

Idaho Low Income Weatherization Program
Evaluation, Measurement & Verification Report
2016-2017

*Prepared for
Rocky Mountain Power
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Table of Contents

1.	Executive Summary	1
2.	Introduction and Purpose of Study.....	7
3.	Description of Program	8
4.	Impact Evaluation	11
5.	Process Evaluation	21
6.	Cost Effectiveness Evaluation	33
7.	Conclusions and Recommendations	37
8.	Appendix: Participant Survey	39

List of Tables

Table 1-1:	Idaho Low Income Weatherization Program Claimed and Evaluated Energy Savings for 2016-2017	1
Table 1-2:	Low Income Weatherization Non-Energy Impacts by Program Year	2
Table 1-3:	Low Income Program Level Results PY2016-2017	4
Table 1-4:	Low Income Program Level Cost-Effectiveness Results PY2016.....	4
Table 1-5:	Low Income Program Level Cost-Effectiveness Results PY2017	4
Table 3-1:	Rocky Mountain Power’s Low Income Weatherization Program in Idaho Number of Participants by Implementation Agency 2016-2017	9
Table 3-2:	Quantities of Measures Installed 2016-2017.....	9
Table 4-1:	Idaho Low Income Weatherization Program Claimed and Evaluated Energy Savings for 2016-2017	11
Table 4-2:	Regression Results Idaho LIW Energy Savings Per Home 2016-2017 ..	16
Table 4-3:	Analysis of Changes in External Assistance Payments Based on Mean Monthly Payments	18
Table 4-4:	Analysis of Changes in Arrearages Based on Mean Monthly Arrearage Balances	19
Table 4-5:	Health and Safety Measures.....	20
Table 4-6:	Low Income Weatherization Non-Energy Impacts by Program Year	20

Table 5-1:	How did respondents learn about the program?	25
Table 5-2:	Why did respondents decide to participate in the program?	26
Table 5-3:	What measures did survey respondents receive?	26
Table 6-1:	Low Income Weatherization Program Inputs	33
Table 6-2:	Low Income Weatherization Annual Program Costs.....	33
Table 6-3:	Low Income Weatherization Non-Energy Impacts by Program Year	34
Table 6-4:	Low Income Weatherization Program – Savings by Program Year	34
Table 6-5:	Benefit/Cost Ratios by Program Year	35
Table 6-6:	Low Income Program Level Results PY2016-2017	35
Table 6-7:	Low Income Program Level Cost-Effectiveness Results PY2016.....	36
Table 6-8:	Low Income Program Level Cost-Effectiveness Results PY2017	36

List of Figures

Figure 1-1:	Idaho Low Income Weatherization Program Funding Flow.....	2
Figure 3-1:	Idaho Low Income Weatherization Program Funding Flow.....	8
Figure 5-1:	Satisfaction with Energy Savings Measures	28
Figure 5-2:	Satisfaction with Scheduling, Energy Education and Savings on Electric Bills.	31
Figure 5-3:	Overall Program Satisfaction	32

1. Executive Summary

This report provides the results of ADM’s impact and process evaluations of Rocky Mountain Power’s Low Income Weatherization (LIW) program in Idaho during 2016 and 2017.

The program provides energy-efficiency weatherization services at no cost to income-eligible Rocky Mountain Power customers living in single family homes, manufactured homes, or multi-unit residential housing in Idaho. During the evaluation period, Rocky Mountain Power reimbursed program implementers for installing energy efficient refrigerators as well as building shell, health and safety, HVAC, lighting and water heating measures. One hundred and twenty six households participated in the program during the evaluation period.

1.1 Impact Evaluation Results

Energy saving impacts

Table 1-1 presents the claimed gross savings, evaluated gross savings, and realization rates that resulted from the program in 2016 and 2017.

Table 1-1: Idaho Low Income Weatherization Program Claimed and Evaluated Energy Savings for 2016-2017

Year	Measure	Quantity	Claimed Gross Savings (kWh/yr)	Evaluated Gross Savings (kWh/yr)	Realization Rate
2016	ID Weatherization - ID	66	140,069	85,536	61%
2017	ID Weatherization - ID	60	131,340	77,760	59%
Total		126	271,409	163,296	60%

Non-energy impacts

ADM evaluated non-energy impacts including the changes in payment assistance and arrearage balances for program participants. The direct cost of health and safety repairs is also included as a NEI and is quantified as a cost-offset to the program. Health and safety repair costs are provided by Rocky Mountain Power. The total payment assistance and arrearages benefits that resulted from the program in 2016 and 2017 are shown in Table 1-2.

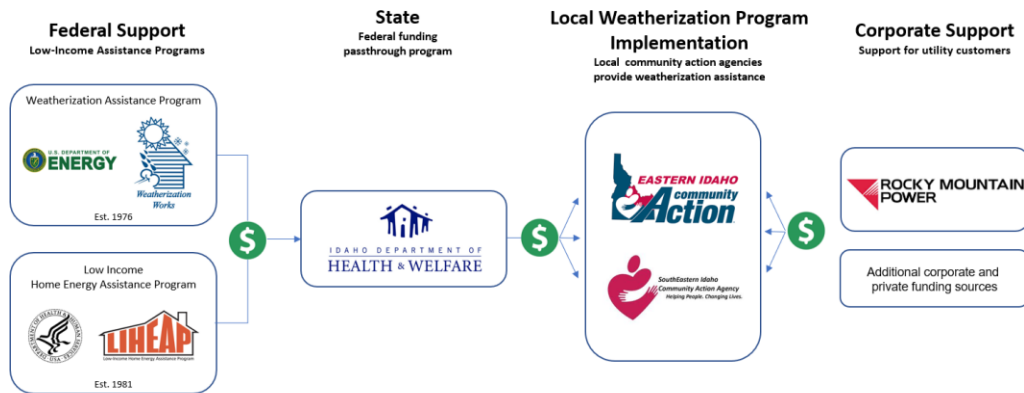
Table 1-2: Low Income Weatherization Non-Energy Impacts by Program Year

Non-Energy Impacts	PY2016	PY2017
Health & Safety	\$35,758.42	\$143,417.40
Payment assistance	\$3,697.32	\$4,518.00
Arrearages	\$1,332.54	\$1,817.40
Total	\$40,788.28	\$149,752.80

1.2 Process Evaluation Results

In Idaho, Rocky Mountain Power’s LIW program is implemented by two non-profit Community Action Partnership organizations: Eastern Idaho Community Action Partnership and Southeastern Idaho Community Action Agency. Each provides a variety of wraparound services to income-eligible families and individuals, including federally funding Low Income Home Energy Assistance Program (LIHEAP) and Weatherization Assistance Program (WAP) services; see Figure 1-1. Agencies leverage “braided funding” from multiple sources to offer comprehensive weatherization services to participants.

Figure 1-1: Idaho Low Income Weatherization Program Funding Flow



Rocky Mountain Power benefits from working with these implementation agencies in the following ways:

Trained workforce. By working with implementing agencies, Rocky Mountain Power benefits from access to crews that receive annual weatherization workforce training. Both implementation agencies are members of a National Community Action Partnership (NCAP) network, an association of local organizations many of which are WAP implementers that benefit greatly from national and regional WAP conferences.

Leveraged funding. By combining funding sources, agencies can leverage shared program resources and can maximize the number of measures installed in a single home, maximizing benefits for customers and energy savings.

Lower program administration costs. By managing multiple funding streams, agencies distribute overhead costs across funders.

ADM conducted a participant survey to verify measure installations and determine customer satisfaction. All survey respondents shared positive feedback about the program. Respondents rated their satisfaction with program measures and their overall experience highly.

1.3 Cost Effectiveness Results

Guidehouse estimated the cost-effectiveness results for the Idaho Low Income Weatherization Program, based on 2016 and 2017 costs provided by Rocky Mountain Power and evaluated savings provided by ADM. They conducted the following cost-effectiveness tests:

- Total Resource Cost Test (PTRC) + Conservation Adder
 - The TRC test shows benefits and costs from the perspective of all utility customers (participants and nonparticipants) in the utility service territory. The 10% conservation benefit and adder is included in addition to quantifiable non-energy impacts.
- Total Resource Cost Test (TRC) No Adder
- Utility Cost Test (UCT)
 - The UCT test is an economic test used to compare the present value of the benefits to the present value of the costs over the useful life of an energy efficiency measure or program from the utility revenue requirement perspective.
- Rate Impact Test (RIM)
 - The RIM test shows impact of efficiency measure on non-participating ratepayers overall
- Lifecycle Revenue Impacts (\$/kWh)

Since program participants do not incur costs, the Participant Cost Test (PCT) was not conducted. The program did not pass the cost-effectiveness tests during the evaluation period. Table 1-3 through Table 1-5 **Error! Reference source not found.** report cost effectiveness test results.

*Table 1-3: Low Income Program Level Results
PY2016-2017*

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.2103	\$495,819	\$405,257	-\$90,562	0.82
Total Resource Cost Test (TRC) No Adder	\$0.2103	\$495,819	\$385,738	-\$110,081	0.78
Utility Cost Test (UCT)	\$0.2103	\$495,819	\$195,197	-\$300,622	0.39
Rate Impact Test (RIM)		\$759,151	\$195,197	-\$563,954	0.26
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000031637

*Table 1-4: Low Income Program Level Cost-Effectiveness Results
PY2016*

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.2003	\$247,333	\$174,714	-\$72,619	0.71
Total Resource Cost Test (TRC) No Adder	\$0.2003	\$247,333	\$162,539	-\$84,794	0.66
Utility Cost Test (UCT)	\$0.2003	\$247,333	\$121,751	-\$125,582	0.49
Rate Impact Test (RIM)		\$385,712	\$121,751	-\$263,961	0.32
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000029204

*Table 1-5: Low Income Program Level Cost-Effectiveness Results
PY2017*

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.2213	\$248,486	\$230,543	-\$17,943	0.93
Total Resource Cost Test (TRC) No Adder	\$0.2213	\$248,486	\$223,199	-\$25,287	0.90
Utility Cost Test (UCT)	\$0.2213	\$248,486	\$73,446	-\$175,040	0.30
Rate Impact Test (RIM)		\$373,439	\$73,446	-\$299,993	0.20
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000034139

1.4 Conclusions and Recommendations

ADM's evaluation results in the following conclusions:

- During the evaluation period, the program resulted in total evaluated energy savings of 271,409 kWh/year from 126 participating households.
- The program also reduced participants' reliance on energy payment assistance programs by a total of \$8,215.32 and reduced the arrears balances carried by participants by \$3,149.94.
- Rocky Mountain Power continued their partnership with two community action agencies to implement the LIW program in Idaho. The agencies expressed positive program outcomes including reduced energy demand, improved home comfort, reduction of health and safety hazards, and retention of homes in the affordable housing inventory. Participant testimonials express deep gratitude for the positive impact the program had on participants' quality of life.
- The program did not pass the cost-effectiveness tests during the evaluation period.

Based on its evaluation, ADM recommend the following actions for Rocky Mountain Power to consider in its future implementation of its LIW program in Idaho:

- Rocky Mountain Power should continue partnering with agencies that provide federally funded weatherization services to take advantage of existing program infrastructure and leveraged funding, and access to a trained weatherization workforce.
- Rocky Mountain Power could consider providing branded, up-to-date educational materials to distribute during weatherization implementations to improve education and funding attribution. The company might also consider reinforcing or reintroducing the past practice of installing Rocky Mountain Power branded yard signs at homes during active project cycle to reinforce funding attribution.
- Rocky Mountain Power could consider sharing its program objectives (qualitative and quantitative) with its partner community action agencies in order to more clearly determine the success of the program. Both Rocky Mountain Power and the agencies would likely benefit from more explicit program goals.
- Rocky Mountain Power could consider requesting more detailed tracking data from implementers to increase the accuracy and granularity of measures' specifications. For example, additional data could include baseline and efficient wattages for bulbs installed through the program, specifications for baseline and replacement efficient refrigerators, and pre- and post-installation insulation conditions. Implementers are already recording extensive data in the DOE-approved auditing software used for

projects that include Weatherization Assistance Program (WAP) funding, and therefore the additional data reporting should not create an unreasonable burden.

- Rocky Mountain Power could consider reducing the interval between program implementation and evaluation to facilitate more accurate and timely energy savings estimates.
- Rocky Mountain Power could consider implementing a process for collecting weatherization program customers' email addresses to enable more accurate and comprehensive program evaluations.
- Rocky Mountain Power could consider increasing its promotion of the weatherization program to its customers in Southeast Idaho Community Action Agency service area.
- Rocky Mountain Power could consider rebalancing the allocation of funding across implementation agencies to address unmet demand in Eastern Idaho Community Action Partnership's service area.
- Rocky Mountain Power could consider using a blended ex-ante value from prior program years analysis, rather than updating annually to the most recent evaluation findings. The small sample sizes in Low Income program create high variability in program savings across years. Using an average value across a couple prior evaluation cycles could reduce the fluctuation in realization rates by program year.

2. Introduction and Purpose of Study

This report provides results of the ADM Associates, Inc. (ADM) impact and process evaluations of the Rocky Mountain Power 2016-2017 Low Income Weatherization (LIW) program in Idaho. It also includes results of a cost effectiveness evaluation completed by Guidehouse.

2.1 Impact evaluation

The primary objective of the impact evaluation was to determine ex-post verified gross energy (kWh) savings that resulted from the installation of energy saving measures through the program. The impact evaluation also an estimate of the program's impact on participants' reliance on energy assistance payments and participants' arrears balances.

2.2 Process evaluation

The objective of the process evaluation was to gain an in-depth understanding of program operations and identify both program strengths and opportunities for improvement. The process evaluation includes information gathered from Rocky Mountain Power staff, staff of both agencies that implement the program, and program participants.

2.3 Cost effectiveness evaluation

The cost-effectiveness evaluation, completed by Guidehouse using cost estimates provided by Rocky Mountain Power and energy saving estimates provided by ADM, includes results of the following cost effectiveness tests:

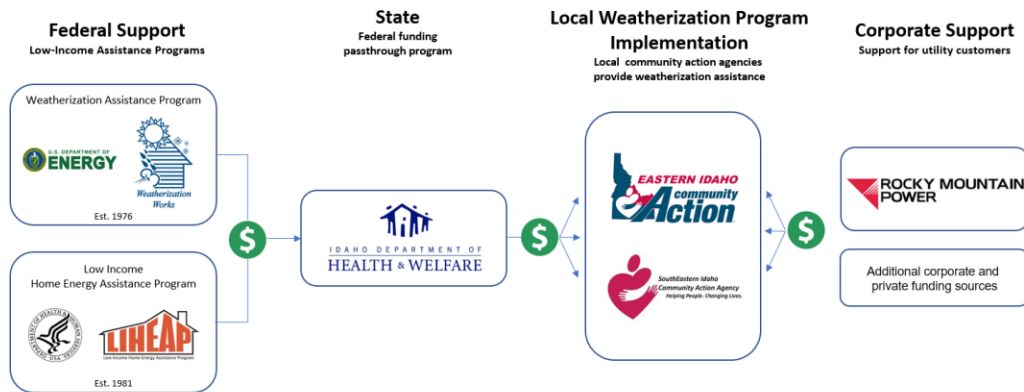
- PacifiCorp Total Resource Cost Test (PTRC) + Conservation Adder
- Total Resource Cost Test (TRC) No Adder
- Utility Cost Test (UCT)
- Rate Impact Test (RIM)
- Lifecycle Revenue Impacts (\$/kWh)

Since program participants do not incur costs, the Participant Cost Test (PCT) was not conducted. The following chapters provide descriptions of the methods used to complete these evaluations and their results.

3. Description of Program

In Idaho, Rocky Mountain Power’s LIW program is implemented by two non-profit Community Action Partnership organizations: Eastern Idaho Community Action Partnership and SouthEastern Idaho Community Action Agency. Each provides a variety of wraparound services to income-eligible families and individuals, including federally funding Low Income Home Energy Assistance Program (LIHEAP) and Weatherization Assistance Program (WAP) services; see Figure 3-1. Agencies leverage “braided funding” from multiple sources to offer comprehensive weatherization services to participants.

Figure 3-1: Idaho Low Income Weatherization Program Funding Flow



Rocky Mountain Power benefits from working with these implementation agencies in the following ways:

Trained workforce. By working with implementing agencies, Rocky Mountain Power benefits from access to crews that receive annual weatherization workforce training. Both implementation agencies are members of a National Community Action Partnership (NCAP) network, an association of local organizations many of which are WAP implementers that benefit greatly from national and regional WAP conferences and training.

Leveraged funding. By combining funding sources, agencies can leverage shared program resources and can maximize the number of measures installed in a single home, maximizing benefits for customers and energy savings.

Lower program administration costs. By managing multiple funding streams, agencies distribute overhead costs across funders.

Table 3-1 includes participant counts for each agency.

*Table 3-1: Rocky Mountain Power's Low Income Weatherization Program in Idaho
Number of Participants by Implementation Agency 2016-2017*

Agency	2016	2017	Total
Eastern Idaho Community Action Partnership	60	48	108
SouthEastern Idaho Community Action Agency	6	12	18
Total	66	60	126

Covered costs: For its customers who are program participants, Rocky Mountain Power provided funding for 85 percent of the cost of eligible measures and a 15% administrative allowance with a maximum value that ranges from \$50-\$350 per home depending on the scope of the project. Rocky Mountain Power allows up to 15% of reimbursed costs to be used for health and safety measures.

Table 3-2 includes the quantities of each measure that was installed during the evaluated period.

Table 3-2: Quantities of Measures Installed 2016-2017

Measure Type	2016	2017	Total
Appliances			
901 Refrigerator Replacement - ID	44	29	73
Building Shell			
08 Wall Insulation - ID	11	9	20
09 Ceiling Insulation - ID	50	26	76
10 Attic Ventilation - ID	45	19	64
11 Floor Insulation - ID	22	19	41
18 Air Sealed/Infiltration - ID	66	60	126
31 Thermal Doors - ID	45	45	90
32 Double Glass Replacement - ID	29	48	77
ID Weatherization - ID	66	60	126
Container			
Low Income Weatherization Typical	1	-	1
Health and Safety			
274 Health and Safety - ID	67	60	127
HVAC			
15 Duct Insulation/Sealing Insulation - ID	15	19	34
271 Furnace Repair - ID	26	35	61
272 Furnace Replacement - ID	9	22	31

Measure Type	2016	2017	Total
Lighting			
21 CFL Bulbs - ID	184	64	248
21 Fluorescent Lighting - ID	112		112
50 LED Bulbs - ID	48	408	456
50 LED Bulbs - WY	8		8
Non-TRL Measures			
Low Income Weatherization Payments	-	-	-
Water Heating			
12 Pipe Insulation HYD - ID	55	58	113
240 Water Heater Repair - ID	28	39	67
273 Water Heater Replacement - ID	1	2	3
Total	932	1,022	1,954

Program goals: The agencies indicated that their programs goals included: enabling people to stay in their homes, reduce their utility bills and increase home comfort. Neither Rocky Mountain Power nor the agencies indicated that there were specific energy saving performance goals.

4. Impact Evaluation

This chapter provides the results of ADM’s impact evaluation of the Rocky Mountain Power LIW program in Idaho during 2016 and 2017. The impact analysis estimates the energy and non-energy impacts that resulted from the program including:

- energy saving (kWh)
- reduced need for payment assistance
- reduced arrears balances

During the evaluation period, Rocky Mountain Power reimbursed program implementers for installing energy efficient refrigerators as well as building shell, health and safety, HVAC, lighting, and water heating measures.

4.1 Energy Savings

Rocky Mountain Power estimated energy savings using a single measure ex-ante value per home, *Weatherization - ID*, that represented the bundled effect of all installed measures. ADM used a regression analysis of billing data to verify the savings that resulted from the program.

Table 4-1 presents the energy impact evaluation results including the quantity, claimed gross savings, evaluated gross savings, and realization rates for the evaluation period.

*Table 4-1: Idaho Low Income Weatherization Program
Claimed and Evaluated Energy Savings for 2016-2017*

Year	Measure	Quantity	Claimed Gross Savings (kWh/yr)	Evaluated Gross Savings (kWh/yr)	Realization Rate
2016	Weatherization - ID	66	140,069	85,536	61%
2017	Weatherization - ID	60	131,340	77,760	59%
Total		126	271,409	163,296	60%

Total ex post energy savings were comparable to the prior evaluation cycle. Ex ante reported savings were higher than the prior evaluation cycle savings. The updates from the last completed evaluation were not reflected in this cycle’s reported ex ante savings, resulting in a low realization rate.

4.1.1 Energy Savings Evaluation Methodology

The impact evaluation component of this report estimates annual gross energy savings (kWh) as framed by the following research question:

- How many homes received the weatherization and energy savings measures?
- What were the kWh savings achieved by the program?
- Did the program have other non-energy impacts such as reducing program participants' reliance on energy assistance payments or a reducing their arrears with Rocky Mountain Power?

4.1.2 Data Collection and Measure Verification

ADM reviewed and reconciled program tracking data to the participation counts and ex-ante savings indicated in the 2016 and 2017 annual reports. ADM reviewed a census of program tracking data. In concert with tracking data reviews, ADM also reviewed the savings values and measure savings assumptions and calculations contained in the Technical Resource Library (TRL) files. ADM issued data requests as needed to ensure that all data was collected that could be reasonably expected or required for this evaluation.

ADM took the following steps to evaluate tracking data and verify program savings.

Review of the program tracking database is an essential first step for verifying data integrity. ADM assessed the program data management system DSMC – which facilitates data collection and organization. ADM reviewed a census of program tracking data contained in DSMC. Each program year's dataset was reviewed for completeness, consistency, and compliance with the provided TRL files.

Review of measure savings assumptions and calculations occurred concurrent with the DSMC data reviews mentioned above. Savings values are maintained in the Technical Reference Library (TRL). The TRL files sometimes include measure savings assumptions, calculations, source papers or files (e.g. RTF versions), and additional documentation that together comprise the generally accepted rules and guidance for evaluating programs. ADM reviewed all TRL documentation and included in this report any errors, omissions, or inconsistencies identified during ADM's review.

Data requests related to EM&V activities occurred throughout the period of this evaluation. ADM provided Rocky Mountain Power various data requests for DSMC and TRL data pulls and reports, billing data, and other program data and verification, as necessary.

Established a comparative sample consisting of 2018 – 2019 program participants.

4.1.3 Database Review

ADM reviewed and reconciled the program tracking data to the claimed participation counts and ex-ante claimed savings in the 2016 and 2017 annual reports. Further, ADM

verified that all energy savings are claimed in accordance with the applicable TRL documents and calculations

For the *Weatherization - ID* measure in 2016 and 2017, Rocky Mountain Power claimed an ex-ante Unit Energy Savings (UES) value of 1,308 kWh/year for 5 homes (all served in 2016) and 2,189 kWh/year for 121 homes (served in 2016 and 2017).

ADM verified that the source for the 2,189 kWh/year ex-ante UES value is the *Idaho Low-Income Weatherization Program Evaluation Report for Program Years 2010-2012*¹ and the source for the 1,308 kWh ex-ante value is the *Idaho Low-Income Weatherization Program Evaluation (2007-2009)*². Both ex-ante values were the result of regression analysis of billing data completed during their respective evaluations. ADM believes it was reasonable to use past evaluated savings as ex-ante values to estimate energy savings given that there were not significant changes to the program or measure assortment.

4.2 Evaluated Gross Annual Energy (kWh) Savings

ADM completed a regression analysis to determine an ex-post estimate of energy savings per participating home. The following sections document how the regression analysis was completed.

4.2.1 Data Cleaning

ADM began its analysis by cleaning the billing and tracking data to develop a streamlined, simple format for analysis. Both the tracking and billing data contain a billing account number (called “Bill Account Number” in the tracking data and “Concat Agreement Number” in the billing data) which can be used to match a specific premise and customer with their received measures and measure installation date.

The billing data contains line-items unique to a given billing period and as such contains multiple line-items which are unique to given premise. Each line-item breaks down the billed kWh energy into multiple categories (Summer/Winter, Block 1/Block 2, Off Peak/On Peak). The billed consumption is aggregated across these categories to develop a single value for the billing period. Additionally, the data includes the date at which the billing meter registered the period consumption amount along with the number of days in the billing period. A calculation was made to determine a separate value of the number of days in the billing period. Approximately .30% of the data points disagreed with the original estimate for the number of days in the billing period. The independently calculated value for the billing period was used and the average kWh per day (KWHD) was calculated for each line-item.

¹ Smith & Lehmann Consulting and H Gil Peach & Associates, January 26, 2015.

² The Cadmus Group, Inc. / Energy Services, April 20, 2011.

4.2.2 Incorporate Weather Data

Zip codes in the billing data were used to match line items with the nearest weather stations by calculating the Haversine distance between latitudinal and longitudinal coordinates.

An optimizing algorithm applied on integer sets of possible cooling degree day (CDD) and heating degree day (HDD) base conditions is used on the billing data and associated weather data to determine the appropriate average degree day bases by selecting the set of parameters that minimizes the root mean squared error of a piecewise regression on consumption. The optimal values were found to be 72 for a CDD base and 55 for a HDD base.

The cumulative CDD and HDD for a given line item in the billing data is assigned based on the listed billing cycle start and end dates. These values are divided by the number of days in the billing cycle to get average cooling degree days per day (CDDD) and heating degree days per day (HDDD) values.

4.2.3 Regression Analysis

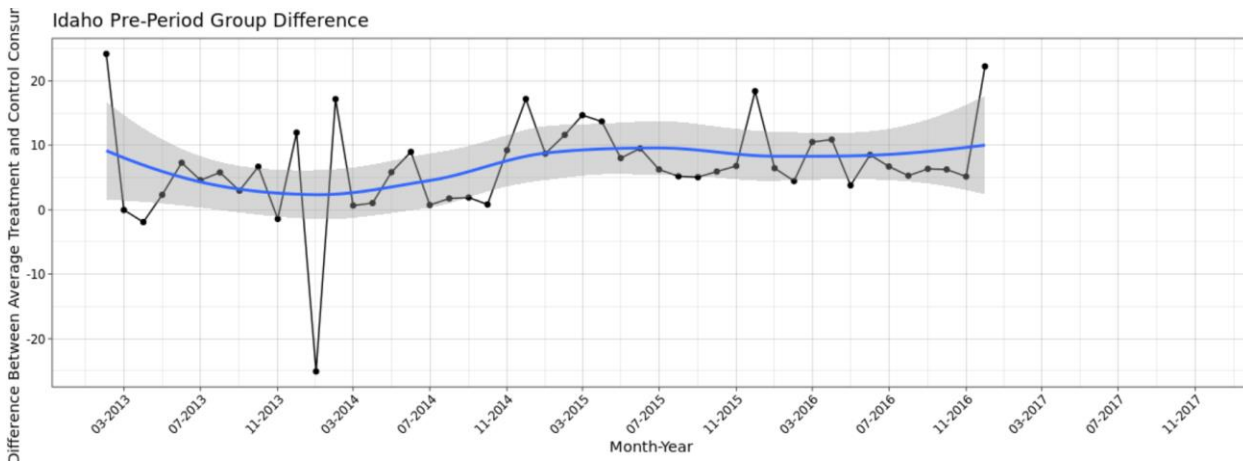
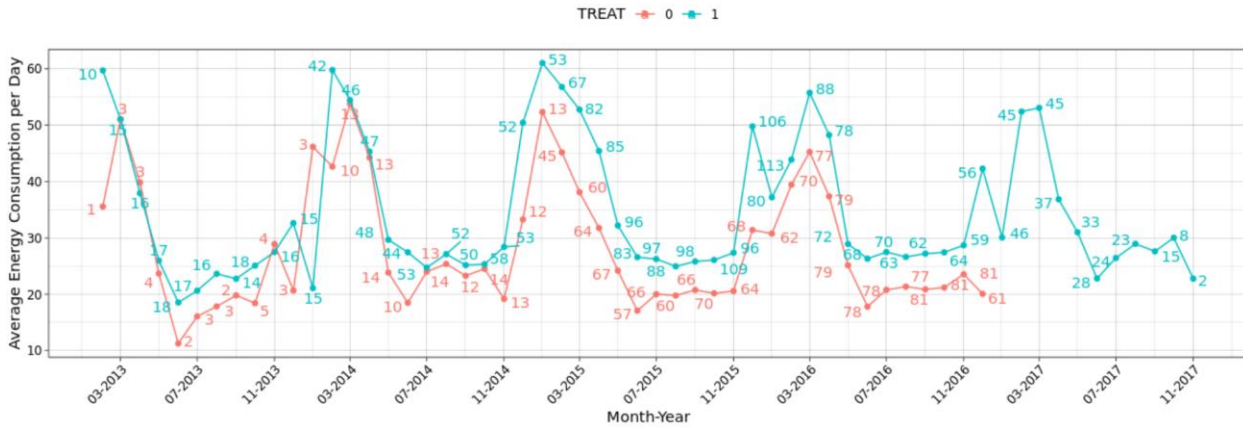
The billing and tracking data were merged together based on their account numbers and data points are assigned a “POST” dummy variable that is 1 if the billing period start date is after the “Measure Effective Date” and 0 if the billing period end date is before it.

Comparison groups are created from the population of program participants that participated in program during 2018 and 2019. Any premise classified as a member of the comparison group had their data filtered to data points prior to their measure installation date.

Data points that indicated there was less than 3 kWh of consumption per a day across a given billing period were removed. This removed 6.1 percent of the data points. Any premise that had less than 6 data points in their pre or post period was removed from consideration in the analysis.

A graphical review of pre-period data for the treatment and comparison groups was conducted to ensure the parallel trends assumption of the difference-in-differences methodology was not broken.

Idaho Pre-Period Group Comparison



After verifying the validity of the comparison group, ADM completed a regression analysis using the following equation.

$$\frac{kWh}{Day} = a_0 + a_1 * Post + a_2 * Treat + a_3 * CDDD + a_4 * HDDD + a_5$$

$$* Post * Treat + a_6 * Post * CDDD + a_7 * Treat * CDDD + a_8 * Post * HDDD$$

$$+ a_9 * Treat * HDDD + a_{10} * Post * Treat * CDDD + a_{11} * Post$$

$$* Treat * HDDD + \left(1 \left| \frac{AcctNum}{Month} \right. \right) + \epsilon$$

Where the terms in this equation are described in the table below:

Symbol	Definition
<i>kWh / Day</i>	The average daily consumption in a given billing period.
<i>Treat</i>	A dummy variable representing inclusion in either the treatment group (treat = 1) or the comparison group (treat = 0).
<i>Post</i>	A dummy variable representing before (post = 0) or after (post = 1) the measure installation.
<i>CDDD</i>	The average daily cooling degree days for a given data point (one billing period). Base temperature of 72 degrees Fahrenheit
<i>HDDD</i>	The average daily heating degree days for a given data point (one billing period). Base temperature of 55 degrees Fahrenheit
ϵ	Error term

The inclusion of the HDDD and CDDD terms control for weather variation during the pre- and post-periods and between the treatment and comparison groups. The model includes a nested random effects term allowing each premise (defined by its account number) to adopt unique intercept values for each month.

Average daily savings are then calculated according to the following formula.

$$kWh_{savings} = \alpha_5 + \alpha_{10} * HDDD_{AvgPostTreat} + \alpha_{11} * CDDD_{AvgPostTreat}$$

The results of the regression analysis are included in Table 4-2

Table 4-2: Regression Results Idaho LIW Energy Savings Per Home 2016-2017

Daily Energy Savings (kWh)	Annual Energy Savings (kWh)	Treatment Premises	Comparison Premises	Pre-Period Treatment Data Points	Post-Period Treatment Data Points	Pre-Period Comparison Data Points	Post-Period Comparison Data Points
3.55	1,296	105	78	2,851	3,229	1,762	1,550

4.3 Non-energy Impact Analysis

ADM estimated non-energy impacts of Rocky Mountain Power’s Low-Income Weatherization Program in Idaho for 2016 and 2017. Three types of non-energy impacts were assessed:

- Reduced external assistance payments to program participants to help them in paying electric bills.

- Reduced arrearages for program participants, where an arrearage is measured by an unpaid ending monthly balance on a customer's bill.
- Health and safety measures.

4.3.1 Method of Analysis

ADM determined the magnitude of the payment assistance and arrearage impact on a per-participant basis using a difference-in-differences analysis. With this analysis, the magnitude of the benefit attributable to the program was determined by comparing changes in payment assistance or arrearages before and after participation for program participants to changes for a comparison group.

Program participants were divided into two groups for the analyses: those participating in 2016 and those participating in 2017. Separate analyses were performed for each group. The comparison group for each analysis included those customers who participated in the program in 2018 or 2019.

Periods for before and after participation were defined as follows.

- For the analysis for 2016 participants, the before period included 2015 and 2016. The after period was 2017, the year after program participation for these customers.
- For the analysis for 2017 participants, the before period included 2016 and 2017. The after period was 2018, the year after program participation for these customers.

4.3.2 Results from Analysis of External Assistance Payments

For the analysis of external assistance payments, PacifiCorp provided payment data for the years 2016, 2017, 2018, and 2019 for LIW program participants in the Idaho (ID) service territory. The data provided identified participants by site and customer account numbers and included payment amounts, payment dates, and source of payment (e.g., Payment Assistance Organization). For the analysis of external assistance payments, data were extracted for valid payments made by a payment assistance organization.

Table 4-3 presents the results of the difference-in-differences analysis of external assistance payments. Mean monthly external assistance payments were calculated for participant and comparison group customers for before and after periods for program participants in 2016 and 2017. The numbers of observations used for the calculations of means are as follows.

- For the analysis of 2016 program participants, the numbers of observations for participants were 64 for the before period and 32 for the after period.

- For the comparison group, there were 67 observations for the before period and 74 for the after period.
- For the analysis of 2017 program participants, the numbers of observations for participants were 59 for the before period and 30 for the after period.
- For the comparison group, there were 100 observations for the before period and 69 for the after period.

Table 4-3: Analysis of Changes in External Assistance Payments Based on Mean Monthly Payments

	Program Participants				Comparison Group				Net difference
	Before	After	Change	% Change	Before	After	Change	% Change	
2016	\$411.98	\$335.94	-\$76.04	32.44%	\$350.98	\$330.96	-\$20.02	-5.70%	\$56.02
2017	\$361.13	\$348.12	-\$13.01	132.44%	\$333.88	\$396.17	\$62.28	18.65%	\$75.30

The analysis of changes in external assistance payments shows the following.

- For 2016 program participants, mean monthly external assistance payments decreased by \$76.04 from the before period to the after period. For comparison group customers, there was a decrease in mean payments of \$20.02. Because the decrease in mean monthly payments for 2016 program participants was \$56.02 more than for the comparison group, the net program benefit associated with external assistance payments for these participants was \$56.02. That is, in the absence of the program, 2016 participants would have required average monthly external assistance payments that would have been \$56.02 higher.
- For 2017 program participants, mean monthly external assistance payments decreased by \$13.01 from the before period to the after period. For comparison group customers, there was an increase in payments of \$62.28. Because the difference in change to mean monthly payments for 2017 program participants was \$75.30, the net program benefit associated with external assistance payments for these participants was \$75.30. That is, in the absence of the program, 2017 participants would have required average monthly external assistance payments that would have been \$75.30 higher.

4.3.3 Results from Analysis of Arrearages

For the analysis of arrearages, PacifiCorp provided arrearage data for the years 2016, 2017, 2018, and 2019 for LIW program participants in the Idaho (ID) service territory.

Using these data, we calculated the change in arrearages for Program participants and compared this to the change in arrearages for the comparison group.

Table 4-4 presents the calculations for this difference-in-differences analysis of arrearages. Mean monthly arrearages were calculated for participant and comparison group customers for before and after periods for program participants in 2016 and 2017. The numbers of observations used for the calculations of means are as follows.

- For the analysis of 2016 program participants, the numbers of observations for participants were 1,090 for the before period and 486 for the after period. For the comparison group, there were 1,553 observations for the before period and 957 for the after period.
- For the analysis of 2017 program participants, the numbers of observations for participants were 1,195 for the before period and 571 for the after period. For the comparison group, there were 1,794 observations for the before period and 1,006 for the after period.

Table 4-4: Analysis of Changes in Arrearages Based on Mean Monthly Arrearage Balances

	Program Participants				Comparison Group				Net difference
	Before	After	Change	% Change	Before	After	Change	% Change	
2016	\$98.39	\$106.91	\$8.52	8.66%	\$45.53	\$74.24	\$28.71	63.06%	\$20.19
2017	\$94.25	\$114.66	\$20.41	21.66%	\$66.85	\$117.55	\$50.70	75.84%	\$30.29

The analysis of changes in arrearages shows the following.

- For 2016 program participants, mean monthly arrearages increased by \$8.52 from the before period to the after period. For comparison group customers, there was an increase in mean arrearages of \$28.71. Had program participants showed the same increase as comparison group customers, their mean monthly arrearage would have been higher by \$20.19. Thus, for 2016 program participants the net program benefit associated with arrearages was \$20.19 per participant. That is, the 2016 program participants had mean monthly arrearages that were \$20.19 lower than would have occurred had they not participated in the program.
- For 2017 program participants, mean monthly arrearages increased by \$20.41 from the before period to the after period. For comparison group customers, there was an increase in mean arrearages of \$50.70. Had program participants

showed the same increase as comparison group customers, their mean monthly arrearage would have been higher by \$30.29. Thus, for 2017 program participants the net program benefit associated with arrearages was \$30.29 per participant. That is, the 2017 program participants had mean monthly arrearages that were \$30.29 lower than would have occurred had they not participated in the program.

4.3.4 Health and Safety Measures

Rocky Mountain Power provides funding for health and safety repairs to bring the home into a condition for which energy saving measures can be effective. Table 4-5 presents the health and safety non-energy impacts.

Table 4-5: Health and Safety Measures

	PY2016	PY2017	Total
Health & Safety	\$35,758.42	\$143,417.40	\$179,175.82

4.3.5 Total Non-energy impacts

The total non-energy impacts that resulted from the program in 2016 and 2017 are shown in Table 4-6.

Table 4-6: Low Income Weatherization Non-Energy Impacts by Program Year

Non-Energy Impacts	PY2016	PY2017
Health & Safety	\$35,758.42	\$143,417.40
Payment assistance	\$3,697.32	\$4,518.00
Arrearages	\$1,332.54	\$1,817.40
Total	\$40,788.28	\$149,752.80

5. Process Evaluation

ADM completed a process evaluation of the Rocky Mountain Power LIW program during 2016 and 2017 that consisted of:

- In-depth interviews with program staff
- Review of program materials
- Program participant survey

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

ADM evaluators interviewed LIW program staff from Rocky Mountain Power and from the two community action agencies that implemented the program. Interviews were conducted to gain insight into program design, to identify program objectives and to assess the program during the evaluation period of 2016 and 2017. The evaluators also reviewed available program materials.

5.1.1 Roles and Responsibilities

Rocky Mountain Power is a subsidiary of PacifiCorp. PacifiCorp's LIW program manager oversees the program in Utah, Wyoming, Washington, Idaho, and California. The program manager who oversaw the program during the 2016-2017 evaluation period is no longer with PacifiCorp and was therefore unavailable to interview. Current program staff, some of whom held positions in the LIW program during evaluation period, were interviewed.

PacifiCorp's LIW program manager works with two community action agencies to implement the program for Rocky Mountain Power in Idaho: Eastern Idaho Community Action Partnership and Southeastern Idaho Community Action Agency. ADM's evaluators interviewed staff at both. Both agencies provide a variety of wraparound services for vulnerable populations, including federally funded LIHEAP and WAP services.

Implementation agencies are responsible for the following program management activities:

- Determine applicants' eligibility
- Perform energy audits and identify eligible measures
- Manage installation of qualifying measures
- Provide certified quality control inspectors to visit and inspect all project sites
- Process invoices for payment by Rocky Mountain Power

5.1.2 Tracking and Reporting

Rocky Mountain Power provided ADM with program tracking data that specified what measures were installed per project and estimated energy savings. Customers' phone numbers and email addresses at the time of participation in the program were included in the tracking data when available. Data about measures installed per project site were provided by the implementation agencies to Rocky Mountain Power when they submitted invoices for completed projects.

Agencies were able to invoice Rocky Mountain Power for eligible measures by submitting an electronic file that output from audit software. This is an efficient billing system for the agencies.

5.1.3 Communication

Both agencies reported that the relationship with Rocky Mountain Power is "good." Agencies felt that Rocky Mountain Power's annual monitoring trip provided a good opportunity for the agencies and Rocky Mountain Power to develop a stronger relationship. Neither Rocky Mountain Power nor the agencies expressed concerns about their level of communication.

5.1.4 Marketing and Outreach

Eastern Idaho Community Action Partnership engaged with participants primarily by phoning LIHEAP program participants and letting them know that they were eligible for the LIW program. LIHEAP customers who return the agency's calls were then scheduled for home energy audits to determine if their homes were appropriate for LIW funding.

The Southeastern Idaho Community Action Agency reported that few Rocky Mountain Power customers submitted LIW program applications. Not enough applicants applied to the program to spend the allocated funding. The agency suggested that Rocky Mountain Power could promote the program through power bill inserts.

5.1.5 Quality Assurances and Quality Controls (QA/QC)

The program's quality assurance and quality control practices were driven by DOE's Weatherization Assistance Program QA/QC requirements that were implemented in 2015, after the previous program evaluation period. DOE requires that all jobs are inspected by Quality Control Inspectors (QCIs) who have been certified by the Building Performance Institute.

Agencies reported complying with DOE auditing, quality control and inspection requirement for federal weatherization programs.

Agencies' QCIs inspected work before submitting invoices to Rocky Mountain Power for qualified installed measures and services.

Rocky Mountain Power representatives join state WAP program managers on an annual monitoring trip to inspect 4-5 homes.

5.1.6 In Depth Interview Takeaways

The following findings resulted from ADM's in-depth interviews with program staff:

- Testimony from program clients is indicative of the transformative effect that weatherization program can have on individuals' quality of life. One client expressed gratitude with great emotion not only for the benefits of the weatherization services, but also of her gratitude for the dignity with which the implementer treated her family.
- Eastern Idaho Community Action Partnership had a remarkably low 2% deferral rate. The agency uses EPA Affordable Housing funds to make repairs to homes that would otherwise not be in condition for weatherization.
- The two agencies differ drastically in time from application to service delivery. Eastern Idaho Community Action Partnership has nearly a 3-year wait list, while Southeastern Idaho Community Action Agency does not have a wait list and generally begins services within weeks and completes most projects within 3 to 4 months of receiving the client's application.
- While both agencies provide energy efficiency educational materials to clients, Southeastern Idaho Community Action Agency appears to be more focused on client education, providing materials and training at least three times for each client throughout the entire project.
- Both agencies collect customer satisfaction data from clients after projects have been completed, though neither reported that they have made changes to the program as a result of the survey results.
- Eastern Idaho Community Action Partnership's annual funding cap from Rocky Mountain Power was \$200,000, and Southeastern Idaho Community Action Agency's annual funding cap was \$100,000. During years when Southeastern Idaho Community Action Agency does not spend their entire budget, Rocky Mountain Power transfers funds to Eastern Idaho Community Action Partnership.
- The agencies weatherization and energy assistance programs use a joint application process that reduces processing redundancy both for agency staff and applicants.

- Eastern Idaho Community Action Partnership does not advertise to promote their program. Given existing wait lists, it does not feel that any additional program promotion is warranted. In contrast, Southeastern Idaho Community Action Agency has great difficulty finding clients that are eligible for Rocky Mountain Power funding and could benefit from additional program promotion.
- Idaho compliancy requirements create barriers for agencies to hire contractors (HVAC, plumbing, electrical), especially for Southeastern Idaho Community Action Agency. Few contractors were willing to complete background checks and comply with all training requirements in order to be eligible to bid for weatherization projects.

5.2 Program Participant Survey

The participant survey evaluation was designed to research and document the experiences of program participants. ADM used survey results to assess implementation strategies and program design. The participant survey was designed to answer the following questions.

- How did participants hear about the program?
- Why did customers decide to participate in the program?
- How satisfied were participants with the work performed, the scheduling and application processes, and other aspects of program participation?
- What were the perceived energy and non-energy impacts associated with the program?

To address these researchable issues, ADM reviewed program documentation and administered participant surveys.

Program Documentation Review: ADM reviewed tracking data that included information about install measures and program participants contact information.

Participant Survey: ADM conducted a mixed mode (online and telephone) survey of qualifying income-qualified participants who received measures or services from the program. Participant emails ($n = 22$) and phone numbers ($n = 118$) were identified from data provided by Rocky Mountain Power and linked to the tracking data. ADM attempted to contact a total of 126 program participants as part of the survey efforts.

ADM sent emails to participants a total of four times throughout the month of December 2019 inviting them to participate in the survey, resulting in one completed survey and four hard bounced emails. ADM staff made 315 phone calls to 117 participants with phone numbers during the month of December (up to four unsolicited call attempts per household) resulting in 35 completed surveys, 26 disconnected phones, nine refusals,

four who did not recall participating in the program, and eight wrong numbers. Phone calls and email campaign messages were discontinued after ADM collected enough surveys ($n = 36$) to represent the total population of 126 program participants. Due to the small sample size obtained, a +10% precision was not able to be met, rather a +11.59% precision with 90% statistical confidence was achieved.

ADM analyzed survey responses from 36 participants: online responses to an email campaign ($n = 1$) and telephone responses ($n = 35$). Program participants were offered monetary incentives (\$10 gift cards) for completing the survey. Survey topics covered measure installation rates as well as customer experiences with the program, installation crew, and agency staff.

This section summarizes feedback received from survey respondents.

5.2.1 Program Awareness

LIW program respondents first learned about the program through a variety of channels. Most participants reported learning about the program from a community agency (39%), word of mouth (22%) from friends or neighbors, or from Rocky Mountain Power (22%) as well as other sources as indicated below in Table 5-1.

Table 5-1: How did respondents learn about the program?

Response	<i>n</i>	Percentage of Respondents
From a community agency/another program	14	39%
From a friend/neighbor	8	22%
From information received through Rocky Mountain Power	8	22%
From an information brochure	3	8%
Former program participant	1	3%
From the internet	0	0%
Don't remember	0	0%
Other	2	6%

Respondents reported deciding to participate in the program to save money on their energy bills (92%), to improve home comfort (78%), because the services were provided at no cost (58%), to reduce energy use for environmental reasons (47%), to improve the value of the home (42%) and other reasons (3%) as shown in Table 5-2.

Table 5-2: Why did respondents decide to participate in the program?

Response	<i>n</i>	Percentage of Respondents
To save money on energy bills	33	92%
To improve home comfort	28	78%
The services were provided at no cost	21	58%
To reduce energy use for environmental reasons	17	47%
To improve value of the home	15	42%
Other	1	3%

*Note: The sum of *n* may exceed the total surveyed (36) and percentages may exceed 100% because respondents could choose more than one response.*

5.2.2 Measures Installed

ADM asked survey respondents to confirm measures were installed in their homes through the program. Survey respondents confirmed receipt of all (100%) LED and CFL light bulbs, ceiling and wall insulation, heat duct sealing/insulation, thermal doors, windows, and furnace replacement. Respondents confirmed receipt of 63-95% (Average of measures = 85%) of the remaining measures captured in the survey. It is likely that the extended time period between participation and collection of survey data as well as the unseen nature of many weatherization measures (insulations being inside walls or under the floor for example) can explain the lower than 100% confirmation rates. Table 5-3 displays a summary of the measures that survey respondents reported receiving. The one program participant who received water heater replacement did not complete the survey because they were unable to be reached (no email nor phone number available).

Table 5-3: What measures did survey respondents receive?

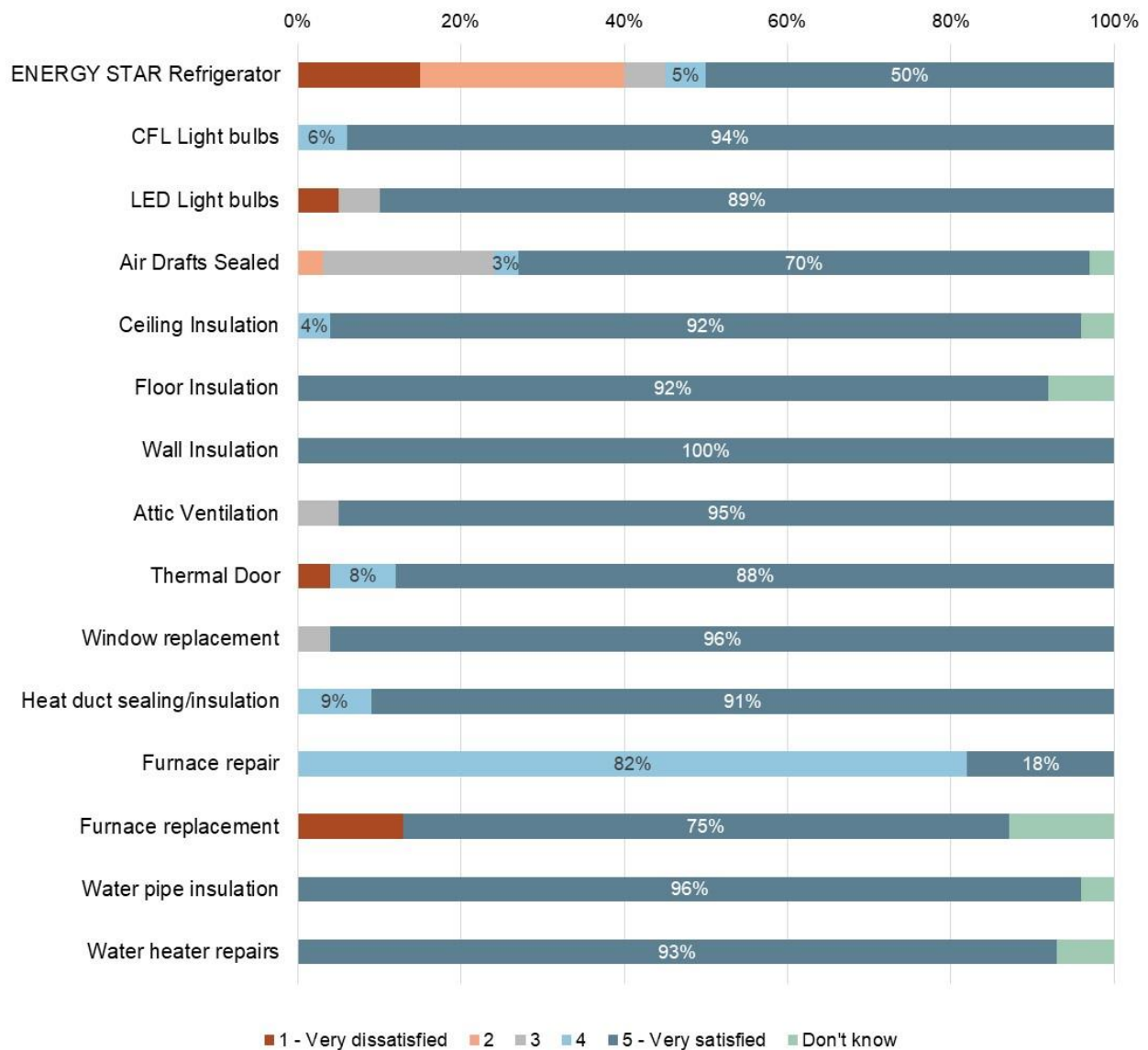
Measures	Yes	No	Don't know	Percentage confirming Yes
ENERGY STAR certified refrigerator	20	1	0	95%
LED light bulbs	19	0	0	100%
CFL light bulbs	16	0	0	100%

Air drafts sealed	33	1	2	92%
Ceiling insulation	25	0	0	100%
Floor insulation	12	0	1	92%
Wall insulation	4	0	0	100%
Attic ventilation	20	0	1	95%
Thermal door(s)	26	0	0	100%
Window replacement	26	0	0	100%
Heat duct sealing and/or insulation	11	0	0	100%
Furnace repair	12	3	1	75%
Furnace replacement	8	0	0	100%
Water pipe insulation	28	6	0	82%
Water heater repair	15	8	1	63%
Water heater replacement	0	0	0	0%

Note: The percentages may exceed 100% because respondents were only asked to confirm receipt of measures indicated in tracking data and percentages were calculated for each item individually.

ADM asked respondents to rate their satisfaction with the measures they received through the program on a scale from 1 to 5, in which 1 meant “very dissatisfied” and 5 meant “very satisfied”. ADM asked respondents to rate their satisfaction with the measures they received through the program on a scale from 1 to 5, in which 1 meant “very dissatisfied” and 5 meant “very satisfied”. Most respondents (55-100%) rated their satisfaction with the measures a “4” or “5” with “don’t know” responses interspersed. A few ratings of “3” or lower were noted; comments noted include refrigerators being too small, not functioning properly and breaking easily, LED bulbs having a dull light, the thermal door locks did not work and the furnace (“heater”) runs up the bill super high. Figure 5-1 displays survey respondents’ level of satisfaction with items that were among the most received by program participants.

Figure 5-1: Satisfaction with Energy Savings Measures



All respondents who confirmed receipt of refrigerators, windows, thermal door(s) and furnace replacements through the program reported they were still installed (100%).

Approximately two-thirds of respondents (59% LED, 38% CFL) reported they had not uninstalled any of the lightbulbs they received through the program. The remainder of respondents noted they had removed some of the light bulbs they received through the program (41% LED, 62% CFL). Twenty-four percent of respondents who recalled details on the number of bulbs received from the program reported they were given LED bulbs that were never installed, all stating they were given to them as extras or spares.

Of the respondents that mentioned some or all LED and CFL light bulbs had been removed, all of them noted the reason was they broke or burned out (100% each). Most

participants reported LED bulbs (71%) that were removed were done so more than one year after installation. In comparison, most participants reported CFL bulbs (75%) that were removed were done so within the first year of installation.

Most respondents (71% LED, 100% CFL) who reported receiving light bulbs said they replaced incandescent bulbs and 12% noted the LEDs replaced CFLs (percentages sum to greater than 100% for LEDs as one household reported LED bulbs replaced more than one type of bulb). Twenty-four percent of participants who installed LEDs did not recall what bulb or fixture the new LED replaced.

Given the time lapse between the installation of measures and the survey, participants were prompted again later in the survey to recall whether they received some of the measures not easily seen in the home (insulations, ground cover, repairs etc.). For example, two participants who initially denied that ceiling insulation was installed as stated in program records, later changed their answer and confirmed the installation had been installed. In the case of air drafts that were sealed in the home, two of the thirty-six participants (5.6%) who initially denied the installation occurred or said they did not know, later changed their answer and confirmed it was indeed installed. Response changes can be seen across many measures (as shown in Table 5-4 below) suggesting participants recall of the installations has faltered over time. Therefore, we assume a 100% installation rate for these measures.

Table 5-4: Respondents consistency in recall of installation
Number of participants who answered a repeated prompt with the same response

Measures	Yes 1st/2nd Survey Prompts	No 1st/2nd Survey Prompts	Don't know 1st/2nd Survey Prompts	2nd Prompt Responded "Don't Remember"
Air drafts sealed	33/35	1/0	2/1	0
Ceiling insulation	25/25	0/0	0/0	0
Floor insulation	12/11	0/0	1/0	0
Wall insulation	4/3	0/0	0/0	0
Attic ventilation	20/20	0/1	1/0	0
Duct sealing and/or insulation	11/10	0/0	0/0	1
Furnace repair	12/12	3/3	1/0	1
Water pipe insulation	28/28	6/4	0/0	2

Water heater repair	15/16	8/5	1/0	2
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Note: The total number of participants who completed the second prompt for recall may not total the same number who completed the first prompt as participants could choose not to respond.

5.2.3 Audit Experience

Most survey respondents reported they had a positive experience with the home energy audit. All respondents rated their satisfaction with scheduling their audit a 4 (3%) or 5 (97%) on a scale from 1 to 5 in which 1 represented “not at all useful” and 5 represented “extremely useful” (see Figure 5-2). All respondents (100%) stated their visit was scheduled at a convenient time, and nearly all (92%) stated the home energy auditor or inspector arrived at their home on time or at least within 15 minutes of the scheduled appointment. Eight percent of participants reported they did not remember the details of the auditor’s arrival time.

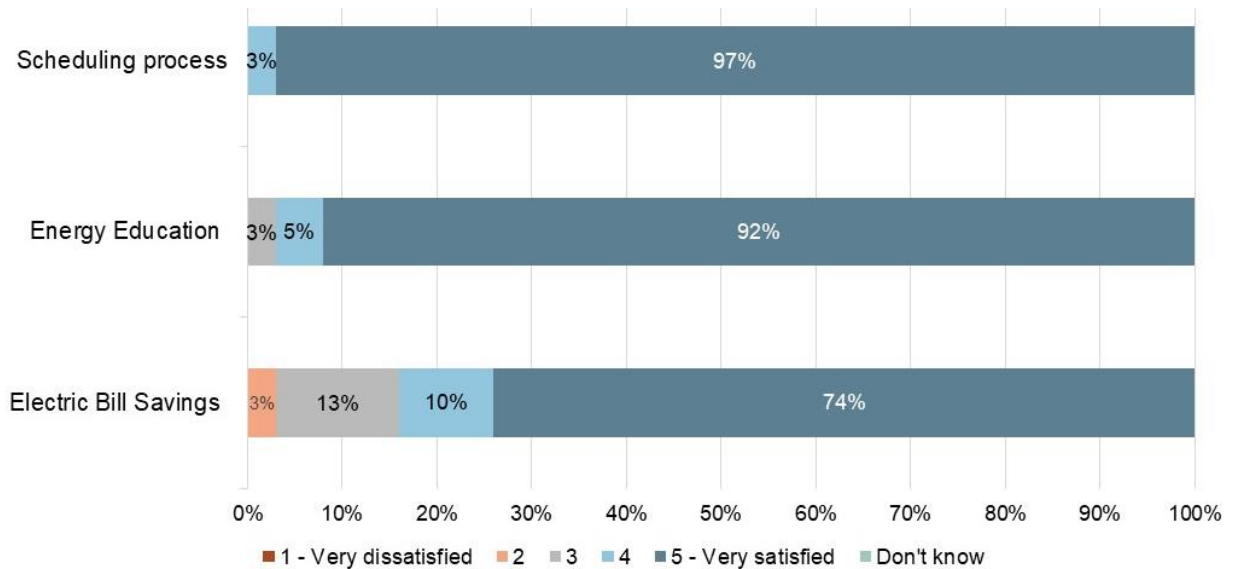
Many respondents (92%) indicated they spoke with the auditor about ways to save energy in their home or that the auditor left educational materials about how to save energy, while the remainder reported they did not receive information (6%) or they did not remember (3%). Ninety-one percent of respondents indicated they felt they knew more about saving energy after the auditor’s visit and the majority (97%) rated their satisfaction with the information’s they received about ways to use less electricity a 4 (5%) or 5 (92%) (see Figure 5-2).

Fifty-nine percent of respondents noted that they have done something in their home or changed their behavior to use less electricity since the auditor visited; the remainder (41%) changed nothing.

Of the respondents who reported an effort to use less electricity and left comments with specifics, 44% were more conscious of keeping lights off when they are not in use, 44% unplugged appliances when not in use or used them at appropriate times, 39% made heating related adjustments (lowering and regulating thermostat, opening/closing doors and windows), and 17% purchased or made efforts to use more energy efficient devices or appliances³. Eighty-three percent of respondents said that they have noticed energy savings since participating in the program; eighty-four percent of these respondents rated their satisfaction with the savings either a 4 (10%) or 5 (74%) as shown in Figure 5-2.

³ Percentages may total greater than 100% as respondents often reported more than one category of energy savings behavior.

Figure 5-2: Satisfaction with Scheduling, Energy Education and Savings on Electric Bills.

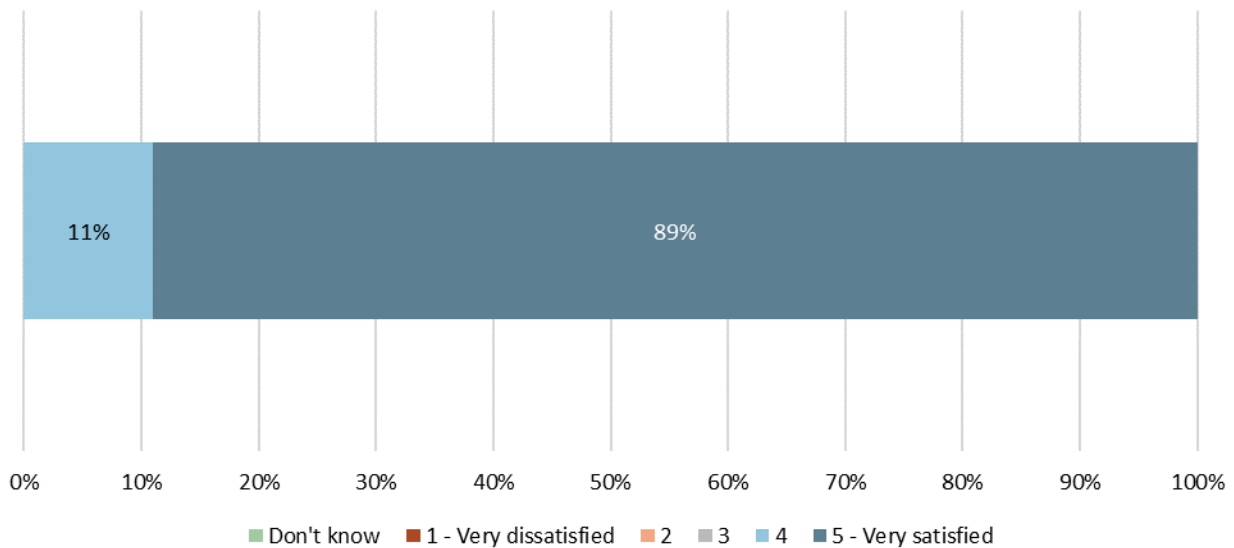


5.2.4 Program Satisfaction

Thirty-one percent of survey respondents indicated they had contacted agency staff with questions about the items or services they could receive through this program through the course of participation. Of those that contacted agency staff, the majority (73%) were satisfied with their communications and gave ratings of 4 (9%) or 5 (64%). Twenty-seven percent of respondents rated their communication with agency staff a 3 and did not leave comments as to why.

Overall, program participants rated their satisfaction with the LIW program incredibly high. All participants rated the program a 4 (11%) or 5 (89%) out of 5 as shown in Figure 5-3. Respondents were given the opportunity to provide additional feedback and took this opportunity to request a copy of their home audit report or additional help involving plumbing. Others commented on their dissatisfaction with the contractors and their work. Another respondent reported issues with the new windows that were installed indicating leakage from rainy weather.

Figure 5-3: Overall Program Satisfaction



5.2.5 Participant Survey Takeaways

ADM noted the following results from the participant survey:

- Most survey respondents shared positive feedback and support for the program.
- A small portion of respondents noted issues with the program and shared comments regarding areas for potential improvement including:
 - More direct or clear ways to communicate issues with agency staff
 - Inclusion of additional measures
 - Improving customer service
- A small portion of participants chose the “don’t remember” or “don’t know” option available in some questions indicating difficulty recalling details 2-4 years after participation.

6. Cost Effectiveness Evaluation

The cost-effectiveness evaluation, completed by Guidehouse using cost estimates provided by Rocky Mountain Power and energy saving estimates provided by ADM, includes results of the following cost effectiveness tests:

- PacifiCorp Total Resource Cost Test (PTRC) + Conservation Adder
- Total Resource Cost Test (TRC) No Adder
- Utility Cost Test (UCT)
- Rate Impact Test (RIM)
- Lifecycle Revenue Impacts (\$/kWh)

Since program participants do not incur costs, and Participant Cost Test (PCT) was not conducted. Table 6-1 includes the cost effectiveness evaluation inputs for 2016 and 2017.

Table 6-1: Low Income Weatherization Program Inputs

Parameter	PY2016	PY2017
Discount Rate	6.66%	6.66%
Residential Line Loss	11.47%	11.47%
Residential Energy Rate (\$/kWh) ¹	\$0.1041	\$0.1034
Inflation Rate	1.90%	1.90%

¹ Future rates determined using a 1.90% annual escalator.

Table 6-2 reports program costs by year.

Table 6-2: Low Income Weatherization Annual Program Costs

Program Year	Engineering Costs	Utility Admin	Program Delivery	Program Development	Incentives	Total Utility Costs	Gross Customer Costs
2016	\$0	\$12,986	\$13,429	\$357	\$220,561	\$247,333	\$0
2017	\$0	\$14,858	\$14,689	\$3,953	\$214,986	\$248,486	\$0
2016-2017	\$0	\$27,844	\$28,118	\$4,310	\$435,547	\$495,819	\$0

Table 6-3 includes non-energy impacts that resulted from the program during the evaluation period.

Table 6-3: Low Income Weatherization Non-Energy Impacts by Program Year

Non-Energy Impacts	PY2016	PY2017	Perspective Adjusted
Health & Safety	\$35,758.42	\$143,417.40	PTRC, TRC
Payment assistance	\$3,697.32	\$4,518.00	PTRC, TRC
Arrearages	\$1,332.54	\$1,817.40	PTRC, TRC
Total	\$40,788.28	\$149,752.80	

Table 6-4 includes energy savings resulting from the program for the evaluation period.

Table 6-4: Low Income Weatherization Program – Savings by Program Year

Program Year	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
2016	140,069	61%	85,536	100%	85,536	25
2017	131,340	59%	77,760	100%	77,760	25
2016-2017	271,409	60%	163,296	100%	163,296	25

Table 6-5 includes the summarized results of the following cost effectiveness tests for the evaluation period: Total Resource Cost Test (PTRC), Total Resource Cost Test (TRC), Utility Cost Test (UCT), Rate Impact Test (RIM).

The program did not pass cost effectiveness tests for the evaluation period. The 2016-2017 Low Income Weatherization program outperformed prior years with respect to average savings achieved per household. The average program and incentive costs per participating household were slightly lower than prior program years and the total non-energy impacts were comparable. Avoided costs per kWh decreased between the 2013-2015 program cycle and the 2016-17 program cycle, causing the program to not pass PTRC.

Table 6-5: Benefit/Cost Ratios by Program Year

Program Year	PTRC	TRC	UCT	RIM
2016	0.71	0.66	0.49	0.32

2017	0.93	0.90	0.30	0.20
2016-2017	0.82	0.78	0.39	0.26

Table 6-6 through Table 6-8 **Error! Reference source not found.** report cost effectiveness test results for the 2016-2017 period and for 2016 and 2017 individually.

*Table 6-6: Low Income Program Level Results
PY2016-2017*

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.2103	\$495,819	\$405,257	-\$90,562	0.82
Total Resource Cost Test (TRC) No Adder	\$0.2103	\$495,819	\$385,738	-\$110,081	0.78
Utility Cost Test (UCT)	\$0.2103	\$495,819	\$195,197	-\$300,622	0.39
Rate Impact Test (RIM)		\$759,151	\$195,197	-\$563,954	0.26
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000031637

*Table 6-7: Low Income Program Level Cost-Effectiveness Results
PY2016*

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.2003	\$247,333	\$174,714	-\$72,619	0.71
Total Resource Cost Test (TRC) No Adder	\$0.2003	\$247,333	\$162,539	-\$84,794	0.66
Utility Cost Test (UCT)	\$0.2003	\$247,333	\$121,751	-\$125,582	0.49
Rate Impact Test (RIM)		\$385,712	\$121,751	-\$263,961	0.32
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000029204

*Table 6-8: Low Income Program Level Cost-Effectiveness Results
PY2017*

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.2213	\$248,486	\$230,543	-\$17,943	0.93
Total Resource Cost Test (TRC) No Adder	\$0.2213	\$248,486	\$223,199	-\$25,287	0.90
Utility Cost Test (UCT)	\$0.2213	\$248,486	\$73,446	-\$175,040	0.30
Rate Impact Test (RIM)		\$373,439	\$73,446	-\$299,993	0.20
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000034139

7. Conclusions and Recommendations

ADM's evaluation results in the following conclusions:

- During the evaluation period, the program resulted in total evaluated energy savings of 271,409 kWh/year from 126 participating households.
- The program also reduced participants' reliance on energy payment assistance programs by a total of \$8,215.32 and reduced the arrears balances carried by participants by \$3,149.94. Rocky Mountain Power continued their partnership with two community action agencies to implement the LIW program in Idaho. The agencies expressed positive program outcomes including reduced energy demand, improved home comfort, reduction of health and safety hazards, and retention of homes in the affordable housing inventory. Participant testimonials express deep gratitude for the positive impact the program had on participants' quality of life.

Based on its evaluation, ADM recommend the following actions for Rocky Mountain Power to consider in its future implementation of its LIW program in Idaho:

- The program did not pass the cost-effectiveness tests during the evaluation period; The decreased avoided costs create an additional barrier to passing cost effectiveness. Therefore, Rocky Mountain Power could consider discussions with stakeholders on the application of incentive payments for the TRC test. Currently the program costs include both material and labor costs. The TRC test is designed to capture benefits and costs from the perspective of all utility customers (participants and nonparticipants) in the utility service territory. ADM confirmed that for the 2016-17 program cycle the labor payments for the work completed stayed in the service territory. Meaning, because the work was completed by agencies and contractors with employees residing in the service territory, the economic benefit for the work completed is essentially shifted to another utility customer. Rocky Mountain Power could consider applying only the material cost as a program cost.
- Rocky Mountain Power should continue partnering with agencies that provide federally funded weatherization services to take advantage of existing program infrastructure and leveraged funding, and access to a trained weatherization workforce.
- Rocky Mountain Power could consider providing branded, up-to-date educational materials to distribute during weatherization implementations to improve education and funding attribution. The company might also consider reinforcing or reintroducing the past practice of installing Rocky Mountain Power branded yard signs at homes during active project cycle to reinforce funding attribution.

- Rocky Mountain Power could consider sharing its program objectives (qualitative and quantitative), in addition to its budget, with its partner community action agencies in order to more clearly determine the success of the program. Both Rocky Mountain Power and the agencies would likely benefit from more explicit program goals.
- Rocky Mountain Power could consider requesting more detailed tracking data from implementers to increase the accuracy and granularity of measures' specifications. For example, additional data could include baseline and efficient wattages for bulbs installed through the program, specifications for baseline and replacement efficient refrigerators, and pre- and post-installation insulation conditions. Implementers are already recording extensive data in the DOE-approved auditing software used for projects that include Weatherization Assistance Program (WAP) funding, and therefore the additional data reporting should not create an unreasonable burden.
- Rocky Mountain Power could consider reducing the interval between program implementation and evaluation to facilitate more accurate and timely energy savings estimates.
- Rocky Mountain Power could consider implementing a process for collecting weatherization program customers' email addresses to enable more accurate and comprehensive program evaluations.
- Rocky Mountain Power could consider increasing its promotion of the weatherization program to its customers in Southeast Idaho Community Action Agency service area.
- Rocky Mountain Power could consider rebalancing the allocation of funding across implementation agencies to address unmet demand in Eastern Idaho Community Action Partnership's service area.
- Rocky Mountain Power could consider using a blended ex-ante value from prior evaluations, rather than using only the most recent evaluation findings. The small sample sizes in Low Income program create high variability in program savings across years. Using an average value across a couple prior evaluation cycles could reduce the fluctuation in realization rates by program year.

8. Appendix: Participant Survey

Idaho Rocky Mountain Power Home Energy Efficiency Program Survey

Variables

- Window replacement
- Wall Insulation
- Ceiling Insulation
- Attic Ventilation
- Floor Insulation
- Water Pipe Insulation
- Duct Insulation and Sealing
- Air Sealed/Infiltration
- CFL bulbs
- Water Heater Replacement
- Thermal Doors
- Water heater repair
- LED bulbs
- Furnace repair
- Replacement refrigerator
- Replacement Customer
- Name
- Site Address
- Site City
- Site State
- Site Zip
- Customer Phone
- Contact Email Address
- Agency Name

Screening

Page exit logic: Skip / Disqualify LogicIF: #1 Question "Do you recall participating in [question ('value'), id='299'] Home Energy Efficiency Program? Through this program you may have received light bulbs, or you may have had an appliance replaced with an ENERGY STAR certified appliance; you may also have received home weatherization or other home energy improvement measures." is one of the following answers ("No", "Don't know") THEN: Disqualify and display: "Thank you for your time!"

Do you recall participating in [question ('value'), id='299'] Home Energy Efficiency Program? Through this program you may have received light bulbs, or you may have had an appliance replaced with an ENERGY STAR certified appliance; you may also have received home weatherization or other home energy improvement measures.*

- Yes
- No
- Don't know

Awareness

How did you first learn about the Home Energy Efficiency Program?

- From an information brochure
- From a friend/neighbor
- From your property owner/landlord
- From a community agency
- From a contractor
- From the internet
- From information received through Rocky Mountain Power
- Other (please specify)

Why did you choose to participate in the program? (Select all that apply)

- To save money on energy bills
- To reduce energy use for environmental reasons
- The services were provided at no cost
- To improve home comfort
- To improve value of the home
- Other (please specify)
- Don't remember
- Don't know

Do you rent or own this property?

- Rent
- Own

Program records indicate that you received the following items from the Home Energy Efficiency Program. Could you please confirm whether these records are correct? *

	Yes	No	Don't know
LED light bulbs			
CFL light bulbs			
ENERGY STAR® certified refrigerator			
Air Drafts Sealed			
Ceiling insulation			
Floor insulation			
Wall insulation			
Attic Ventilation			
Thermal door(s)			
Window replacement			
Heat duct sealing and/or insulation			
Furnace repair			
Furnace replacement			
Water pipe insulation			
Water heater repair			
Water heater replacement			

Logic: Hidden unless: Question "LED light bulbs" is one of the following answers ("Yes")

Before today, had you ever heard of light emitting diode light bulbs, or LED light bulbs?

- Yes
- No
- Don't know

Logic: Hidden unless: Question "LED light bulbs" is one of the following answers ("Yes")

Do you believe you could identify a typical LED light bulb if one was placed in front of you?

- Yes
- No
- Don't know

Logic: Hidden unless: Question "CFL light bulbs" is one of the following answers ("Yes")

Before today, had you ever heard of compact fluorescent light bulbs, or CFL light bulbs?

- Yes
- No
- Don't know

Logic: Hidden unless: Question "CFL light bulbs" is one of the following answers ("Yes")

Do you believe you could identify a typical CFL light bulb if one was placed in front of you?

- Yes
- No
- Don't know

Participation Efficiency

Our records indicate that you received an energy audit that was provided as part of this program

Logic: Show/hide trigger exists.

Did someone visit your household to discuss ways of saving energy and to install energy efficient equipment?

- Yes
- No
- Don't remember
- Don't know

Logic: Show/hide trigger exists. Hidden unless: Question "Did someone visit your household to discuss ways of saving energy and to install energy efficient equipment?" is one of the following answers ("Yes")

Are you the person who scheduled the home visit?

- Yes
- No
- Don't know

Logic: Hidden unless: #12 Question "Were you at home at the time of this visit?" is one of the following answers ("Yes")

Using a scale where 1 means "completely disagree" and 5 means "completely agree," how much do you agree with the following statements about the work that was done on the home:

	Completely disagree 1	2	3	4	Completely agree 5	Don't know
The completion of the work was timely and efficient						
The work crew was courteous and professional						
The information provided about your home's energy use was useful						
The information provided about your home's energy use was easy to understand						

Lighting LED

Logic: Show/hide trigger exists. Hidden unless: Question "LED light bulbs" is one of the following answers ("Yes")

You indicated that you received LED light bulbs from the program. Program records indicate you received [question("value"), id="18"] LED light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of LED light bulbs?

- Yes, that is the correct number of LED light bulbs
- No, I received a different number of LED light bulbs
- Don't remember
- Don't know

Validation: Must be numeric Whole numbers only Positive numbers only

Logic: Hidden unless: Question "You indicated that you received LED light bulbs from the program. Program records indicate you received [question("value"), id="18"] LED light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of LED light bulbs?" is one of the following answers ("No, I received a different number of LED light bulbs")

What is the correct number of LED light bulbs that you received?*

Logic: Show/hide trigger exists. Hidden unless: Question "You indicated that you received LED light bulbs from the program. Program records indicate you received [question("value"), id="18"]

LED light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of LED light bulbs?" is one of the following answers ("Yes, that is the correct number of LED light bulbs") OR Question "What is the correct number of LED light bulbs that you received?" is greater than "0"

Has anyone removed any of the LED light bulbs that were installed through this program?

- Yes
- No
- Don't remember
- Don't know

Logic: Show/hide trigger exists. Hidden unless: #16 Question "Has anyone removed any of the LED light bulbs that were installed through this program?" is one of the following answers ("Yes")

Why were some LED light bulbs removed? (Select all that apply)

- LED light bulb(s) broke or burned out
- LED light bulb(s) did not work as needed (e.g., lights too dim)
- Using them in another home or at work
- Storing them for later use
- Gave them away
- Returned them to the program
- Other (please specify)

Logic: Hidden unless: Question "Why were some LED light bulbs removed? (Select all that apply)" is one of the following answers ("LED light bulb(s) broke or burned out", "LED light bulb(s) did not work as needed (e.g., lights too dim)", "Using them in another home or at work", "Storing them for later use", "Gave them away", "Returned them to the program", "Other (please specify)")

How long were the LED light bulbs installed before someone removed them?

- Less than one year
- More than one year

Logic: Show/hide trigger exists. Hidden unless: (Question "You indicated that you received LED light bulbs from the program. Program records indicate you received [question("value"), id="18"] LED light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of LED light bulbs?" is one of the following answers ("Yes, that is the correct number of LED light bulbs") OR Question "What is the correct number of LED light bulbs that you received?" is greater than "0")

Were any of the LED light bulbs you received from the program never installed?

- Yes
- No
- Don't know

Logic: Show: Hidden unless: Question "Were any of the LED light bulbs you received from the program never installed?" is one of the following answers ("Yes")

Why were some of the LED light bulbs never installed?

Page entry logic: This page will show when: (Question "LED light bulbs" is one of the following answers ("Yes") AND #15 Question "You indicated that you received LED light bulbs from the program. Program records indicate you received [question("value"), id="18"] LED light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of LED light bulbs?" is one of the following answers ("Yes, that is the correct number of LED light bulbs"))

Lighting LED

Validation: Must be numeric Whole numbers only Positive numbers only

Logic: Hidden unless: (Question "LED light bulbs" is one of the following answers ("Yes") AND #15 Question "You indicated that you received LED light bulbs from the program. Program records indicate you received [question("value"), id="18"] LED light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of LED light bulbs?" is one of the following answers ("Yes, that is the correct number of LED light bulbs"))

To verify, of the [question("value"), id="18"] LED light bulbs you received, how many are currently installed, were installed and removed, or were never installed?

- Number of LED light bulbs currently installed
- Number of LED light bulbs installed and removed
- Number of LED light bulbs never installed

Total : [#]

Page entry logic: This page will show when: (Question "LED light bulbs" is one of the following answers ("Yes") AND Question "What is the correct number of LED light bulbs that you received?" is greater than "0")

Validation: Must be numeric Whole numbers only Positive numbers only

Logic: Hidden unless: (Question "LED light bulbs" is one of the following answers ("Yes") AND Question "What is the correct number of LED light bulbs that you received?" is greater than "0")

To verify, of the [question('value'), id='76'] LED light bulbs you received, how many are currently installed, were installed and removed, or were never installed?

- Number of LED light bulbs currently installed
- Number of LED light bulbs installed and removed
- Number of LED light bulbs never installed

Total : [#]

Page entry logic: This page will show when: (Question "LED light bulbs" is one of the following answers ("Yes") AND (#15 Question "You indicated that you received LED light bulbs from the program. Program records indicate you received [question("value"), id="18"] LED light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of LED

Page entry logic: This page will show when: (Question "LED light bulbs" is one of the following answers ("Yes") AND Q22A is greater than "0")

Validation: Must be numeric Whole numbers only Positive numbers only

Logic: Hidden unless: (Question "LED light bulbs" is one of the following answers ("Yes") AND Q22A is greater than "0")

To the best of your recollection, how many of the [question("value"), id="268"] LED light bulbs received through the program are currently installed in each of the following locations?

- Bedrooms
 - Bathrooms
 - Living room
 - Kitchen
 - Entryway
 - Dining room
 - Garage
 - Basement
 - Den
 - Stairway
 - Office
 - Laundry room
 - Other
- Total: [#]

Page entry logic: This page will show when: (#15 Question "You indicated that you received LED light bulbs from the program. Program records indicate you received [question("value"), id="18"] LED light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of LED light bulbs?" is one of the following answers ("Yes, that is the correct number of LED light bulbs") OR Question "What is the correct number of LED light bulbs that you received?" is greater than "0")

Logic: Hidden unless: (#15 Question "You indicated that you received LED light bulbs from the program. Program records indicate you received [question("value"), id="18"] LED light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of LED light bulbs?" is one of the following answers ("Yes, that is the correct number of LED light bulbs") OR Question "What is the correct number of LED light bulbs that you received?" is greater than "0")

What type of light bulbs did the LED light bulbs replace? (Select all that apply)

- Incandescent
- CFL light bulbs
- LED light bulbs
- Installed in new fixture
- Other (please specify)
- Don't remember
- Don't know

Lighting CFL

Logic: Show/hide trigger exists. Hidden unless: Question "CFL light bulbs" is one of the following answers ("Yes")

You indicated that you received CFL light bulbs from the program. Program records indicate you received [question("value"), id="13"] CFL light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of CFL light bulbs?

- Yes, that is the correct number of CFL light bulbs
- No, received a different number of CFL light bulbs
- Don't remember
- Don't know

Validation: Must be numeric Whole numbers only Positive numbers only

Logic: Hidden unless: Question "You indicated that you received CFL light bulbs from the program. Program records indicate you received [question("value"), id="13"] CFL light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of CFL light bulbs?" is one of the following answers ("No, received a different number of CFL light bulbs")

What is the correct number of CFL light bulbs that you received?*

Logic: Show/hide trigger exists. Hidden unless: (#27 Question "You indicated that you received CFL light bulbs from the program. Program records indicate you received [question("value"), id="13"] CFL light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of CFL light bulbs?" is one of the following answers ("Yes, that is the

correct number of CFL light bulbs") OR #28 Question "What is the correct number of CFL light bulbs that you received?" is greater than "0")

Has anyone removed any of the CFL light bulbs that were installed through this program?

- Yes
- No
- Don't remember
- Don't know

Logic: Show/hide trigger exists. Hidden unless: Question "Has anyone removed any of the CFL light bulbs that were installed through this program?" is one of the following answers ("Yes")

Why were some CFL light bulbs removed? (Select all that apply)

- CFL light bulbs broke or burned out
- CFL light bulbs did not work as needed (e.g., lights too dim)
- Using them in another home or at work
- Storing them for later use
- Gave them away
- Returned them to the program
- Other (please specify)

Logic: Hidden unless: Question "Why were some CFL light bulbs removed? (Select all that apply)" is one of the following answers ("CFL light bulbs broke or burned out", "CFL light bulbs did not work as needed (e.g., lights too dim)", "Using them in another home or at work", "Storing them for later use", "Gave them away", "Returned them to the program", "Other (please specify)")

How long were the CFL light bulbs installed before someone removed them?

- Less than one year
- More than one year

Logic: Show/hide trigger exists. Hidden unless: (#27 Question "You indicated that you received CFL light bulbs from the program. Program records indicate you received [question("value"), id="13"] CFL light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of CFL light bulbs?" is one of the following answers ("Yes, that is the correct number of CFL light bulbs") OR #28 Question "What is the correct number of CFL light bulbs that you received?" is greater than "0")

Were any of the CFL light bulbs you received from the program never installed?

- Yes
- No
- Don't remember
- Don't know

Hidden unless: #32 Question "Were any of the CFL light bulbs you received from the program never installed?" is one of the following answers ("Yes")

Why were some of the CFL light bulbs never installed?

Page entry logic: This page will show when: (Question "CFL light bulbs" is one of the following answers ("Yes") AND #27 Question "You indicated that you received CFL light bulbs from the program. Program records indicate you received [question("value"), id="13"] CFL light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of CFL light bulbs?" is one of the following answers ("Yes, that is the correct number of CFL light bulbs"))

Validation: Must be numeric Whole numbers only Positive numbers only

Logic: Hidden unless: (Question "CFL light bulbs" is one of the following answers ("Yes") AND #27 Question "You indicated that you received CFL light bulbs from the program. Program records indicate you received [question("value"), id="13"] CFL light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of CFL light bulbs?" is one of the following answers ("Yes, that is the correct number of CFL light bulbs"))

To verify, of the [question("value"), id="13"] CFL light bulbs you received, how many are currently installed, were installed and removed, or were never installed?

- Number of CFL light bulbs currently installed
 - Number of CFL light bulbs installed and removed
 - Number of CFL light bulbs never installed
- Total : [#]

Page entry logic: This page will show when: (Question "CFL light bulbs" is one of the following answers ("Yes") AND #28 Question "What is the correct number of CFL light bulbs that you received?" is greater than "0")

Validation: Must be numeric Whole numbers only Positive numbers only

Logic: Hidden unless: (Question "CFL light bulbs" is one of the following answers ("Yes") AND #28 Question "What is the correct number of CFL light bulbs that you received?" is greater than "0")

To verify, of the [question("value"), id="97"] CFL light bulbs you received how many are currently installed, were installed and removed, or were never installed?

- Number of CFL light bulbs currently installed
 - Number of CFL light bulbs installed and removed
 - Number of CFL light bulbs never installed
- Total : [#]

Logic: Hidden unless: (Question "CFL light bulbs" is one of the following answers ("Yes") AND (#27 Question "You indicated that you received CFL light bulbs from the program. Program records indicate you received [question("value"), id="13"] CFL light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of CFL light bulbs?" is one of the following answers ("Yes, that is the correct number of CFL light bulbs") OR #27 Question "You indicated that you received CFL light bulbs from the program. Program records indicate you received [question("value"), id="13"] CFL light bulbs. To the best of your

To the best of your recollection, how many of the [question("value"), id="269"] CFL light bulbs received through the program are currently installed in each of the following locations?

- Bedrooms
 - Bathrooms
 - Living room
 - Kitchen
 - Entryway
 - Dining room
 - Garage
 - Basement
 - Den
 - Stairway
 - Office
 - Laundry room
 - Other
- Total: [#]

Logic: Hidden unless: (#27 Question "You indicated that you received CFL light bulbs from the program. Program records indicate you received [question("value"), id="13"] CFL light bulbs. To the best of your knowledge, is that number correct or did you receive a different number of CFL light bulbs?" is one of the following answers ("Yes, that is the correct number of CFL light bulbs") OR #28 Question "What is the correct number of CFL light bulbs that you received?" is greater than "0")

What type of light bulbs did the CFL light bulbs replace? (Select all that apply)

- Incandescent
- CFL
- LED
- Installed in new fixture
- Other (please specify)
- Don't remember
- Don't know

Appliance Replacement

Logic: Hidden unless: Question "ENERGY STAR certified refrigerator" is one of the following answers ("Yes")

You indicated that your refrigerator was replaced. What is the door-style of the new refrigerator?

- Freezer-on-top
- Freezer-on-bottom
- Side-by-side
- Don't remember
- Don't know

Logic: Show/hidden trigger exists. Hidden unless: Question "ENERGY STAR certified refrigerator" is one of the following answers ("Yes")

Is the refrigerator you received still installed? *

- Yes
- No
- Don't remember
- Don't know

Logic: Hidden unless: #41 Question "Is the refrigerator you received still installed? " is one of the following answers ("No")

Why is the refrigerator not currently installed? *

Logic: Hidden unless: #41 Question "Is the refrigerator you received still installed? " is one of the following answers ("No")

How long did you have the refrigerator before it was removed?

- Less than one year
- More than one year

Shell

Logic: Hidden unless: (((((Question "Air Sealed/Infiltration" is greater than "0" OR Question "Ceiling Insulation" is greater than "0") OR Question "Floor Insulation" is greater than "0") OR Question "Wall Insulation" is greater than "0") OR Question "Attic Ventilation" is greater than "0") OR Question "Thermal Doors" is greater than "0")

Program records show that you had some home energy improvements such as air drafts sealed, insulation, ground cover, and/or a new thermal door installed by a participating agency or contractor. Is that correct?

	Yes	No	Don't know
Air drafts sealed			
Ceiling insulation			
Floor insulation			
Wall insulation			
Attic insulation			
Thermal door			

Logic: Hidden unless: (((((Question "Air drafts sealed" is one of the following answers ("Yes") OR Question "Ceiling insulation" is one of the following answers ("Yes")) OR Question "Floor

insulation" is one of the following answers ("Yes")) OR Question "Wall insulation" is one of the following answers ("Yes")) OR Question "Attic ventilation" is one of the following answers ("Yes")) OR Question "Thermal door" is one of the following answers ("Yes"))

On a scale of 1 to 5, where 1 is "not at all important" and 5 is "extremely important," how important were the following factors in your decision to receive air draft sealing, insulation, ground cover and/or a thermal door?

	Not at all important 1	2	3	4	Extremely important 5	Don't know
Improve home comfort						
The improvements were provided at no cost						
Reduce electric bills						

Logic: Hidden unless: (((((Question "Air drafts sealed" is one of the following answers ("Yes") AND Question "Ceiling insulation" is one of the following answers ("Yes")) AND Question "Floor insulation" is one of the following answers ("Yes")) AND Question "Wall insulation" is one of the following answers ("Yes")) AND Question "Attic ventilation" is one of the following answers ("Yes")) AND Question "Thermal door" is one of the following answers ("Yes"))

Where there any other factors that were also important to your decision to receive the home energy improvements? If so, what were they?

Window Replacement

Logic: Show/hide trigger exists. Hidden unless: Question "Window replacement" is one of the following answers ("Yes")

You indicated that you received an energy saving window from the program. Is the window currently installed?

- Yes
- No
- Don't know
- Don't remember

Logic: Show/hide trigger exists. Hidden unless: #47 Question "You indicated that you received an energy saving window from the program. Is the window currently installed?" is one of the following answers ("No")

Why was the window removed or otherwise not currently installed?

- Window broke
- Window not working as needed
- The window was never installed
- Other (please specify)
- Don't remember
- Don't know

Logic: Hidden unless: #47 Question "You indicated that you received an energy saving window from the program. Is the window currently installed?" is one of the following answers ("No")

How long was the window installed before someone removed it?

- Less than one year
- More than one year

Logic: Hidden unless: #48 Question "Why was the window removed or otherwise not currently installed?" is one of the following answers ("The window was never installed")

Why was the window never installed?

HVAC

Logic: Hidden unless: (Question "Duct Insulation and Sealing " is greater than "0" OR Question "Furnace repair" is greater than "0")

Program records show that you had some home energy improvements such as heat duct insulation and sealing, and/or furnace repairs performed by a participating agency or contractor. Is that correct?

	Yes	No	Don't remember	Don't know
Duct sealing/insulation				
Furnace repair				

Logic: Hidden unless: (Question "Furnace repair" is one of the following answers ("Yes") OR Question "Duct sealing/insulation" is one of the following answers ("Yes"))

On a scale of 1 to 5, where 1 is "not at all important" and 5 is "extremely important," how important were the following factors in your decision to receive the heat duct insulation and sealing, and/or furnace repairs?

	Not at all important 1	2	3	4	Extremely important 5	Don't know

Improve home comfort						
The improvements were provided at no cost						
Reduce electric bills						

Logic: Hidden unless: (Question "Duct sealing/insulation" is one of the following answers ("Yes") OR Question "Furnace repair" is one of the following answers ("Yes"))

Were there any other factors that were important to your decision to receive the heat duct insulation and sealing, and/or furnace repairs? If so, what were they?

HVAC Furnace Replacement

Logic: Show/hide trigger exists. Hidden unless: Question "Furnace replacement" is one of the following answers ("Yes")

You indicated that your furnace was replaced. Is the furnace currently installed?

- Yes
- No
- Don't remember
- Don't know

Logic: Show/hide trigger exists. Hidden unless: #54 Question "You indicated that your furnace was replaced. Is the furnace currently installed?" is one of the following answers ("No")

Why was the furnace removed or otherwise not currently installed?

- Furnace broke
- Furnace not working as needed
- Returned it to the program
- Furnace was never installed
- Other (please specify)
- Don't remember
- Don't know

Logic: Hidden unless: #55 Question "Why was the furnace removed or otherwise not currently installed?" is one of the following answers ("Furnace broke", "Furnace not working as needed", "Returned it to the program", "Other (please specify)")

How long was the furnace installed before someone removed it?

- Less than one year
- More than one year

Logic: Hidden unless: #54 Question "You indicated that your furnace was replaced. Is the furnace currently installed? " is one of the following answers ("Yes")

To the best of your recollection, what type of furnace or other heating source(s) did the furnace that you received through the program replace? (Select all that apply)

- Hardwood stove
- Pellet stove
- Fuel oil furnace (diesel)
- Propane furnace
- Natural gas furnace
- Electric furnace
- Electric space heater
- Heat pumps
- Electric resistance (baseboard heater)

Water Heater Replacement

Logic: Show/hide trigger exists. Hidden unless: Question "Water heater replacement" is one of the following answers ("Yes")

You indicated that your water heater was replaced. Is the water heater currently installed? *

- Yes
- No
- Don't remember
- Don't know

Logic: Show/hide trigger exists. Hidden unless: Question "You indicated that your water heater was replaced. Is the water heater currently installed? " is one of the following answers ("No")

Why was the water heater removed or otherwise not currently installed?

- Water heater broke
- Water heater not working as needed
- Returned to the program
- Water heater was never installed
- Other (please specify)
- Don't remember
- Don't know

Logic: Hidden unless: Question "Why was the water heater removed or otherwise not currently installed?" is one of the following answers ("Water heater broke", "Water heater not working as needed", "Returned to the program", "Other (please specify)")

How long were the water heater installed before someone removed it?

- Water heater broke
- Water heater not working as needed
- Returned to the program

- Water heater was never installed
- Other (please specify)
- Don't remember
- Don't know

Logic: Hidden unless: Question "Why was the water heater removed or otherwise not currently installed?" is one of the following answers ("Water heater broke", "Water heater not working as needed", "Returned to the program", "Other (please specify)")

How long were the water heater installed before someone removed it?

- Less than one year
- More than one year

Logic: Hidden unless: Question "Why was the water heater removed or otherwise not currently installed?" is one of the following answers ("Water heater was never installed")

Why was the water heater you received from the program never installed?

Logic: Hidden unless: #64 Question "You indicated that you received a smart thermostat from the program. Is the smart thermostat currently installed? " is one of the following answers ("No")

Why was the thermostat never installed?

Water heater pipe insulation and furnace repairs

Logic: Hidden unless: (Question "Water pipe Insulation" is greater than "0" OR Question "Water heater repair" is greater than "0")

Program records show that you had some home energy improvements such as water pipe insulation and/or water heater repairs performed by a participating agency or contractor. Is that correct?

	Yes	No	Don't remember	Don't know
Water pipe insulation				
Water heater repair				

Logic: Hidden unless: (Question "Water pipe insulation" is one of the following answers ("Yes") OR Question "Water heater repair" is one of the following answers ("Yes"))

On a scale of 1 to 5, where 1 is "not at all important" and 5 is "extremely important," how important were the following factors in your decision to receive the water pipe insulation and/or water heater repairs?

	Not at all important 1	2	3	4	Extremely important 5	Don't know
Improve home comfort						
The improvements were provided at no cost						
Reduce electric bills						

Audit Experience

Was the home visit scheduled at a convenient time for you?

- Yes
- No
- Don't remember
- Don't know

Did the home energy auditor or inspector arrive within 15 minutes of the scheduled appointment?

- Yes
- No
- Don't remember
- Don't know

Energy Education

Logic: Show/hide trigger exists.

When the auditor or inspector visited your home, did they talk with you about ways to use less electricity in your home or leave materials with you that described how you could save electricity?

- Yes
- No
- Don't remember
- Don't know

Logic: Show/hide trigger exists. Hidden unless: Question "When the auditor or inspector visited your home, did they talk with you about ways to use less electricity in your home or leave

The final set of questions is about your satisfaction with the home improvements or items you received and other aspects of the program. For each, please rate your satisfaction on a scale of 1 to 5, where 1 is “very dissatisfied” and 5 is “very satisfied.”

	Very dissatisfied 1	2	3	4	Very Satisfied 5	Don't know
LED light bulbs you received through the program						
CFL light bulbs you received through the program						
ENERGY STAR certified refrigerator(s) you received through the program						
Air drafts sealed through the program						
Ceiling insulation you received through the program						
Floor insulation you received through the program						
Wall insulation you received through the program						
Thermal door you received through the program						
Window replacement you received through the program						
Heat duct sealing and/or insulation						
Furnace repairs you received through the program						
Water pipe insulation you received through the program						
Water heater repairs you received through the program						
Water heater replacement you received through the program						
The scheduling of the visit						
The information you received about ways to use less electricity						

Logic: Hidden unless: (((((((((((((((Question "LED light bulbs you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "CFL light bulbs you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "ENERGY STAR certified refrigerator(s) you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Air drafts sealed through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Ceiling insulation you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Floor insulation you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Wall insulation you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Attic ventilation you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Thermal door you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Window replacement you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Heat duct sealing and/or insulation" is one of the following answers ("Very dissatisfied 1","2") OR Question "Furnace repairs you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Furnace replacement you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Water pipe insulation you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Water heater repairs you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "Water heater replacement you received through the program" is one of the following answers ("Very dissatisfied 1","2") OR Question "The scheduling of the visit" is one of the following answers ("Very dissatisfied 1","2") OR Question "The information you received about ways to use less electricity" is one of the following answers ("Very dissatisfied 1","2")

You indicated you were less than satisfied with some of the product(s) or service(s) you received. What was less than satisfactory about the product(s) or service(s)?

Logic: Show/hide trigger exists.

In the course of participating in the program, how often did you contact agency staff with questions about the items or services you could or did receive through this program?

- Never
- Once
- 2 or 3 times
- 4 times or more

Logic: Show/hide trigger exists. Hidden unless: Question "In the course of participating in the program, how often did you contact agency staff with questions about the items or services you could or did receive through this program? " is one of the following answers ("Once","2 or 3 times","4 times or more")

How satisfied were you with the communication from agency staff? Please rate your satisfaction on a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied."

Very dissatisfied 1	2	3	4	Very Satisfied 5	Don't know
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Logic: Hidden unless: Question "How satisfied were you with the communication from agency staff? Please rate your satisfaction on a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied." is one of the following answers ("Very dissatisfied 1", "2")

What was not satisfactory?

Logic: Show/hide trigger exists.

Have you noticed any savings on your electric bill since the home improvements were completed or items were installed?

- Yes
- No
- Not sure
- Don't know

Logic: Hidden unless: Question "Have you noticed any savings on your electric bills since the home improvements were completed or items were installed?" is one of the following answers ("Yes")

How satisfied are you with any savings you noticed on your electric bills? Please rate your satisfaction on a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied."

Very dissatisfied 1	2	3	4	Very Satisfied 5	Don't know
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How satisfied were you overall with the Home Energy Efficiency Program? Please rate your satisfaction on a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied."

Very dissatisfied 1	2	3	4	Very Satisfied 5	Don't know
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Logic: Show/hide trigger exists.

Do you have any suggestions for improving the Program?

- Yes
- No

Logic: Hidden unless: Question "Do you have any suggestions for improving the Program?" is one of the following answers ("Yes")

What suggestions do you have for improving the program?

Conclusion

Page exit logic: Skip / Disqualify Logic IF: #85 Question "Would you like your gift card to be sent to the following email address: [question('value'), id='31']?" is one of the following answers ("No (Please enter correct email address)") THEN: Flag response as complete

Thank you for your input regarding the Home Energy Efficiency Program. You have now completed the survey. We would like to send you a \$10 gift card of your choice for your participation.

Logic: Show/hide trigger exists.

Would you like your gift card to be sent to the following email address:
[question('value'), id='31']?

- Yes
- No (please enter correct email address)
- I will pass on the gift card

Logic: Hidden unless: #85 Question "Would you like your gift card to be sent to the following email address: [question('value'), id='31']?" is one of the following answers ("Yes")

To confirm, your email address is [question("value"), id="31"]?

- Yes
- No

Logic: Hidden unless: #64 Question "Would you like your gift card to be sent to the following email address: [question('value'), id='31']?" is one of the following answers ("I will pass on the gift card")

If you have any questions regarding this survey, please send an email to:

adm-surveys@admenergy.com

Once again thank you for your participation on behalf of Rocky Mountain Power. Have a great day!

Logic: Hidden unless: #64 Question "Would you like your gift card to be sent to the following email address: [question('value'), id='31']?" is one of the following answers ("Yes", "No (Please enter correct email address)")

You should be receiving an email with the link to your gift card approximately 10 business days. If you have any questions regarding this survey or would like to know the status of your gift card, please send an email to:

adm-surveys@admenergy.com

On behalf of Rocky Mountain Power, thank you for your participation! Have a great day.