baseline data.

Add TRL version control process

The TRL is a complex set of documents that provides the basis for program planning and evaluation. ADM recommends that Rocky Mountain Power implement a more stringent version control process to ensure that complete, accurate TRL data is maintained.

Remove individual measures installed in construction projects from tracking data

Program tracking data includes individual measures installed in multifamily home projects with 0 kWh claimed savings. Savings are claimed only for project measure. This results duplicate measure counts, once as an individual measures and again as projects. ADM recommends that Rocky Mountain Power consider removing no-savings individual measures that are installed in construction and renovation projects from final tracking data.

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 energy savings (kWh) that resulted from Rocky Mountain Power's 2019-2020 Wattsmart Home Energy Savings Program in Utah. This report documents ADM's findings.

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2.1 Description of Programs

The program provides financial incentives (discounts, rebates, and free products) for Rocky Mountain Power residential customers to purchase and install energy efficient products. The Program leverages relationships with manufacturers, distributors, and retailers to ensure effective program implementation and optimize participation. Products included in the program are reported in Table 2-1.

Table 2-1: Quantities of Measures
Delivered through Program by Measure Category

Measure Category	2019	2020	2019-2020
Appliances	**77**	**210**	**287**
Clothes Washer	-	10	10
Dishwasher	24	100	124
Refrigerator	53	100	153
Building Shell (sq ft)	**2,063,157**	**2,559,883**	**4,623,040**
Attic Insulation (sq ft)	1,952,064	2,481,514	4,433,578
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Window Upgrade (sq ft)	471	232	703
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HVAC	**24,462**	**22,014**	**46,476**
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Furnace Blower Motor	-	33	33
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Measure Category	2019	2020	2019-2020
Heat Pump - Ductless	73	141	214
Residential Room Air Conditioner	60	562	622
Rooftop Snow Melt Devices	-	17	17
Room AC	-	(1)	(1)
Split-System Air Conditioner	10	20	30
Thermostat	9,963	6,411	16,374
Whole-House Fan	24	222	246
Lighting	**1,878,456**	**2,062,506**	**3,940,962**
Custom	18,801	24,025	42,826
LED	1,859,655	2,038,481	3,898,136
Plumbing	**2**	**-**	**2**
Pool Pump	2	-	2
Water Heating	**31,042**	**40,261**	**71,303**
Faucet Aerators	15,750	757	16,507
Heat Pump Water Heater	6	10	16
Low Flow Shower Head	15,286	39,478	54,764
Water Heater Replacement	-	16	16
Whole Building	**2,807**	**9,709**	**12,516**
Custom	52	65	117
Energy Modeling	2,244	6,268	8,512
HERS	511	3,376	3,887
Whole Home	**3,218**	**901**	**4,119**
New Homes - Energy Star	633	834	1,467
New Homes HERS	2,585	67	2,652
Total	**4,005,400**	**4,695,622**	**8,701,022**

Table 2-2 reports the methods by which the program provides incentives to customers for each measure category.

Table 2-2: Incentive Delivery Method

Measure Category	Incentive Delivery
HVAC	Point of sale (upstream) Post purchase rebate application
Energy Kits	Free kit requested for mail delivery
Whole Home	Post installation rebate application
Lighting	Point-of-sale pricing Distribution through foodbanks and senior centers
Water Heating	Post purchase rebate application (HPWHs) Distribution through foodbanks and senior centers (flow control)
Appliances	Post purchase rebate application
Building Shell	Post purchase rebate application

Upstream LED lighting measures were offered at a discounted price at the point of sale. The program paid the discount incentive to the manufacturer. These point-of-sale incentives did not require the consumer to apply for the financial benefit; it is an efficient and cost-effective means to encourage customers to purchase relatively high-volume, low-cost measures such as LEDs.

Upstream discounts were also offered on evaporative coolers and room air conditioners.

Rocky Mountain Power offered incentives to contractors for building single family and multifamily homes that exceeded Utah's energy efficiency building standards.

Additional appliances and HVAC measures were processed through a post-purchase application form designed to verify that incentives were delivered only for eligible measures. HVAC measures were sold as upstream measures through retail sales and as downstream measure through trade allies.

Rocky Mountain Power also offered customers the opportunity to request free Starter Kits comprised of energy saving lighting and water saving measures through an online application process. And finally, Rocky Mountain Power provided free low-flow showerhead, faucet aerators and LEDs distributed through community centers such as foodbanks and senior centers.

2.2 Impact Evaluation Objectives

The primary objective of the impact evaluation is to determine the gross and net energy savings (kWh) that resulted from the program. Gross energy savings reflect the estimated amount of energy savings resulting from the installation of measures that incentives were paid for. Net energy savings reflect gross savings multiplied by evaluated net-to-gross (NTG) ratios. Net-to-gross ratios estimate the percentage of savings that would have occurred in the absence of the program.

ADM completed the following steps to determine the evaluated gross and net energy savings (kWh) that resulted from the program.

- Reviewed and reconciled program tracking data to the claimed savings reported in 2019 and 2020 annual reports.
- Administered customer surveys to determine actual installation rates at the measure level. Online surveys were administered for both program participants and non-participant Rocky Mountain Power customers.
- Determined gross unit energy savings (UES), which incorporated verified variables.

- Net-to-Gross ratios were calculated by measure category and in some categories with greater granularity.
- Achieved a minimum precision of better than ±10 percent with 90 percent statistical confidence ("90/10 precision") for gross realized savings estimates.
- Provided comprehensive documentation and transparency for all evaluation tasks.
- Estimated leakage rates for lighting measures using geospatial analysis.
- Provided inputs for cost benefit analyses.
- Provided ongoing technical reviews and guidance throughout the evaluation cycle.
- ADM did not conduct on-site verification or equipment monitoring as part of this evaluation.

2.3 Process Evaluation Objectives

The purpose of the process evaluation is to gain an in-depth understanding of program operations and the challenges and evaluation needs. ADM conducted key staff interviews with Rocky Mountain Power and implementers, complemented with a program documentation review and program participant surveys.

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

- What are key barriers and drivers to program success in Rocky Mountain Power's Utah service territory?
- How can those be addressed to improve program operations in the future?
- 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?

3 Impact Evaluation

The Wattsmart program resulted in a net evaluated savings of 81316,954 kWh during the evaluation period with an 83 percent realization rate and an overall net-to-gross ratio of 75 percent. Gross and net evaluated savings (kWh) are presented in Table 3-1 through Table 3-3.[3] Detailed impact evaluation results and analysis methodology for each measure category are included in subsequent sections.

Table 3-1: Total Program Savings by Measure Category 2019-2020

Measure Category	Quantity	Claimed Saving (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)	% Total Program Savings
Lighting	3,940,962	76,479,353	57,567,400	75%	69%	39,564,234	49%
Whole Building	12,516	25,283,359	24,930,875	99%	95%	23,696,138	29%
HVAC	46,476	21,707,710	21,605,804	100%	67%	14,549,780	18%
Water Heating	71,303	4,424,220	1,439,303	33%	100%	1,433,914	2%
Whole Home	4,119	1,543,324	1,543,324	100%	80%	1,226,943	2%
Building Shell	4,623,040	733,294	732,993	100%	75%	551,211	0.7%
Energy Kits	2,317	559,174	352,580	63%	84%	294,735	0.4%
Appliances	287	0	0			-	0.0%
Plumbing	2	0	0			-	0.0%
Grand Total	**8,701,022**	**130,730,435**	**108,172,279**	**83%**	**75%**	**81,316,954**	**100%**

Table 3-2: Total Program Savings by Measure Category 2019

Measure Category	Quantity	Claimed Saving (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)	% Total Program Savings
Lighting	1,878,456	36,214,803	27,334,280	75%	69%	18,860,525	52%
Whole Building	2,807	8,601,974	8,419,762	98%	96%	8,123,139	23%
HVAC	24,462	10,360,134	10,260,579	99%	67%	6,889,962	19%
Whole Home	3,218	1,441,843	1,441,843	100%	80%	1,146,265	3%
Water Heating	31,042	1,362,726	452,877	33%	100%	450,620	1%
Energy Kits	2,179	527,378	332,236	63%	84%	277,737	0.8%
Building Shell	2,063,157	298,624	301,456		75%	226,695	0.6%
Appliances	77	0	0				
Plumbing	2	0	0				
Total	**4,005,400**	**58,807,482**	**48,543,032,**	**83%**	**74%**	**35,974,943**	**100%**

[3] Measures reported with 0 kWh savings were install in multifamily projects. Their savings are reported at the project level in Section 3.2.

Table 3-3: Total Program Savings by Measure Category 2020

Measure Category	Quantity	Claimed Saving (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)	% Total Program Savings
Lighting	2,062,506	40,264,550	30,233,120	75%	68%	20,703,709	46%
Whole Building	9,709	16,681,385	16,511,113	99%	94%	15,572,999	34%
HVAC	22,014	11,347,576	11,345,225	100%	68%	7,659,818	17%
Water Heating	40,261	3,061,494	986,427	32%	100%	983,294	2%
Building Shell	2,559,883	434,670	431,537	99%	75%	324,516	0.7%
Whole Home	901	101,481	101,481	100%	80%	80,677	0.2%
Energy Kits	138	31,797	20,344	64%	84%	16,998	0%
Appliances	210	0	0			-	0%
Total	**4,695,622**	**71,922,953**	**59,629,247**	**83%**	**76%**	**45,342,011**	**100%**

3.1 Impact Evaluation Approach

ADM's evaluated unit energy savings (UES) for each measure takes into consideration savings values presented in TRL reference files. TRL reference files generally rely on the Regional Technical Forum's (RTF) library of measures maintained by the Northwest Power and Conservation Council to verify and evaluate energy efficiency savings.

When applicable, ADM incorporated verified variables such as in service rates (ISRs) and hours of use (HOUs) in place of ex ante variables used in the calculation of RTF values.

When determining savings that resulted from HVAC measures, in addition to reporting evaluated savings based on savings values sourced from TRL reference files, ADM completed a usage data analysis to provide insights to consider for future program design.

ADM reviewed a census of program tracking data, associated savings values, input 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 surveyed a representative sample of known participants and employed a general population survey for participants who purchased upstream measures to collect installation data.

ADM completed the following activities as part of the evaluation, measurement and verification process.

- ADM reviewed a census of program tracking dataset for completeness, consistency, and compliance with the provided TRL files.

- Review of measure savings assumptions and calculations maintained in the Technical Reference Library (TRL). The TRL files include measure savings assumptions, calculations, source papers or files (e.g. from the Regional Technical Forum), and additional documentation that together comprise the generally accepted rules and guidance for evaluating the program.
- ADM reviewed all TRL documentation and include in this report any errors, missing data, or inconsistencies identified during ADM's review.
- ADM includes a list of TRL reference files that it used in this evaluation in Appendix A.
- ADM requested program tracking data, TRL reports and reference files, in addition to other program data and verification, as necessary.
- ADM collected primary data from Rocky Mountain Power customers through three online surveys; one to customers who received energy kits, one to the general customer population to collect data about upstream measures, and a third to collect data from customers who received incentives for HVAC measures.

3.1.1 Sample Design

ADM achieved a sampling precision of ±10 percent or better with 90 percent statistical confidence – or "90/10 precision" – for gross realized savings estimates at the measure category level for all significant measures, including lighting, construction and HVAC measure categories.

For upstream lighting measures, for which participants are not known, ADM employed a General Population Survey where the sampling frame is the population of Rocky Mountain Power residential customers in Utah with valid email address, excluding known participants in any energy efficiency programs that Rocky Mountain Power implemented in 2019 or 2020. Four hundred customers responded to the survey. These responses were used to collect data used in the impact analysis for lighting measures and to determine non-participant net-to-gross spillover savings.

For starter kits, the sampling frame is the population of participants who received a kit for whom the tracking dataset includes valid email addresses. Sixty-eight starter kit program participants completed an online survey.

A census of HVAC tracking data was reviewed in detail, and an alternative analysis was completed using a census of billing data from customers who received an incentive for HVAC measures for which quantities were large enough to evaluate.

ADM included the following datasets in its evaluation:

- Census review of all measures in the program tracking dataset to ensure appropriate use of UES values sourced from TRL files.
- Review of a sample of HVAC measure manufacturer model numbers and specifications to verify that measures met the criteria established in the TRL reference files.
- Census review of lighting measures by manufacturer and product model number to verify that lighting products for which incentives were paid met the efficiency criteria established in the TRL reference files.
- Census review of heat pump water heater and other appliance manufacturer model numbers and specifications to verify that measures for which incentives were paid met efficiency criteria established in the TRL reference files.
- A sample of program participants who received energy kits was surveyed for measure installation rates, installation location, and process evaluation responses.
- A sample of Rocky Mountain Power residential customers who were not known to have participated in any downstream or request-by-mail Wattsmart program offering was surveyed using a general customer population survey to determine measure installation rates, installation location, and process evaluation responses for upstream lighting measures. Survey response rates are reported in Table 3-4.

Table 3-4: Survey Sample Response Size

Survey	Number of Survey Invites Sent	Number of Completed Surveys	Response Rate
General Population Survey	3,998	400	10%
Energy Kits Survey	996	68	7%
HVAC Participant Survey	2086	232	11%

3.1.2 Impact Evaluation Approach by Measure Category

Table 3-5 shows the methodology used to calculate evaluated savings for each measure category. ADM reviewed TRL UES values, their assumptions and calculations, modeling files, and additional information contained in the TRL reference files and underlying Regional Technical Forum (RTF) files. Additional reference sources are indicated in the descriptions of evaluated savings for some measure categories. ADM calculated NTG values from participant surveys for all major measure categories. A program-wide average NTG was calculated for remaining small-savings categories.

Table 3-5: Impact Evaluation Methodology Approach by Measure

Measure Category	Impact Evaluation Methodologies	Inputs to Gross Evaluated Savings
HVAC	Unit Energy Savings Review	• TRL reference files verified savings values • Customer billing data
Energy Kits	Unit Energy Savings Review	• TRL reference files verified savings values • Energy kits survey
Whole Homes	REMRate / Custom Model Review	• Project files
Lighting	Unit Energy Savings Review	• TRL reference files verified savings values • General population survey
Water Heating	Unit Energy Savings Review	• TRL reference files verified savings values
Appliances	Unit Energy Savings Review	• TRL reference files verified savings values
Building Shell	Unit Energy Savings Review	• TRL reference files verified savings values

3.1.3 Measure version numbers

Measures are included in the program with up to two different version numbers. Each version is treated as a separate measure for evaluation purposes. Measure and version number are concatenated in the following tables, for example LED Downlight: 10 watts - Retail - UT – 4 and LED Downlight: 10 watts - Retail - UT – 5 are versions 4 and 5 of the same measure, with different ex ante and ex post variable used in the evaluation.

3.2 Whole Building and Whole Home

Rocky Mountain Power offered financial incentives for a variety of whole home and whole building efficiency measures. Builders received financial incentives for constructing homes or multifamily buildings that exceeded Utah energy efficiency building codes, and owners of existing multifamily buildings received financial incentives for improving energy efficiency in apartment units and common areas.

Program tracking data listed 8,006 new homes projects and 248 multi-family projects, totaling 24,923,080 kWh of net savings, accounting for 31 percent of total program savings, with a 99 percent realization rate and a 94 percent net-to-gross ratio. Total program savings in 2019 and 2020 are shown in Table 3-6.

Table 3-6: Whole Building and Whole Home Program Savings by Year

Program Year	Quantity[4]	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
2019	6,025	10,043,817	9,861,605	98%	94%	9,269,404
2020	10,610	16,782,866	16,612,594	99%	94%	15,653,676
Total	**16,635**	**26,826,683**	**26,474,199**	**99%**	**94%**	**24,923,080**

3.2.1 Tracking Data Verification

ADM reviewed program tracking data to evaluate:

- if tracking dataset included duplicate or erroneous data entries,
- if data entries in the program tracking dataset included all necessary fields to calculate savings,
- if claimed energy savings matched savings as indicated in the applicable source documents and calculations.

ADM found the following in the dataset and project documentation.

- One home in the sample reviewed for the Whole Home program was assigned the incorrect measure category and deemed savings.
- Some minor differences occurred between the measure specifications and the installed measures for HVAC, lighting, and ENERGY STAR® windows in the Multifamily Retrofit program. For example, there were minor differences between

[4] Quantities reflect number of units in multifamily projects, number of ENERGY STAR certifications for new homes, and project counts.

HVAC capacity or rating, lighting specifications, and reported window sizes as calculated and as reported in the project documentation.

3.2.2 Ex Ante Review

For new homes, claimed savings were developed using the New Home HERs Score. New Homes were modeled in REM/Rate™ modeling software and the program HERs score was used to determine the applicable unit savings for the project. Additional savings were possible for homes that met the ENERGY STAR® 3.0 certification.

ADM reviewed the applicable documentation to determine the relevant source for each unit savings assumption.

For multifamily projects, savings were determined using either modeling software (including REM/Rate™ or other similar software), or measure-level calculations. Modeling software was used for new construction or major renovation projects, while measure level calculations were used for retrofit projects. ADM requested a sample of new construction, major renovation and retrofit projects for review.

Retrofit projects relied on additional technical reference manuals (TRMs) for multifamily-specific energy saving algorithms and inputs. TRMs used to determine savings from retrofit projects included the Illinois TRM, New Mexico TRM, and ENERGY STAR appliance calculators. ADM verified that the savings algorithms for each energy-efficient measure installed in the program were correct and applied appropriately.

3.2.3 Evaluated Savings

ADM evaluated the Whole Home and Whole Buildings program paths separately.

Whole Home Projects

For new homes projects included in the Whole Home measure category, ADM requested documentation for a sample of 68 new home projects to determine verified savings with 90 percent confidence at ±10 percent precision. ADM reviewed the REM/Rate™ model files for each measure in the sample to ensure that the measure used to assign deemed savings to the project aligned with the measure characteristics reported in the supporting documentation.

ADM found only 1 of the 68 projects reviewed which did not align with the reported measure characteristics. The measure was reported as 49 – 55 HERs, Gas Heat home, but was found to have a HERs score of 57. The verified savings for this program were adjusted to the deemed savings appropriate to this measure.

The achieved realization rate was calculated for each measure type in the program, by year. The achieved realization rate was then applied to the full tracking data set, by home type, efficiency, and year. The verified realization rate for these measures was 100 percent.

Whole Building Projects

The Whole Building measure category was comprised of multifamily projects classified as either New Construction/Major Renovation, or Whole Building (Retrofit). New Construction/Major renovation projects comprised 56 percent of the total program savings, while Whole Building (Retrofit) projects comprised the remaining 44 percent. Each category was further subdivided into Low-Income (LI) projects, and Market Rate (MR) projects.

ADM requested documentation for a stratified sample of new homes projects needed to determine verified savings with 90 percent confidence at ±10 percent precision.

For New Construction/Major Renovation projects, documentation included energy use models created in REM/Rate™ or similar modeling software, baseline energy consumption models, inspection reports, and other supporting information. ADM reviewed available documentation to confirm that calculated energy savings were correct and appropriate. Minor adjustments were made to two projects where verified HVAC system characteristics did not align with specifications reported in the energy model. The verified realization rate for these measures was 100 percent.

For Whole Building (Retrofit) projects, documentation included a list of all measures installed, energy savings calculations for each intervention in the project, inspection reports, and other relevant documentation for items installed in apartment units and common areas.

ADM reviewed documentation for each Whole Building (Retrofit) project and adjusted savings based on project documentation or TRM recommendations. ADM verified the savings algorithm source for all calculations and adjusted the following algorithm inputs:

- Smart Thermostats: If the Smart Thermostat was installed in conjunction with heat pumps, ADM adjusted the indicated Annual Heating Consumption used in the Smart Thermostats savings calculations to be equal to the annual consumption of the heat pump, as this is the quantity of energy expected to be consumed to heat the unit in a given year.
- Heat Pumps: ADM verified the heat pump characteristics using the AHRI Directory of Certified Product Performance and adjusted the measure characteristics in cases where they did not agree with the measure specifications.

- Interior and Exterior Lighting: ADM verified the algorithm inputs using the NM TRM and adjusted algorithm inputs based on recommendations in the TRM.
- Window Upgrades: Energy savings from window upgrades were determined using REM/RateTM models to evaluate the difference in energy consumption in a home with and without high efficiency windows. ADM reviewed the models and assumptions and adjusted savings estimates based on the models and supporting documentation.
- Additional adjustments were applied as needed for other measures in the program.

The overall realization rate for the sample of retrofit projects was 98 percent, though the realization rate ranged from 110 percent for an HVAC project in which verified measure characteristics increased program savings to 42 percent for a small project (<1 percent of total savings for the sample) in which ADM found that the inconsistencies in the savings calculations from ENERGY STAR windows.

ADM applied a 100 percent ISR for the Whole Building and Whole Home measure categories.

Total claimed and verified gross savings, and verified net savings, are shown in Table 3-7 through Table 3-9.

Table 3-7: Whole Building and Whole Home Program Savings by Measure 2019-2020

Measure - Version	Qty	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Evaluated Net UES (kWh)
MF-LI-New Construction/Major Renovation - Whole Property Energy Modeling – UT - 1	8	1,214,666	1,214,666	100%	100%	1,214,666
MF-LI-Whole Bldg - UT - 1	88	6,553,233	6,272,045	96%	100%	6,272,045
MF-MR-New Construction/Major Renovation - Whole Property Energy Modeling - UT - 1	8,504	11,406,857	11,412,145	100%	95%	10,887,187
MF-MR-Whole Bldg - UT - 1	29	3,351,383	3,313,117	99%	95%	3,160,714
New Homes - ENERGY STAR 3.0 Certification - UT	633	50,640	50,640	100%	80%	40,259
New Homes - ENERGY STAR 3.0 Certification - UT - 1	834	66,720	66,720	100%	80%	53,042
New Homes - HERS 48 or lower - Electric Heat - SF - UT - 2	3	12,030	12,030	100%	80%	9,564
New Homes - HERS 48 or lower - Gas Heat - SF – UT	34	42,398	42,398	100%	80%	33,706
New Homes - HERS 48 or lower - Gas Heat - SF - UT - 2	168	209,496	209,496	100%	80%	166,549
New Homes - HERS 49 to 55 - Electric Heat - SF - UT - 2	6	16,038	16,038	100%	80%	12,750
New Homes - HERS 49 to 55 - Gas Heat - SF – UT	341	283,371	283,371	100%	80%	225,280
New Homes - HERS 49 to 55 - Gas Heat - SF - UT - 2	1,939	1,611,309	1,572,991	98%	80%	1,250,528
New Homes - HERS 56 to 62 - Electric Heat - SF - UT - 2	2	2,674	2,674	100%	80%	2,126
New Homes - HERS 56 to 62 - Gas Heat - SF – UT	136	56,576	56,576	100%	80%	44,978
New Homes - HERS 56 to 62 - Gas Heat - SF - UT - 2	1,258	523,328	523,328	100%	80%	416,046
New Homes - HERS Index 48 or lower - Electric Heat - UT	1	3,083	3,083	100%	80%	2,451
New Homes - HERS Index 48 or lower - Electric Heat - UT - 1	1	3,083	3,083	100%	80%	2,451
New Homes - HERS Index 48 or lower - Gas Heat - UT	100	101,100	101,100	100%	80%	80,375
New Homes - HERS Index 48 or lower - Gas Heat - UT - 1	1	1,011	1,011	100%	80%	804
New Homes - HERS Index 55 or lower - Gas Heat - UT	1,333	898,442	898,442	100%	80%	714,261
New Homes - HERS Index 55 or lower - Gas Heat - UT - 1	26	17,524	17,524	100%	80%	13,932
New Homes - HERS Index 62 or lower - Electric Heat - UT	1	1,028	1,028	100%	80%	817
New Homes - HERS Index 62 or lower - Gas Heat - UT	1,150	387,550	387,550	100%	80%	308,102
New Homes - HERS Index 62 or lower - Gas Heat - UT - 1	39	13,143	13,143	100%	80%	10,449
Total	**16,635**	**26,826,683**	**26,474,199**	**99%**	94%	24,923,080

Table 3-8: Whole Building and Whole Home Program Savings by Measure 2019

Measure - Version	Qty	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Evaluated Net UES (kWh)
MF-LI-New Construction/Major Renovation - Whole Property Energy Modeling - UT - 1	2	164,223	164,223	100%	100%	164,223
MF-LI-Whole Bldg - UT - 1	36	3,336,114	3,128,812	94%	100%	3,128,812
MF-MR-New Construction/Major Renovation - Whole Property Energy Modeling - UT - 1	2,242	3,353,640	3,358,929	100%	95%	3,204,418
MF-MR-Whole Bldg - UT - 1	16	1,365,652	1,385,453	101%	95%	1,321,722
New Homes - ENERGY STAR 3.0 Certification - UT	633	50,640	50,640	100%	80%	40,259
New Homes - HERS 48 or lower - Gas Heat - SF - UT	34	42,398	42,398	100%	80%	33,706
New Homes - HERS 49 to 55 - Gas Heat - SF - UT	341	283,371	283,371	100%	80%	225,280
New Homes - HERS 56 to 62 - Gas Heat - SF - UT	136	56,576	56,576	100%	80%	44,978
New Homes - HERS Index 48 or lower - Electric Heat - UT	1	3,083	3,083	100%	80%	2,451
New Homes - HERS Index 48 or lower - Gas Heat - UT	100	101,100	101,100	100%	80%	80,375
New Homes - HERS Index 55 or lower - Gas Heat - UT	1,333	898,442	898,442	100%	80%	714,261
New Homes - HERS Index 62 or lower - Electric Heat - UT	1	1,028	1,028	100%	80%	817
New Homes - HERS Index 62 or lower - Gas Heat - UT	1,150	387,550	387,550	100%	80%	308,102
Total	**6,025**	**10,043,817**	**9,861,605**	**98%**	94%	9,269,404

Table 3-9: Whole Building and Whole Home Program Savings by Measure 2020

Measure - Version	Qty	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Evaluated Net UES (kWh)
MF-LI-New Construction/Major Renovation - Whole Property Energy Modeling – UT - 1	6	1,050,443	1,050,443	100%	100%	1,050,443
MF-LI-Whole Bldg – UT - 1	52	3,217,119	3,143,233	98%	100%	3,143,233
MF-MR-New Construction/Major Renovation - Whole Property Energy Modeling - UT - 1	6,262	8,053,217	8,053,217	100%	95%	7,682,769
MF-MR-Whole Bldg - UT - 1	13	1,985,731	1,927,664	97%	95%	1,838,992
New Homes - ENERGY STAR 3.0 Certification - UT - 1	834	66,720	66,720	100%	80%	53,042
New Homes - HERS 48 or lower - Electric Heat - SF - UT - 2	3	12,030	12,030	100%	80%	9,564
New Homes - HERS 48 or lower - Gas Heat - SF - UT - 2	168	209,496	209,496	100%	80%	166,549
New Homes - HERS 49 to 55 - Electric Heat - SF - UT - 2	6	16,038	16,038	100%	80%	12,750
New Homes - HERS 49 to 55 - Gas Heat - SF - UT - 2	1,939	1,611,309	1,572,991	98%	80%	1,250,528
New Homes - HERS 56 to 62 - Electric Heat - SF - UT - 2	2	2,674	2,674	100%	80%	2,126
New Homes - HERS 56 to 62 - Gas Heat - SF - UT - 2	1,258	523,328	523,328	100%	80%	416,046
New Homes - HERS Index 48 or lower - Electric Heat - UT - 1	1	3,083	3,083	100%	80%	2,451
New Homes - HERS Index 48 or lower - Gas Heat - UT - 1	1	1,011	1,011	100%	80%	804
New Homes - HERS Index 55 or lower - Gas Heat - UT - 1	26	17,524	17,524	100%	80%	13,932
New Homes - HERS Index 62 or lower - Gas Heat - UT - 1	39	13,143	13,143	100%	80%	10,449
Total	**10,610**	**16,782,866**	**16,612,594**	**99%**	**94%**	**15,653,676**

Total quantities of measures installed in multifamily projects are reported in Table 3-10.

Table 3-10: Measures Installed in Multifamily Projects

Measure - Version	Quantity
Appliances	
MF-MR-Refrigerator - UT - 1	100
MF-MR-Dishwasher - UT - 1	124
MF-LI-Clothes Washer - UT - 1	10
MF-LI-Refrigerator - UT - 1	53
Building Shell	
MF-MR-Window Upgrade - UT - 1	123
MF-MR- Wall & Ceiling Insulation - UT - 1 (sq ft)	5,825
MF-LI- Wall & Ceiling Insulation - UT - 1 (sq ft)	118,552
MF-LI-Window Upgrade - UT - 1	580
HVAC	
MF-MR- Controls and Thermostats- Programable Thermostat - UT - 1	135
MF-MR- Heating & Cooling w/ Derating for Early Retirement - Air Source Heat Pump - UT - 1	247
MF-MR- Cooling w/ Derating for Early Retirement - Room Air Conditioning - UT - 1	8
MF-LI- Controls and Thermostats- Smart Thermostat - UT - 1	6,909
MF-LI- Controls and Thermostats- Programable Thermostat - UT - 1	219
MF-LI- Cooling w/ Derating for Early Retirement - Central Air Conditioning - UT - 1	2
MF-MR- Controls and Thermostats- Smart Thermostat - UT - 1	858
MF-LI- Cooling w/ Derating for Early Retirement - Room Air Conditioning - UT - 1	10
MF-MR- Heating & Cooling & Cooling w/ Derating for Early Retirement - Ductless Heat Pump - UT - 1	122
MF-LI- Heating & Cooling - Furnace Blower Motor - 1	33
MF-MR-Duct Sealing and/or Insulation - UT - 1	4
MF-LI- Heating & Cooling & Cooling w/ Derating for Early Retirement - Ductless Heat Pump - UT - 1	37
MF-LI- Heating & Cooling w/ Derating for Early Retirement - Air Source Heat Pump - UT - 1	282
Lighting	
MF-MR-Interior Lighting - UT - 1	6,034
MF-LI-Exterior Lighting - UT - 1	1,276
MF-MR-Lighting Controls - UT - 1	70
MF-LI-Interior Lighting - UT - 1	34,932
MF-MR-Exterior Lighting - UT - 1	514
Plumbing	
MF-LI- Pool Pump - UT - 1	2
Water Heating	
MF-MR-Low Flow Shower Head - UT - 1	58
MF-LI-Faucet Aerators - UT - 1	1,505
MF-MR-Water Heater w/ Derating for Early Retirement - UT - 1	16
MF-LI-Low Flow Shower Head - UT - 1	743
MF-MR-Faucet Aerators - UT - 1	127
MF-MR-New Construction/Major Renovation - Whole Unit Energy Modeling - UT - 1	7
MF-LI-New Construction/Major Renovation - Whole Building Energy Modeling - UT - 1	674
MF-MR-New Construction/Major Renovation - Whole Building Energy Modeling - UT - 1	7,642

3.2.4 Discussion of Realization Rates

The overall program realization rate was 99 percent.

- For new homes projects, gross savings differ from claimed savings due to one project reviewed for which the claimed HERs category did not align with the evaluated category.
- For multifamily projects, gross realized savings differ slightly from expected savings due to adjustments made to savings for retrofit projects as outlined in Section 3.2.3. These adjustments had a minimal impact on the overall verified program savings.

3.2.5 Net to Gross Ratio

Separate NTG ratios were applied to the following measure types in this category: low-income multifamily projects (MF-LI), market rate multifamily projects (MF-MR) and New Homes. An NTG ratio of 100 percent was applied to low-income multifamily projects reflecting that customers with economic hardships were not likely to install energy efficient measures in the absence of the program. An NTG ratio of 95 percent for market rate multifamily projects was drawn from ADM 2019 Builders Survey. And the NTG for new homes projects was calculated using the following methodology.

Free ridership

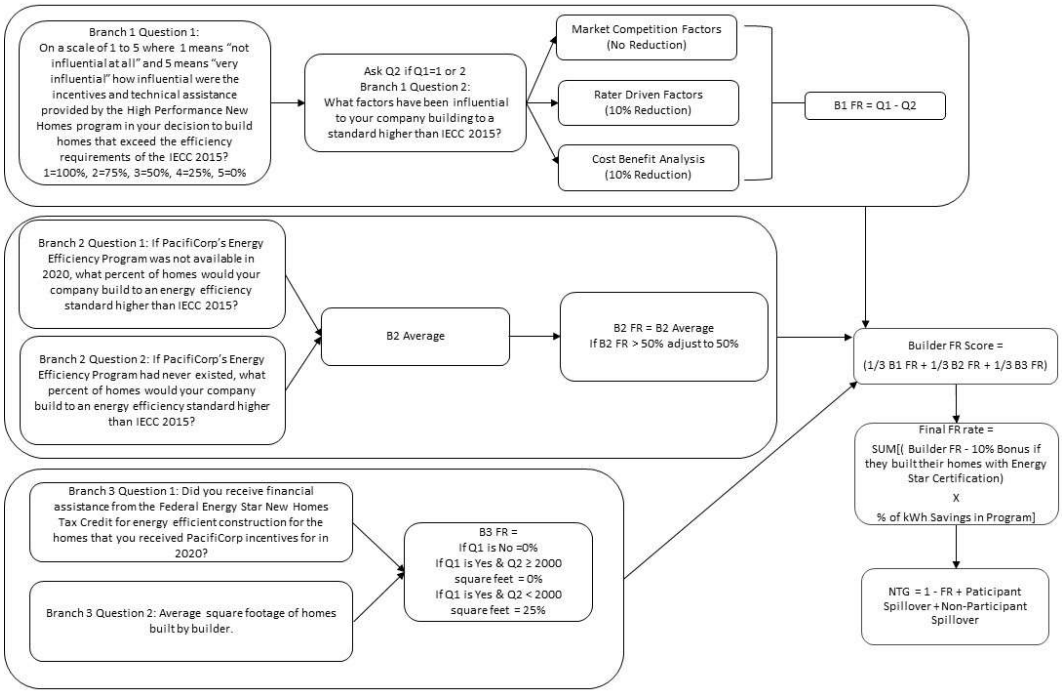
ADM attempted to contact 40 new homes builders in Utah, utilizing phone calls and email, and attempting each builder at least three times. ADM combined interviews with 2 builders during 2020 with builder interviews from 2017 and 2018 to assign free ridership scores. The builders interview in 2020 represent approximately 13 percent (3,454,409 kWh) of total claimed savings for measures in 2019 and 2020. ADM calculated NTG rates based on spillover and free ridership scoring.

Free ridership scores were developed for each interviewed builder by analyzing responses to three lines of questioning: program influence, building practices in the absence of the program, and co-participation in other rebate programs. Each line of questioning was used to account for 1/3 of the overall free ridership score for each respondent. That is:

$$\textit{Total Free Ridership} = 1/3\ \textit{Program Influence FR} +$$
$$1/3 \times \textit{Building Practices in the Absence of the Program FR} +$$
$$1/3 \times \textit{Co-Participation FR.}$$

The method for calculating free ridership scoring is detailed in Figure 3-1.

Figure 3-1: Methodology for Free Ridership Scoring



ADM calculated an overall free ridership rate of 26 percent for new homes measures.

Spillover

In order to prevent Multifamily projects from becoming too heavily weighted towards lighting measures, Rocky Mountain Power introduced a soft requirement that program incentives from lighting projects not exceed one third of total program savings.

As a result, a portion of savings from installed lighting measures in some projects were neither incentivized, nor claimed. ADM classified these un-incentivized lighting savings as program spillover and calculated the spillover rate for the sample of multifamily projects.

Program spillover was found for 11 of the 28 Market Rate New Construction/Major Renovation projects, with the percent spillover ranging from 5 percent to 134 percent of total program savings. No spillover was found for Low-Income or Retrofit projects. The overall spillover for Multifamily projects was determined to be 1.3 percent.

NTG result

The Whole Homes program net to gross ratio was determined to be 79.5 percent based on surveys with builders. An additional participant spillover rate of 0.01 was included for Multifamily projects due to additional, unincentivized lighting savings that were not included in the claimed savings calculations. The resulting Net to Gross Ratio, per project type, is shown in Table 3-11.

Table 3-11: New Homes Net to Gross Ratio

Project Type	Free Ridership (FR)	Non-Participant Spillover (NPS)	Participant Spillover (PS)	NTG*
New Homes	26.0%	4.2%	1.3%	79.5%
*NTG = 1 – FR + NPS + PS.				

3.3 Lighting

A total of 3,898,136 discounted LED lighting measures were distributed through the program. Most were sold through retail locations in Rocky Mountain Power's Utah service area through the upstream lighting program during the evaluation period. Lighting measures were also included in Whole Building and New Homes projects, and bulbs were distributed for free through foodbanks. Savings for construction projects is included at the project level in section 3.3. All other lighting measures resulted in 39,564,234 kWh of net savings, representing 49 percent of program savings, with a 75 percent realization rate and a 69 percent net-to-gross ratio.

ADM reviewed claimed savings included in tracking data and ex ante savings values reported in TRL reference files. It also calculated in-service rates (ISRs) and hours of use (HOUs) for lighting measures using responses from a general population survey emailed to Rocky Mountain Power customers. Additionally, ADM calculated and applied a leakage rate and net-to-gross ratios to gross evaluated savings to calculate net evaluated savings. Total program savings from lighting measures are reported in Table 3-12.

Note that quantities of lighting measures that were included in multifamily projects are not included here; they are reported in section 3.2 where their savings are aggregated by project.

Table 3-12: Total Lighting Program Savings by Year

Program Year	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
2019	1,859,655	36,214,803	27,334,280	75%	69%	18,860,525
2020	2,038,481	40,264,550	30,233,120	75%	68%	20,703,709
2019-2020	**3,898,136**	**76,479,353**	**57,567,400**	**75%**	69%	**39,564,234**

3.3.1 Tracking Data Verification

ADM reviewed program tracking data to evaluate:

- if the tracking dataset included duplicate or erroneous data entries,
- if data entries in the program tracking dataset included all necessary fields for savings calculations,
- if claimed energy savings match the applicable TRL source documents and calculations,
- if specific product model numbers sold through the program met the requirements of the measure definition as documented in the TRL reference files,

- if upstream lighting measures were sold through retail stores in the service area.

ADM found the following in the dataset:

- Lighting measures that were distributed for free through foodbanks and community centers were included in the tracking data with savings indicated for retail sales.
- A portion of lighting fixtures sold through the program did not meet the requirements established in the TRL reference files. They had removable rather than integrated bulbs.

3.3.2 Ex Ante Review

ADM compared ex ante values in TRL reference documents with claimed savings included in program tracking data. Up to two different versions of each measure were included in the tracking data; ADM reviewed each version. ADM added three new measures to record measures distributed for free through foodbanks and community centers.

3.3.3 Evaluated Unit Energy Savings

Unit energy savings (UES) were evaluated for each lighting measure sold through the upstream program using ex ante savings (kWH) values from the indicated reference file for each version of each measure. Evaluated UES reflect ISRs and HOUs collected from general population survey responses. The total gross evaluated savings by measure is the product of the evaluated UES and the quantity of the measure sold through the program as documented in the program tracking data.

Total net savings for lighting measures applies an evaluated leakage rate and the evaluate net-to-gross ratio. The leakage rate reflects an estimate of the percentage of bulbs sold through the program that are not installed in the service area (buyers who live outside the service area have purchase the bulbs from participating retail stores).

ADM calculated ISRs and HOUs from customer survey responses for each of four categories of lighting measures: standard bulbs, specialty bulbs, downlights and fixtures.

In Service Rates (ISR)

For lighting measures that were sold through retail stores, ISRs were calculated using Equation 3-1 using responses gathered from a 2020 General Population Survey of Rocky Mountain Power customers in the service area.

Equation 3-1: In-Service Rate – Lighting Measures

$$ISR = (Qty\ currently\ installed + (Qty\ stored/3))/Qty\ Purchased$$

For measures that were distributed for free through foodbanks and community centers, the installation rate of 80.3 percent was used, as indicated in the *Illinois Statewide Technical Reference Manual for Energy Efficiency Version 10* for LEDs distributed via foodbanks.

Hours of Use (HOU)

ADM used a weighted average HOU calculated for each lighting measure type (standard bulbs, specialty bulbs, downlights and fixtures), using locations identified in the general population survey. HOU per room were drawn from *Residential Lighting End-Use Consumption Study (DNV KEMA Energy and Sustainability, Pacific Northwest National Laboratory; December 2012).*

Unit and Total Evaluated Savings

Evaluated UES for lighting measures are included in Table 3-13. Total gross and net evaluated program savings for lighting measures, by measure, are reported in Table 3-14 through Table 3-16.

Table 3-13: Lighting Unit Energy Savings (UES) by Measure

Measure Name - Measure Version	Claimed UES (kWh)	Ex ante HOU	Evaluated HOU	Ex ante ISR	Evaluated ISR	Evaluated UES (kWh)
LED Downlight: 10 watts - Retail - UT - 4	34.68	1.9	1.6	91%	92%	28.54
LED Downlight: 10 watts - Retail - UT - 5	30.10	2.1	1.6	98%	92%	24.34
LED Downlight: 11 watts - Retail - UT - 4	40.36	1.9	1.6	91%	92%	33.21
LED Downlight: 11 watts - Retail - UT - 4 - FOODBANK	40.36	1.9	1.6	91%	80%	29.12
LED Downlight: 11 watts - Retail - UT - 5	35.03	2.1	1.6	98%	92%	28.33
LED Downlight: 12 watts - Retail - UT - 4	33.42	1.9	1.6	91%	92%	27.50
LED Downlight: 13 watts - Retail - UT - 4	32.79	1.9	1.6	91%	92%	26.98
LED Downlight: 13 watts - Retail - UT - 5	28.46	2.1	1.6	98%	92%	23.02
LED Downlight: 14 watts - Retail - UT - 4	32.16	1.9	1.6	91%	92%	26.47
LED Downlight: 14 watts - Retail - UT - 5	27.91	2.1	1.6	98%	92%	22.58
LED Downlight: 15 watts - Retail - UT - 4	31.53	1.9	1.6	91%	92%	25.95
LED Downlight: 15 watts - Retail - UT - 5	27.37	2.1	1.6	98%	92%	22.13
LED Downlight: 16 watts - Retail - UT - 4	37.21	1.9	1.6	91%	92%	30.62
LED Downlight: 16 watts - Retail - UT - 5	32.30	2.1	1.6	98%	92%	26.12
LED Downlight: 18 watts - Retail - UT - 4	35.95	1.9	1.6	91%	92%	29.58
LED Downlight: 19 watts - Retail - UT - 3	35.32	1.9	1.6	91%	92%	29.07
LED Downlight: 19 watts - Retail - UT - 4	30.66	2.1	1.6	98%	92%	24.79
LED Downlight: 20 watts - Retail - UT - 4	34.68	1.9	1.6	91%	92%	28.54
LED Downlight: 20 watts - Retail - UT - 5	30.10	2.1	1.6	98%	92%	24.34
LED Downlight: 23 watts - Retail - UT - 2	42.25	1.9	1.6	91%	92%	34.77
LED Downlight: 23 watts - Retail - UT - 3	36.67	2.1	1.6	98%	92%	29.66
LED Downlight: 5 watts - Retail - UT - 4	44.14	1.9	1.6	91%	92%	36.32
LED Downlight: 5 watts - Retail - UT - 5	38.31	2.1	1.6	98%	92%	30.99
LED Downlight: 6 watts - Retail - UT - 4	43.51	1.9	1.6	91%	92%	35.81
LED Downlight: 6 watts - Retail - UT - 5	37.77	2.1	1.6	98%	92%	30.54
LED Downlight: 7 watts - Retail - UT - 4	23.96	1.9	1.6	91%	92%	19.72
LED Downlight: 7 watts - Retail - UT - 5	20.80	2.1	1.6	98%	92%	16.82
LED Downlight: 8 watts - Retail - UT - 4	23.33	1.9	1.6	91%	92%	19.20
LED Downlight: 8 watts - Retail - UT - 5	20.25	2.1	1.6	98%	92%	16.38

Measure Name - Measure Version	Claimed UES (kWh)	Ex ante HOU	Evaluated HOU	Ex ante ISR	Evaluated ISR	Evaluated UES (kWh)
LED Downlight: 9 watts - Retail - UT - 4	35.32	1.9	1.6	91%	92%	29.07
LED Downlight: 9 watts - Retail - UT - 5	30.66	2.1	1.6	98%	92%	24.79
LED Fixture - ENERGY STAR - UT - 4	29.10	1.9	1.4	100%	100%	20.87
LED Fixture - ENERGY STAR - UT - 5	26.58	2.1	1.4	100%	100%	20.07
LED General Purpose: 10 watts - Retail - UT - 4	20.81	1.9	1.6	91%	83%	15.41
LED General Purpose: 10 watts - Retail - UT - 5	18.06	2.1	1.6	98%	83%	13.14
LED General Purpose: 11 watts - Retail - UT - 4	20.18	1.9	1.6	91%	83%	14.94
LED General Purpose: 11 watts - Retail - UT - 5	17.52	2.1	1.6	98%	83%	12.75
LED General Purpose: 12 watts - Retail - UT - 4	19.55	1.9	1.6	91%	83%	14.47
LED General Purpose: 12 watts - Retail - UT - 5	16.97	2.1	1.6	98%	83%	12.35
LED General Purpose: 13 watts - Retail - UT - 4	18.92	1.9	1.6	91%	83%	14.01
LED General Purpose: 13 watts - Retail - UT - 5	16.42	2.1	1.6	98%	83%	11.95
LED General Purpose: 15 watts - Retail - UT - 5	17.66	1.9	1.6	91%	83%	13.08
LED General Purpose: 15 watts - Retail - UT - 6	15.33	2.1	1.6	98%	83%	11.15
LED General Purpose: 16 watts - Retail - UT - 4	23.33	1.9	1.6	91%	83%	17.27
LED General Purpose: 16 watts - Retail - UT - 5	20.25	2.1	1.6	98%	83%	14.74
LED General Purpose: 17 watts - Retail - UT - 2	34.68	1.9	1.6	91%	83%	25.68
LED General Purpose: 17 watts - Retail - UT - 3	30.10	2.1	1.6	98%	83%	21.90
LED General Purpose: 18 watts - Retail - UT - 2	34.68	1.9	1.6	91%	83%	25.68
LED General Purpose: 18 watts - Retail - UT - 3	30.10	2.1	1.6	98%	83%	21.90
LED General Purpose: 6 watts - Retail - UT - 3	14.50	1.9	1.6	91%	83%	10.74
LED General Purpose: 6 watts - Retail - UT - 4	12.59	2.1	1.6	98%	83%	9.16
LED General Purpose: 7 watts - Retail - UT - 3	13.87	1.9	1.6	91%	83%	10.27
LED General Purpose: 8 watts - Retail - UT - 4	13.24	1.9	1.6	91%	83%	9.80
LED General Purpose: 8 watts - Retail - UT - 5	11.49	2.1	1.6	98%	83%	8.36
LED General Purpose: 9 watts - Retail - UT - 4	12.61	1.9	1.6	91%	83%	9.34
LED General Purpose: 9 watts - Retail - UT - 4 - FOODBANK	12.61	1.9	1.6	91%	80%	8.98
LED General Purpose: 9 watts - Retail - UT - 5	10.95	2.1	1.6	98%	83%	7.96
LED Specialty - 3-Way: 3,8,18 watts - Retail - UT - 2	32.79	1.9	1.5	91%	80%	23.01
LED Specialty - 3-Way: 5,9,20 watts - Retail - UT - 2	32.16	1.9	1.5	91%	80%	22.56
LED Specialty - 3-Way: 9 watts - Retail - UT - 1	27.56	2.1	1.5	98%	80%	19.25

Measure Name - Measure Version	Claimed UES (kWh)	Ex ante HOU	Evaluated HOU	Ex ante ISR	Evaluated ISR	Evaluated UES (kWh)
LED Specialty - Candelabra: 2 watts - Retail - UT - 3	14.50	1.9	1.5	91%	80%	10.17
LED Specialty - Candelabra: 2 watts - Retail - UT - 4	12.43	2.1	1.5	98%	80%	8.68
LED Specialty - Candelabra: 3 watts - Retail - UT - 2	13.87	1.9	1.5	91%	80%	9.73
LED Specialty - Candelabra: 3 watts - Retail - UT - 3	11.89	2.1	1.5	98%	80%	8.30
LED Specialty - Candelabra: 4 watts - Retail - UT - 3	13.24	1.9	1.5	91%	80%	9.29
LED Specialty - Candelabra: 4 watts - Retail - UT - 4	11.35	2.1	1.5	98%	80%	7.92
LED Specialty - Candelabra: 5 watts - Retail - UT - 3	22.07	1.9	1.5	91%	80%	15.48
LED Specialty - Candelabra: 5 watts - Retail - UT - 3 - FOODBANK	22.07	1.9	1.5	91%	80%	15.53
LED Specialty - Candelabra: 5 watts - Retail - UT - 4	18.91	2.1	1.5	98%	80%	13.21
LED Specialty - Candelabra: 7 watts - Retail - UT - 2	20.81	1.9	1.5	91%	80%	14.60
LED Specialty - Globe: 4 watts - Retail - UT - 2	10.09	1.9	1.5	91%	80%	7.08
LED Specialty - Globe: 4 watts - Retail - UT - 3	8.65	2.1	1.5	98%	80%	6.04
LED Specialty - Globe: 5 watts - Retail - UT - 3	22.07	1.9	1.5	91%	80%	15.48
LED Specialty - Globe: 5 watts - Retail - UT - 4	18.91	2.1	1.5	98%	80%	13.21
LED Specialty - Globe: 6 watts - Retail - UT - 2	21.44	1.9	1.5	91%	80%	15.04
LED Specialty - Globe: 6 watts - Retail - UT - 3	18.37	2.1	1.5	98%	80%	12.83

Sources: (LED bulbs) HES_UT_LEDs_12-1-2016.xlsx; 2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx; (Fixtures) HES_UT_LED Fixture_9-16-2016.xlsx; (ISRs and HOUs) ADM General Population Survey results 2020, *Residential Lighting End-Use Consumption Study: Estimation Framework and Initial Estimates; Residential Lighting End-Use Consumption Study (DNV KEMA Energy and Sustainability, Pacific Northwest National Laboratory; December 2012).* (ISR for foodbank distributed LEDs) 2019 Illinois Statewide Technical Reference Manual for Energy Efficiency Version 10.

Table 3-14: Lighting Program Savings 2019-2020

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	Leakage	NTG	Net Evaluated Savings (kWh)
LED Downlight: 10 watts - Retail - UT - 4	68,976	2,392,088	1,968,497	82%	3%	68%	1,289,313
LED Downlight: 10 watts - Retail - UT - 5	2,840	85,490	69,134	81%	3%	68%	45,281
LED Downlight: 11 watts - Retail - UT - 4	23,340	942,002	775,193	82%	3%	68%	507,730
LED Downlight: 11 watts - Retail - UT - 4 - FOODBANK	39,338	1,587,682	1,145,608	72%	0%	100%	1,145,608
LED Downlight: 11 watts - Retail - UT - 5	39,058	1,368,299	1,106,596	81%	3%	68%	724,791
LED Downlight: 12 watts - Retail - UT - 4	26,357	880,851	724,870	82%	3%	68%	474,770
LED Downlight: 13 watts - Retail - UT - 4	36,494	1,196,638	984,738	82%	3%	68%	644,977
LED Downlight: 13 watts - Retail - UT - 5	560	15,939	12,890	81%	3%	68%	8,443
LED Downlight: 14 watts - Retail - UT - 4	32,885	1,057,582	870,305	82%	3%	68%	570,027
LED Downlight: 14 watts - Retail - UT - 5	328	9,156	7,405	81%	3%	68%	4,850
LED Downlight: 15 watts - Retail - UT - 4	5,895	185,869	152,956	82%	3%	68%	100,182
LED Downlight: 15 watts - Retail - UT - 5	728	19,924	16,113	81%	3%	68%	10,554
LED Downlight: 16 watts - Retail - UT - 4	5,116	190,366	156,656	82%	3%	68%	102,606
LED Downlight: 16 watts - Retail - UT - 5	223	7,203	5,825	81%	3%	68%	3,815
LED Downlight: 18 watts - Retail - UT - 4	6,602	237,342	195,313	82%	3%	68%	127,925
LED Downlight: 19 watts - Retail - UT - 3	4,986	176,106	144,921	82%	3%	68%	94,919
LED Downlight: 19 watts - Retail - UT - 4	294	9,013	7,289	81%	3%	68%	4,774
LED Downlight: 20 watts - Retail - UT - 4	286	9,918	8,162	82%	3%	68%	5,346
LED Downlight: 20 watts - Retail - UT - 5	49	1,475	1,193	81%	3%	68%	781
LED Downlight: 23 watts - Retail - UT - 2	1,091	46,095	37,932	82%	3%	68%	24,845
LED Downlight: 23 watts - Retail - UT - 3	67	2,457	1,987	81%	3%	68%	1,302
LED Downlight: 5 watts - Retail - UT - 4	2,579	113,837	93,679	82%	3%	68%	61,357
LED Downlight: 5 watts - Retail - UT - 5	180	6,896	5,577	81%	3%	68%	3,653
LED Downlight: 6 watts - Retail - UT - 4	5,642	245,483	202,013	82%	3%	68%	132,313
LED Downlight: 6 watts - Retail - UT - 5	360	13,596	10,996	81%	3%	68%	7,202
LED Downlight: 7 watts - Retail - UT - 4	51,996	1,245,824	1,025,214	82%	3%	68%	671,488
LED Downlight: 7 watts - Retail - UT - 5	1,018	21,172	17,122	81%	3%	68%	11,215
LED Downlight: 8 watts - Retail - UT - 4	292,729	6,829,368	5,620,024	82%	3%	68%	3,680,965
LED Downlight: 8 watts - Retail - UT - 5	652	13,203	10,678	81%	3%	68%	6,994

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	Leakage	NTG	Net Evaluated Savings (kWh)
LED Downlight: 9 watts - Retail - UT - 4	92,825	3,279,605	2,698,009	82%	3%	68%	1,767,123
LED Downlight: 9 watts - Retail - UT - 5	1,650	50,585	40,910	81%	3%	68%	26,795
LED Fixture - ENERGY STAR - UT - 4	90,071	2,621,066	1,852,586	71%	3%	79%	1,425,909
LED Fixture - ENERGY STAR - UT - 5	1,789	47,373	35,386	75%	3%	79%	27,236
LED General Purpose: 10 watts - Retail - UT - 4	348,533	7,252,972	5,370,113	74%	3%	68%	3,517,280
LED General Purpose: 10 watts - Retail - UT - 5	14,282	257,977	187,715	73%	3%	68%	122,948
LED General Purpose: 11 watts - Retail - UT - 4	95,542	1,928,038	1,427,522	74%	3%	68%	934,989
LED General Purpose: 11 watts - Retail - UT - 5	1,219	21,352	15,537	73%	3%	68%	10,176
LED General Purpose: 12 watts - Retail - UT - 4	14,924	291,764	216,023	74%	3%	68%	141,489
LED General Purpose: 12 watts - Retail - UT - 5	324	5,498	4,001	73%	3%	68%	2,620
LED General Purpose: 13 watts - Retail - UT - 4	36,986	699,775	518,115	74%	3%	68%	339,351
LED General Purpose: 13 watts - Retail - UT - 5	2,078	34,126	24,832	73%	3%	68%	16,264
LED General Purpose: 15 watts - Retail - UT - 5	28,217	498,312	368,951	74%	3%	68%	241,653
LED General Purpose: 15 watts - Retail - UT - 6	1,952	29,922	21,772	73%	3%	68%	14,260
LED General Purpose: 16 watts - Retail - UT - 4	65,217	1,521,513	1,126,531	74%	3%	68%	737,847
LED General Purpose: 16 watts - Retail - UT - 5	2,560	51,841	37,722	73%	3%	68%	24,707
LED General Purpose: 17 watts - Retail - UT - 2	21,458	744,163	550,980	74%	3%	68%	360,877
LED General Purpose: 17 watts - Retail - UT - 3	580	17,459	12,704	73%	3%	68%	8,321
LED General Purpose: 18 watts - Retail - UT - 2	224,884	7,798,977	5,774,377	74%	3%	68%	3,782,062
LED General Purpose: 18 watts - Retail - UT - 3	4,746	142,865	103,955	73%	3%	68%	68,088
LED General Purpose: 6 watts - Retail - UT - 3	116,021	1,682,305	1,245,581	74%	3%	68%	815,822
LED General Purpose: 6 watts - Retail - UT - 4	5,668	71,337	51,908	73%	3%	68%	33,998
LED General Purpose: 7 watts - Retail - UT - 3	61,451	852,325	631,063	74%	3%	68%	413,330
LED General Purpose: 8 watts - Retail - UT - 4	243,735	3,227,051	2,389,315	74%	3%	68%	1,564,937
LED General Purpose: 8 watts - Retail - UT - 5	6,582	75,642	55,041	73%	3%	68%	36,050
LED General Purpose: 9 watts - Retail - UT - 4	804,606	10,146,082	7,512,177	74%	3%	68%	4,920,275
LED General Purpose: 9 watts - Retail - UT - 4 - FOODBANK	335,806	4,234,514	3,016,534	71%	0%	100%	3,016,534
LED General Purpose: 9 watts - Retail - UT - 5	82,457	902,531	656,720	73%	3%	68%	430,134
LED Specialty - 3-Way: 3,8,18 watts - Retail - UT - 2	12	393	270	69%	3%	68%	177
LED Specialty - 3-Way: 5,9,20 watts - Retail - UT - 2	3,634	116,869	80,338	69%	3%	68%	52,619

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	Leakage	NTG	Net Evaluated Savings (kWh)
LED Specialty - 3-Way: 9 watts - Retail - UT - 1	496	13,670	9,354	68%	3%	68%	6,126
LED Specialty - Candelabra: 2 watts - Retail - UT - 3	3,308	47,966	32,973	69%	3%	68%	21,596
LED Specialty - Candelabra: 2 watts - Retail - UT - 4	40	497	340	68%	3%	68%	223
LED Specialty - Candelabra: 3 watts - Retail - UT - 2	95,536	1,325,084	910,882	69%	3%	68%	596,603
LED Specialty - Candelabra: 3 watts - Retail - UT - 3	419	4,982	3,408	68%	3%	68%	2,232
LED Specialty - Candelabra: 4 watts - Retail - UT - 3	118,293	1,566,199	1,076,628	69%	3%	68%	705,162
LED Specialty - Candelabra: 4 watts - Retail - UT - 4	42,331	480,316	328,651	68%	3%	68%	215,258
LED Specialty - Candelabra: 5 watts - Retail - UT - 3	56,171	1,239,694	852,183	69%	3%	68%	558,157
LED Specialty - Candelabra: 5 watts - Retail - UT - 3 - FOODBANK	39,338	868,190	598,520	69%	0%	100%	598,520
LED Specialty - Candelabra: 5 watts - Retail - UT - 4	844	15,963	10,923	68%	3%	68%	7,154
LED Specialty - Candelabra: 7 watts - Retail - UT - 2	526	10,946	7,524	69%	3%	68%	4,928
LED Specialty - Globe: 4 watts - Retail - UT - 2	42,645	430,288	295,786	69%	3%	68%	193,732
LED Specialty - Globe: 4 watts - Retail - UT - 3	1,428	12,348	8,449	68%	3%	68%	5,534
LED Specialty - Globe: 5 watts - Retail - UT - 3	67,991	1,500,561	1,031,507	69%	3%	68%	675,610
LED Specialty - Globe: 5 watts - Retail - UT - 4	3,565	67,428	46,137	68%	3%	68%	30,219
LED Specialty - Globe: 6 watts - Retail - UT - 2	62,236	1,334,340	917,244	69%	3%	68%	600,770
LED Specialty - Globe: 6 watts - Retail - UT - 3	2,491	45,770	31,318	68%	3%	68%	20,512
Total	**3,898,136**	**76,479,353**	**57,567,400**	**75%**		**69%**	**39,564,234**

Table 3-15: Lighting Program Savings 2019

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	Leakage	NTG	Net Evaluated Savings (kWh)
LED Downlight: 10 watts - Retail - UT - 4	38,109	1,321,620	1,087,588	82%	3%	68%	712,341
LED Downlight: 11 watts - Retail - UT - 4	16,330	659,079	542,369	82%	3%	68%	355,237
LED Downlight: 12 watts - Retail - UT - 4	18,200	608,244	500,536	82%	3%	68%	327,838
LED Downlight: 13 watts - Retail - UT - 4	17,344	568,710	468,003	82%	3%	68%	306,529
LED Downlight: 14 watts - Retail - UT - 4	17,660	567,946	467,374	82%	3%	68%	306,117
LED Downlight: 15 watts - Retail - UT - 4	1,516	47,799	39,335	82%	3%	68%	25,763
LED Downlight: 16 watts - Retail - UT - 4	3,696	137,528	113,175	82%	3%	68%	74,126
LED Downlight: 18 watts - Retail - UT - 4	3,464	124,531	102,479	82%	3%	68%	67,121
LED Downlight: 19 watts - Retail - UT - 3	2,946	104,053	85,627	82%	3%	68%	56,083
LED Downlight: 23 watts - Retail - UT - 2	591	24,970	20,548	82%	3%	68%	13,458
LED Downlight: 5 watts - Retail - UT - 4	438	19,333	15,910	82%	3%	68%	10,420
LED Downlight: 6 watts - Retail - UT - 4	2,733	118,913	97,856	82%	3%	68%	64,093
LED Downlight: 7 watts - Retail - UT - 4	27,759	665,106	547,329	82%	3%	68%	358,486
LED Downlight: 8 watts - Retail - UT - 4	170,493	3,977,602	3,273,248	82%	3%	68%	2,143,890
LED Downlight: 9 watts - Retail - UT - 4	44,120	1,558,318	1,282,372	82%	3%	68%	839,919
LED Fixture - ENERGY STAR - UT - 4	67,968	1,977,869	1,397,970	71%	3%	79%	1,075,998
LED General Purpose: 10 watts - Retail - UT - 4	121,931	2,537,384	1,878,684	74%	3%	68%	1,230,487
LED General Purpose: 11 watts - Retail - UT - 4	34,353	693,244	513,279	74%	3%	68%	336,184
LED General Purpose: 12 watts - Retail - UT - 4	9,659	188,833	139,813	74%	3%	68%	91,574
LED General Purpose: 13 watts - Retail - UT - 4	16,182	306,163	226,684	74%	3%	68%	148,472
LED General Purpose: 15 watts - Retail - UT - 5	17,222	304,141	225,186	74%	3%	68%	147,491
LED General Purpose: 16 watts - Retail - UT - 4	17,354	404,869	299,766	74%	3%	68%	196,338
LED General Purpose: 17 watts - Retail - UT - 2	13,762	477,266	353,369	74%	3%	68%	231,447
LED General Purpose: 18 watts - Retail - UT - 2	119,798	4,154,595	3,076,069	74%	3%	68%	2,014,743
LED General Purpose: 6 watts - Retail - UT - 3	48,778	707,281	523,672	74%	3%	68%	342,991
LED General Purpose: 7 watts - Retail - UT - 3	60,580	840,245	622,119	74%	3%	68%	407,471
LED General Purpose: 8 watts - Retail - UT - 4	149,540	1,979,910	1,465,929	74%	3%	68%	960,144
LED General Purpose: 9 watts - Retail - UT - 4	343,925	4,336,894	3,211,044	74%	3%	68%	2,103,148
LED General Purpose: 9 watts - Retail - UT - 4 - FOODBANK	257,130	3,242,409	2,309,790	71%	3%	100%	2,240,496
LED Specialty - 3-Way: 5,9,20 watts - Retail - UT - 2	756	24,313	16,713	69%	3%	68%	10,947
LED Specialty - Candelabra: 2 watts - Retail - UT - 3	1,008	14,616	10,047	69%	3%	68%	6,581
LED Specialty - Candelabra: 3 watts - Retail - UT - 2	50,482	700,185	481,317	69%	3%	68%	315,250

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	Leakage	NTG	Net Evaluated Savings (kWh)
LED Specialty - Candelabra: 4 watts - Retail - UT - 3	57,890	766,464	526,878	69%	3%	68%	345,091
LED Specialty - Candelabra: 5 watts - Retail - UT - 3	25,780	568,965	391,114	69%	3%	68%	256,169
LED Specialty - Candelabra: 7 watts - Retail - UT - 2	526	10,946	7,524	69%	3%	68%	4,928
LED Specialty - Globe: 4 watts - Retail - UT - 2	22,023	222,212	152,752	69%	3%	68%	100,048
LED Specialty - Globe: 5 watts - Retail - UT - 3	27,162	599,465	412,081	69%	3%	68%	269,902
LED Specialty - Globe: 6 watts - Retail - UT - 2	30,447	652,784	448,733	69%	3%	68%	293,908
Total	**1,859,655**	**36,214,803**	**27,334,280**	**75%**		**69%**	**18,791,231**

Table 3-16: Lighting Program Savings 2020

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	Leakage	NTG	Net Evaluated Savings (kWh)
LED Downlight: 10 watts - Retail - UT - 4	30,867	1,070,468	880,909	82%	3%	68%	576,972
LED Downlight: 10 watts - Retail - UT - 5	2,840	85,490	69,134	81%	3%	68%	45,281
LED Downlight: 11 watts - Retail - UT - 4	7,010	282,924	232,824	82%	3%	68%	152,493
LED Downlight: 11 watts - Retail - UT - 4 - FOODBANK	39,338	1,587,682	1,145,608	72%	0%	100%	1,145,608
LED Downlight: 11 watts - Retail - UT - 5	39,058	1,368,299	1,106,596	81%	3%	68%	724,791
LED Downlight: 12 watts - Retail - UT - 4	8,157	272,607	224,334	82%	3%	68%	146,933
LED Downlight: 13 watts - Retail - UT - 4	19,150	627,928	516,735	82%	3%	68%	338,448
LED Downlight: 13 watts - Retail - UT - 5	560	15,939	12,890	81%	3%	68%	8,443
LED Downlight: 14 watts - Retail - UT - 4	15,225	489,636	402,931	82%	3%	68%	263,909
LED Downlight: 14 watts - Retail - UT - 5	328	9,156	7,405	81%	3%	68%	4,850
LED Downlight: 15 watts - Retail - UT - 4	4,379	138,070	113,620	82%	3%	68%	74,418
LED Downlight: 15 watts - Retail - UT - 5	728	19,924	16,113	81%	3%	68%	10,554
LED Downlight: 16 watts - Retail - UT - 4	1,420	52,838	43,482	82%	3%	68%	28,479
LED Downlight: 16 watts - Retail - UT - 5	223	7,203	5,825	81%	3%	68%	3,815
LED Downlight: 18 watts - Retail - UT - 4	3,138	112,811	92,835	82%	3%	68%	60,804
LED Downlight: 19 watts - Retail - UT - 3	2,040	72,053	59,294	82%	3%	68%	38,836
LED Downlight: 19 watts - Retail - UT - 4	294	9,013	7,289	81%	3%	68%	4,774
LED Downlight: 20 watts - Retail - UT - 4	286	9,918	8,162	82%	3%	68%	5,346
LED Downlight: 20 watts - Retail - UT - 5	49	1,475	1,193	81%	3%	68%	781
LED Downlight: 23 watts - Retail - UT - 2	500	21,125	17,384	82%	3%	68%	11,386
LED Downlight: 23 watts - Retail - UT - 3	67	2,457	1,987	81%	3%	68%	1,302
LED Downlight: 5 watts - Retail - UT - 4	2,141	94,504	77,769	82%	3%	68%	50,937
LED Downlight: 5 watts - Retail - UT - 5	180	6,896	5,577	81%	3%	68%	3,653
LED Downlight: 6 watts - Retail - UT - 4	2,909	126,571	104,157	82%	3%	68%	68,220
LED Downlight: 6 watts - Retail - UT - 5	360	13,596	10,996	81%	3%	68%	7,202
LED Downlight: 7 watts - Retail - UT - 4	24,237	580,719	477,885	82%	3%	68%	313,002
LED Downlight: 7 watts - Retail - UT - 5	1,018	21,172	17,122	81%	3%	68%	11,215
LED Downlight: 8 watts - Retail - UT - 4	122,236	2,851,766	2,346,775	82%	3%	68%	1,537,075
LED Downlight: 8 watts - Retail - UT - 5	652	13,203	10,678	81%	3%	68%	6,994
LED Downlight: 9 watts - Retail - UT - 4	48,705	1,721,287	1,415,637	82%	3%	68%	927,204
LED Downlight: 9 watts - Retail - UT - 5	1,650	50,585	40,910	81%	3%	68%	26,795
LED Fixture - ENERGY STAR - UT - 4	22,103	643,197	454,616	71%	3%	79%	349,911

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	Leakage	NTG	Net Evaluated Savings (kWh)
LED Fixture - ENERGY STAR - UT - 5	1,789	47,373	35,386	75%	3%	79%	27,236
LED General Purpose: 10 watts - Retail - UT - 4	226,602	4,715,588	3,491,429	74%	3%	68%	2,286,793
LED General Purpose: 10 watts - Retail - UT - 5	14,282	257,977	187,715	73%	3%	68%	122,948
LED General Purpose: 11 watts - Retail - UT - 4	61,189	1,234,794	914,244	74%	3%	68%	598,805
LED General Purpose: 11 watts - Retail - UT - 5	1,219	21,352	15,537	73%	3%	68%	10,176
LED General Purpose: 12 watts - Retail - UT - 4	5,265	102,931	76,210	74%	3%	68%	49,916
LED General Purpose: 12 watts - Retail - UT - 5	324	5,498	4,001	73%	3%	68%	2,620
LED General Purpose: 13 watts - Retail - UT - 4	20,804	393,612	291,431	74%	3%	68%	190,879
LED General Purpose: 13 watts - Retail - UT - 5	2,078	34,126	24,832	73%	3%	68%	16,264
LED General Purpose: 15 watts - Retail - UT - 5	10,995	194,172	143,765	74%	3%	68%	94,162
LED General Purpose: 15 watts - Retail - UT - 6	1,952	29,922	21,772	73%	3%	68%	14,260
LED General Purpose: 16 watts - Retail - UT - 4	47,863	1,116,644	826,765	74%	3%	68%	541,509
LED General Purpose: 16 watts - Retail - UT - 5	2,560	51,841	37,722	73%	3%	68%	24,707
LED General Purpose: 17 watts - Retail - UT - 2	7,696	266,897	197,611	74%	3%	68%	129,430
LED General Purpose: 17 watts - Retail - UT - 3	580	17,459	12,704	73%	3%	68%	8,321
LED General Purpose: 18 watts - Retail - UT - 2	105,086	3,644,382	2,698,307	74%	3%	68%	1,767,319
LED General Purpose: 18 watts - Retail - UT - 3	4,746	142,865	103,955	73%	3%	68%	68,088
LED General Purpose: 6 watts - Retail - UT - 3	67,243	975,024	721,909	74%	3%	68%	472,831
LED General Purpose: 6 watts - Retail - UT - 4	5,668	71,337	51,908	73%	3%	68%	33,998
LED General Purpose: 7 watts - Retail - UT - 3	871	12,081	8,945	74%	3%	68%	5,858
LED General Purpose: 8 watts - Retail - UT - 4	94,195	1,247,142	923,386	74%	3%	68%	604,793
LED General Purpose: 8 watts - Retail - UT - 5	6,582	75,642	55,041	73%	3%	68%	36,050
LED General Purpose: 9 watts - Retail - UT - 4	460,681	5,809,187	4,301,133	74%	3%	68%	2,817,127
LED General Purpose: 9 watts - Retail - UT - 4 - FOODBANK	78,676	992,104	706,744	71%	0%	100%	706,744
LED General Purpose: 9 watts - Retail - UT - 5	82,457	902,531	656,720	73%	3%	68%	430,134
LED Specialty - 3-Way: 3,8,18 watts - Retail - UT - 2	12	393	270	69%	3%	68%	177
LED Specialty - 3-Way: 5,9,20 watts - Retail - UT - 2	2,878	92,556	63,625	69%	3%	68%	41,672
LED Specialty - 3-Way: 9 watts - Retail - UT - 1	496	13,670	9,354	68%	3%	68%	6,126
LED Specialty - Candelabra: 2 watts - Retail - UT - 3	2,300	33,350	22,925	69%	3%	68%	15,015
LED Specialty - Candelabra: 2 watts - Retail - UT - 4	40	497	340	68%	3%	68%	223
LED Specialty - Candelabra: 3 watts - Retail - UT - 2	45,054	624,899	429,564	69%	3%	68%	281,353
LED Specialty - Candelabra: 3 watts - Retail - UT - 3	419	4,982	3,408	68%	3%	68%	2,232
LED Specialty - Candelabra: 4 watts - Retail - UT - 3	60,403	799,736	549,750	69%	3%	68%	360,071
LED Specialty - Candelabra: 4 watts - Retail - UT - 4	42,331	480,316	328,651	68%	3%	68%	215,258

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	Leakage	NTG	Net Evaluated Savings (kWh)
LED Specialty - Candelabra: 5 watts - Retail - UT - 3	30,391	670,729	461,069	69%	3%	68%	301,988
LED Specialty - Candelabra: 5 watts - Retail - UT - 3 - FOODBANK	39,338	868,190	598,520	69%	0%	100%	598,520
LED Specialty - Candelabra: 5 watts - Retail - UT - 4	844	15,963	10,923	68%	3%	68%	7,154
LED Specialty - Globe: 4 watts - Retail - UT - 2	20,622	208,076	143,034	69%	3%	68%	93,684
LED Specialty - Globe: 4 watts - Retail - UT - 3	1,428	12,348	8,449	68%	3%	68%	5,534
LED Specialty - Globe: 5 watts - Retail - UT - 3	40,829	901,096	619,426	69%	3%	68%	405,708
LED Specialty - Globe: 5 watts - Retail - UT - 4	3,565	67,428	46,137	68%	3%	68%	30,219
LED Specialty - Globe: 6 watts - Retail - UT - 2	31,789	681,556	468,511	69%	3%	68%	306,862
LED Specialty - Globe: 6 watts - Retail - UT - 3	2,491	45,770	31,318	68%	3%	68%	20,512
Total	**2,038,481**	**40,264,550**	**30,233,120**	**75%**		**68%**	**20,703,709**

3.3.4 Discussion of Realization Rates

Realization rates other than 100 percent result from evaluated ISRs and HOUs that differed from ex ante values for these variables (see Table 3-13).

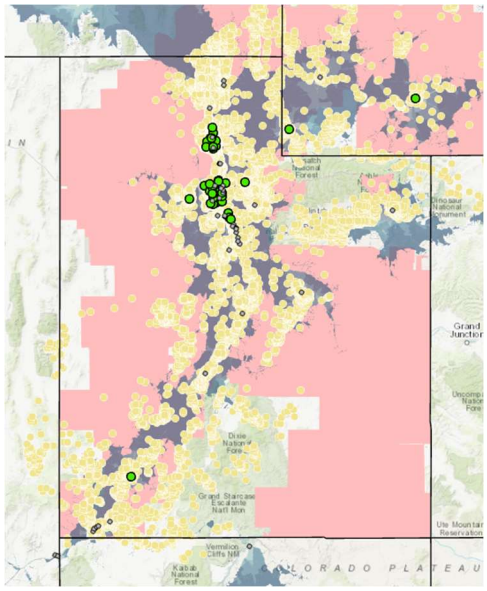
3.3.5 Leakage analysis

Leakage is an estimate of the percentage of measures sold through the program that were purchased by residents who live outside Rocky Mountain Power's service area. ADM assessed leakage using geo-mapping data of participating and non-participating retailers combined with general population survey responses.

First, ADM mapped 60-minute drive-time areas surrounding both participating and non-participating (competing) retailers[5] (see Figure 3-2). If retailers had overlapping areas, ADM assumed that customers purchased measures from the closest store and modified retailers' drive-time areas.

Second, ADM determined the total population in each retailer's drive time area and the percentage of the population in each area that are Rocky Mountain Power customers[6].

Figure 3-2: Sample Leakage Analysis Map



Retailer (green dot), Drive time areas (blue), Rocky Mountain Power service area (pink), census block population (yellow).

[5] 2020 data. Safe Graph Data: https://marketplace.arcgis.com/listing.html?id=3425348e4bee4059af2b353e52df43c2

[6] 2010 Census block data from Environmental System Research Institute (ESRI).

Third, ADM modified drive-time areas established in step one using general population survey[7] responses to define drive-time range categories to assess how many consumers were willing to drive and shop at each participating retail store. Drive-time behavior survey results are included in Table 3-17. Within each drive-time category, ADM calculated the percentage of the population that lives in Rocky Mountain Power's service area.

Table 3-17: Drive Time Results from General Population Survey

Retail Type	0-5	5-10	10-15	15-20	20-25	25-30	30-40	40-50	50-60	60+
DIY	4%	21%	28%	26%	9%	1%	9%	1%	0%	1%
Big Box	5%	24%	31%	24%	11%	0%	5%	0%	0%	1%
Member	8%	14%	16%	31%	10%	5%	8%	4%	1%	4%
Discount	9%	34%	30%	17%	3%	0%	6%	1%	0%	1%

Fourth, for each drive-time category indicated in Table 3-17 for each retailer, ADM calculated the predicted population that was willing to drive to and shop at the retailer, and what percentage of that population was Rocky Mountain Power customers.

The resulting leakage percentage is the share of residents who are willing to drive to participating retailers who are not Rocky Mountain Power customers. ADM calculated lighting program leakage by weighting each store's leakage by its ex post savings (kWh).

ADM estimated that 3.1 percent of the upstream lighting measures sold at participating retailers were purchased by residents living outside of Rocky Mountain Power's service area. Leakage was not considered for lighting measures distributed through foodbanks.

3.3.6 Net to Gross Ratio

The net-to-gross (NTG) analysis estimates the share of program activity that would have occurred in the absence of the program (free ridership) and additional energy savings that were the result of the program for which the customer did not received an incentive (spillover). See Equation 3-2: Net to Gross Calculation

Equation 3-2: Net to Gross Calculation

$$NTG = 1 - Freeridership\ rate + Spillover\ rate$$

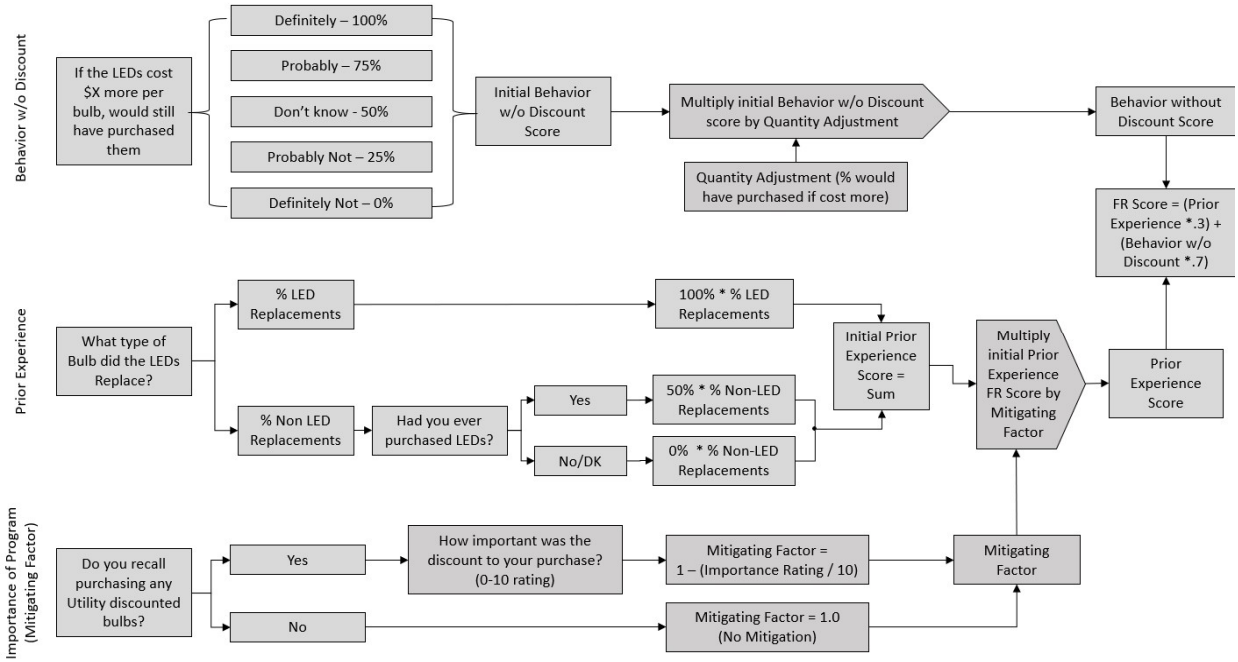
ADM surveyed Rocky Mountain Power customers who purchased discounted upstream lighting measures to determine both free ridership and spillover estimates.

[7] ADM conducted the general population survey in 2020.

Free ridership

Free ridership was estimated using the methodology illustrated in Figure 3-3.

Figure 3-3: Free Ridership Methodology for Lighting



Spillover

Spillover estimates energy saving that resulted from additional measures without receiving a program incentive. ADM calculated both participant and non-participant spillover.

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 the Wattsmart program 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 to or greater than 4.

ADM used a net-to-gross ratio of 1.0 for lighting measures that were distributed for free through foodbanks and community centers reflecting that customers dependent on food assistance are less likely to have install energy efficiency measures absent the program.

3.4 HVAC

Rocky Mountain Power offered customers financial incentives to install energy efficient HVAC measures in their homes during the evaluation period. HVAC measures resulted in 14,549,843 kWh of net savings, accounting for 18 percent of total program savings. The overall realization rate for the HVAC measures was 99.5 percent and the net-to-gross ratio was 67 percent. HVAC measures included evaporative coolers, smart thermostats, central and split-system air conditioners, furnace and whole-house fans, heat pumps, room air conditioners, and rooftop snow melt devices. Forty-three percent of HVAC savings resulted from evaporative coolers. HVAC program savings are reported in Table 3-18 through Table 3-20.

Note that quantities of HVAC measures that were included in multifamily projects are not included here; they are reported in section 3.2 where their savings are aggregated by project.

Table 3-18: HVAC Program Savings by Measure Sub Type 2019-2020

Measure Category	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
Evaporative Cooler	6,753	9,367,647	9,367,647	100%	69%	6,463,676
Thermostat	16,374	6,714,706	6,714,706	100%	78%	5,237,471
Central Air Conditioner	10,219	3,608,776	3,509,460	97%	42%	1,473,973
Furnace Fan	3,210	1,466,582	1,466,582	100%	69%	1,011,942
Ductless Heat Pump	99	236,794	236,794	100%	69%	163,388
Heat Pump - Ductless	55	103,774	103,774	100%	69%	71,604
Whole-House Fan	246	86,100	83,650	97%	56%	46,844
Residential Room Air Conditioner	603	55,271	55,131	100%	69%	38,104
Heat Pump - Air Source	3	28,626	28,626	100%	69%	19,752
Rooftop Snow Melt Devices	17	22,950	22,950	100%	69%	15,836
Split-System Air Conditioner	30	15,259	15,259	100%	42%	6,409
Air Source Heat Pump	1	1,225	1,225	100%	69%	845
Total	**37,610**	**21,707,710**	**21,605,804**	**99.5%**	**67%**	**14,549,843**

Table 3-19: HVAC Program Savings by Measure Sub Type 2019

Measure Category	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
Evaporative Cooler	3,229	4,160,330	4,160,330	100%	69%	2,870,628
Thermostat	9,963	2,829,982	2,829,982	100%	78%	2,207,386
Furnace Fan	3,205	1,465,022	1,465,022	100%	42%	688,779
Central Air Conditioner	4,552	1,739,265	1,639,949	94%	69%	1,010,865
Heat Pump - Ductless	55	103,774	103,774	100.0%	69%	71,604
Heat Pump - Air Source	3	28,626	28,626	100.0%	69%	19,752
Ductless Heat Pump	6	16,967	16,967	100%	69%	11,707
Whole-House Fan	24	8,400	8,161	97%	56%	4,570
Residential Room Air Conditioner	60	5,217	5,217	100%	69%	3,600
Split-System Air Conditioner	10	2,550	2,550	100%	42%	1,071
Total	**21,107**	**10,360,134**	**10,260,579**	**99%**	**67%**	**6,889,962**

Table 3-20: HVAC Program Savings by Measure Sub Type 2020

Measure Category	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
Evaporative Cooler	3,524	5,207,317	5,207,317	100%	69%	3,593,049
Thermostat	6,411	3,884,724	3,884,724	100%	78%	3,030,084
Central Air Conditioner	5,667	1,869,511	1,869,511	100%	42%	785,195
Ductless Heat Pump	93	219,827	219,827	100%	69%	151,681
Whole-House Fan	222	77,700	75,489	97%	56%	42,274
Residential Room Air Conditioner	543	50,054	49,914	100%	69%	34,440
Rooftop Snow Melt Devices	17	22,950	22,950	100%	69%	15,836
Split-System Air Conditioner	20	12,709	12,709	100%	42%	5,338
Furnace Fan	5	1,560	1,560	100%	69%	1,076
Air Source Heat Pump	1	1,225	1,225	100%	69%	845
Total	**16,503**	**11,347,576**	**11,345,225**	**100%**	**68%**	**7,659,818**

3.4.1 Tracking Data Verification

ADM reviewed program tracking data to evaluate:

- if program tracking dataset included duplicate or erroneous data entries,
- if program tracking dataset included all necessary fields for savings calculations,
- if claimed energy savings match the applicable TRL source documents and calculations,

- if installed measure model numbers or measure specifications reported in implementer's tracking data and/or application data met efficiency requirements documented in the TRL.

ADM found the following in the dataset:

- 4,494 central air conditioners (37% of central air conditioners) were miscategorized based on the SEER ratings provided for the measures in the supplemental program data.
- The CFM ratings for 7 whole-house fans (out of ADM's sample of 246 records) were did not meet the TRL efficiency guidelines.

3.4.2 Ex Ante Review

ADM compared ex ante values in TRL reference documents with claimed savings included in program tracking data and verified that the claimed savings represented savings documented in TRL reference documents. ADM found one data entry error in the TRL reference file for room air conditioners. This finding represents a decrease in the evaluated savings for room air conditioners of 0.24 kWh/unit.

3.4.3 Evaluated Savings

Evaluated savings were calculated using UES values included in the TRL reference files for all HVAC measures for which ADM could verify savings through a review of the program data. For three measure types, ADM was unable to fully verify savings: room air conditioners, central air conditioners, and whole-house fans.

Room Air Conditioners

ADM found an error in the specified RTF reference file. The evaluated UES for room air conditioners represents the same savings indicated in the TRL brief, corrected for the typo (resulting in a realization rate >99 percent).

Central Air Conditioners

ADM verified SEER ratings for a sample of 11,154 central air conditioners. From that sample, ADM found that 4,494 central air conditioners were assigned incorrect savings based on their SEER ratings. Evaluated savings for those records were assigned appropriate savings based on each measure's SEER rating, following the guidance in the RTF reference files.

Whole House Fans

ADM verified CFM ratings for a sample of 246 records of whole-house fans. From that sample, ADM could not verify savings for 7 whole-house fans because the CFM ratings of the models did not meet TRL guidelines. From this verification exercise, ADM

calculated a 97 percent realization rate, which was applied to the claimed savings for all whole-house fans.

Average UES are reported in Table 3-21. Total savings are reported by measure in Table 3-22 through Table 3-24.

Table 3-21: HVAC Unit Energy Savings (UES) by Measure

Measure - Version	Average Claimed UES	Average Evaluated UES	Realization Rate
Air Source Heat Pump			
Heat Pump Upgrade - Tier 2 - SEER 16 / HSPF 9.5 - SF - Downstream – UT - 4	1,225	1,225	100%
Central Air Conditioner			
Central Air Conditioner - Tier 1 - 15 to 16.9 SEER - Midstream – UT – 2	341	342	100%
Central Air Conditioner - Tier 1 - 15 to 16.9 SEER - Midstream – UT – 3	248	248	100%
Central Air Conditioner - Tier 2 - 17 to 19.9 SEER - Midstream - UT - 2	530	455	86%
Central Air Conditioner - Tier 2 - 17 to 19.9 SEER - Midstream - UT - 3	310	310	100%
Central Air Conditioner - Tier 3 - 20 SEER or greater - Midstream - UT - 2	742	655	88%
Central Air Conditioner - Tier 3 - 20 SEER or greater - Midstream - UT - 3	683	683	100%
New Homes - Central Air Conditioner 15 SEER or higher - Downstream - UT	179	179	100%
Ductless Heat Pump			
Ductless Heat Pump - Multi-Head - SF - Downstream - UT - 4	5,654	5,654	100%
Ductless Heat Pump - Single-Head - SF - Downstream - UT - 4	2,692	2,692	100%
Ductless Heat Pump - Supplemental Heat - SF - Downstream - UT - 4	945	945	100%
Evaporative Cooler			
Evaporative Cooler - >= 3,500 CFM - Midstream - Distributor - UT - 2	1,631	1,631	100%
Evaporative Cooler - >= 3,500 CFM - Midstream - Retail - UT - 2	1,631	1,631	100%
Evaporative Cooler - >= 3,500 CFM - Midstream - Retail - UT - 3	1,631	1,631	100%
Evaporative Cooler - 2,000 to 3,499 CFM - Midstream - Retail - UT - 2	932	932	100%
Evaporative Cooler - 2,000 to 3,499 CFM - Midstream - Retail - UT - 3	932	932	100%
Evaporative Cooler - Midmarket - Distributor - Min 3,500 CFM - UT - 1	1,446	1,446	100%

Measure - Version	Average Claimed UES	Average Evaluated UES	Realization Rate
Evaporative Cooler - Midmarket - Retail - 2,000 - 3,499 CFM - UT - 1	826	826	100%
Evaporative Cooler - Midmarket - Retail - Min 3,500 CFM - UT - 1	1,446	1,446	100%
Furnace Fan			
95% Gas Furnace with ECM Blower - Midstream - UT - 2	477	477	100%
ECM on Existing Furnace - Downstream - UT - 3	312	312	100%
Furnace Fan ECM - SF - Downstream - UT - 4	312	312	100%
New Homes - 95% Gas Furnace with ECM Blower - Downstream - UT	269	269	100%
Heat Pump - Air Source			
Heat Pump Conversion - Tier 1 - 9.0 HSPF and 15 SEER - Downstream - UT - 3	9,254	9,254	100%
Heat Pump Conversion - Tier 2 - 9.5 HSPF and 16 SEER - Downstream - UT - 3	9,686	9,686	100%
Heat Pump - Ductless			
Ductless Heat Pump - Multi-Head - Downstream - UT - 3	5,654	5,654	100%
Ductless Heat Pump - Supplemental Heat - Downstream - UT - 3	945	945	100%
Residential Room Air Conditioner			
Room AC - ENERGY STAR - Midstream - Retail - UT - 2	92	92	100%
Room Air Conditioner - Midmarket - Retail - ENERGY STAR - UT - 1	87	87	100%
Rooftop Snow Melt Devices			
Rooftop Heat Tape Controller - UT - 1	1,350	1,350	100%
Room AC			
Room AC - ENERGY STAR - Midstream - Retail - UT - 1	92	92	100%
Split-System Air Conditioner			
Central AC - Split System - Tier 1 - SEER 15 to 16.9 - CZ5 - SF - New Homes - UT	255	255	100%
Central AC - Split System - Tier 2 - SEER 17 to 19.9 - CZ5 - SF - New Homes - UT - 1	451	451	100%
Central AC - Split System - Tier 3 - SEER 20+ - CZ5 - SF - New Homes - UT – 1	668	668	100%
Thermostat			
Connected Thermostat - CAC Only - Instant Rebates - UT - 2	351	351	100%
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT	227	227	100%
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT - 1	227	227	100%

Measure - Version	Average Claimed UES	Average Evaluated UES	Realization Rate
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT - 2	228	228	100%
Connected Thermostat - CAC Only - UT - 3	384	384	100%
Connected Thermostat - CAC Only - UT - 4	348	348	100%
Connected Thermostat - Electric FAF w/ CAC - Instant Rebates - UT - 2	2,382	2,382	100%
Connected Thermostat - Electric FAF w/ CAC - UT - 3	2,529	2,529	100%
Connected Thermostat - Electric FAF w/ CAC - UT - 4	2,376	2,376	100%
Connected Thermostat - Electric FAF w/out CAC - Instant Rebates - UT - 2	2,028	2,028	100%
Connected Thermostat - Electric FAF w/out CAC - UT - 3	2,362	2,362	100%
Connected Thermostat - Electric FAF w/out CAC - UT - 4	2,028	2,028	100%
Connected Thermostat - Electric Heat Pump - Instant Rebates - UT - 2	1,368	1,368	100%
Connected Thermostat - Electric Heat Pump - New Homes - CZ5 & CZ6 - UT - 1	745	745	100%
Connected Thermostat - Electric Heat Pump - UT - 3	1,483	1,483	100%
Connected Thermostat - Electric Heat Pump - UT - 4	1,368	1,368	100%
Smart T-stat w/ ASHP - UT - 2	698	698	100%
Smart T-stat w/ EFAF - UT – 2	1,193	1,193	100%
Smart T-stat w/ EFAF + CAC - UT - 2	1,291	1,291	100%
Smart T-stat w/ Gas FAF + CAC - UT - 2	98	98	100%
Smart_Tstat_w/Any_Gas_Instant_Rebates - UT - 1	98	98	100%
Smart_Tstat_w/ASHP_Instant_Rebates - UT - 1	698	698	100%
Smart_Tstat_w/EAF_Instant_Rebates - UT - 1	1,193	1,193	100%
Smart_Tstat_w/EFAF_CAC_Instant_Rebates - UT - 1	1,291	1,291	100%
Whole-House Fan			
Whole-House Ventilation Fan - UT - 1	350	340	97%
Whole-House Ventilation Fan - UT - 2	350	340	97%

Table 3-22: HVAC Program Savings by Measure 2019-2020

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate
95% Gas Furnace with ECM Blower - Midstream - UT - 2	2,897	1,381,869	1,381,869	100%
Central AC - Split System - Tier 1 - SEER 15 to 16.9 - CZ5 - SF - New Homes - UT	10	2,550	2,550	100%
Central AC - Split System - Tier 2 - SEER 17 to 19.9 - CZ5 - SF - New Homes - UT - 1	3	1,353	1,353	100%
Central AC - Split System - Tier 3 - SEER 20+ - CZ5 - SF - New Homes - UT – 1	17	11,356	11,356	100%
Central Air Conditioner - Tier 1 - 15 to 16.9 SEER - Midstream - UT - 2	536	182,776	183,154	100%
Central Air Conditioner - Tier 1 - 15 to 16.9 SEER - Midstream - UT - 3	3,839	950,667	950,667	100%
Central Air Conditioner - Tier 2 - 17 to 19.9 SEER - Midstream - UT - 2	994	526,820	452,566	86%
Central Air Conditioner - Tier 2 - 17 to 19.9 SEER - Midstream - UT - 3	3,577	1,110,359	1,110,359	100%
Central Air Conditioner - Tier 3 - 20 SEER or greater - Midstream - UT - 2	293	217,406	191,966	88%
Central Air Conditioner - Tier 3 - 20 SEER or greater - Midstream - UT - 3	883	603,385	603,385	100%
Connected Thermostat - CAC Only - Instant Rebates - UT – 2	2,152	756,157	756,157	100%
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT	158	35,866	35,866	100%
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT - 1	912	207,024	207,024	100%
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT - 2	1	228	228	100%
Connected Thermostat - CAC Only - UT - 3	2,532	971,942	971,942	100%
Connected Thermostat - CAC Only - UT - 4	377	131,196	131,196	100%
Connected Thermostat - Electric FAF w/ CAC - Instant Rebates - UT - 2	362	862,282	862,282	100%
Connected Thermostat - Electric FAF w/ CAC - UT - 3	478	1,208,707	1,208,707	100%
Connected Thermostat - Electric FAF w/ CAC - UT - 4	64	152,064	152,064	100%
Connected Thermostat - Electric FAF w/out CAC - Instant Rebates - UT - 2	3	6,084	6,084	100%
Connected Thermostat - Electric FAF w/out CAC - UT – 3	15	35,430	35,430	100%
Connected Thermostat - Electric FAF w/out CAC - UT – 4	4	8,112	8,112	100%
Connected Thermostat - Electric Heat Pump - Instant Rebates - UT - 2	9	12,312	12,312	100%

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate
Connected Thermostat - Electric Heat Pump - New Homes - CZ5 & CZ6 - UT - 1	1	745	745	100%
Connected Thermostat - Electric Heat Pump - UT - 3	35	51,900	51,900	100%
Connected Thermostat - Electric Heat Pump - UT - 4	3	4,104	4,104	100%
Ductless Heat Pump - Multi-Head - Downstream - UT - 3	11	62,194	62,194	100%
Ductless Heat Pump - Multi-Head - SF - Downstream - UT - 4	23	130,042	130,042	100%
Ductless Heat Pump - Single-Head - SF - Downstream - UT - 4	20	53,832	53,832	100%
Ductless Heat Pump - Supplemental Heat - Downstream - UT - 3	44	41,580	41,580	100%
Ductless Heat Pump - Supplemental Heat - SF - Downstream - UT - 4	56	52,920	52,920	100%
ECM on Existing Furnace - Downstream - UT - 3	7	2,184	2,184	100%
Evaporative Cooler - >= 3,500 CFM - Midstream - Distributor - UT - 2	137	223,447	223,447	100%
Evaporative Cooler - >= 3,500 CFM - Midstream - Retail - UT - 2	2,615	4,265,065	4,265,065	100%
Evaporative Cooler - >= 3,500 CFM - Midstream - Retail - UT - 3	13	21,203	21,203	100%
Evaporative Cooler - 2,000 to 3,499 CFM - Midstream - Retail - UT - 2	771	718,572	718,572	100%
Evaporative Cooler - 2,000 to 3,499 CFM - Midstream - Retail - UT - 3	3	2,796	2,796	100%
Evaporative Cooler - Midmarket - Distributor - Min 3,500 CFM - UT - 1	90	130,140	130,140	100%
Evaporative Cooler - Midmarket - Retail - 2,000 - 3,499 CFM - UT - 1	824	680,624	680,624	100%
Evaporative Cooler - Midmarket - Retail - Min 3,500 CFM - UT - 1	2,300	3,325,800	3,325,800	100%
Furnace Fan ECM - SF - Downstream - UT - 4	5	1,560	1,560	100%
Heat Pump Conversion - Tier 1 - 9.0 HSPF and 15 SEER - Downstream - UT - 3	1	9,254	9,254	100%
Heat Pump Conversion - Tier 2 - 9.5 HSPF and 16 SEER - Downstream - UT - 3	2	19,372	19,372	100%
Heat Pump Upgrade - Tier 2 - SEER 16 / HSPF 9.5 - SF - Downstream - UT - 4	1	1,225	1,225	100%
New Homes - 95% Gas Furnace with ECM Blower - Downstream - UT -	301	80,969	80,969	100%
New Homes - Central Air Conditioner 15 SEER or higher - Downstream - UT -	97	17,363	17,363	100%
Rooftop Heat Tape Controller - UT - 1	17	22,950	22,950	100%
Room AC - ENERGY STAR - Midstream - Retail - UT - 2	544	50,146	50,006	100%

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate
Room AC - ENERGY STAR - Midstream - Retail - UT - 1	(1)	(92)	(92)	100%
Room Air Conditioner - Midmarket - Retail - ENERGY STAR - UT - 1	60	5,217	5,217	100%
Smart T-stat w/ ASHP - UT - 2	37	25,826	25,826	100%
Smart T-stat w/ EFAF - UT - 2	20	23,860	23,860	100%
Smart T-stat w/ EFAF + CAC - UT - 2	623	804,293	804,293	100%
Smart T-stat w/ Gas FAF + CAC - UT - 2	3,259	319,382	319,382	100%
Smart_Tstat_w/Any_Gas_Instant_Rebates - UT - 1	4,829	471,359	471,359	100%
Smart_Tstat_w/ASHP_Instant_Rebates - UT - 1	33	23,034	23,034	100%
Smart_Tstat_w/EAF_Instant_Rebates - UT - 1	1	1,193	1,193	100%
Smart_Tstat_w/EFAF_CAC_Instant_Rebates - UT - 1	466	601,606	601,606	100%
Whole-House Ventilation Fan - UT - 1	243	85,050	82,630	97%
Whole-House Ventilation Fan - UT - 2	3	1,050	1,020	97%
Total	**37,610**	**21,707,710**	**21,605,804**	**99.5%**

Table 3-23: HVAC Program Savings by Measure 2019

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate
95% Gas Furnace with ECM Blower - Midstream - UT - 2	2,897	1,381,869	1,381,869	100%
Central AC - Split System - Tier 1 - SEER 15 to 16.9 - CZ5 - SF - New Homes - UT	10	2,550	2,550	100%
Central Air Conditioner - Tier 1 - 15 to 16.9 SEER - Midstream - UT - 2	528	180,048	180,426	100%
Central Air Conditioner - Tier 1 - 15 to 16.9 SEER - Midstream - UT - 3	1,320	328,864	328,864	100%
Central Air Conditioner - Tier 2 - 17 to 19.9 SEER - Midstream - UT - 2	994	526,820	452,566	86%
Central Air Conditioner - Tier 2 - 17 to 19.9 SEER - Midstream - UT - 3	1,013	289,500	289,500	100%
Central Air Conditioner - Tier 3 - 20 SEER or greater - Midstream - UT - 2	293	217,406	191,966	88%
Central Air Conditioner - Tier 3 - 20 SEER or greater - Midstream - UT - 3	307	179,264	179,264	100%
Connected Thermostat - CAC Only - Instant Rebates - UT - 2	169	66,073	66,073	100%
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT	158	35,866	35,866	100%
Connected Thermostat - CAC Only - UT - 3	320	198,110	198,110	100%
Connected Thermostat - Electric FAF w/ CAC - Instant Rebates - UT - 2	13	33,058	33,058	100%
Connected Thermostat - Electric FAF w/ CAC - UT - 3	58	214,843	214,843	100%
Connected Thermostat - Electric FAF w/out CAC - UT - 3	1	7,038	7,038	100%
Connected Thermostat - Electric Heat Pump - Instant Rebates - UT - 2	2	2,736	2,736	100%
Connected Thermostat - Electric Heat Pump - UT - 3	3	8,124	8,124	100%
Ductless Heat Pump - Multi-Head - Downstream - UT - 3	11	62,194	62,194	100%
Ductless Heat Pump - Multi-Head - SF - Downstream - UT - 4	2	11,308	11,308	100%
Ductless Heat Pump - Single-Head - SF - Downstream - UT - 4	1	2,824	2,824	100%
Ductless Heat Pump - Supplemental Heat - Downstream - UT - 3	44	41,580	41,580	100%
Ductless Heat Pump - Supplemental Heat - SF - Downstream - UT - 4	3	2,835	2,835	100%
ECM on Existing Furnace - Downstream - UT - 3	7	2,184	2,184	100%
Evaporative Cooler - >= 3,500 CFM - Midstream - Retail - UT - 2	14	22,834	22,834	100%
Evaporative Cooler - 2,000 to 3,499 CFM - Midstream - Retail - UT - 2	1	932	932	100%

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate
Evaporative Cooler - Midmarket - Distributor - Min 3,500 CFM - UT - 1	90	130,140	130,140	100%
Evaporative Cooler - Midmarket - Retail - 2,000 - 3,499 CFM - UT - 1	824	680,624	680,624	100%
Evaporative Cooler - Midmarket - Retail - Min 3,500 CFM - UT - 1	2,300	3,325,800	3,325,800	100%
Heat Pump Conversion - Tier 1 - 9.0 HSPF and 15 SEER - Downstream - UT - 3	1	9,254	9,254	100%
Heat Pump Conversion - Tier 2 - 9.5 HSPF and 16 SEER - Downstream - UT - 3	2	19,372	19,372	100%
New Homes - 95% Gas Furnace with ECM Blower - Downstream - UT -	301	80,969	80,969	100%
New Homes - Central Air Conditioner 15 SEER or higher - Downstream - UT	97	17,363	17,363	100%
Room Air Conditioner - Midmarket - Retail - ENERGY STAR - UT - 1	60	5,217	5,217	100%
Smart T-stat w/ ASHP - UT - 2	37	25,826	25,826	100%
Smart T-stat w/ EFAF - UT - 2	20	23,860	23,860	100%
Smart T-stat w/ EFAF + CAC - UT - 2	620	800,420	800,420	100%
Smart T-stat w/ Gas FAF + CAC - UT - 2	3,239	317,422	317,422	100%
Smart_Tstat_w/Any_Gas_Instant_Rebates - UT - 1	4,823	470,773	470,773	100%
Smart_Tstat_w/ASHP_Instant_Rebates - UT - 1	33	23,034	23,034	100%
Smart_Tstat_w/EAF_Instant_Rebates - UT - 1	1	1,193	1,193	100%
Smart_Tstat_w/EFAF_CAC_Instant_Rebates - UT - 1	466	601,606	601,606	100%
Whole-House Ventilation Fan - UT - 1	24	8,400	8,161	97%
Total	**21,107**	**10,360,134**	**10,260,579**	99%

Table 3-24: HVAC Program Savings by Measure 2020

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate
Central AC - Split System - Tier 2 - SEER 17 to 19.9 - CZ5 - SF - New Homes - UT - 1	3	1,353	1,353	100%
Central AC - Split System - Tier 3 - SEER 20+ - CZ5 - SF - New Homes - UT - 1	17	11,356	11,356	100%
Central Air Conditioner - Tier 1 - 15 to 16.9 SEER - Midstream - UT - 2	8	2,728	2,728	100%
Central Air Conditioner - Tier 1 - 15 to 16.9 SEER - Midstream - UT - 3	2,519	621,804	621,804	100%
Central Air Conditioner - Tier 2 - 17 to 19.9 SEER - Midstream - UT - 3	2,564	820,859	820,859	100%
Central Air Conditioner - Tier 3 - 20 SEER or greater - Midstream - UT - 3	576	424,121	424,121	100%
Connected Thermostat - CAC Only - Instant Rebates - UT - 2	1,983	690,084	690,084	100%
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT - 1	912	207,024	207,024	100%
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT - 2	1	228	228	100%
Connected Thermostat - CAC Only - UT - 3	2,212	773,832	773,832	100%
Connected Thermostat - CAC Only - UT - 4	377	131,196	131,196	100%
Connected Thermostat - Electric FAF w/ CAC - Instant Rebates - UT - 2	349	829,224	829,224	100%
Connected Thermostat - Electric FAF w/ CAC - UT - 3	420	993,864	993,864	100%
Connected Thermostat - Electric FAF w/ CAC - UT - 4	64	152,064	152,064	100%
Connected Thermostat - Electric FAF w/out CAC - Instant Rebates - UT - 2	3	6,084	6,084	100%
Connected Thermostat - Electric FAF w/out CAC - UT - 3	14	28,392	28,392	100%
Connected Thermostat - Electric FAF w/out CAC - UT - 4	4	8,112	8,112	100%
Connected Thermostat - Electric Heat Pump - Instant Rebates - UT - 2	7	9,576	9,576	100%
Connected Thermostat - Electric Heat Pump - New Homes - CZ5 & CZ6 - UT - 1	1	745	745	100%
Connected Thermostat - Electric Heat Pump - UT - 3	32	43,776	43,776	100%
Connected Thermostat - Electric Heat Pump - UT - 4	3	4,104	4,104	100%
Ductless Heat Pump - Multi-Head - SF - Downstream - UT - 4	21	118,734	118,734	100%
Ductless Heat Pump - Single-Head - SF - Downstream - UT - 4	19	51,008	51,008	100%
Ductless Heat Pump - Supplemental Heat - SF - Downstream - UT - 4	53	50,085	50,085	100%

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate
Evaporative Cooler - >= 3,500 CFM - Midstream - Distributor - UT - 2	137	223,447	223,447	100%
Evaporative Cooler - >= 3,500 CFM - Midstream - Retail - UT - 2	2,601	4,242,231	4,242,231	100%
Evaporative Cooler - >= 3,500 CFM - Midstream - Retail - UT - 3	13	21,203	21,203	100%
Evaporative Cooler - 2,000 to 3,499 CFM - Midstream - Retail - UT - 2	770	717,640	717,640	100%
Evaporative Cooler - 2,000 to 3,499 CFM - Midstream - Retail - UT - 3	3	2,796	2,796	100%
Furnace Fan ECM - SF - Downstream - UT - 4	5	1,560	1,560	100%
Heat Pump Upgrade - Tier 2 - SEER 16 / HSPF 9.5 - SF - Downstream - UT - 4	1	1,225	1,225	100%
Rooftop Heat Tape Controller - UT - 1	17	22,950	22,950	100%
Room AC - ENERGY STAR - Midstream - Retail - UT - 2	544	50,146	50,006	100%
Room AC - ENERGY STAR - Midstream - Retail - UT - 1	(1)	(92)	(92)	100%
Smart T-stat w/ EFAF + CAC - UT - 2	3	3,873	3,873	100%
Smart T-stat w/ Gas FAF + CAC - UT - 2	20	1,960	1,960	100%
Smart_Tstat_w/Any_Gas_Instant_Rebates - UT - 1	6	586	586	100%
Whole-House Ventilation Fan - UT - 1	219	76,650	74,469	97%
Whole-House Ventilation Fan - UT - 2	3	1,050	1,020	97%
Total	**16,503**	**11,347,576**	**11,345,225**	**100%**

3.4.4 Discussion of Realization Rates

Evaluated savings for the HVAC measure category resulted in 99.5 percent realization rate. Realization rates other than 100 percent resulted from the following factors:

Efficiency rating threshold documented in TRL reference files was not met for 4,501 records in the tracking data (4,494 central air conditioners and 7 whole-house fans). The verification rates for these measures resulted, overall, in decreased realization rates of 97.2% for both central air conditioners and whole-house fans.

A TRL reference file typo found in *2019.05.23_UT_Wattsmart_RAC_Brief* decreased the realization rate for 18 room air conditioners classified as measure type *Room AC - ENERGY STAR - Midstream - Retail - UT - 2* and decreased the realization rate for this measure overall to 99.7%.

3.4.5 Supplemental Analyses

ADM completed additional analyses of HVAC measures reported in a separate memo for Rocky Mountain Power to use for program planning purposes.

3.4.6 Net to Gross Ratio

ADM surveyed a sample of program participants to determine free ridership rates for HVAC program offerings. Free ridership estimates the percentage of participants who would have installed the measure if they had not received a discount for through the program. Spillover estimates the percentage of additional measures that participants installed without an incentive as a result of the influence of participation. Non-participant spillover is an estimate of savings that resulted from program influence on non-participants. Net to gross is calculated using

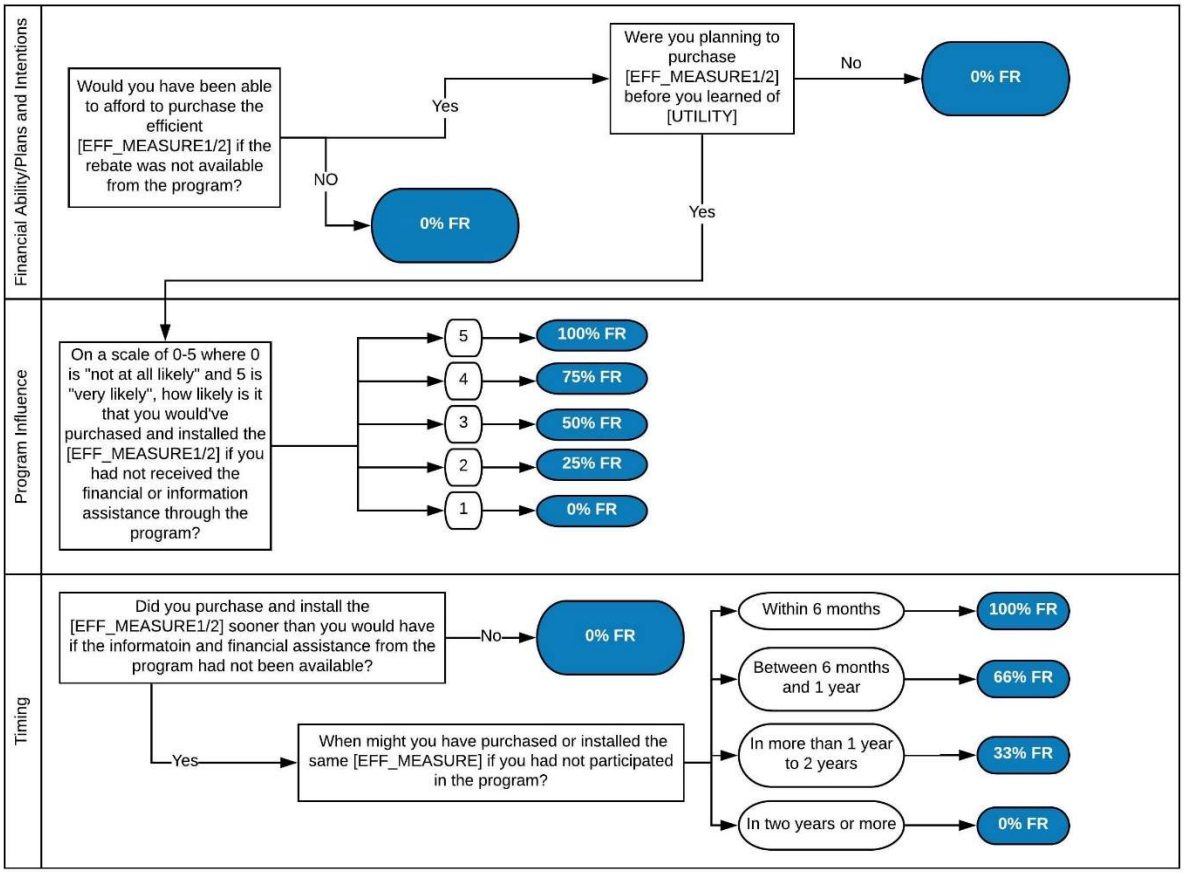
Equation 3-3: Net-to-Gross Calculation

$$Net - to - Gross\ Ratio = 1 - Free\ Ridership + Spillover$$

For HVAC measure groups with too few survey responses to calculate NTG, ADM calculated an HVAC weighted average NTG ratio of 69 percent.

Figure 3-4 illustrates the methodology for calculating free ridership for HVAC measures.

Figure 3-4: HVA Free Ridership Calculation Methodology



HVAC net-to-gross results are reported in Table 3-25.

Table 3-25: HVAC Net-to-Gross Results

Measure Subtype	Free Ridership	Participant Spillover	Non-Participant Spillover	NTG
Central Air Conditioning	64%	2%	4%	42%
Smart Thermostats	28%	2%	4%	78%
Whole House Vent Fans	50%	2%	4%	56%
Heat Pumps	Weighted Average for HVAC Measure Category			69%
Evaporative Coolers	Weighted Average for HVAC Measure Category			69%

3.5 Water Heating

The Water Heating measure category consists of flow control measures (low-flow showerheads and faucet aerators) and heat pump water heaters. The measure category resulted in net savings of 1,433,914 kWh with a 33 percent realization rate, accounting for 2 percent of total program savings. Savings are reported in Table 3-26.

Note that quantities of water heating measures that were included in multifamily projects are not included here; they are reported in section 3.2 where their savings are aggregated by project.

Table 3-26: Water Heating Program Savings by Year

Program Year	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
2019	29,756	1,362,726	452,877	33%	100%	450,620
2020	39,098	3,061,494	986,427	32%	100%	983,294
Total	**68,854**	**4,424,220**	**1,439,303**	**33%**	**100%**	**1,433,914**

3.5.1 Flow Control Measures

Rocky Mountain Power distributed water flow controlling low-flow showerheads and faucet aerators through foodbanks and community centers in the service area during the evaluation period. Flow control measures resulted in a savings of 1,417,572 kWh, accounting for 1 percent of program savings, with a 32 percent realization rate and a 100 percent net-to-gross ratio. Savings are reported in Table 3-27.

Table 3-27: Flow Control Program Savings by Year

Program Year	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
2019	29,750	1,353,625	443,776	33%	100%	443,776
2020	39,088	3,048,864	973,797	32%	100%	973,797
Total	**68,838**	**4,402,489**	**1,417,572**	**32%**	**100%**	**1,417,572**

3.5.1.1 Ex Ante Review

ADM evaluated the UES values claimed by Rocky Mountain Power in the applicable TRL documents. ADM found that the distribution channels indicated for flow control measures distributed through community service organizations was inconsistent. Ex ante showerheads savings were based on retail distribution; aerator savings were based on by-request distribution.

3.5.1.2 Tracking Data Verification

ADM reviewed the program tracking data to verify that all flow control measures were distributed within the service area. ADM also verified with community services organization that they received and distributed the measures to their clients.

3.5.2 Evaluated Savings

Rocky Mountain Power distributed low-flow showerheads and faucet aerators through foodbanks, senior centers and community centers throughout the service area.

Evaluated savings for these measures were determined by evaluating the ex ante ISRs and percentage of electric water heaters presented in the TRL reference files. The resulting evaluated UESs for these measures are reported in Table 3-28.

Table 3-28: Flow Control Measures Unit Energy Savings (UES)

Measure - Version	Ex Ante UES (kWh)	Ex Ante ISR	Ex Ante % Electric Water Heaters	Evaluated ISR	Evaluated % Electric Water Heaters	Evaluated UES (kWh)	Realization Rate
Low-Flow Shower Head - Any DHW - 1.50 GPM - Midstream - UT - 1	78	80%	58%	57%	26%	24.91	32%
Faucet Aerators - Any DHW - 1.0 GPM or Less - Midstream - UT - 1	13	55%	56%	45%	26%	4.92	38%

Sources: (Ex ante) 2019.06.05_UT_Wattsmart_Aerators_Brief, 2019.06.05_UT Wattsmart Low Flow Showerheads Brief.xlsx; (Evaluated % electric water heaters) US Energy Information Administration 2015 Residential Energy Consumption Survey; (Evaluated ISR) Illinois Statewide Technical Reference Manual Version 10.

Total gross evaluated savings is the product of the evaluated UES and the verified quantity of measures distributed in the service area. Total savings that resulted from flow control measures are reported in Table 3-29 through Table 3-31.

Table 3-29: Flow Control Program Savings 2019-2020

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
Low-Flow Shower Head - Any DHW - 1.50 GPM - Midstream - UT - 1	14,875	1,160,250	370,580	32%	100%	370,580
Faucet Aerators - Any DHW - 1.0 GPM or Less - Midstream - UT - 1	14,875	193,375	73,196	38%	100%	73,196
Low-Flow Shower Head - Any DHW - 1.50 GPM - Midstream - UT - 2	39,088	3,048,864	973,797	32%	100%	973,797
Total	**68,838**	**4,402,489**	**1,417,572**	**32%**	**100%**	**1,417,572**

Table 3-30: Flow Control Program Savings 2019

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
Low-Flow Shower Head - Any DHW - 1.50 GPM - Midstream - UT - 1	14,875	1,160,250	370,580	32%	100%	370,580
Faucet Aerators - Any DHW - 1.0 GPM or Less - Midstream - UT - 1	14,875	193,375	73,196	38%	100%	73,196
Total	**29,750**	**1,353,625**	**443,776**	**33%**	**100%**	**443,776**

Table 3-31: Flow Control Program Savings 2020

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
Low-Flow Shower Head - Any DHW - 1.50 GPM - Midstream - UT - 2	39,088	3,048,864	973,797	32%	100%	973,797

3.5.2.1 Net to Gross Ratio

ADM used a net-to-gross ratio of 100 percent for aerators and showerheads that were distributed for free through foodbanks and community centers reflecting that customers dependent on food assistance are less likely to have install energy efficiency measures absent the program.

3.5.2.2 Discussion of Realization Rates

The following factors impacted realization rates for flow control measures.

Installation rates The ex ante ISR for showerheads of 80 percent was sourced from the RTF reference for showerheads distributed through retail sales. The evaluated ISR for showerheads of 57 percent was sourced from the Illinois Statewide Technical Reference Manual V.10 for Distributed Efficiency Kits-One showerhead kit (Income Eligible). The ex ante ISR for aerators of 55 percent was sourced from the RTF reference for by request distribution; an evaluated ISR of 45 percent was sourced from the Illinois Statewide Technical Reference Manual V.10 for Community Distributed Kit Aerators. The evaluated ISRs reduce realization rates.

Water heater fuel The ex ante percentage of electric water heaters indicated in the RTF files for low flow showerheads is 58 percent and for aerators is 56 percent. The evaluated percentage of electric water heaters was 26 percent, sourced from US Energy Information Administration 2015 Residential Energy Consumption Survey. The evaluated value resulted in a lower realization rate.

3.5.3 Heat Pump Water Heaters

Rocky Mountain Power offered rebates to verified customers on qualified energy efficient heat pump water heaters during the evaluation period. Rebates were issued on 32 water heaters resulting in savings of 16,342 kWh, accounting for 0.02 percent of program savings as reported in Table 3-32.

Table 3-32: Water Heater Program Savings by Year

Program Year	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
2019	6	9,101	9,101	100%	75%	6,844
2020	26	12,630	12,630	100%	75%	9,498
Total	**32**	**21,731**	**21,731**	**100%**	75%	**16,342**

3.5.3.1 Tracking Data Verification

ADM reviewed the program tracking data to evaluate:

- if measure requirements were met for all documented heat pump water heater model numbers
- if the program tracking dataset included duplicate or erroneous data entries.

ADM found the following data elements were missing from in the dataset:

- Tracking data did not include baseline conditions.
- Tracking data did not include installation location or conditions as indicated by measure names.

3.5.3.2 Ex Ante Review

ADM verified that the UESs claimed in the program tracking data matched the appropriate measures as indicated in the TRL reference documents.

3.5.3.3 Evaluated savings

ADM reviewed the manufacture model specifications for each heat pump water heater reported in the program tracking data and verified each met the requirements for the tier specified in the tracking data. All model numbers met or exceeded tier specifications.

ADM did not make any adjustments to claimed savings. ADM assumed an ISR of 1.0 for water heating measures. Savings are reported in Table 3-33 through Table 3-35.

Table 3-33: Heat Pump Water Heater Program Savings by Measure 2019-2020

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
HPWH - Tier 2 and above - Indoor Gas Heat - 0-55 Gallons - Self Install - Downstream - UT - 1	2	3,380	3,380	100%	**75%**	2,542
HPWH - Tier 2 and above - Basement - 0-55 Gallons - Downstream - UT - 1	1	1,614	1,614	100%	**75%**	1,214
HPWH - Tier 2 and above - Basement - 0-55 Gallons - Self Install - Downstream - UT - 1	1	1,614	1,614	100%	**75%**	1,214
HPWH - Tier 2 and above - Indoor Electric Resistance Heat - 0-55 Gallons - Self Install - Downstream - UT - 1	1	1,230	1,230	100%	**75%**	925
HPWH - Tier 3+ - 0-55 Gal - Self Install - UT - 1	11	13,893	13,893	100%	**75%**	10,448
Total	**16**	**21,731**	**21,731**	**100%**	**75%**	**16,342**

Table 3-34: Heat Pump Water Heater Program Savings by Measure 2019

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
HPWH - Tier 2 and above - Indoor Gas Heat - 0-55 Gallons - Self Install - Downstream - UT - 1	2	3,380	3,380	100%	**75%**	**16,342**
HPWH - Tier 2 and above - Basement - 0-55 Gallons - Downstream - UT - 1	1	1,614	1,614	100%	**75%**	**16,342**
HPWH - Tier 2 and above - Basement - 0-55 Gallons - Self Install - Downstream - UT - 1	1	1,614	1,614	100%	**75%**	**16,342**
HPWH - Tier 2 and above - Indoor Electric Resistance Heat - 0-55 Gallons - Self Install - Downstream - UT - 1	1	1,230	1,230	100%	**75%**	**16,342**
HPWH - Tier 3+ - 0-55 Gal - Self Install - UT - 1	1	1,263	1,263	100%	**75%**	**16,342**
Total	**6**	**9,101**	**9,101**	**100%**	**75%**	**6,844**

Table 3-35: Heat Pump Water Heater Program Savings by Measure 2020

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
HPWH - Tier 3+ - 0-55 Gal - Self Install - UT - 1	10	12,630	12,630	100%	**75%**	**9,498**

3.5.3.4 Net to Gross Ratio

ADM used a program-wide NTG of 75 percent for heat pump water heaters. The category was too small to complete a category specific NTG analysis.

3.6 Building Shell

Rocky Mountain Power offered rebates to verified customers who installed insulation in their homes during the evaluation period. Rocky Mountain Power provided incentives for 4,623,040 square feet of insulation installed in 3,818 homes during the evaluation period, resulting in net savings of 551,211 kWh accounting for 0.7 percent of total program savings with a 100 percent realization rate and a 75 percent net-to-gross ratio, as reported in Table 3-36.

Quantities of billing shell measures included in multifamily projects are not included here; they are reported in section 3.2 where their savings are aggregated by project.

Table 3-36: Building Shell Program Savings by Year

PY	Quantity (sq ft)	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings
2019	2,063,157	298,624	301,456	101%	75%	226,695
2020	2,559,883	434,670	431,537	99%	75%	324,516
Total	**4,623,040**	**733,294**	**732,993**	**100%**	**75%**	**551,211**

3.6.1 Tracking Data Verification

ADM reviewed program tracking data to evaluate:

- if tracking dataset included duplicate or erroneous data entries,
- if data entries in the program tracking dataset included all necessary fields for savings calculations,
- if claimed energy savings matched the applicable TRL source documents and calculations

ADM found the following in the dataset.

- Program tracking data provided heating and cooling data as well as baseline and efficient specifications for 1615 records (37 percent) to verify that the correct measure and claimed savings were recorded. This data was not provided for the remaining 2680 (63 percent) of records to verify that the correct savings were claimed.
- Of the 1615 records for which heating and cool type was specified, 5 records included the incorrect measure.
- Average claimed savings in program tracking data did not match TRL documented savings for four measures. See 3.6.4 Discussion of Realization Rates.

3.6.2 Ex Ante Review

ADM verified that the UES values included in the TRL by Rocky Mountain Power were supported by the applicable reference documents.

3.6.3 Evaluated Savings

ADM used a 100 percent ISR for home insulation measures. Because of the small percentage of program savings that resulted from home insulation, ADM did not survey program participants to verify savings calculation variables. ADM used TRL reference documents to determine evaluated savings. Savings by measure are included in Table 3-37 through Table 3-39.

Table 3-37: Building Shell Program Savings by Measure 2019-2020

Measure - Version	Quantity (sq ft)	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings
Insulation - Attic - CAC Only - SF - UT - 6	2,415,826	389,180	386,532	99%	75%	290,672
Insulation - Attic - CAC Only - SF - Self Install - UT - 1	33,521	5,363	5,363	100%	75%	4,033
Insulation - Attic - CAC Only - SF - UT - 1	63,757	10,711	10,195	95%	75%	7,667
Insulation - Attic - CAC Only - SF - UT - 6	98,885	22,265	22,265	100%	75%	16,743
Insulation - Attic - Electric Cooling - UT - 4	575,651	74,835	74,835	100%	75%	56,276
Insulation - Attic - Electric Cooling - UT - 5	1,255,407	163,203	166,183	102%	75%	124,970
Insulation - Attic - Electric FAF with CAC - SF - UT - 6	18,374	24,254	24,254	100%	75%	18,239
Insulation - Attic - Electric FAF with CAC - SF - UT - 6	2,076	2,387	2,387	100%	75%	1,795
Insulation - Attic - Electric FAF with CAC - UT - 4	5,354	7,442	7,442	100%	75%	5,596
Insulation - Attic - Electric FAF with CAC - UT - 5	13,543	18,825	18,676	99%	75%	14,044
Insulation - Attic - Electric FAF without CAC SF - UT -6	1,943	2,234	2,234	100%	75%	1,680
Insulation - Attic - Electric FAF without CAC - UT - 4	3,356	4,061	4,061	100%	75%	3,054
Insulation - Attic - Electric FAF without CAC - UT - 5	2,147	2,598	2,598	100%	75%	1,954
Insulation - Attic - Electric Heat Pump - SF - UT - 6	1,680	1,193	1,193	100%	75%	897
Insulation - Attic - Electric Heat Pump - SF - Self Install - UT - 1	625	413	444	108%	75%	334
Insulation - Attic - Electric Heat Pump - SF - UT - 6	750	533	533	100%	75%	400
Insulation - Attic - Electric Heat Pump Heating System - UT - 4	3,525	2,644	2,644	100%	75%	1,988
Insulation - Attic - Electric Heat Pump Heating System - UT - 5	1,540	1,155	1,155	100%	75%	869
Total	**4,623,040**	**733,294**	**732,993**	**100%**	**75%**	**551,211**

Table 3-38: Building Shell Program Savings by Measure 2019

Measure - Version	Quantity (sq ft)	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings
Insulation - Attic - CAC Only - SF - UT - 6	98,885	22,265	22,265	100%	75%	16,743
Insulation - Attic - Electric Cooling - UT - 4	575,651	74,835	74,835	100%	75%	56,276
Insulation - Attic - Electric Cooling - UT - 5	1,245,237	161,881	164,861	102%	75%	123,976
Insulation - Attic - Electric FAF with CAC - SF - UT - 6	2,076	2,387	2,387	100%	75%	1,795
Insulation - Attic - Electric FAF with CAC - UT - 4	5,354	7,442	7,442	100%	75%	5,596
Insulation - Attic - Electric FAF with CAC - UT - 5	13,543	18,825	18,676	99%	75%	14,044
Insulation - Attic - Electric FAF without CAC - UT - 4	3,356	4,061	4,061	100%	75%	3,054
Insulation - Attic - Electric FAF without CAC - UT - 5	2,147	2,598	2,598	100%	75%	1,954
Insulation - Attic - Electric Heat Pump - SF - UT - 6	750	533	533	100%	75%	400
Insulation - Attic - Electric Heat Pump Heating System - UT - 4	3,525	2,644	2,644	100%	75%	1,988
Insulation - Attic - Electric Heat Pump Heating System - UT - 5	1,540	1,155	1,155	100%	75%	869
Total	**2,063,157**	**298,624**	**301,456**	**101%**	**75%**	**226,695**

Table 3-39: Building Shell Program Savings by Measure 2020

Measure - Version	Quantity (sq ft)	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings
Insulation - Attic - CAC Only - SF - UT - 6	2,415,826	389,180	386,532	99%	74%	284,101
Insulation - Attic - CAC Only - SF - Self Install - UT - 1	33,521	5,363	5,363	100%	74%	3,942
Insulation - Attic - CAC Only - SF - UT - 1	63,757	10,711	10,195	95%	74%	7,493
Insulation - Attic - Electric Cooling - UT - 5	10,170	1,322	1,322	100%	74%	972
Insulation - Attic - Electric FAF with CAC - SF - UT - 6	18,374	24,254	24,254	100%	74%	17,826
Insulation - Attic - Electric FAF without CAC - SF - UT - 6	1,943	2,234	2,234	100%	74%	1,642
Insulation - Attic - Electric Heat Pump - SF - UT - 6	1,680	1,193	1,193	100%	74%	877
Insulation - Attic - Electric Heat Pump - SF - Self Install - UT - 1	625	413	444	108%	74%	326
Total	**2,559,883**	**434,670**	**431,537**	**99%**	**74%**	**317,180**

3.6.4 Discussion of Realization Rates

The claimed UES did not match TRL UES for measures reported in Table 3-40 resulting in realization rates both higher and lower than 1.0.

Table 3-40: Measures with Undocumented Claimed Savings

Measure - Version	Average Claimed UES	TRL UES
Insulation - Attic - CAC Only - SF - UT - 1	0.17	0.16
Insulation - Attic - CAC Only - SF - UT - 6	0.23	0.16
Insulation - Attic - Electric FAF with CAC - SF - UT - 6	1.15	1.32
Insulation - Attic - Electric Heat Pump - SF - Self Install - UT - 1	0.66	0.71

3.6.5 Net to Gross Ratio

ADM used a program wide NTG of 75 percent for building shell measures. The category was too small to complete a category specific NTG analysis.

3.7 Starter Kits

Rocky Mountain Power supplied 2,317 energy saving kits, referred to as *Starter Kits* on the Rocky Mountain Power web site, at no charge to eligible customers who requested them. The kits resulted in 294,735 kWh of net savings, accounting for 0.4 percent of total program savings during the evaluation period, with a 63 percent realization rate and a 84 percent net-to-gross ratio.

All kits contained four standard LED bulbs; customers who indicated that they had an electric water heater also received water saving aerators and low-flow showerheads for up to two bathrooms. Rocky Mountain Power customer eligibility was determined through a web-based portal where customers ordered kits.

Total starter kit savings are presented in Table 3-41 through Table 3-43.

Table 3-41: Starter Kit Program Savings 2019-2020

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
Energy Savings Kit - Best - 1 Bathroom – UT - 4	174	70,576	38,214	54%	84%	32,092
Energy Savings Kit - Best - 2 Bathrooms – UT - 4	407	285,795	142,501	50%	84%	120,152
Energy Savings Kit - Best 1 - 1 Bathroom - Multifamily – UT - 4	33	13,385	7,248	54%	84%	6,086
Energy Savings Kit - Best 2 - 2 Bathrooms - Multifamily – UT - 4	77	54,069	26,960	50%	84%	22,731
Energy Savings Kit - LED - Multifamily – UT - 4	147	12,236	12,445	102%	83%	10,277
Energy Savings Kit - LED – UT - 4	1,479	123,112	125,213	102%	83%	103,396
Total	**2,317**	**559,174**	**352,580**	**63%**	84%	**294,735**

Table 3-42: Starter Kit Program Savings 2019

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
Energy Savings Kit - Best - 1 Bathroom – UT- 4	159	64,492	34,920	54%	84%	29,326
Energy Savings Kit - Best - 2 Bathrooms – UT -4	382	268,240	133,748	50%	84%	112,772
Energy Savings Kit - Best 1 - 1 Bathroom - Multifamily – UT - 4	33	13,385	7,248	54%	84%	6,086
Energy Savings Kit - Best 2 - 2 Bathrooms - Multifamily – UT - 4	77	54,069	26,960	50%	84%	22,731
Energy Savings Kit - LED - Multifamily – UT - 4	147	12,236	12,445	102%	83%	10,277
Energy Savings Kit - LED – UT = 4	1,381	114,954	116,916	102%	83%	96,545
Total	**2,179**	**527,378**	**332,236**	**63%**	84%	**277,737**

Table 3-43: Starter Kit Program Savings 2020

Measure - Version	Quantity	Claimed Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
Energy Savings Kit - Best - 1 Bathroom – UT - 4	15	6,084	3,294	54%	84%	2,767
Energy Savings Kit - Best - 2 Bathrooms – UT - 4	25	17,555	8,753	50%	84%	7,380
Energy Savings Kit - LED – UT - 4	98	8,158	8,297	102%	83%	6,851
Total	**138**	**31,797**	**20,344**	**64%**	84%	**16,998**

3.7.1 Tracking Data Verification

ADM reviewed program tracking data to evaluate:

- if tracking dataset included duplicate or erroneous data entries,
- if data entries in the program tracking dataset included all necessary fields for savings calculations,
- if claimed energy savings match the applicable TRL source documents and calculations.

ADM found the following in the dataset.

- Two customers received two starter kits.

3.7.2 Ex Ante Review

ADM completed an ex ante review of each kit component to verify that claimed savings in the tracking data reflected the ex ante values in the TRL reference documents. Reference files included additional embedded reference files for each kit component.

3.7.3 Evaluated Savings

To calculate evaluated savings, ADM used ISRs and percentage of recipients with electric water heaters drawn from participant survey responses. Respondents reported installation information for each component, allowing ADM to calculate ISRs for each kit component separately. Only customers who received water savings measures were consider when calculating percentage of participants with electric water heaters. UES for starter kits are reported in Table 3-44.

Table 3-44: Starter Kit Unit Energy Savings (UES) by Component

Kit Component	Claimed UES (kWh)	Evaluated Gross UES (kWh)	Evaluated ISR*	Evaluated % electric DWH	Gross Evaluated (kWh)	Realization Rate	NTG	Net Evaluated UES (kWh)
Energy Savings Kit - Best - 1 Bathroom								
LED 1 (9.5 Watt)	20.81	22.67	96%		21.85	105%	83%	18.05
LED 2 (9.5 Watt)	20.81	22.67	97%		22.03	106%	83%	18.19
LED 3 (9.5 Watt)	20.81	22.67	92%		20.94	101%	83%	17.29
LED 4 (9.5 Watt)	20.81	22.67	88%		19.84	95%	83%	16.38
Aerator Kitchen (1.5 gph)	25.77	30.52	67%	47%	9.58	37%	84%	8.07
Aerator Bath 1 (0.5 gpm)	62.59	74.12	74%	47%	25.70	41%	84%	21.66
Showerhead 1 (1.5 gpm)	234	277	76%	47%	99.68	43%	85%	84.79
TOTAL	**405.6**				**219.62**	**54%**		**184.44**
Energy Savings Kit - Best - 2 Bathrooms								
LED 1 (9.5 Watt)	20.81	22.67	96%		21.85	105%	83%	18.05
LED 2 (9.5 Watt)	20.81	22.67	97%		22.03	106%	83%	18.19
LED 3 (9.5 Watt)	20.81	22.67	92%		20.94	101%	83%	17.29
LED 4 (9.5 Watt)	20.81	22.67	88%		19.84	95%	83%	16.38
Aerator Kitchen (1.5 gph)	25.77	30.52	67%	47%	9.58	37%	84%	8.07
Aerator Bath 1 (0.5 gpm)	62.59	74.12	74%	47%	25.70	41%	84%	21.66
Aerator Bath 2 (0.5 gpm)	62.59	74.12	87%	47%	30.23	48%	84%	25.48
Showerhead 1 (1.5 gpm)	234	277	76%	47%	99.68	43%	85%	84.79
Showerhead 2 (1.5 gpm)	234	277	77%	47%	100.27	43%	85%	85.30
TOTAL	**702.19**				**350.13**	**50%**		**295.21**
Energy Savings Kit – LED								
LED 1 (9.5 Watt)	20.81	22.67	96%		21.85	105%	83%	18.05
LED 2 (9.5 Watt)	20.81	22.67	97%		22.03	106%	83%	18.19
LED 3 (9.5 Watt)	20.81	22.67	92%		20.94	101%	83%	17.29
LED 4 (9.5 Watt)	20.81	22.67	88%		19.84	95%	83%	16.38
TOTAL	**83.24**				**84.66**	**102%**		**69.91**

SOURCES: (Evaluated ISR and % Electric DWH) Customer survey 2021. Evaluated gross UESs are based on direct install distribution with ISRs of 1.0. This allowed the application of evaluated ISRs to the same bulb type as included in TRL files for kits.

3.7.4 Discussion of Realization Rates

The following factors impacted realization rates for starter kits. Note that gross evaluated component UESs were drawn from reference files as direct installed to start with an assumed ISR of 100 percent for the same measures that were included in the kits with lower ISRs for by-request distributions.

LEDs

LED realization rates exceeded 100 percent because evaluated ISRs exceeded ex ante ISRs except for the last of the 4 bulbs in each kit. ADM used survey data to calculate ISRs for each light bulb in the kit; individual ISRs ranged from 97 to 88 percent. Realization rates over 100 percent reflect the higher ISRs.

Aerators and Showerheads

ISRs for water saving measures were calculated for each individual component. Evaluated ISRs were lower than ex ante ISRs, decreasing their realization rates.

Ex ante savings were based on the assumption that all recipients of water saving measures had electric water heaters. The evaluated percentage of electric water heaters for customers who received water saving measures was 47 percent reducing realization rates.

Duplication of kits sent to customers

No savings were assigned to two kits that were distributed outside the lifetime per customer limit guidelines. This adjustment had no material impact on the realization rate.

3.7.5 Net to Gross Ratio

ADM completed a net-to-gross analysis for starter kits using responses to the Starter Kit Participant Survey. A net-to-gross ratio captures the savings that would have occurred without the program intervention as well as additional non-incentivized savings that occur as result of energy saving actions participants take as a result of the program. The net to gross factor is calculated as indicated in Equation 3-4.

Equation 3-4: Net to Gross Calculation

$$Net\ to\ Gross\ Ratio = 1 - Free\ Ridership\ Rate + Spillover\ Rate$$

3.7.5.1 Free Ridership

Free ridership estimates the percentage of participant who would have installed the same energy-saving measures if they had not received them through the program. To determine free ridership scores, ADM used participant survey responses about:

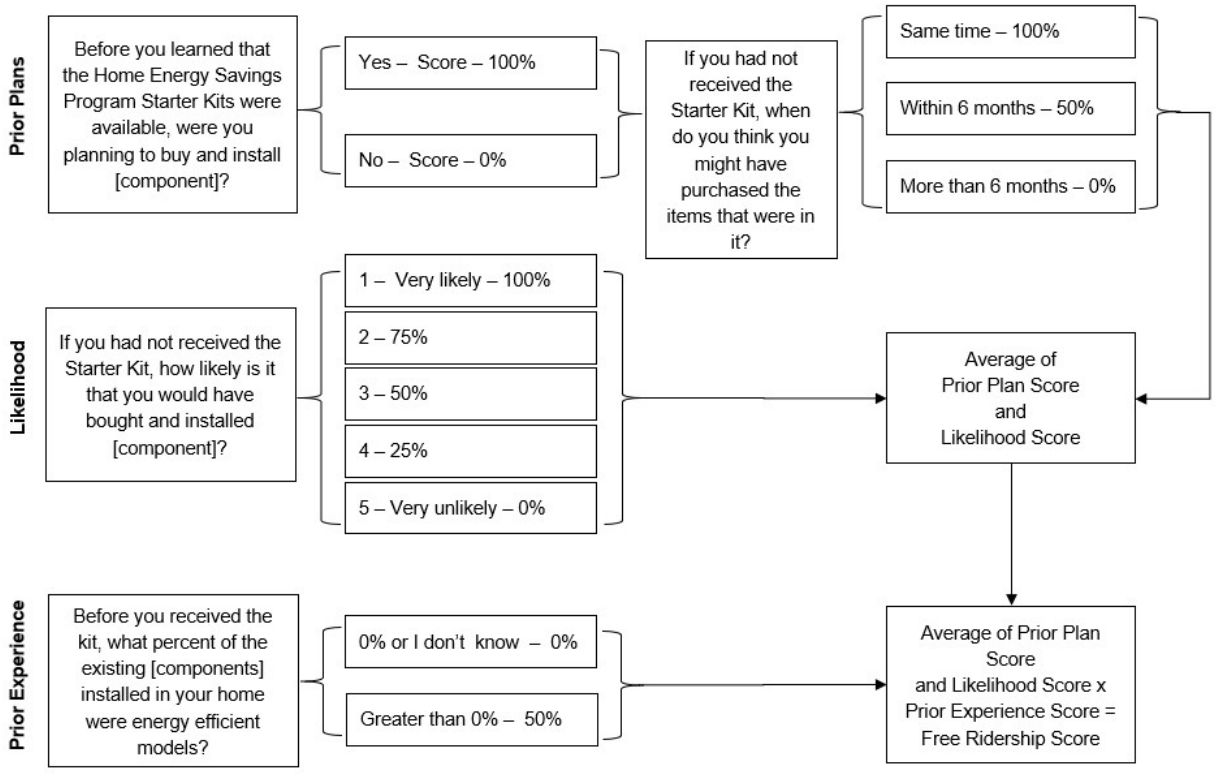
- Participant's prior plans to install kits components in their home
- Estimate of time when they would have installed the components
- Likelihood that the participant would have installed the components
- Prior installations of similar measures in the home

ADM calculated a free ridership score for each kit component using Equation 3-5 as illustrated in Figure 3-5. Each participant was assigned a free ridership score for each kit component. Participants' scores were averaged to calculate overall free ridership score for each component.

Equation 3-5: Kits Free Ridership

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

Figure 3-5: Kits Free Ridership Methodology



Free ridership scores by kit component are included in Table 3-45.

Table 3-45: Free Ridership Scores by Kit Component

Kit Component	Free Ridership Score
LEDs	23%
Aerators	22%
Low Flow Showerheads	21%

3.7.6 Spillover

Spillover represents energy savings that resulted indirectly from the program's influence on participants to implement additional energy saving measures without receiving a program incentive.

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. Participants who report implementing one or more efficiency measures are then asked two questions used to develop a spillover score:

SO1: How important was your experience with the Home Energy Savings Program Starter Kits when you installed [spillover measure]?

SO2: How likely would you have been to take the additional steps to save energy if you had not received the Home Energy Savings Program Starter Kit?

Responses were collected using a 5-point Likert Scale evaluating program influence on installing the additional energy saving measures. The spillover score is the average of the responses to the two questions (see Equation 3-6).

Equation 3-6: Spillover Score for Installed Measures

$$Spillover\ Score\ =\ Average(SO1, 5 - SO2)$$

Any energy saving measures with a spillover score of 4 or greater were included in spillover savings. Spillover is represented as the percentage of total spillover savings discovered through the survey divided by the total of kit savings generated by survey respondents. This ratio is applied as the spillover rate for kits (see Equation 3-7).

Equation 3-7: Spillover Ratio for Kits Program

$$Spillover\ Ratio = \\ Sum\ of\ savings\ from\ all\ measures\ with\ spillover\ scores\ greater\ than\ 4\ \div\ Total\ kits\ savings\ generated\ by\ survey\ respondents)$$

The evaluated spillover for kits was 6 percent for the evaluation period (see Table 3-46 through Table 3-48.

Table 3-46: Spillover Measures Identified

Measures with Spillover Scores >= 3	Quantity	UES (kWh)	Total Energy Savings (kWh)
LEDs	61	19.75	1,204.57

Table 3-47: Total Claimed Savings from Survey Respondents

Kit Type Received by Survey Respondent	Ex Ante UES	Qty surveyed	Total Claimed Savings for Survey respondents
Energy Savings Kit - LED – UT - 4	83	95	7,908
Energy Savings Kit - Best - 1 Bathroom – UT - 4	406	4	1,622
Energy Savings Kit - Best - 2 Bathrooms – UT - 4	702	16	11,235
Total			**20,765**

Table 3-48: Starter Kit Spillover Rate

Claimed Savings (kWh)	Total Spillover Savings	Spillover Rate
20,765	1,204.57	6%

Net- to-gross results are presented in Table 3-49.

Table 3-49: Starter Kits Net to Gross Results by Kit Component

Kit component	Free ridership	Spillover	NTG
LEDs	23%	6%	83%
Aerators	22%	6%	84%
Low Flow Showerheads	21%	6%	85%

4 Process Evaluation

ADM completed a process analysis of the program which included in depth interviews and conversations with key staff at Rocky Mountain Power and program implementers. Additional information was gathered from a general customer survey, a starter kit participant survey, an HVAC participant survey and a review of program materials. ADM also contacted foodbank staff that received kits to distribute to their clients.

4.1 Roles and Responsibilities

The Rocky Mountain Power program manager is responsible for the Wattsmart Home Energy Savings programs in Utah, Wyoming and Idaho, including oversight of the regulatory process, assessing cost effectiveness of the program, regulatory recovery, review of marketing campaigns, program participation and procedures, and design and implementation of procedures.

Rocky Mountain Power contracted with CLEAResult as the program implementer during the evaluation period. Portions of the program are implemented by additional contractors, for example the new homes program was managed by iCAST and the starter kits program was managed by AM Conservation Group and sales of downstream central air conditioners was managed by Nexant. Implementation partner responsibilities included program implementation, contract management, client management, and overseeing day-to-day operations.

4.1.1 Program Design and Goals

The primary purpose of the program is to achieve conservation targets. Of note during this evaluation cycle, the COVID pandemic occurred during the last ten months of the evaluation period (March through December 2020).

4.1.2 Tracking and Reporting

Rocky Mountain Power savings documentation is comprised of the technical reference library (TRL) with its associated files and the program tracking dataset.

4.1.2.1 Technical Reference Library (TRL)

Ex ante program savings, as well as other measure specifications, are documented in Rocky Mountain Power's Technical Reference Library (TRL). The TRL is comprised of a list of all program measures and all versions of each measure. Measure specification are updated as required by changing regulatory and market conditions. The TRL file is maintained jointly by Rocky Mountain Power and its contracted program implementer. Each measure listed includes specifications for the measure and version number,

including reference files that document UES savings values or savings calculation methodologies.

TRL reference files generally rely on Regional Technical Forum's (RTF) library of measure UESs that is maintained by the Northwest Power and Conservation Council to verify and evaluate energy efficiency savings.

Because the TRL includes multiple versions of specific measures for which the savings values can vary, the accuracy of TRL necessitates that a specific reference file is indicated for each version of each measure. ADM found that the TRL often reported reference files used for groups of measures without explicitly indicating a reference file for each specific measure complicating ex ante review of claimed savings.

4.1.3.2 Program Tracking Dataset

Rocky Mountain Power maintains a program tracking dataset that includes:

- Measure name and corresponding data that ties to TRL
- Record or application status and relevant dates
- For downstream measures, customer and account information

The program implementer collects and retains the following data elements that are not included in Rocky Mountain Power's dataset:

- Product manufacturer and model numbers
- Retail sales location for upstream measures
- Baseline conditions

ADM found that key program tracking data elements are retained with program implementer and are not integrated into Rocky Mountain Power's program tracking database. Program data provided by Rocky Mountain Power and the implementer was missing some data required to verify savings as reported by measure category in *Section 3 Impact Analysis*.

4.1.3 Communication

Rocky Mountain Power has regular meetings with implementation staff. In addition, there are quarterly meetings and ad hoc communications. Weekly meeting topics include program status and performance, long-term strategy, day-to-day tactical decisions, and marketing activities.

4.2 General Population Survey

ADM administered a General Population Survey in 2020 to 400 Rocky Mountain Power customers to collect data about upstream LED lighting, room air conditioners and evaporative coolers measures included in the program during the evaluation period. The survey also collected data from non-participants to estimate a non-participant spillover rate. ADM sent customers email invitations to complete the questionnaire through an online survey platform and offered a monetary incentive (a $5 electronic gift card) to complete the survey. The survey collected data used for both the process evaluation and impact analyses.

Types of Purchases

Participants indicated if they purchased any of the upstream measures included in the program during the evaluation period. Twenty percent of respondents purchased ENERGY STAR® certified LED lighting products, 10 percent bought ENERGY STAR® certified room air conditioners, and seven percent bought an evaporative cooler. The remaining 64 percent stated they did not buy any products or did not recall purchasing any of these measures during 2019 or 2020 (see Table 4-1).

Table 4-1: Did you or anyone else in your home buy any of the following energy saving products in 2019 or 2020?

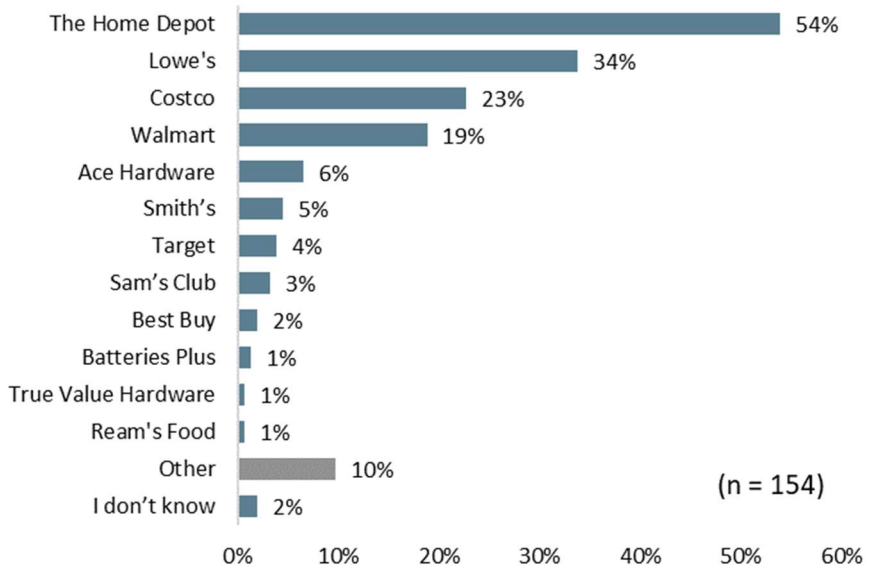
Products	Percent of Responses (n = 393)
I did not buy any of these products in 2019-2020	51%
ENERGY STAR® certified LED lighting products	20%
ENERGY STAR® certified room air conditioner	10%
Evaporative cooler	7%
I don’t remember	13%

*Multiple response questions- percentage exceeds 100%.

LED Lighting Measures

Customers who bought LED measures were asked if they purchased their measures from retail stores participating in the upstream lighting program. The top retail stores among the survey respondents were The Home Depot (54 percent), Lowe's (34 percent), and Costco (23 percent). Other retailers include Walmart (19 percent), Ace Hardware (6 percent), and Smith's grocery store (5 percent). See Figure 4-1: Which stores did you buy your ENERGY STAR® LED lighting from?

Figure 4-1: Which stores did you buy your ENERGY STAR® LED lighting from?



As shown above, of the 154 respondents, 10 percent indicated they purchased their LEDs from other sources. Of the respondents who bought their LEDs from non-participating retailers, ten people indicated they bought their lights from Amazon. One person said they also bought their LEDs from eBay, and one mentioned shopping online with no further specifications. The remaining respondents stated they purchased their LEDs from other companies like Rocky Mountain (n = 1), Royal Wholesale Electric (n = 1), or a solar company (n = 1).

Of the 140 participants who bought LED measures, 84 percent purchased standard LED bulbs, 37 percent bought specialty bulbs, 17 percent purchased fixtures, and 22 percent purchased LED downlights.

Table 4-2: Types of LED Lighting Purchased

Type	Percent (n = 140)
Standard LED bulb(s)	84%
Specialty LED bulb(s)	37%
LED fixture(s)	17%
LED downlight(s)	22%
I don't know	1%

*Multiple response questions- percentage exceeds 100%.

Furthermore, 76 percent of respondents purchased their standard LEDs during 2020 compared to 74 percent who purchased theirs in 2019. People who purchased specialty

LEDs or fixtures bought more in 2020 than in 2019. See the following table for more details; many of the participants bought their lights during both years.

Table 4-3: Purchases of LEDs by Years

LED Types	2019	2020
Standard LED bulb(s) (n = 117)	74%	76%
Specialty LED bulb(s) (n = 52)	58%	73%
LED fixture(s) (n = 24)	50%	67%
LED downlight(s) (n = 31)	2%	2%

*Multiple response question- percentage exceeds 100%.

Participant Motivations - LEDs

The most common reason given for buying LED bulbs was wanting to replace burned-out bulbs (62 percent), followed by replacing working bulbs with ones that consumed less energy (48 percent). Twenty-four percent of respondents indicated they had added a new light fixture in their home, and 10 percent wanted to take advantage of the discount pricing. Just one percent of the respondents could not recall.

Regarding the discount pricing, 21 percent of respondents indicated they recalled that the standard LEDs had been discounted, compared to 40 percent who stated the measures were not discounted, and 39 percent did not recall (n = 103). Of the people who recalled the discount, 27 percent remembered seeing a label or sign indicating Rocky Mountain Power provided the discount compared to the 45 percent who did not see a label and 27 percent who could not recall. For 64 percent of participants, the discount was somewhat or very important when purchasing the standard LEDs.

Table 4-4: How important was the discount to your purchase of ENERGY STAR® LED standard light bulbs?

Rating	***Percentage (n = 22)***
0- Not important	5%
1	0%
2	0%
3	0%
4	5%
5	9%
6	18%
7	27%
8	5%
9	9%
10- Very important	23%

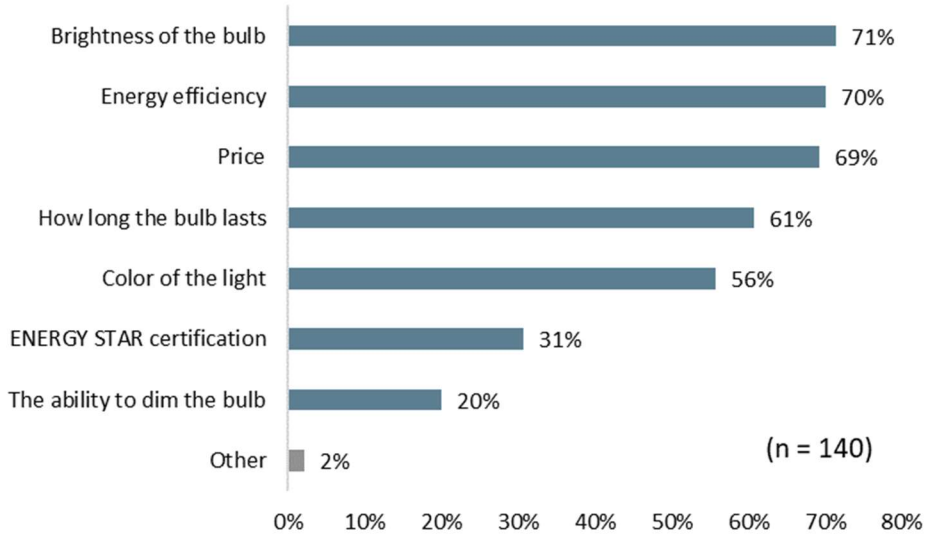
Participants who purchased specialty LED bulbs stated they either knew the measures were discounted (12 percent), were unaware (39 percent), or could not recall (49 percent). Three of the six people who knew the measures were discounted did not see a label indicating the discount was provided by Rocky Mountain Power compared to the 17 percent who did see a label and 33 percent who could not recall. The discount was somewhat important for 50 percent of participants compared to 50 percent who stated the discount was very important when purchasing the standard LEDs.

Of the 23 people who bought LED fixtures, 13 percent knew the measures were discounted, 35 percent did not, and 52 percent could not recall at the time of the survey. Only one person of the three who knew about the discount remembered seeing a label indicating the discount was provided by Rocky Mountain Power compared to two who did not recall. The discount was relatively important among the three people (6/10, 7/10, and 9/10 rating respectively; 0-10 scale rating with ten meaning "very important").

Nineteen percent of people who purchased LED downlights stated they recalled the discount (19 percent) compared to 48 percent who did not and 32 percent who could not recall. Of the six people who knew of the discounts only one recalled seeing a label indicating the discount was provided by Rocky Mountain Power. Finally, two people indicated the discount was very important compared to one who said the discount was not important, and the remaining three who indicated relative importance (2/10, 5/10, and 6/10 rating respectively; 0-10 scale rating with ten meaning "very important").

Although pricing was a major factor when considering the purchase, it was not the most important to many respondents. The figure below illustrates the top characteristics customers considered when purchasing LED lighting.

Table 4-5 Which characteristic do you consider when purchasing light bulbs?



ENERGY STAR® Certified Room Air Conditioners

Most participants who purchased an ENERGY STAR® certified room air conditioner during the evaluation period reported they did not buy it from a participating store (71 percent). One participant did indicate they bought their room air conditioner at The Home Depot, and 21 percent could not recall. Of the 71 percent (n = 10) who bought their room air conditioner elsewhere, half bought them from specialty retailers (50 percent), 30 percent from a big-box retailer, and 20 percent from a contractor (see Table 4-6).

Table 4-6 Which non-participating store did you purchase your ENERGY STAR® certified room air conditioner from?

Other Sources	Count (n = 10)
Contractor	2
Lowe's	2
Mountain Air Conditioning and Heating	1
Just Right Heating and Air	1
SOS Heating and Air	1
Any Hours Services	1
HVAC Company	1
Walmart	1

Participant Motivations- ENERGY STAR® Certified Room Air Conditioners

No participants responded to questions regarding what motivated them to purchase an air conditioner from a participating retailer.

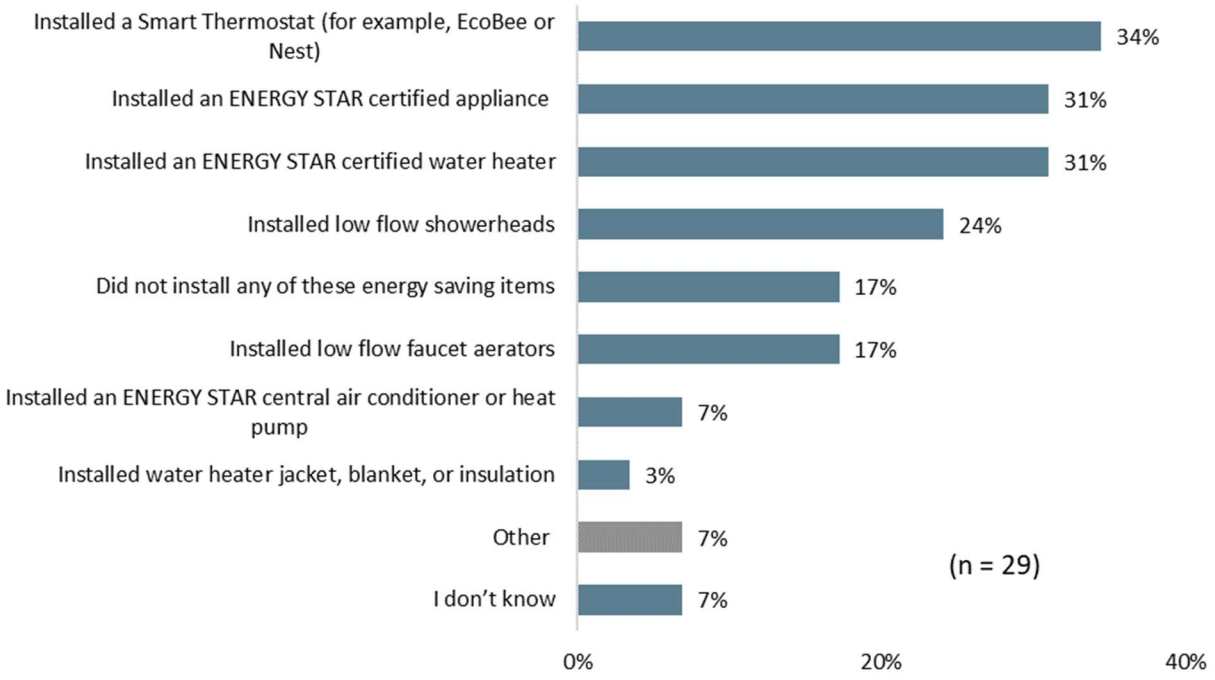
Evaporative Coolers

Six respondents reported that they purchased an evaporative cooler during the evaluation period. Two indicated they bought it from The Home Depot (n = 2), one through a classified ad (n = 1), and three could not recall (n = 3). Of the two participants who bought the evaporative coolers from The Home Depot, one purchased it during 2019 and the other in 2020. Both stated they replaced previously owned evaporative coolers with new ones. Only one of the two respondents stated they recalled the measure's price having a discount at the time of purchase.

Participant Behavior and Attitudes

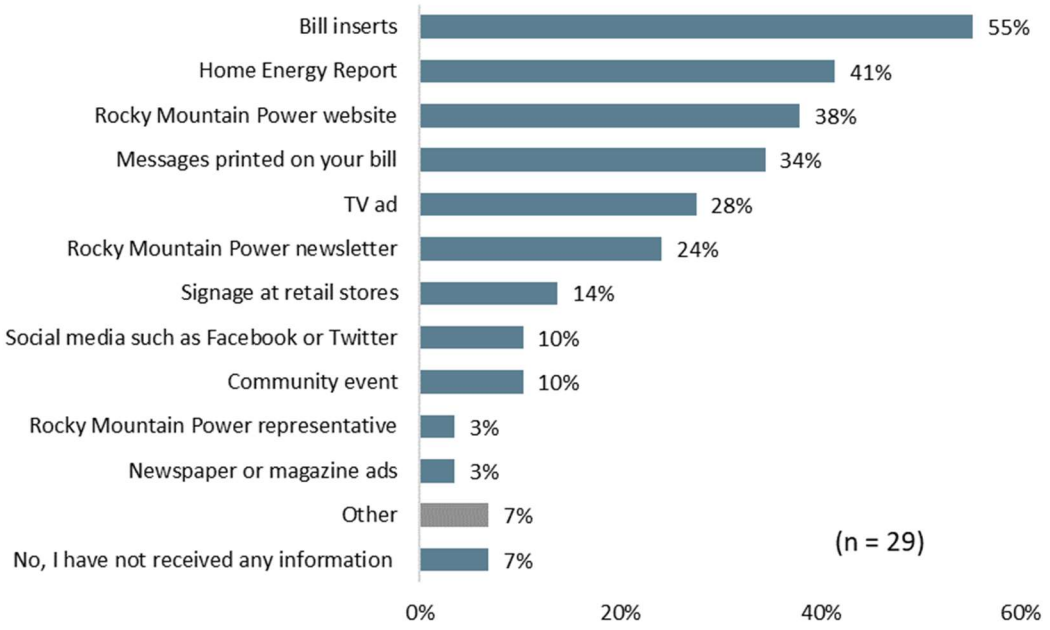
Some respondents who installed the discounted measures from the upstream program also stated they have since made other energy efficiency-related purchases. Figure shows measures survey respondents have installed in their homes. Most of the participants installed smart thermostats (34 percent), ENERGY STAR® certified appliances (31 percent), and ENERGY STAR® certified water heaters (31 percent).

Figure 4-2 After buying the discounted ENERGY STAR® lighting product, ENERGY STAR® room air conditioner, or evaporative cooler, have you taken any of the following additional steps to save energy in your home?



Program participants indicated whether they had received information from Rocky Mountain Power about how to save energy in their homes. Most participants stated they received information from bill inserts (55 percent), home energy reports (41 percent), or the utility's website (38 percent). See additional details below.

Figure 4-3: From where have you received information from Rocky Mountain Power about how to save energy in your home from any of these sources?



According to the respondents, many non-participants who purchased the above measures did not receive or recalled receiving any incentives or rebates for their products. See Table 4-7 below for more details.

Table 4-7 Did you receive an incentive or discount to buy the measure?

Measures	Yes	No	Do not recall
Smart thermostat (n = 10)	*80%*	*20%*	*0%*
ENERGY STAR® certified water heater (n = 9)	*33%*	*56%*	*11%*
ENERGY STAR® appliance (n = 9)	*22%*	*78%*	*0%*
Low-flow aerators (n = 5)	*20%*	*60%*	*20%*
Low-flow showerheads (n = 5)	*0%*	*100%*	*0%*
Water heater jacket, blanket, or insulation (n = 1)	*0%*	*100%*	*0%*
Room air conditioner (n = 2)	*0%*	*100%*	*0%*

Of the participants who purchased the ENERGY STAR® appliances, many purchased more than one type. Most people purchased a refrigerator (86 percent) (see Table 4-8).

Table 4-8 What kind of ENERGY STAR® certified appliance did you purchase?

Measure	Percentage (n = 7)
Refrigerator	86%
Dishwater	71%
Clothes washer	57%
Clothes dryer	57%

*Multiple response question- percentage exceeds 100%.

Many respondents who purchased a new water heater stated they replaced a natural gas storage tank water heater (83 percent), and one person stated that the new water heater came with their new home (17 percent). Finally, one respondent who bought a new room air conditioner stated they replaced an old central air conditioner cooling system.

Non-Participant Summary

Some of the respondents who stated they had not bought or could not recall having purchased any upstream discounted measures in 2019 or 2020, indicated the other ways they had participated in Rocky Mountain Power energy efficiency programs. Five percent of the people who participated in a program received a discount on measures or energy efficiency services, and another five percent purchased LED lighting or cooling products discounted by Rocky Mountain Power (see Table 4-9).

Table 4-9: In 2019 or 2020, did you participate in any of the following Rocky Mountain Power programs that promoted energy saving?

Response	Percentage (n = 256)
No one in my home participated in any Rocky Mountain Power energy efficiency program.	89%
Received a rebate or discount from Rocky Mountain Power energy efficient appliances, heating or cooling products, home insulation, or weatherization products and services.	5%
Purchased LED lighting products, an ENERGY STAR® room air conditioner, or an evaporative cooler discounted by Rocky Mountain Power from a retail store.	5%
Received a rebate or discount from Rocky Mountain Power on energy efficient products included in a new home that you purchased.	2%
Received a Rocky Mountain Power Wattsmart Homes Starter Kit that included LED light bulbs and may have included low flow faucet aerators and a showerhead.	1%

*Multiple response questions- percentage exceeds 100%.

Non-participants who purchased ENERGY STAR® certified appliances gave details on which measures they bought. Most respondents who bought appliances, bought more than one. The top two purchased appliances were refrigerators and dishwashers.

Table 4-10 Non-Participants: What type of ENERGY STAR® certified appliance did you purchase?

Measure	Percentage (n = 20)
Refrigerator	55%
Dishwater	45%
Clothes washer	45%
Clothes dryer	35%
Other	25%

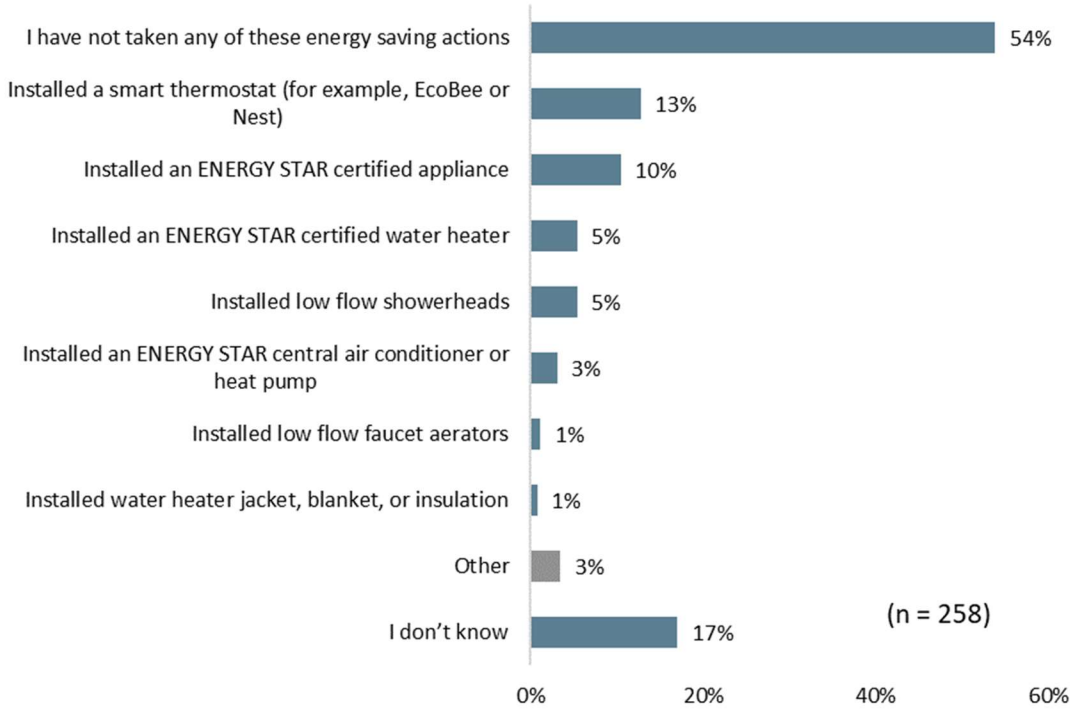
According to the respondents, not many non-participants who purchased the above measures received or recalled receiving any incentives or rebates for their products. See Table 4-11 below for more details.

Table 4-11 Did you receive an incentive or discount to buy the measure?

Measure	Yes	No	Do not recall
ENERGY STAR® certified appliance (n = 27)	7%	81%	11%
Low-flow faucet aerator (n = 3)	33%	67%	0%
Low-flow showerhead (n = 14)	7%	93%	0%
ENERGY STAR® certified water heater (n = 3)	33%	67%	0%
Room air conditioner (n = 9)	0%	67%	33%
Water heater jacket, blanket, or insulation (n = 3)	33%	67%	0%
ENERGY STAR® cooling system (n = 8)	0%	63%	38%
Smart thermostat (n = 33)	24%	61%	15%

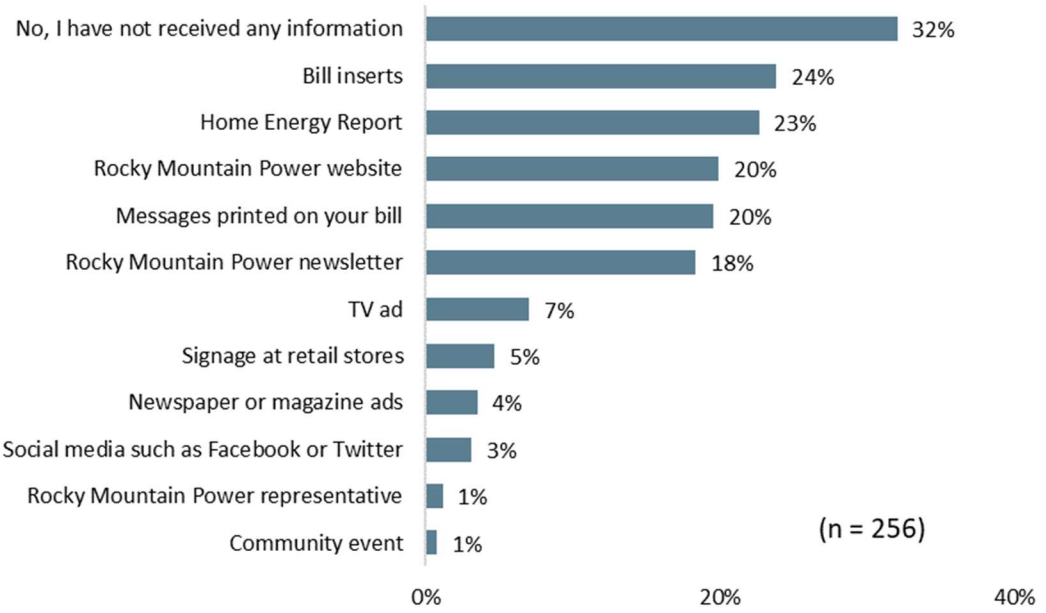
As shown in the figure below, 13 percent purchased smart thermostats,10 percent bought ENERGY STAR® certified appliances, and 5 percent bought ENERGY STAR® certified water heaters.

Figure 4-4 Non-Participants: In 2019 and 2020, did you take any of the following steps to save energy in your home based on the information you received from Rocky Mountain Power?



Twenty-four percent of non-participants stated they received information from the bill inserts, 23 percent received energy saving information from a home energy report, and 20 percent received efficiency information from the utility's website (20 percent). See additional details in Figure 4-5.

Figure 4-5 Non-Participants: Have you received information from Rocky Mountain Power about how to save energy in your home from any of these sources?



Home Characteristics

Participants' home characteristics are summarized in Table 4-12. Most reported living in single-family homes (68 percent) and most owned their homes (77 percent). More than half of the participants' homes were built before 2000 (54 percent).

Seventy-three percent of respondents reported that natural gas is their primary home heating fuel. Sixty percent of home sizes are between 1,000 and 3,000 square feet, and half of the respondents indicated that up to two people lived in their household. Nineteen percent of respondents indicated their income was below the federal poverty level.

Table 4-12: Home Characteristics

Home Characteristics	Percentage (n = 400)
Single-family home	68%
Apartment or condominium	15%
Duplex or townhouse	13%
Manufactured or mobile home	2%
Other	2%
Year Built	**Percentage (n = 399)**
Before 1960	13%
1960 to 1979	20%
1980 to 1999	21%
2000 to 2009	18%
2010 or later	20%
Do not recall/Prefer not to answer	9%
Own or Rent	**Percentage (n = 399)**
Own	77%
Rent	22%
Do not recall/Prefer not to answer	1%
What is the main fuel used for heating your home?	**Percentage (n = 400)**
Natural Gas	73%
Electricity	20%
Propane	2%
Don't heat home	<1%
Other	<1%
Do not recall/Prefer not to answer	5%
How large is your home?	**Percentage (n = 400)**
Less than 1,000 square feet	12%
1,000-2,000 square feet	34%
2,000-3,000 square feet	26%
3,000-4,000 square feet	15%
Greater than 4,000 square feet	8%
Do not recall/Prefer not to answer	5%

4.3 Starter Kits Program Participant Survey

A total of 112 customers who participated in the Starter Kits Program 2019 or 2020 completed a Starter Kit Participant questionnaire administered online by ADM. The survey gathered data related to program awareness, measures installed, in-service rates, experience, and various aspects of the customers' satisfaction. The survey collected data for both the process evaluation and impact analyses.

Program Awareness and Enrollment Experience

Participants provided information and feedback regarding how they learned about the Starter Kits program. More than half of participants reported hearing about the program through the utility's website (57 percent), utility bills insert (31 percent), or through a message printed on the bill (12 percent). A summary of survey responses appears in Table 4-13.

Table 4-13: How did respondents learn about the program?

How did you hear about these kits?	Percentage (n = 112)
Rocky Mountain Power website	57%
Utility bill insert	31%
My bill	12%
Word of mouth	8%
Rocky Mountain Power newsletter	4%
Rocky Mountain Power representative	3%
Home Energy Report	3%
TV ad	2%
Community event	2%
Social media such as Facebook or Twitter	2%
I don't know	4%
**Percentage exceeds 100%. Participants could choose more than one option.*	

Customer Experience and Installation of Measures

Survey respondents provided feedback about their experience installing the kit contents. Respondents were asked if their home had an electric water heater. Eighty-six percent of respondents (n = 112) reported they have a natural gas water heater, compared to 12 percent who have an electric water heater. Customers who received either bath kit-1 or bath kit-2 (n = 21) reported having an electric (47 percent) or natural gas water heater (52 percent). See the two tables below for more details.

Table 4-14 What fuel does your main water heater use?

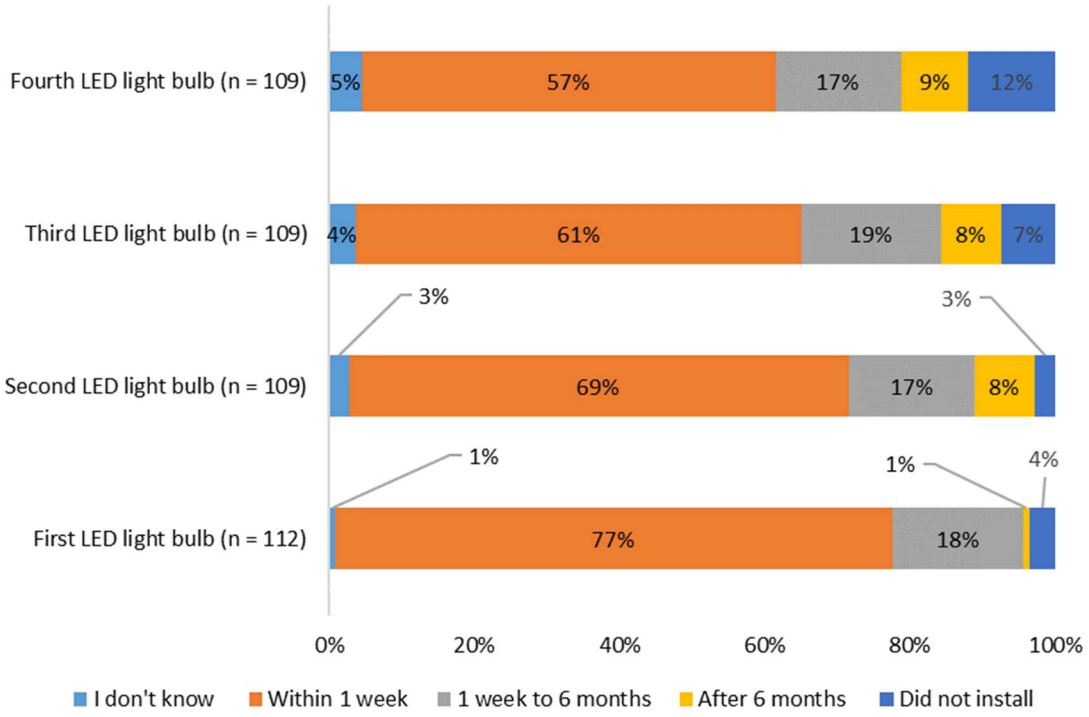
What fuel does your main water heater use?	Percentage of All Kit Recipients (n = 112)
Natural gas	86%
Electricity	12%
Propane	1%
I don't know	2%

Table 4-15 What fuel does your main water heater use?

What fuel does your main water heater use?	Percentage of Bath-1 and Bath-2 Kit Recipients (n = 21)
Electricity	47%
Natural gas	52%

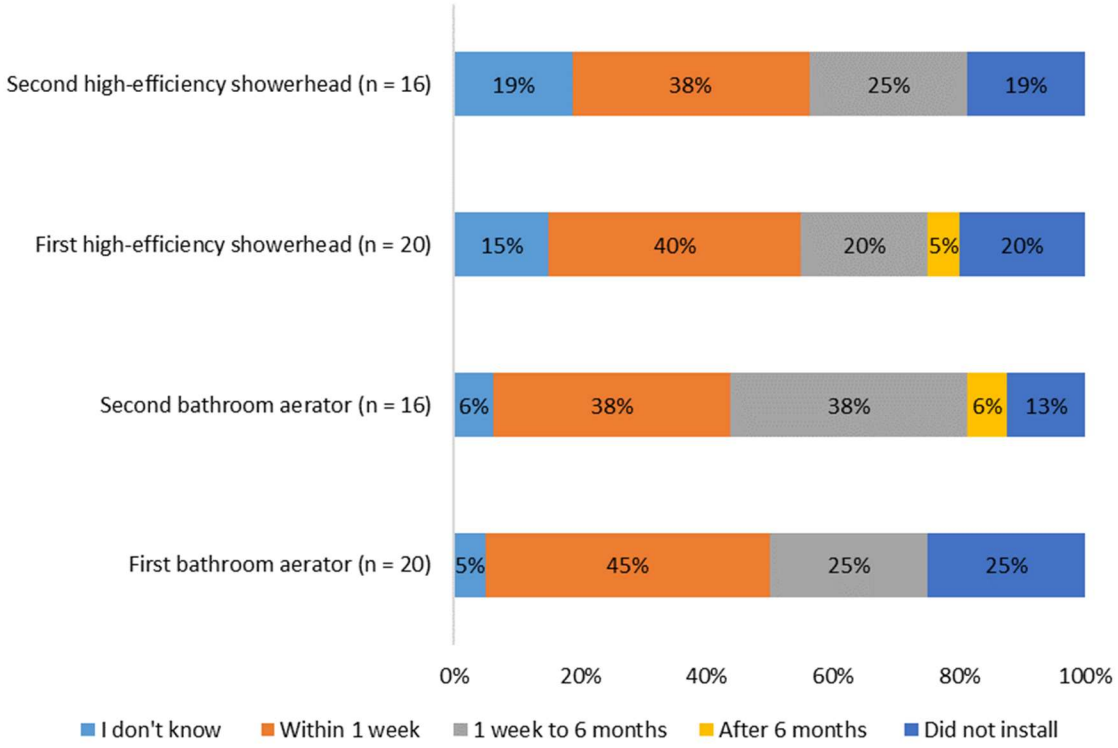
Most respondents indicated they installed their LED lightbulbs within a week of receiving the kits. See Figure for more details. Kit recipients who had not installed the LEDs at the time of the survey stated they were waiting for their bulbs to burn out (n = 13). Others stated that the bulb was not a correct wattage (n = 3), one person disliked the color, and another stated the bulb did not fit into the fixtures.

Figure 4-6 How long after receiving your kit did you install the LEDs?



For participants who also received showerheads or bathroom aerators, approximately 40 percent of customers installed them within a week (see Figure). Forty-three percent of people installed kitchen aerators within a week, 33 percent had not installed them, 19 percent installed them between a week to six months, and five percent installed the measure(s) after six months.

Figure 4-7 How long after receiving your kit did you install the bathroom measures?

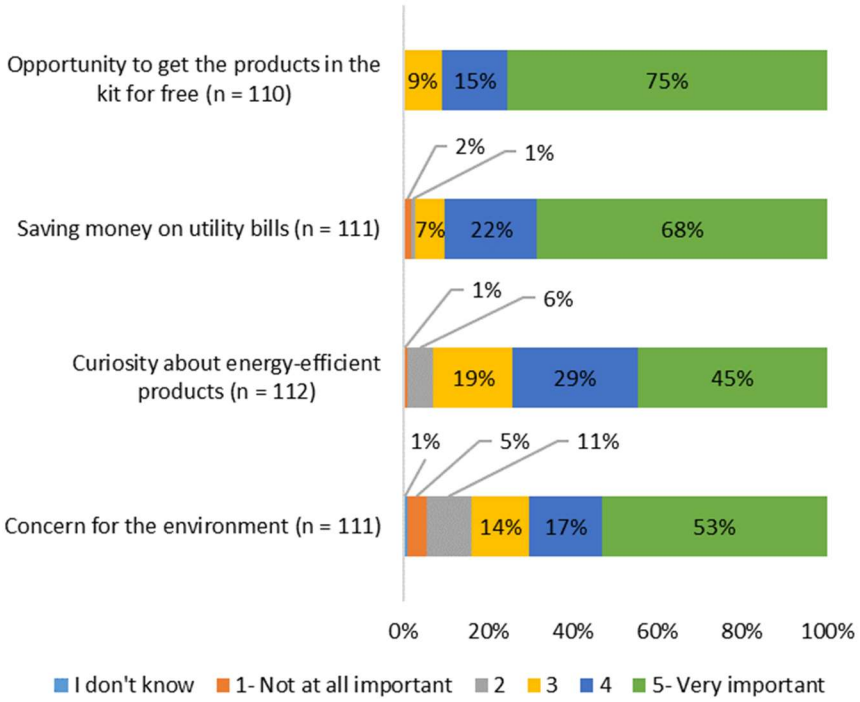


Reasons for not using the showerheads ranged from having high-efficiency showerheads already installed (n = 1), the measure did not integrate well with the plumbing (n = 2), disliked the water pressure (n = 1), or disliked the way it looked (n = 2). People who decided not to install the aerators stated they already had an aerator(s) installed (n = 2), the measure did not integrate well with the plumbing (n = 5) or they disliked the way it looked (n = 1).

Participant Motivations

Respondents provided feedback regarding what influenced them to request the Starter Kit. Ninety percent of respondents ranked “opportunity to get the products in the kit for free” as their strongest motivation to request a kit, followed by “saving money on utility bills” (90 percent).

Figure 4-8: Survey respondents' Ranking of Reasons for Requesting a Starter Kit



Before learning about the kits, 77 percent of respondents stated they had intentions of installing LED lights. Only 22 percent of customers had no LEDs in their homes. Moreover, 49 percent stated they would have bought and installed the LEDs even if they had not received the energy kits. Yet, the time the customers would have taken to install the bulbs extended beyond six months. Seventy-seven percent stated they would have waited up to six months or longer to install the bulbs, compared to seven percent who would have bought them around the same time they received the energy kit.

Since receiving the kits, 90 customers reported installing additional LEDs. The number of bulbs purchased ranged from two to 75. Thirty-three percent of participants indicated their bulbs had been discounted from their regular pricing, but only 33 percent indicated that Rocky Mountain Power had provided the discount for the additional LED bulbs they purchased.

Thirty-three reported owning energy-efficient showerheads compared to 57 percent who stated they did not have one before receiving the kit. Without the kit, 20 percent reported they would have bought showerheads for their home. Only 10 percent said they would have bought and installed the showerhead(s) about the same times as when they obtained the kit. Eleven people reported installing additional showerheads since participating in the program.

For people who installed the aerators, only 25 percent were likely to install the measures before learning about the program. Without receiving a kit, 10 percent reported they would

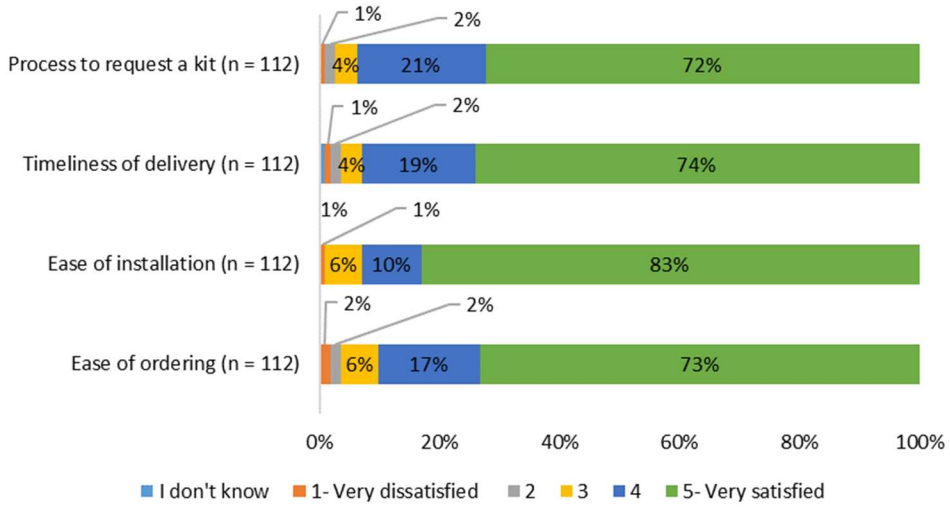
have been likely to purchase an aerator. Forty-five percent thought they would take six months or longer. Three people purchased additional aerators after participating in the program.

Customers also reported about additional actions they took to save energy. For example, 38 people have purchased ENERGY STAR appliances or equipment, 45 installed a new smart thermostat, and 15 installed a water heater or a water heater accessory. Additionally, 11 installed an energy efficient central air conditioner, heat pump, or evaporative cooler, while four people reported taking other actions.

Customer Satisfaction

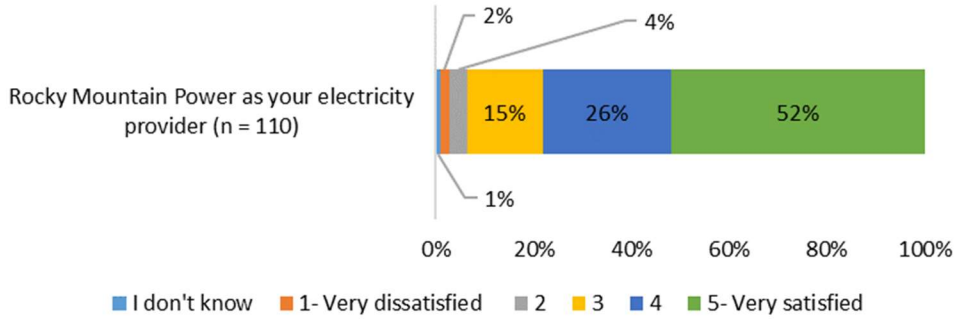
Participants provided feedback regarding their level of satisfaction with specific aspects of the program and their overall experience. Participants indicated they were satisfied with the process to request a kit (93 percent), the timeliness of delivery (93 percent), ease of installation (93 percent), and ease of ordering (90 percent). See Figure 4-9. Respondents also expressed satisfaction with the contents found in the kits (81 percent) and the measures' quality (86 percent).

Figure 4-9: Customer Satisfaction with Starter Kit Program



Fifty-six percent of respondents indicated they were satisfied or very satisfied with the amount of energy savings they perceived from installing the measures compared to 21 percent who saw no difference, and seven percent who were not satisfied. Overall satisfaction with the Rocky Mountain Power as their utility company was 78 percent (see Figure).

Figure 4-10 Customer Satisfaction with Rocky Mountain Power



Home Characteristics

Participants' home characteristics are summarized in Table 4-16. Participants most often reported living in single-family homes (77 percent) and most owned their home (85 percent). Sixty-two percent of respondents' homes were built in 1999 or earlier, 37 percent were built during the year 2000 or later, and the remaining two percent were unsure. Eighty-nine percent of respondents also stated they live in a household of up to five people.

Eighty-three percent of respondents reported that natural gas was their main home heating fuel, while 87 percent reported natural gas as their main water heating fuel.

Table 4-16: Home Characteristics

Home Characteristics	Percentage (n = 112)
Single-family home	77%
Apartment or condominium	11%
Duplex or townhouse	11%
Manufactured or mobile home	1%
I don't know	1%
Year Built	**Percentage (n = 112)**
Before 1960	20%
1960-1979	16%
1980-1999	26%
2000-2009	17%
2010 or later	20%
I don't know	2%
Own or Rent	**Percentage (n = 112)**
Own	85%
Rent	13%
Prefer not to answer	2%
What is the main fuel used for heating your home?	**Percentage (n = 112)**
Natural Gas	83%
Electricity	15%
Propane	1%
Don't heat home	1%
What fuel does your main water heater use?	**Percentage (n = 112)**
Natural Gas	87%
Electricity	12%
Propane	1%
I don't know	2%

4.4 Process Evaluation Key Findings

ADM made the following key findings during its process analysis.

- The technical reference library (TRL) is a key program reference resource that documents ex ante savings values for all versions of all measures included in the program. Maintaining TRL version control, timeliness and completeness is a challenge for which opportunities for process improvement are available.
- Rocky Mountain Power receives and maintains program tracking dataset. Additional information, such as upstream sales details, downstream product model specifications, and new home model details, are maintained by the implementer.
- The program tracking dataset did not include some data elements that were required to verify savings for some measure categories which therefore impacted realization rates.
- Rocky Mountain Power attribution for upstream program discounts is relatively low; 27 percent of customers who reported purchasing discounted standard LED light bulbs from participating retailers recalled that the discount was provided by Rocky Mountain Power.
- Survey responses suggest that there may be an opportunity to increase the number of participants in the upstream room air conditioning program if more participating retailers were recruited.
- Over thirty percent of Rocky Mountain Power non-participating customers who responded to the survey indicated they had not received any information about energy saving from the utility.
- General satisfaction with the Rocky Mountain Power as their utility company was high.
- Nineteen percent of general customer survey respondents indicated their income was below the federal poverty level.

5 Cost-Effectiveness

Guidehouse estimated the cost-effectiveness results for the program based on 2019 and 2020 costs and savings estimates provided by PacifiCorp. Cost-effectiveness was tested using the 2019 and 2020 IRP decrement for all measure categories. The program passes the cost-effectiveness for the UCT and PCT tests.

The onset of the covid-19 pandemic occurred 15 months into the 24-month evaluation period. In response, Rocky Mountain Power increased its distribution of energy saving products through foodbanks to target its customers who were hardest hit by the economic downturn to help them reduce their energy costs. The foodbank distributions were a quick-response approach to assisting customers during an acute crisis.

Cost effectiveness results are presented separately for:

- Total program excluding measures distributed through foodbanks
- Measures distributed through foodbanks
- Total program

Program inputs used in the cost effectiveness analysis are included in *Table 5-1*.

Table 5-1: Program Inputs

Parameter	2019	2020
Discount Rate	6.57%	6.92%
Residential Line Loss	9.32%	6.36%
Residential Energy Rate ($/kWh)[1]	$0.1063	$0.1068
Inflation Rate	2.20%	2.28%

[1] Future rates determined using a 2.20% and 2.28% annual escalator.

5.1 Cost Effectiveness Results for Total Program Excluding Measures Distributed through Foodbanks 2019-2020

Table 5-2 through Table 5-5 include total program cost effectiveness results excluding measures distributed through foodbanks.

Table 5-2: Program Costs by Year
Excluding Measures Distributed through Foodbanks

Program Year	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
2019	$0	$243,793	$4,656,066	$74,945	$7,617,767	$12,592,571	$33,037,009
2020	$0	$224,107	$4,400,579	$47,903	$9,021,843	$13,694,431	$20,206,257
2019-2020	$0	$467,900	$9,056,644	$122,847	$16,639,610	$26,287,002	$53,243,266

Table 5-3: Program Savings by Year
Excluding Measures Distributed through Foodbanks

Program Year	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
2019	55,016,343	83%	45,870,008	73%	33,369,149	13
2020	65,426,113	86%	56,050,757	75%	41,817,426	14
2019-2020	120,442,456	85%	101,920,764	74%	75,186,575	13

Table 5-4: Program Benefit/Cost Ratios by Year
Excluding Measures Distributed through Foodbanks

Program Year	PTRC	TRC	UCT	RIM	PCT
2019	0.63	0.57	1.44	0.35	1.81
2020	1.35	1.23	1.70	0.37	3.61
2019-2020	0.90	0.82	1.57	0.37	2.49

Table 5-5: Program Cost-Effectiveness Results – PY2019-2020
Excluding Measures Distributed through Foodbanks

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0666	$50,504,335	$45,498,330	-$5,006,005	0.90
Total Resource Cost Test (TRC) No Adder	$0.0666	$50,504,335	$41,362,118	-$9,142,217	0.82
Utility Cost Test (UCT)	$0.0347	$26,287,002	$41,362,118	$15,075,116	1.57
Rate Impact Test (RIM)		$113,193,993	$41,362,118	-$71,831,875	0.37
Participant Cost Test (PCT)		$53,243,266	$132,784,276	$79,541,010	2.49
Lifecycle Revenue Impacts ($/kWh)					$0.0000095747
Discounted Participant Payback (years)					5.08

5.2 Cost Effectiveness Results for Total Program Measures Distributed through Foodbanks 2019-2020

Cost effectiveness results reported in Table 5-6 through Table 5-9 include only measures distributed through foodbanks.

Table 5-6: Program Costs for Measures Distributed through Foodbanks

Measure Category	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
Lighting	$0	$28,411	$144,706	$6,941	$369,239	$549,297	$1,364,074
Water Heating	$0	$12,550	$606,622	$2,980	$358,644	$980,796	$20,461
Total	$0	$40,960	$751,329	$9,921	$727,883	$1,530,093	$1,384,534

Table 5-7: Program Savings for Measures Distributed through Foodbanks

Measure Category	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Lighting	6,690,385	66%	4,738,667	100%	4,738,667	12
Water Heating	3,597,594	52%	1,149,059	100%	1,149,059	11
Total	10,287,979	57%	5,887,726	100%	5,887,726	12

Table 5-8: Benefit/Cost Ratios for Measures Distributed through Foodbanks

Measure Category	PTRC	TRC	UCT	RIM	PCT
Lighting	1.40	1.28	3.59	0.36	3.89
Water Heating	0.72	0.65	0.43	0.21	68.22
Total	1.20	1.09	1.56	0.32	4.84

Table 5-9: Cost-Effectiveness Results – PY2019-2020 for Measures Distributed through Foodbanks

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0419	$2,186,744	$2,631,666	$444,922	1.20
Total Resource Cost Test (TRC) No Adder	$0.0419	$2,186,744	$2,392,424	$205,680	1.09
Utility Cost Test (UCT)	$0.0293	$1,530,093	$2,392,424	$862,331	1.56
Rate Impact Test (RIM)		$7,507,908	$2,392,424	-$5,115,484	0.32
Participant Cost Test (PCT)		$1,384,534	$6,705,698	$5,321,164	4.84
Lifecycle Revenue Impacts ($/kWh)					$0.0000045722
Discounted Participant Payback (years)					1.47

5.3 Cost Effectiveness Results for Total Program

Table 5-10 through Table 5-13 include total program cost effectiveness results, including measures distributed through foodbanks.

Table 5-10: Total Program Costs by Year

Year	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
2019	$0	$264,353	$4,811,221	$80,109	$7,828,960	$12,984,642	$33,761,332
2020	$0	$244,508	$4,996,752	$52,659	$9,538,534	$14,832,453	$20,866,468
2019-2020	$0	$508,860	$9,807,973	$132,768	$17,367,494	$27,817,095	$54,627,800

Table 5-11: Total Program Savings by Year

Year	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
2019	58,807,482	82%	48,355,060	74%	35,854,202	13
2020	71,922,953	83%	59,453,430	76%	45,220,099	14
2019-2020	130,730,435	82%	107,808,490	75%	81,074,301	13

Table 5-12: Total Program Benefit/Cost Ratios by Year

Year	PTRC	TRC	UCT	RIM	PCT
2019	0.65	0.59	1.47	0.35	1.86
2020	1.34	1.22	1.66	0.37	3.68
2019-2020	0.91	0.83	1.57	0.36	2.55

Table 5-13: Total Program Level Cost-Effectiveness Results – PY2019-2020

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0650	$52,666,489	$48,129,996	-$4,536,493	0.91
Total Resource Cost Test (TRC) No Adder	$0.0650	$52,666,489	$43,754,542	-$8,911,948	0.83
Utility Cost Test (UCT)	$0.0343	$27,817,095	$43,754,542	$15,937,447	1.57
Rate Impact Test (RIM)		$120,701,901	$43,754,542	-$76,947,360	0.36
Participant Cost Test (PCT)		$54,627,800	$139,489,974	$84,862,174	2.55
Lifecycle Revenue Impacts ($/kWh)					$0.0000102566
Discounted Participant Payback (years)					4.73

6 Conclusions and Recommendations

ADM makes the following conclusions and recommendations from its evaluation.

6.1 Conclusions

Rocky Mountain Power's 2019-2020 Home Energy Savings program in Utah resulted in 81,316,954 kWh of net savings with a 83 percent realization rate and program net-to-gross ratio of 75 percent as reported in Table 6-1.

Table 6-1: Total Program Savings by Year

Year	Claimed Saving (kWh)	Evaluated Savings (kWh)	Realization Rate	NTG	Net Evaluated Savings (kWh)
2019	58,807,482	48,543,032	83%	74%	35,974,943
2020	71,922,953	59,629,247	83%	76%	45,342,011
Total	**130,730,435**	**108,172,279**	**83%**	**75%**	**81,316,954**

Lighting measures accounted for 49 percent of program savings; Whole Building and Whole Home measure categories accounted for 31 percent of savings, and HVAC measures accounted for 18 percent. The remaining measure categories — water heating, building shell and energy kits (starter kits) — account for 3 percent collectively. This represents the growing importance of construction projects, both multifamily projects and new homes, as well as the increased importance of HVAC measures in the residential efficiency program portfolio. The portion of savings resulting from LED lighting measures is declining as the market transformation continues. A comparison of savings during this and the previous evaluation are reported in Table 6-2.

Table 6-2: Total 2019-2020 Program Savings Compared to 2017-2018

Measure Category	2019-2020					2017-2018		
	Claimed Saving (kWh)	Gross Evaluated Savings (kWh)	RR	Net Evaluated Savings (kWh)	% Total Program Savings	RR	Net Evaluated Savings (kWh)	% Total Program Savings
Lighting	76,479,353	57,567,400	75%	39,564,234	49%	69%	70,964,280	80%
Whole Building	25,283,359	24,930,875	99%	23,696,138	29%	99%	4,107,132	4.6%
HVAC	21,707,710	21,605,804	100%	14,549,780	18%	52%	9,759,308	11%
Water Heating	4,424,220	1,439,303	33%	1,433,914	2%	100%	12,690	0.01%
Whole Home	1,543,324	1,543,324	100%	1,226,943	2%	100%	1,402,824	1.6%
Building Shell	733,294	732,993	100%	551,211	1%	105%	649,598	0.7%
Energy Kits	559,174	352,580	63%	294,735	0.7%	104%	1,522,334	1.7%
Appliances	0	0		0	0.4%	100%	110,306	0.1%
Total	**130,730,435**	**108,172,279**	**83%**	**81,316,954**	**100%**	**83%**	**88,528,472**	**100%**
RR – Realization Rate								

6.2 Recommendations

ADM recommends that Rocky Mountain Power consider the following actions.

Create separate measures definitions for products distributed through alternative distribution channels

ADM recommends that Rocky Mountain Power track measures that are distributed through foodbanks and similar channels as separate measures that identify the channel appropriately. This allows for different variables, such as installation rates, that vary by distribution channel.

Update ex ante savings to reflect electric water heater market saturation

Ex ante savings for water saving measures include the percentage of electric water heaters as a key variable. Customer surveys and the US Energy Information Administration Residential Energy Consumption Survey all point to a lower percentage of electric water heaters than the ex ante percentage in RTF reference files.

Consider repeat recipients of kits distributed through foodbanks and community centers

Rocky Mountain Power implemented a program to distribute aerators, low-flow showerheads and LED light bulbs through foodbanks and community centers. Staff at community distribution sites indicate that there is a high degree of client retention at food assistance programs resulting in households receiving more than one kit.

Add data elements to tracking and reporting

Rocky Mountain Power relies on implementation partners to collect and store critical data that is required to evaluate the program and verify the resulting energy savings.

ADM recommends that Rocky Mountain Power adds the following data elements to its internal program tracking datasets:

- Product manufacturer and model numbers, or minimally efficiency specifications
- Sales or distribution location for all upstream measures
- Baseline conditions (specifics varies by measure)

Add process controls to program implementation

ADM recommends that Rocky Mountain Power work with program implementers to revise program controls to ensure that all data elements required to verify program eligibility requirements are met for all measures.

Evaluate program on an annual basis

Annual evaluations would allow Rocky Mountain Power to monitor program controls and data collection throughout the program year, allowing the utility to respond to program performance midcycle. ADM recommends that Rocky Mountain Power implement annual rather than biannual program evaluations.

Collect baseline data for evaporative coolers

Baseline data assumptions for evaporative coolers distributed through upstream channels is not able to be corroborated through current program design. ADM recommends that Rocky Mountain Power identify a process for collecting evaporative cooler baseline data (baseline system size and SEER ratings). Utilizing the annual program evaluation design would allow for this data collection to occur throughout the program year by way of instore time of sale surveying

Add TRL version control process

The TRL is a complex set of documents that provides the basis for program planning and evaluation. ADM recommends that Rocky Mountain Power implement a more stringent version control process to ensure that complete, accurate TRL data is maintained.

Remove individual measures installed in construction projects from tracking data

Program tracking data includes individual measures installed in multifamily home projects with 0 kWh claimed savings. Savings are claimed only for project measure. This results duplicate measure counts, once as an individual measures and again as projects. ADM recommends that Rocky Mountain Power consider removing no-savings individual measures that are installed in construction and renovation projects from final tracking data.

Appendix A – TRL Reference Documents

Measure Name - Measure Version	ADM Verified Reference Document
Building Shell	
Insulation - Attic - CAC Only - SF - UT - 6	2019.05.23_UT_Wattsmart_SF_Attic_Insulation_Brief.xlsx
Insulation - Attic - CAC Only - SF - Self Install - UT - 1	2019.05.23_UT_Wattsmart_SF_Attic_Insulation_Brief.xlsx
Insulation - Attic - CAC Only - SF - UT - 1	2019.05.23_UT_Wattsmart_SF_Attic_Insulation_Brief.xlsx
Insulation - Attic - CAC Only - SF - UT - 6	2019.05.23_UT_Wattsmart_SF_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric Cooling - UT - 4	2017.05.30_UT_HES_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric Cooling - UT - 5	2017.05.30_UT_HES_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric FAF with CAC - SF - UT - 6	2019.05.23_UT_Wattsmart_SF_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric FAF with CAC - SF - UT - 6	2019.05.23_UT_Wattsmart_SF_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric FAF with CAC - UT - 4	2017.05.30_UT_HES_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric FAF with CAC - UT - 5	2017.05.30_UT_HES_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric FAF without CAC - SF - UT - 6	2019.05.23_UT_Wattsmart_SF_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric FAF without CAC - UT - 4	2017.05.30_UT_HES_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric FAF without CAC - UT - 5	2017.05.30_UT_HES_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric Heat Pump - SF - UT - 6	2019.05.23_UT_Wattsmart_SF_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric Heat Pump - SF - Self Install - UT - 1	2019.05.23_UT_Wattsmart_SF_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric Heat Pump - SF - UT - 6	2019.05.23_UT_Wattsmart_SF_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric Heat Pump Heating System - UT - 4	2017.05.30_UT_HES_Attic_Insulation_Brief.xlsx
Insulation - Attic - Electric Heat Pump Heating System - UT - 5	2017.05.30_UT_HES_Attic_Insulation_Brief.xlsx
Energy Kits	
Energy Savings Kit - Best - 1 Bathroom - UT - 4	KitsMSW_UT_30Mar17.xlsx
Energy Savings Kit - Best - 2 Bathrooms - UT - 4	KitsMSW_UT_30Mar17.xlsx
Energy Savings Kit - Best 1 - 1 Bathroom - Multifamily - UT - 4	KitsMSW_UT_30Mar17.xlsx
Energy Savings Kit - Best 2 - 2 Bathrooms - Multifamily - UT - 4	KitsMSW_UT_30Mar17.xlsx
Energy Savings Kit - LED - Multifamily - UT - 4	KitsMSW_UT_30Mar17.xlsx
Energy Savings Kit - LED - UT - 4	KitsMSW_UT_30Mar17.xlsx

HVAC	
95% Gas Furnace with ECM Blower - Midstream - UT - 2	HES_UT_95 Gas Furnace w ECM Mid_upstream_12-08-2016.xlsx
Central AC - Split System - Tier 2 - SEER 17 to 19.9 - CZ5 - SF - New Homes - UT - 1	2019.05.23-UT_NH_cAC_Upgrade_CZ25_Brief.xlsx
Central AC - Split System - Tier 3 - SEER 20+ - CZ5 - SF - New Homes - UT - 1	2019.05.23-UT_NH_cAC_Upgrade_CZ25_Brief.xlsx
Central Air Conditioner - Tier 1 - 15 to 16.9 SEER - Midstream - UT - 2	HES_UT_CAC Mid_upstream_12-08-2016.xlsx
Central Air Conditioner - Tier 1 - 15 to 16.9 SEER - Midstream - UT - 3	HVAC Midstream Tool Calculation Workbook v3.1
Central Air Conditioner - Tier 2 - 17 to 19.9 SEER - Midstream - UT - 2	HES_UT_CAC Mid_upstream_12-08-2016.xlsx
Central Air Conditioner - Tier 2 - 17 to 19.9 SEER - Midstream - UT - 3	HVAC Midstream Tool Calculation Workbook v3.1
Central Air Conditioner - Tier 3 - 20 SEER or greater - Midstream - UT - 2	HES_UT_CAC Mid_upstream_12-08-2016.xlsx
Central Air Conditioner - Tier 3 - 20 SEER or greater - Midstream - UT - 3	HVAC Midstream Tool Calculation Workbook v3.1
Connected Thermostat - CAC Only - Instant Rebates - UT - 2	2019.05.23_UT_Wattsmart_SF_Smart_Tstat_Instant_Rebate_Brief.xlsx
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT - 1	2019.05.23_UT_NH_Smart_Tstat__CZ5_Brief.xlsx
Connected Thermostat - CAC Only - New Homes - CZ5 & CZ6 - UT - 2	2019.05.23_UT_NH_Smart_Tstat__CZ5_Brief.xlsx
Connected Thermostat - CAC Only - UT - 3	2019.05.23_UT_Wattsmart_SF_Smart_Tstat_Brief.xlsx
Connected Thermostat - Electric FAF w/ CAC - Instant Rebates - UT - 2	2019.05.23_UT_Wattsmart_SF_Smart_Tstat_Instant_Rebate_Brief.xlsx
Connected Thermostat - Electric FAF w/ CAC - UT - 3	2019.05.23_UT_Wattsmart_SF_Smart_Tstat_Brief.xlsx
Connected Thermostat - Electric FAF w/out CAC - Instant Rebates - UT - 2	2019.05.23_UT_Wattsmart_SF_Smart_Tstat_Instant_Rebate_Brief.xlsx
Connected Thermostat - Electric FAF w/out CAC - UT - 3	2019.05.23_UT_Wattsmart_SF_Smart_Tstat_Brief.xlsx
Connected Thermostat - Electric Heat Pump - Instant Rebates - UT - 2	2019.05.23_UT_Wattsmart_SF_Smart_Tstat_Instant_Rebate_Brief.xlsx
Connected Thermostat - Electric Heat Pump - New Homes - CZ5 & CZ6 - UT - 1	2019.05.23_UT_NH_Smart_Tstat__CZ5_Brief.xlsx
Connected Thermostat - Electric Heat Pump - UT - 3	2019.05.23_UT_Wattsmart_SF_Smart_Tstat_Brief.xlsx
Ductless Heat Pump - Multi-Head - Downstream - UT - 3	HES_UT_DHP_9-7-2016.xlsx
Ductless Heat Pump - Multi-Head - SF - Downstream - UT - 4	HES_UT_DHP_9-7-2016.xlsx
Ductless Heat Pump - Single-Head - SF - Downstream - UT - 4	HES_UT_DHP_9-7-2016.xlsx
Ductless Heat Pump - Supplemental Heat - Downstream - UT - 3	HES_UT_DHP_9-7-2016.xlsx
Ductless Heat Pump - Supplemental Heat - SF - Downstream - UT - 4	HES_UT_DHP_9-7-2016.xlsx
ECM on Existing Furnace - Downstream - UT - 3	HES_UT_ECM Existing Furnace_9-7-2016.xlsx
Evaporative Cooler - >= 3,500 CFM - Midstream - Distributor - UT - 2	2019.05.23_UT_Wattsmart_Evap Cooler_Brief.xlsx
Evaporative Cooler - >= 3,500 CFM - Midstream - Retail - UT - 2	2019.05.23_UT_Wattsmart_Evap Cooler_Brief.xlsx
Evaporative Cooler - 2,000 to 3,499 CFM - Midstream - Retail - UT - 2	2019.05.23_UT_Wattsmart_Evap Cooler_Brief.xlsx
Evaporative Cooler - Midmarket - Distributor - Min 3,500 CFM - UT - 1	HES_UT_Evap Coolers 3500 CFM_ Midmarket Retail 2.20.2017.xlsx

Evaporative Cooler - Midmarket - Retail - 2,000 - 3,499 CFM - UT - 1	HES_UT_Evap Coolers 2000 CFM_Midmarket Retail 2.20.2017.xlsx
Evaporative Cooler - Midmarket - Retail - Min 3,500 CFM - UT - 1	HES_UT_Evap Coolers 3500 CFM_ Midmarket Retail 2.20.2017.xlsx
Furnace Fan ECM - SF - Downstream - UT - 4	2019.05.23_UT_Wattsmart_ECM Retro_Brief.xlsx
Heat Pump Conversion - Tier 1 - 9.0 HSPF and 15 SEER - Downstream - UT - 3	HES_UT_HP_Conversion_9-7-2016.xlsx
Heat Pump Conversion - Tier 2 - 9.5 HSPF and 16 SEER - Downstream - UT - 3	HES_UT_HP_Conversion_9-7-2016.xlsx
Heat Pump Upgrade - Tier 2 - SEER 16 / HSPF 9.5 - SF - Downstream - UT - 4	2019.05.16_UT_Wattsmart_ASHP_Upgrade_Brief.xlsx
Rooftop Heat Tape Controller - UT - 1	2018.07.16_UT_Wattsmart_SF_Roof_Heat_Tape_Timer_Brief.xlsx
Room AC - ENERGY STAR - Midstream - Retail - UT - 2	HVAC Midstream Tool Calculation Workbook v3.1
Room Air Conditioner - Midmarket - Retail - ENERGY STAR - UT - 1	HES_UT_Room AC_Midmarket Retail 2.20.2017.xlsx
Smart T-stat w/ ASHP - UT - 2	HES_UT_Smart Thermostat_9-21-2016.xlsx
Smart T-stat w/ EFAF - UT - 2	HES_UT_Smart Thermostat_9-21-2016.xlsx
Smart T-stat w/ EFAF + CAC - UT - 2	HES_UT_Smart Thermostat_9-21-2016.xlsx
Smart T-stat w/ Gas FAF + CAC - UT - 2	HES_UT_Smart Thermostat_9-21-2016.xlsx
Smart_Tstat_w/Any_Gas_Instant_Rebates - UT - 1	2018.08.20_UT_Wattsmart_SF_Smart_Tstat_Instant_Rebate_Brief.xlsx
Smart_Tstat_w/ASHP_Instant_Rebates - UT - 1	2018.08.20_UT_Wattsmart_SF_Smart_Tstat_Instant_Rebate_Brief.xlsx
Smart_Tstat_w/EAF_Instant_Rebates - UT - 1	2018.08.20_UT_Wattsmart_SF_Smart_Tstat_Instant_Rebate_Brief.xlsx
Smart_Tstat_w/EFAF_CAC_Instant_Rebates - UT - 1	2018.08.20_UT_Wattsmart_SF_Smart_Tstat_Instant_Rebate_Brief.xlsx
Whole-House Ventilation Fan - UT - 1	2019.05.23_UT_Wattsmart_SF_Whole-house Fan_Brief.xlsx
Lighting	
LED Downlight: 10 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 11 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 12 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 13 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 14 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 15 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 16 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 18 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 19 watts - Retail - UT - 3	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 20 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 23 watts - Retail - UT - 2	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 5 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx

LED Downlight: 6 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 7 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 8 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Downlight: 9 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Fixture - ENERGY STAR - UT - 4	HES_UT_LED Fixture_9-16-2016.xlsx
LED General Purpose: 10 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 11 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 12 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 13 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 15 watts - Retail - UT - 5	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 16 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 17 watts - Retail - UT - 2	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 18 watts - Retail - UT - 2	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 6 watts - Retail - UT - 3	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 7 watts - Retail - UT - 3	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 8 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED General Purpose: 9 watts - Retail - UT - 4	HES_UT_LEDs_12-1-2016.xlsx
LED Specialty - 3-Way: 3,8,18 watts - Retail - UT - 2	HES_UT_LEDs_12-1-2016.xlsx
LED Specialty - 3-Way: 5,9,20 watts - Retail - UT - 2	HES_UT_LEDs_12-1-2016.xlsx
LED Specialty - Candelabra: 2 watts - Retail - UT - 3	HES_UT_LEDs_12-1-2016.xlsx
LED Specialty - Candelabra: 3 watts - Retail - UT - 2	HES_UT_LEDs_12-1-2016.xlsx
LED Specialty - Candelabra: 4 watts - Retail - UT - 3	HES_UT_LEDs_12-1-2016.xlsx
LED Specialty - Candelabra: 5 watts - Retail - UT - 3	HES_UT_LEDs_12-1-2016.xlsx
LED Specialty - Candelabra: 7 watts - Retail - UT - 2	HES_UT_LEDs_12-1-2016.xlsx
LED Specialty - Globe: 4 watts - Retail - UT - 2	HES_UT_LEDs_12-1-2016.xlsx
LED Specialty - Globe: 5 watts - Retail - UT - 3	HES_UT_LEDs_12-1-2016.xlsx
LED Specialty - Globe: 6 watts - Retail - UT - 2	HES_UT_LEDs_12-1-2016.xlsx

LED Downlight: 10 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 11 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 13 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 14 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 15 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 16 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 19 watts - Retail - UT - 4	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 20 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 23 watts - Retail - UT - 3	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 5 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 6 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 7 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 8 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Downlight: 9 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Fixture - ENERGY STAR - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 10 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 11 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 12 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 13 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 15 watts - Retail - UT - 6	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 16 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 17 watts - Retail - UT - 3	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 18 watts - Retail - UT - 3	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 6 watts - Retail - UT - 4	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 8 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED General Purpose: 9 watts - Retail - UT - 5	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Specialty - 3-Way: 9 watts - Retail - UT - 1	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Specialty - Candelabra: 2 watts - Retail - UT - 4	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Specialty - Candelabra: 3 watts - Retail - UT - 3	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Specialty - Candelabra: 4 watts - Retail - UT - 4	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Specialty - Candelabra: 5 watts - Retail - UT - 4	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx

LED Specialty - Globe: 4 watts - Retail - UT - 3	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Specialty - Globe: 5 watts - Retail - UT - 4	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
LED Specialty - Globe: 6 watts - Retail - UT - 3	2020.02.18_UT_LEDs_Brief_Eval adjusted.xlsx
Water Heating	
Faucet Aerators - Any DHW - 1.0 GPM or Less - Midstream - UT - 1	
HPWH - Tier 2 and above - Indoor Gas Heat - 0-55 Gallons - Self Install - Downstream - UT - 1	HES_UT_HPWH 9_7_2016.xlsx
HPWH - Tier 2 and above - Basement - 0-55 Gallons - Downstream - UT - 1	HES_UT_HPWH 9_7_2016.xlsx
HPWH - Tier 2 and above - Basement - 0-55 Gallons - Self Install - Downstream - UT - 1	HES_UT_HPWH 9_7_2016.xlsx
HPWH - Tier 2 and above - Indoor Electric Resistance Heat - 0-55 Gallons - Self Install - Downstream - UT - 1	HES_UT_HPWH 9_7_2016.xlsx
HPWH - Tier 3+ - 0-55 Gal - Self Install - UT - 1	2019.05.16_UT_Wattsmart_HPWH_Brief.xlsx
Low-Flow Shower Head - Any DHW - 1.50 GPM - Midstream - UT - 1	2019.06.05_UT Wattsmart Low Flow Showerheads Brief.xlsx
Low-Flow Shower Head - Any DHW - 1.50 GPM - Midstream - UT - 2	2019.06.05_UT Wattsmart Low Flow Showerheads Brief.xlsx

Appendix B – General Population Survey

1. Did you or anyone else in your home buy any of the following energy saving products in 2019 or 2020? Select all that apply.

   - ENERGY STAR certified LED lighting products
   - ENERGY STAR certified room air conditioner
   - Evaporative cooler
   - I did not buy any of these products in 2019-2020
   - I don't recall

2. Which stores did you buy your ENERGY STAR LED lighting from? Consider only in-store purchases, not online purchases; select all that apply.

   - Ace Hardware
   - Batteries Plus
   - Best Buy
   - CostCo
   - The Home Depot
   - Lowe's
   - Ream's Food
   - Sam's Club
   - Smith's
   - Sutherlands
   - Target
   - True Value Hardware
   - Walmart
   - Other (Please specify)
   - I don't know

3. Which store did you buy your room air conditioner from (consider only in-store purchases, not online purchases)?

   - Home Depot
   - Sutherland's Lumber
   - Other (please specify)
   - I don't know

4. Which store did you purchase your evaporative cooler from (consider only in-store purchases, not online purchases)? Select all that apply.

   - Brian's Canvas Products
   - Home Depot
   - Lowe's
   - Southwest Plumbing Supply
   - Sutherland's Lumber
   - Other (please specify)
   - I don't know

5. What type of ENERGY STAR LED lighting products did you buy? Select all that apply.

   - Standard LED bulb(s)
   - Specialty LED bulb(s)
   - LED downlight(s)
   - LED fixture(s)
   - I don't know

Standard LED bulbs

6. When did you buy the ENERGY STAR standard LED bulbs? Select all that apply

   - 2019
   - 2020

7. How many ENERGY STAR standard LED bulbs did you buy during 2019-2020?

   - [numeric]
   - I don't know

8. Of the [LEDStandardQtyBought] bulbs you bought, how many are currently:

   - Installed [numeric] [LEDStandardQtyInstalled]
   - In storage [numeric]
   - Discarded or given away [numeric]

9. Of the [LEDStandardQtyInstalled] bulbs that you have installed, how many replaced LEDs and how many replaced bulbs that were not LEDs?

    - Number of replaced LED bulbs [numeric]
    - Number of replaced bulbs that were not LEDs (CFL, incandescent, halogen, etc.) [numeric]
    - Number installed in new lamps or fixtures.
    - I don't know

10. If the ENERGY STAR LED standard light bulbs you bought had cost $1.00 more each, would you still have bought them? (Definitely, Probably, Don't know, Probably not, Definitely not.)

11. You indicated that you bought [LEDStandardQtyBought] ENERGY STAR standard LED bulbs. How many fewer would you have bought if they had cost $1.00 more each? [numeric]

    - I don't know

12. Do you recall if the ENERGY STAR standard LED bulbs you bought were discounted?

    - Yes, there were discounted
    - No, they were not discounted
    - I don't remember

13. Do remember seeing a label or sign letting customers know that the discount was provided by Rocky Mountain Power?

    - Yes
    - No
    - I don't remember

14. How important was the discount to your purchase of ENERGY STAR LED standard light bulbs?

    - (Scale 0-10, 0 = Not important, 10 = Very important)

15. Were any of the ENERGY STAR standard LED bulbs you purchased in 2019 or 2020 installed in a business or commercial building?

    - Yes
    - No

16. Approximately how many of the ENERGY STAR standard LED bulbs you purchased were installed in a business or commercial building?

    - Quantity: [numeric]

17. How many of the [LEDStandardQtyInstalled] installed standard LED bulbs are in each of the following locations?

    - Bathroom
    - Bedroom
    - Dining room
    - Exterior
    - Garage
    - Hallway
    - Kitchen
    - Living room
    - Office
    - Other room
    - Installed at building other than home
    - Don’t know

18. Had you bought any LED light bulbs before 2019?

    - Yes
    - No
    - I don’t know

Specialty LED bulbs

19. When did you buy the ENERGY STAR specialty LED bulbs? Select all that apply.

    - 2019
    - 2020

20. How many ENERGY STAR specialty LED bulbs did you buy during 2019-2020?

- [numeric]
- I don’t know

21. Of the [LEDSpecialtyQtyBought] bulbs you bought, how many are currently:

- Installed [numeric]
- In storage [numeric]
- Discarded or given away [numeric]

22. Of the [LEDSpecialtyQtyInstalled] bulbs that you have installed, how many replaced LEDs, and how many replaced bulbs that were not LEDs?

- Number of replaced LED bulbs [numeric]
- Number of replaced bulbs that were not LEDs (CFL, incandescent, halogen, etc.) [numeric]
- Number installed in new lamps or fixtures [numeric]
- I don’t know

23. If the ENERGY STAR specialty LED light bulbs you bought had cost $1.20 more each, would you still have bought them?

- Definitely
- Probably
- Don’t know
- Probably not
- Definitely not

24. You indicated that you bought [LEDSpecialtyQtyBought] ENERGY STAR specialty LED bulbs. How many fewer would you have bought if they had cost $1.20 more each?

- [numeric]
- I don’t know

25. Do you recall if the ENERGY STAR specialty LED bulbs you bought were discounted?

- Yes, there were discounted
- No, they were not discounted
- I don’t remember

26. Do remember seeing a label or sign letting customers know that the discount was provided by Rocky Mountain Power?

- Yes
- No

27. How important was the discount to your purchase of ENERGY STAR specialty LED light bulbs?

- (Scale 0-10, 0 = Not important, 10 = Very important)

28. Were any of the ENERGY STAR specialty LED bulbs you purchased in 2019 or 2020 installed in a business or commercial building?

- Yes
- No
- I don't know

29. Approximately how many of the ENERGY STAR specialty LED bulbs you purchased were installed in a business or commercial building?

- Quantity: ___
- I don't know

30. How many of the [LEDSpecialtyQtyInstalled] specialty LED bulbs that are installed are in your home are in each of the following locations?

- Bathroom [numeric]
- Bedroom
- Dining room
- Exterior
- Garage
- Hallway
- Kitchen
- Living room
- Office
- Other room
- Installed at building other than home
- Don't know

31. Had you ever bought any LED light bulbs before 2019?

- Yes
- No
- I don't know

LED fixtures

32. When did you buy the ENERGY STAR LED fixtures? Select all that apply.

- 2019
- 2020

33. How many ENERGY STAR LED fixtures did you buy during 2019-2020?

- [numeric]
- I don't know

34. Of the [LEDFixtureQtyBought] bulbs you bought, how many are currently:

- Installed [numeric] [LEDFixtureQtyInstalled]
- In storage [numeric]
- Discarded or given away [numeric]

35. Of the [LEDFixtureQtyInstalled] bulbs that you have installed, how many replaced LEDs and how many replaced bulbs that were not LEDs?

- Number of replaced bulbs that were LEDs [numeric] [LEDFixtureReplacedLEDs]
- Number of replaced bulbs that were not LEDs (CFL, incandescent, halogen, etc.) [numeric] [LEDFixtureReplacedNonLEDs]
- Number installed in new lamps or fixtures

36. If the ENERGY STAR LED fixtures you bought had cost $2.85 more each, would you still have bought them?

- Definitely
- Probably
- Don't know
- Probably not
- Definitely not

37. You indicated that you bought [LEDFixtureQtyBought] ENERGY STAR LED fixtures. How many fewer would you have bought if they had cost $2.85 more each?

- [numeric]
- I don't know

38. Do you recall if the ENERGY STAR LED fixtures you bought were discounted?

- Yes, there were discounted
- No, they were not discounted
- I don't remember

39. Do remember seeing a label or sign letting customers know that the discount was provided by Rocky Mountain Power?

- Yes
- No
- I don't remember

40. How important was the discount to your purchase of ENERGY STAR LED fixtures?

- (Scale 0-10, 0 = Not important, 10 = Very important)

41. Were any of the ENERGY STAR LED fixtures you purchased in 2019-2020 installed in a business or commercial building?

- Yes
- No
- I don't know

42. Approximately how many of the ENERGY STAR LED fixtures you purchased were installed in a business or commercial building?

- Quantity: ___

43. How many of the [LEDFixtureQtyInstalled] LED fixtures that are installed are in your home are in each of the following locations?

- Bathroom [numeric]
- Bedroom
- Dining room
- Exterior

- Garage
- Hallway
- Kitchen
- Living room
- Office
- Other room
- Installed in a building other than home
- Don’t know

44. Had you bought any LED light bulbs before 2019?

    - Yes
    - No
    - I don’t know

LED downlight

45. When did you buy the ENERGY STAR LED downlight? Select all that apply.

    - 2019
    - 2020

46. How many ENERGY STAR LED downlights did you buy during 2019-2020?

    - [numeric]
    - I don’t know

47. Of the [LEDDownlightQtyBought] bulbs you bought, how many are currently:

    - Installed [numeric] [LEDDownlightQtyInstalled]
    - In storage [numeric]
    - Discarded or given away [numeric]

48. Of the [LEDDownlightQtyInstalled] LED downlights that you have installed, how many replaced LEDs, how many replaced,bulbs that were not LEDs, and how many went in new fixtures?

    - Number of replaced bulbs that were LEDs [numeric] [LEDDownlightReplacedLEDs]
    - Number of replaced bulbs that were not LEDs (CFL, incandescent, halogen, etc.) [numeric] [LEDDownlightReplacedNonLEDs]
    - Number installed in new fixtures
    - I don’t know

49. If the ENERGY STAR LED downlights you bought had cost $1.50 more each, would you still have bought them?

- Definitely
- Probably
- Don't know
- Probably not
- Definitely not

50. You indicated that you bought [LEDDownlightQtyBought] ENERGY STAR LED downlights. How many fewer would you have bought if they had cost $1.50 more each?

- [numeric]
- I don't know

51. Do you recall if the ENERGY STAR LED downlights you bought were discounted?

- Yes, there were discounted
- No, they were not discounted
- I don't remember

52. Do remember seeing a label or sign letting customers know that the discount was provided by Rocky Mountain Power?

- Yes
- No
- I don't remember

53. How important was the discount to your purchase of ENERGY STAR LED downlights?

- (Scale 0-10, 0 = Not important, 10 = Very important)

54. Were any of the ENERGY STAR LED downlights you purchased in 2019 or 2020 installed in a business or commercial building?

- Yes
- No
- I don't know

55. Approximately how many of the LED downlights you purchased were installed in a business or commercial building?

- Quantity: ___
- I don't know

56. How many of the [LEDDownlightQtyInstalled] LED downlights that are installed in each of the following locations?

- Bathroom [numeric]
- Bedroom
- Dining room
- Exterior
- Garage
- Hallway
- Kitchen
- Living room
- Office
- Other room
- Installed at building other than home
- Don't know

57. Had you bought any LED lights before 2019?

- Yes
- No
- I don't know

LED Lighting Process

58. Which characteristic do you consider when purchasing light bulbs? Select all that apply.

- Price
- Energy efficiency
- ENERGY STAR certification
- Brightness of the bulb
- How long the bulb lasts
- The ability to dim the bulb
- Color of the light
- Other (please specify)
- I don't know

59. Why did you purchase the ENERGY STAR LED lighting? Select all that apply.

- To replace burned out bulbs
- To replace working bulbs to lower energy use
- To add new light fixture(s) in my home
- To take advantage discounted pricing
- Other (please specify)
- I don't know

Room Air Conditioners

60. When did you buy your ENERGY STAR certified room air conditioner? Select all that apply.

- 2019
- 2020

61. Was the ENERGY STAR room air conditioner's price discounted when you bought it?

- Yes
- No
- I don't know

62. Do remember seeing a label or sign letting customers know that the discount was provided by Rocky Mountain Power?

- Yes
- No
- I don't remember

63. How many discounted ENERGY STAR room air conditioners did you buy during 2019-2020?

- [numeric]

64. Would you have been able to buy the ENERGY STAR certified air conditioner if it had not been discounted?

- Yes
- No

65. Were you planning on buying an ENERGY STAR certified air conditioner before you knew about the $20 discount?

- Yes
- No

66. If the ENERGY STAR room air conditioner had cost $20 more, how likely is it that you would have still bought the ENERGY STAR model?

- (Very unlikely (0%), Unlikely (25%), Not sure (50%), Likely (75%), Very likely (100%)

67. When do you think you would have bought an ENERGY STAR room air conditioner if it had not been discounted $20? [1]

- During the same season that I bought it
- The summer season after bought it

68. What cooling appliance did the ENERGY STAR room air conditioner replace? Select all that apply if you bought more than one. [multiple]

- Existing room air conditioner
- Central air conditioning
- Evaporative cooler
- Fan(s)
- The room was not cooled before
- I don’t know

69. What kind of room air conditioner did you buy?

- Brand [text response]
- Model number[text response]
- BTUs [numeric]
- Energy Efficiency Ratio (EER) of room air conditioner [numeric]

Evaporative Cooler

70. When did you buy your evaporative cooler?

- 2019
- 2020

71. What type of cooling appliance did the evaporative cooler replace?

- Room air conditioner
- Central air conditioning
- Evaporative cooler
- Electric fan
- The home/room was not cooled before
- I don’t know.

72. Was the evaporative cooler’s price discounted when you bought it?

- Yes
- No
- I don’t know

73. How many discounted evaporative coolers did you buy during 2019-2020?

- [Numeric]

74. Do remember seeing a label or sign letting customers know that the discount was provided by Rocky Mountain Power?

- Yes
- No
- I don’t remember

75. Would you have been able to buy the evaporative cooler if it had not been discounted?

- Yes
- No

76. Were you planning on buying evaporative cooler before you knew about the discount?

- Yes
- No

77. If the evaporative cooler had not been discounted, what would you have bought instead?

- Smaller evaporative cooler
- Room air condition

- Central air conditioner
- Heat pump
- Other (please specify)
- I would not have bought any cooling appliance

78. If the evaporative cooler had cost $150 more, how likely is it that you would have still bought it?

    - Very unlikely (0%)
    - Unlikely (25%)
    - Not sure (50%)
    - Likely (75%)
    - Very likely (100%)

79. When do you think you would have bought an evaporative cooler if it had not been discounted?

    - During the same season that I bought it
    - The summer season after bought it
    - More than a year later than I did
    - I don't know

80. What kind of evaporative cooler did you buy?

    - Brand [text response]
    - Model number[text response]
    - CFM [numeric]

Upstream Participant Spillover

81. After buying the discounted ENERGY STAR lighting product, ENERGY STAR room air conditioner, or evaporative cooler, have you taken any of the following additional steps to save energy in your home? Select all the apply.

    - Installed an ENERGY STAR certified appliance such as a refrigerator, dishwasher, clothes washer, or clothes dryer
    - Installed low flow faucet aerators
    - Installed low flow showerheads
    - Installed an ENERGY STAR certified heat pump water heater
    - Installed water heater jacket, blanket, or insulation
    - Installed an ENERGY STAR certified room air conditioner

- Installed an ENERGY STAR central air conditioner, heat pump, or evaporative cooler
- Installed a Smart Thermostat (for example, EcoBee or Nest)
- Other (please specify)
- I don't know

Spillover: ENERGY STAR Appliance

82. Did you receive an incentive or discount to buy the ENERGY STAR appliance?

    - Yes
    - No
    - I don't know

83. Rate how important the discount you received on the ENERGY STAR LED lighting product, ENERGY STAR room air conditioner or evaporative cooler was in your decision to purchase the ENERGY STAR appliance? [ApplianceSO1] [1-5 scale]

    - Not important (1) Somewhat important (3) Very important (5)

84. If you had not received the discount on the LEDs, room air conditioner or evaporative cooler, how likely is it that would you still have bought the ENERGY STAR appliance? [ApplianceSO2] [1-5 scale]

    - Very likely(1) Unsure (3) Very unlikely (5)

85. What kind of ENERGY STAR certified appliance did you purchase?

    - Refrigerator
    - Dishwater
    - Clothes washer
    - Clothes dryer
    - Other (Please specify.)
    - I don't know

Spillover: LOW FLOW AERATORS

86. Did you receive an incentive or discount to buy the low flow aerator(s)?

    - Yes
    - No
    - I don't know

87. Rate how important the discount you received on the ENERGY STAR LED lighting product, ENERGY STAR room air conditioner or evaporative cooler was in your decision to purchase the low flow aerator(s)? [AeratorO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

88. If you had not received the discount on the LEDs, room air conditioner or evaporative cooler, how likely is it that would you still have bought the low flow aerator(s)? [AeratorSO2]

- Very likely(1) Unsure (3) Very unlikely (5)

89. How many low flow faucet aerators did you install in bathroom sinks?

- [numeric]
- I don't know.

90. How many low flow faucet aerators did you install in kitchen sinks?

- Quantity:[numeric]
- I don't know.

Spillover: Low flow showerheads

91. Did you receive an incentive or discount to buy the low flow showerhead(s)?

- Yes
- No
- I don't know

92. Rate how important the discount you received on the ENERGY STAR LED lighting product, ENERGY STAR room air conditioner or evaporative cooler was in your decision to purchase the low flow showerhead(s)? [ShowerheadO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

93. If you had not received the discount on the LEDs, room air conditioner or evaporative cooler, how likely is it that would you still have bought the low flow aerator(s)? [ShowerheadSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

94. How many low flow showerheads did you install?

- [numeric]
- I don’t know.

Spillover: Heat pump water heater

95. Did you receive an incentive or discount to buy the ENERGY STAR certified heat pump water heater?

    - Yes
    - No
    - I don’t know

96. Rate how important the discount you received on the ENERGY STAR LED lighting product, ENERGY STAR room air conditioner or evaporative cooler was in your decision to buy the ENERGY STAR water heater? [WaterHeaterSO1] [1-5 scale]

    - Not important (1) Somewhat important (3) Very important (5)

97. If you had not received the discount on the LEDs, room air conditioner or evaporative cooler, how likely is it that would you still have bought the ENERGY STAR water heater? [WaterHeaterSO2] [1-5 scale]

    - Very likely(1) Unsure (3) Very unlikely (5)

98. What type of ENERGY STAR water heater did you install?

    - Natural gas storage tank water heater
    - Electric storage tank water heater
    - Heat pump water heater
    - Natural gas tankless water heater
    - Electric tankless water heater
    - Other (please specify)
    - I don’t know

99. What type of water heater did you replace?

    - Natural gas storage tank water heater
    - Electric storage tank water heater
    - Heat pump water heater
    - Natural gas tankless water heater
    - Electric tankless water heater
    - Other (please specify)

- I don’t know

Spillover: Water heater jacket, blanket, or insulation

100. Did you receive an incentive or discount to buy the water heater jacket, blanket or insulation?

    - Yes
    - No
    - I don’t know

101. Rate how important the discount you received on the ENERGY STAR LED lighting product, ENERGY STAR room air conditioner or evaporative cooler was in your decision to buy the water heater jacket, blanket or insulation? [WHInsulSO1] [1-5 scale]

    - Not important (1) Somewhat important (3) Very important (5)

102. If you had not received the discount on the LEDs, room air conditioner or evaporative cooler, how likely is it that would you still have bought the water heater jacket, blanket or insulation? [WHInsulSO2] [1-5 scale]

    - Very likely(1) Unsure (3) Very unlikely (5)

Spillover water heating fuel

103. What kind of water heating system do you have?

    - Natural gas storage tank water heater
    - Electric storage tank water heater
    - Heat pump water heater
    - Natural gas tankless water heater
    - Electric tankless water heater
    - Other (please specify)
    - I don’t know

Spillover: Room air conditioner

104. Did you receive an incentive or discount to buy the room air conditioner(s)?

    - Yes
    - No
    - I don’t know

105. Rate how important the discount you received on the ENERGY STAR LED lighting product, ENERGY STAR room air conditioner or evaporative cooler was in your decision to buy the ENERGY STAR room air conditioner? [RoomACO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

106. If you had not received the discount on the LEDs, room air conditioner or evaporative cooler, how likely is it that would you still have bought the ENERGY STAR room air conditioner? [RoomACSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

107. What kind of room air conditioner did you buy?

- Brand [text response]
- Model number[text response]
- BTUs [numeric]
- Energy Efficiency Ratio (EER) of room air conditioner [numeric]

108. How many ENERGY STAR room air conditioners did you buy and install?

- Quantity: ___
- I don't know.

109. What type of cooling system did you replace with your new ENERGY STAR room air conditioner?

- Older room air condition
- Evaporative cooler
- Central air conditioner
- Fans
- Room was not cooled before
- Other (please specify)
- I don't know

Spillover: Central cooling system

110. What type of new ENERGY STAR certified central cooling system did you install?

- Central air conditioner
- Heat pump
- Evaporative cooler

- I don’t know

111. Did you receive an incentive or discount to buy the ENERGY STAR certified central cooling system?

- Yes
- No
- I don’t know

112. Rate how important the discount you received on the ENERGY STAR LED lighting product, ENERGY STAR room air conditioner or evaporative cooler was in your decision to buy the ENERGY STAR certified central cooling system? [CentralCoolingSO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

113. If you had not received the discount on the LEDs, room air conditioner or evaporative cooler, how likely is it that would you still have bought the ENERGY STAR certified central cooling system? [CentralCoolingSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

114. What kind of cooling system did you buy?

- Brand [text response]
- Model number[text response]
- BTUs [numeric]
- Energy Efficiency Ratio (SEER) of room air conditioner [numeric]

115. Heat pumps also have a Heating Seasonal Performance Factor (HSPF) rating which indicates how efficient the heat pump is. What is the HSPF is for the heat pump you installed?

- HSPF rating: ___
- I don’t know

116. What type of cooling appliance did your new evaporative cooler replace?

- An existing evaporative cooler
- A room air conditioner
- Central air conditioning
- An electric fan
- I did not have a cooling appliance before

- I don’t know

Spillover: Smart Thermostat

117. Did you receive an incentive or discount to buy the smart thermostat?

    - Yes
    - No
    - I don’t know

118. Rate how important the discount you received on the ENERGY STAR LED lighting product, ENERGY STAR room air conditioner or evaporative cooler was in your decision to buy the smart thermostat? [SmartThermSO1] [1-5 scale]

    - Not important (1) Somewhat important (3) Very important (5)

119. If you had not received the discount on the LEDs, room air conditioner or evaporative cooler, how likely is it that would you still have bought the smart thermostat? [SmartThermSO2] [1-5 scale]

    - Very likely(1) Unsure (3) Very unlikely (5)[

120. What kind of heating system do you have?

    - Electric forced air furnace
    - Electric forced air furnace plus central AC
    - Heat pump
    - Gas forced air furnace plus central AC
    - I don’t know

Spillover: Other

121. What other energy efficient items did you install? [open ended]

122. Did you receive an incentive or discount to buy the energy efficient product?

    - Yes
    - No
    - I don’t know

123. Rate how important the discount you received on the ENERGY STAR LED lighting product, ENERGY STAR room air conditioner or evaporative cooler was in your decision to buy the energy saving item? [OtherSO1] [1-5 scale]

    - Not important (1) Somewhat important (3) Very important (5)

124. If you had not received the discount on the LEDs, room air conditioner or evaporative cooler, how likely is it that would you still have bought the energy saving item? [OtherSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

Leakage

125. How long you would drive in minutes to reach each of the following types of stores?

- Grocery [numeric]
- Do-It-Yourself or DIY retailer (e.g. Home Depot, Lowe's etc.)
- Mass merchant (e.g. Walmart, Target)
- Warehouse Club (e.g. Costco, Sam's Club)

Non-Participant Questions

126. In 2019 or 2020, did you participate in any of the following Rocky Mountain Power programs that promoted energy saving? Select all that apply.

- Purchased LED lighting products, an ENERGY STAR room air conditioner or an evaporative cooler discounted by Rocky Mountain Power from a retail store.
- Received a rebate or discount from Rocky Mountain Power energy efficient appliances, heating or cooling products, or home insulation or weatherization products and services.
- Received a rebate or discount from Rocky Mountain Power on energy efficient products included in a new home that you purchased.
- Received a Rocky Mountain Power Wattsmart Homes Starter Kit that included LED light bulbs and may have included low flow faucet aerators and a showerhead.
- No one in my home participated in any Rocky Mountain Power energy efficiency program.

127. Have you received information from Rocky Mountain Power about how to save energy in your home from any of these sources? Select all apply.

- Signage at retail stores
- Newspaper or magazine ads
- Bill inserts
- Messages printed on your bill
- Rocky Mountain Power website

- TV ad
- Rocky Mountain Power representative
- Rocky Mountain Power newsletter
- Community event
- Social media such as Facebook or Twitter
- Home Energy Report
- Other (please specify)
- No I have not received any information from Rocky Mountain Power about how to save energy

128. In 2019 and 2020, have you taken any of the following steps to save energy in your home based on information you received from Rocky Mountain Power? Select all the apply.

    - Installed an ENERGY STAR certified appliance such as a refrigerator, dishwasher, clothes washer, or clothes dryer
    - Installed low flow faucet aerators
    - Installed low flow showerheads
    - Installed an ENERGY STAR certified heat pump water heater
    - Installed water heater jacket, blanket, or insulation
    - Installed an ENERGY STAR certified room air conditioner
    - Installed an ENERGY STAR central air conditioner, heat pump, or evaporative cooler
    - Installed a Smart Thermostat (for example, EcoBee or Nest)
    - Other (please specify)
    - I have not taken any of these energy saving actions
    - I don't know

Non Participant Spillover: ENERGY STAR Appliance

129. Did you receive an incentive or discount to buy the ENERGY STAR appliance?

    - Yes
    - No
    - I don't know

130. Rate how important energy efficiency information from Rocky Mountain Power was in your decision to purchase the ENERGY STAR appliance? [ApplianceNPSO1] [1-5 scale]

    - Not important (1) Somewhat important (3) Very important (5)

131. If you had not received energy efficiency information from Rocky Mountain Power, how likely is it that would you still have bought the ENERGY STAR appliance? [ApplianceNPSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

132. What kind of ENERGY STAR certified appliance did you purchase?

- Refrigerator
- Dishwater
- Clothes washer
- Clothes dryer
- Other (Please specify.)
- I don't know

Non Participant Spillover: LOW FLOW AERATORS

133. Did you receive an incentive or discount to buy the low flow aerator(s)?

- Yes
- No
- I don't know

134. Rate how important energy efficiency information from Rocky Mountain Power was in your decision to purchase the low flow aerator(s)? [AeratorNPSO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

135. If you had not received energy efficiency information from Rocky Mountain Power, how likely is it that would you still have bought the low flow aerator(s)? [AeratorNPSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

136. How many low flow faucet aerators did you install in bathroom sinks?

- [numeric]
- I don't know.

137. How many low flow faucet aerators did you install in kitchen sinks?

- [numeric]
- I don't know.

Non Participant Spillover: Low flow showerheads

138. Did you receive an incentive or discount to buy the low flow showerhead(s)?

- Yes
- No
- I don't know

139. Rate how important energy efficiency information from Rocky Mountain Power was in your decision to purchase the low flow showerhead(s)? [ShowerheadNPO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

140. If you had not received energy efficiency information from Rocky Mountain Power, how likely is it that would you still have bought the low flow aerator(s)? [ShowerheadNPSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

141. How many low flow showerheads did you install?

- Quantity: ___
- I don't know.

Non Participant Spillover: Heat pump water heater

142. Did you receive an incentive or discount to buy the ENERGY STAR certified heat pump water heater?

- Yes
- No
- I don't know

143. Rate how important energy efficiency information from Rocky Mountain Power was in your decision to buy the ENERGY STAR water heater? [WaterHeaterNPSO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

144. If you had not received energy efficiency information from Rocky Mountain Power, how likely is it that would you still have bought the ENERGY STAR water heater? [WaterHeaterNPSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

145. What type of ENERGY STAR water heater did you install?

- Natural gas storage tank water heater
- Electric storage tank water heater
- Heat pump water heater
- Natural gas tankless water heater
- Electric tankless water heater
- Other (please specify)
- I don't know

146. What type of water heater did you replace?

- Natural gas storage tank water heater
- Electric storage tank water heater
- Heat pump water heater
- Natural gas tankless water heater
- Electric tankless water heater
- Other (please specify)
- I don't know

Non Participant Spillover: Water heater jacket, blanket, or insulation

147. Did you receive an incentive or discount to buy the water heater jacket, blanket or insulation?

- Yes
- No
- I don't know

148. Rate how important energy efficiency information from Rocky Mountain Power was in your decision to buy the water heater jacket, blanket or insulation? [WHInsulNPSO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

149. If you had not received energy efficiency information from Rocky Mountain Power, how likely is it that would you still have bought the water heater jacket, blanket or insulation? [WHInsulNPSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

Non Participant Spillover: Water heating fuel

150. What type of water heater do you have?

- Natural gas storage tank water heater
- Electric storage tank water heater
- Heat pump water heater
- Natural gas tankless water heater
- Electric tankless water heater
- Other (please specify)
- I don't know

Non Participant Spillover: Room air conditioner

151. Did you receive an incentive or discount to buy the room air conditioner(s)?

- Yes
- No
- I don't know

152. Rate how important energy efficiency information from Rocky Mountain Power was in your decision to buy the ENERGY STAR room air conditioner? [RoomACNPSO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

153. If you had not received energy efficiency information from Rocky Mountain Power, how likely is it that would you still have bought the ENERGY STAR room air conditioner? [RoomACNPSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

154. What kind of room air conditioner did you buy?

- Brand [text response]
- Model number[text response]
- BTUs [numeric]
- Energy Efficiency Ratio (EER) of room air conditioner [numeric]

155. How many ENERGY STAR room air conditioners did you install?

- Quantity: ___
- I don't know.

156. What type of cooling system did you replace with your new ENERGY STAR room air conditioner?

- Older room air condition
- Evaporative cooler
- Central air conditioner
- Fans
- Room was not cooled before
- Other (please specify)
- I don't know

Non Participant Spillover: Central cooling system

157. What type of new ENERGY STAR certified central cooling system did you install?

- Central air conditioner
- Heat pump
- Evaporative cooler
- I don't know

158. Did you receive an incentive or discount to buy the ENERGY STAR certified central cooling system?

- Yes
- No
- I don't know

159. Rate how important energy efficiency information from Rocky Mountain Power was in your decision to buy the ENERGY STAR certified central cooling system? [CentralCoolingNPSO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

160. If you had not received energy efficiency information from Rocky Mountain Power, how likely is it that would you still have bought the ENERGY STAR certified central cooling system? [CentralCoolingNPSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

161. What kind of cooling system did you buy?

- Brand [text response]
- Model number[text response]

- BTUs [numeric]
- Energy Efficiency Ratio (SEER) of room air conditioner [numeric]

162. Heat pumps also have a Heating Seasonal Performance Factor (HSPF) rating which indicates how efficient the heat pump is. What is the HSPF is for the heat pump you installed?

- HSPF rating: ___
- I don't know

163. What type of cooling appliance did your new cooling system replace?

- An existing evaporative cooler
- A room air conditioner
- Central air conditioning
- An electric fan
- I did not have a cooling appliance before
- I don't know

Non Participant Spillover: Smart Thermostat

164. Did you receive an incentive or discount to buy the smart thermostat?

- Yes
- No
- I don't know

165. Rate how important energy efficiency information from Rocky Mountain Power was in your decision to buy the smart thermostat? [SmartThermNPSO1] [1-5 scale]

- Not important (1) Somewhat important (3) Very important (5)

166. If you had not received energy efficiency information from Rocky Mountain Power, how likely is it that would you still have bought the smart thermostat? [SmartThermNPSO2] [1-5 scale]

- Very likely(1) Unsure (3) Very unlikely (5)

167. What kind of heating system do you have?

- Electric forced air furnace
- Electric forced air furnace plus central AC
- Heat pump

- Gas forced air furnace plus central AC
- I don't know

Non Participant Spillover: Other

168. What other energy efficient items did you install?

    - [open ended]

169. Did you receive an incentive or discount to buy the smart thermostat?

    - Yes
    - No
    - I don't know

170. Rate how important energy efficiency information from Rocky Mountain Power was in your decision to buy the energy saving item? [OtherNPSO1] [1-5 scale]

    - Not important (1) Somewhat important (3) Very important (5)

171. If you had not received energy efficiency information from Rocky Mountain Power, how likely is it that would you still have bought the energy saving item? [OtherNPSO2] [1-5 scale]

    - Very likely(1) Unsure (3) Very unlikely (5)

Home Demographics

172. Which of the following best describes your home?

    - Manufactured or mobile home
    - Single-family home
    - Duplex or townhouse
    - Apartment or condominium
    - Other (please specify)
    - I don't know

173. Do you own or rent your home?

    - Own
    - Rent
    - Prefer not to answer

174. When was your home built?

- Before 1960
- 1960-1979
- 1980-1999
- 2000-2009
- 2010 or later
- I don't know

175. How large is your home?

- Less than 1,000 square feet
- 1,000-2,000 square feet
- 2,000-3,000 square feet
- 3,000-4,000 square feet
- Greater than 4,000 square feet
- I don't know

176. What is the main fuel used for heating your home?

- Electricity
- Natural Gas
- Propane
- Oil
- Don’t heat home
- Other (Please specify)
- I don’t know

177. Including yourself, how many people are living in your household?

- [FamilySize]

178. Is your annual household income over or under [FPL CUTOFF]?

- Over
- Under
- I don’t know
- Prefer not to answer

Thank you

179. Thank you for your valuable feedback. In exchange for you time, we'd like to send you a $5 electronic gift card that you can use at one of dozens of retailers. We will email your gift card to:

    - [Email]

180. If you would like us to send it to a different email address, enter it here:

    - [GCemail]

181. On behalf of Rocky Mountain Power, thank you for your time and feedback! If you have any questions regarding this survey or the status of your gift card, email

Appendix C – Starter Kit Survey

1. Our records indicate that you received a Rocky Mountain Power Home Energy Savings Program Starter Kit in 2019. Starter Kits contain four LED light bulbs, and customers with electric water heating also receive high-performance showerheads and kitchen and bathroom faucet aerators. Did you receive a Home Energy Savings Program Starter Kit in the mail?

    - Yes
    - No
    - I don't know

2. What fuel does your main water heater use?

    - Electricity
    - Natural gas
    - Propane
    - Other (Please specify)
    - I don’t know

3. How satisfied were you with the following aspects of your Home Energy Savings Program Starter Kit?

    - Ease of ordering
    - Ease of installation
    - Quality of components
    - Timeliness of delivery
    - Process to request a kit
    - Kit contents
    - Energy savings that resulted from install kit
    - Rocky Mountain Power as your electricity provider

4. Why were you dissatisfied?

    - [OPEN-ENDED]

5. How important were each the following reasons for requesting a kit?

    - Saving money on utility bills
    - Concern for the environment
    - Curiosity about energy-efficient products
    - Opportunity to get the products in the kit for free

6. How did you hear about the Starter Kits?

- Newspaper/magazine/print media
- Utility bill insert
- My bill
- Rocky Mountain Power website
- Word of mouth (friend, relative, coworker, etc.)
- Contractor or plumber
- TV ad
- Rocky Mountain Power representative
- Rocky Mountain Power newsletter
- Retailer/store
- Community event
- Social media such as Facebook or Twitter
- Home Energy Report
- Other (Please specify)
- I don't know

7. How long after receiving your kit did you install its contents?

- First LED light bulb
- Second LED light bulb
- Third LED light bulb
- Fourth LED light bulb

8. Why did you decide not to use all the LEDs yet? [SELECT ALL THAT APPLY]

- Waiting for current lights to burn out
- Not the correct wattage
- Disliked the color tone/quality of the emitted light
- Did not fit into my fixtures
- Other (Please specify)

9. Why did you decide not to use the faucet aerator(s) that came in your kit? [SELECT ALL THAT APPLY]

- Faucet aerators were already installed in all sinks
- Did not integrate well with current plumbing
- Disliked the pressure/water volume
- Disliked the way it looked
- Other (Please specify)

10. Why did you decide not to use the high-efficiency shower head(s) included in the kit? [SELECT ALL THAT APPLY]

    - High-efficiency showerheads were already installed in all showers
    - Did not integrate well with current plumbing
    - Disliked the pressure/water volume
    - Disliked the way it looked
    - Other (Please specify)

11. Before you learned that the Home Energy Savings Program Starter Kits were available, were you planning to buy and install LED light bulbs?

    - Yes
    - No
    - I don’t know

12. Before you received the kit, what percent of lights in your home were LED bulbs?

    - 0%
    - 25%
    - 50%
    - 75%
    - 100%
    - I don’t know

13. If you had not received the Starter Kit, how likely is it that you would have bought and installed the items you received

    - LED light bulb
    - [SHOW IF KIT - 2 BATH >0, OR KIT - 1 BATH >0] Faucet aerator
    - [SHOW IF KIT - 2 BATH >0, OR KIT - 1 BATH >0] High-efficiency showerhead

14. If you had not received the Starter Kit, when do you think you might have purchased the items that were in it?

    - LED light bulb
    - [SHOW IF KIT - 2 BATH >0, OR KIT - 1 BATH >0] Faucet aerator
    - [SHOW IF KIT - 2 BATH >0, OR KIT - 1 BATH >0] High-efficiency showerhead

15. Before you received the kit, what percent of sinks in your home had faucet aerators installed?

- 0%
- 25%
- 50%
- 75%
- 100%
- I don't know

16. Before you received the kit, what percent of showers in your home had high-efficiency showerheads installed?

- 0%
- 25%
- 50%
- 75%
- 100%
- I don't know

17. Since receiving your Home Energy Savings Program Starter Kit, have you taken any of the following additional steps to save energy? [SELECT ALL THAT APPLY]

- Installed additional LED Light Bulbs
- Installed an ENERGY STAR® appliance such as a refrigerator, dishwasher, clothes washer, or clothes dryer.
- Installed water heater jacket, blanket, or insulation
- Installed additional low flow faucet aerators
- Installed additional low flow showerheads
- Installed an ENERGY STAR® room air conditioner
- Installed an energy efficient water heater
- Installed an energy efficient central air conditioner, heat pump, or evaporative cooler
- Installed a Smart Thermostat (for example, EcoBee or Nest)
- Other (Please specify)
- I have not taken any additional energy saving steps
- I don't know

18. How many LEDs have you purchased and installed?

- Quantity: ___
- I don't know

19. Were any of the additional LED bulbs you purchased discounted from their normal price?

- Yes
- No
- I don't know

20. Do you know if Rocky Mountain Power sponsored the discount for the light bulb(s) you purchased?

- Yes, the discount was sponsored by Rocky Mountain Power
- No, the discount was not sponsored by Rocky Mountain Power
- I don't know

21. What kind of appliance did you purchase?

- Appliance type: ___
- I don't know

22. How many low flow faucet aerators did you install in bathroom sinks?

- Quantity: ___
- I don't know

23. How many low flow faucet aerators did you install in kitchen sinks?

- Quantity: ___
- I don't know

24. How many low flow showerheads did you install?

- Quantity: ___
- I don't know

25. How many ENERGY STAR® room air conditioners did you install?

- Quantity: ___
- I don't know

26. What type of water heater did you install?

- Natural gas storage tank water heater
- Electric storage tank water heater
- Heat pump water heater
- Natural gas tankless water heater
- Electric tankless water heater
- Other (Please specify)
- I don't know

27. Was the new central cooling system that you installed an air conditioner, heat pump, evaporative cooler?

- Air conditioner
- Heat pump
- Evaporative cooler
- I don't know

28. Air conditioners and heat pumps have an energy efficiency rating called Seasonal Energy Efficiency Ratio (SEER) that is displayed on the Energy Guide label. What is the SEER rating of the unit you installed?

- SEER rating: ___
- I don't know

29. Heat pumps have an energy efficiency rating called a Heating Seasonal Performance Factor (HSPF) that is displayed on the Energy Guide label. What is the HSPF of the unit you installed?

- HSPF rating: ___
- I don't know

30. Evaporative coolers have an energy efficiency rating called an Energy Efficiency Ratio (EER) that is displayed on the Energy Guide label. What is the EER of the unit you installed?

- EER rating: ___
- I don't know

31. What kind of heating system do you have?

- Air source heat pump
- Electric forced air furnace
- Electric forced air furnace plus central air conditioner
- Gas forced air furnace plus central air conditioner
- I don’t know

32. Did you receive a Rocky Mountain Power incentive, rebate, or discount when you [Q17 SPILL_MEASURE]?

- Yes
- No
- I don’t know

33. How important was your experience with the Home Energy Savings Program Starter Kits when you [SPILL_MEASURE]?

34. How likely would you have been to take the additional steps to save energy if you had ***not*** received the Home Energy Savings Program Starter Kit?

35. Which of the following best describes your home?

- Manufactured or mobile home
- Single-family home
- Duplex or townhouse
- Apartment or condominium
- Other (please specify)
- Don’t know

36. When was your home built?

- Before 1960
- 1960-1979
- 1980-1999
- 2000-2009
- 2010 or later
- Don't know

37. Do you own or rent your home?

- Own
- Rent
- Prefer not to answer

38. What is the main fuel used to heat your home?

- Electricity
- Natural gas
- Propane
- Oil
- Other (Please specify)
- Don’t heat home
- Don’t know

39. What fuel does your main water heater use?

- Electricity
- Natural gas
- Propane
- Other (Please specify)
- Don’t know

40. Including yourself, how many people are living in your household?

41. Is your annual household income over or under [FPL threshold CUTOFF based on members of household]?

- Over
- Under
- Don’t know
- Prefer not to answer

42. We appreciate your time and would like to send you a $5 electronic gift card to thank you. We will send it to [EMAIL]. If you would like us to send your gift card to a different address, please enter the new address below. You should receive an email with the link to your gift card within 10 days.

- Please send my gift card to the above email address.
- Please send my electronic gift card to the following email address: __
- I do not wish to receive a gift card

43. If you have questions regarding this survey or would like to know the status of your gift card, you can send an email to adm-surveys@admenergy.com. On behalf of Rocky Mountain Power, thank you for participating. Have a great day!