
Utah Low-Income Weatherization Program Evaluation Report

Program Years 2010-2012

Prepared for
Rocky Mountain Power
by

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TABLE OF CONTENTS

TABLE OF ACRONYMS 1

REPORT SUMMARY 2

IMPACT EVALUATION 10

 Methodology 10

 Data and Document Review 11

 Program Participation and Reported Savings 12

 Evaluated Energy Savings 14

 Energy Savings Results and Conclusions 20

PROCESS EVALUATION 23

 Methodology 25

 Participant Survey 26

 Stakeholder and Agency Interviews 31

 Process Evaluation Conclusions 36

COST EFFECTIVENESS 38

 Assumptions and Results 39

 Cost-Effectiveness Results 41

CONCLUSIONS & RECOMMENDATIONS 43

REFERENCES 46

APPENDIX 47

 Client Survey Protocol 47

 Agency Interview Protocol 54

 Weatherization Priority Rating System 57

 Deferral of Service Notification 60

 Weatherization Deferral of Service Guidelines 62

Table of Acronyms

Acronym	Meaning
AAPOR	American Association for Public Opinion Research
AOG	Association of Governments
ARRA	American Recovery and Reinvestment Act
BWR	Building Weatherization Report
SPM	California Standard Practice Manual
CFL	Compact Fluorescent Light Bulb
DEER	California Database for Energy Efficient Resources
EISA	Energy Independence and Security Act
FPL	Federal Poverty Level
HEAT	Home Energy Assistance Target Program
HOU	Hours-Of-Use
ISR	In-Service Ratio
kWh	kilowatt-hour
LIHEAP	Low Income Home Energy Assistance Program
PCT	Participant Cost Test
PTRC	PacifiCorp Total Resource Cost Test
RIM	Ratepayer Impact Measure Test
SIR	Savings-to-Investment Ratio
TRC	Total Resource Cost
UCT	Utility Cost Test
USDHHS	United States Department of Health & Human Services
USDOE	United States Department of Energy
UTDHCD	Utah Division of Housing & Community Development
UTDWS	Utah Department of Workforce Services
WAP	Weatherization Assistance Program

REPORT SUMMARY

Introduction

Rocky Mountain Power's Low-Income Weatherization Program in Utah is directed towards improving energy efficiency and thereby reducing both energy usage and energy bills for the homes of qualifying low-income customers.¹ Rocky Mountain Power's effort is coordinated with the federal/state Weatherization Assistance Program (WAP). Energy saving improvements and installation are provided at no cost to the low-income households. This government contribution to this program is funded and coordinated by the United States Department of Energy (USDOE) and United States Department of Health and Human Services (USDHHS), and administered by the Utah Division of Housing and Community Development (UTDHCD). This kind of coordination is considered a best practice because it provides substantial leverage to each utility dollar through a highly organized federal/state program that establishes high standards, provides training to weatherization specialists, ensures quality control and takes into account the health, safety and repair and replacement problems endemic to the low-income portion of the housing stock.

Rocky Mountain Power is doing its part to support federal leveraging requirements. The small amount of potential additional federal funding follows a formula and is different each year, depending on the total leveraging across all fifty states. Questar Gas Company is the major natural gas provider in Utah and also provides low-income funding.²

Since very few homes in Utah have electric heat, the primary Rocky Mountain Power measures installed by the program were energy-efficient electric lights (compact fluorescent light bulbs or CFLs) and energy-efficient refrigerators. Together, these comprised about 97% of the program energy savings over the three-year evaluation period. For this reason, a measure-based approach was used in the analysis.

Evaluation Approach

Rocky Mountain Power contracted with Smith & Lehmann Consulting, Inc. to conduct a process evaluation and an impact evaluation for program years 2010, 2011 and 2012. The process evaluation assesses program delivery and opportunities for improvement. The impact evaluation assesses energy impacts and inputs to calculating program cost-effectiveness. Some of the components of the evaluation approach are discussed below.

◆ Data Collection

Program participant and energy saving improvement (measure) data were provided by Rocky Mountain Power. Utility program cost data was also provided by Rocky Mountain Power along

¹ **Energy Efficiency** - The use of less energy to provide the same or an improved level of service to the energy consumer; or the use of less energy to perform the same function.

² Questar Gas Company provides lump-sum funding for the testing, repair, and replacement of gas appliances.

with program reported (ex-ante) savings. Reported energy savings and program cost-effectiveness results are also reported yearly by the Company. In addition, Utah (UTDHCD) provided data with which to verify Company data including copies of invoices, detailed summary information from Utah's Building Weatherization Report (BWR) database and detailed information on refrigerators and refrigerator testing. Examining the match between Rocky Mountain Power and Utah's data ensures that the analysis in this study is well grounded.

◆ **Process Approach**

Smith & Lehmann conducted telephone survey discussions with the UTDHCD and with each agency that administers the program (as a subgrantee to the Housing Division) in different areas of the State. The evaluation team also conducted a telephone survey with a random sample of Rocky Mountain Power customers who participated in the program to assess cost-effectiveness, customer satisfaction, verification of program services, and opinions on various program components.

◆ **Evaluation Approach to Program Energy Savings**

Reported Energy Savings: The evaluator collected and is reporting Rocky Mountain Power's program (*ex-ante*) estimates of energy savings.

Evaluated Energy Saving: Smith & Lehmann Consulting developed an evaluation analysis of energy (kWh) savings associated with the energy saving improvements (measures) installed. Since very few homes in Utah have electric heat, the primary Rocky Mountain Power measures installed by the program were energy-efficient electric lights (CFLs) and energy-efficient refrigerators. Together, these comprised about 97% of the program energy savings over the three-year evaluation period. For this reason, a measure-based approach was used in the analysis.

◆ **Cost-Effectiveness Assessment**

Cost-effectiveness was assessed using five different approaches. Smith & Lehmann Consulting provided inputs to the Cost-effectiveness calculations to Cadmus, who performed the calculations of Net Benefits, Benefit/Cost Ratio, and Levelized Cost for each of the program years and for the total evaluation period.

Conclusions and Major Findings

- ◆ Rocky Mountain Power's program exemplifies a utility best practice in that it is coordinated with the USDOE, USDHHS, Questar Gas Company, and Utah Housing Division Weatherization Assistance Program (UTDHCD). This provides powerful leverage to each utility dollar provided in this joint effort to serve low-income customers. Rocky Mountain Power's decision to coordinate its weatherization efforts with UTDHCD provides substantial leverage to each utility dollar and should be continued. Coordination with the Utah WAP is a best practice.

- ◆ Rocky Mountain Power did not include a Fuel Flag for the three program years included in this study, 2010-2012. However, this problem has been resolved and fuel type is now reported by agencies to Rocky Mountain Power. The new database allows for entry of a specific electric heating type, such as baseboard, and if the home is not electrically heated, “Non Electric” is entered.
- ◆ All Utah subgrantee agencies are partnering with the Home Energy Assistance Target (HEAT) program, administered by the State (UTDHCD) to bring in clients and streamline their qualification process.³ HEAT provides bill payment assistance with federal Low Income Home Energy Assistance Program (LIHEAP) funds to income eligible households at 150% of the Federal Poverty Level (FPL). Qualifying participants along with LIHEAP efforts, and using HEAT certificates as proof of eligibility simplifies qualification effort for the agencies; however, Rocky Mountain Power should be aware that some qualifying customers whose incomes place them between 151% and 200% of the FPL may not receive assistance.⁴
- ◆ Overall, this evaluation demonstrates that the program is operating as planned within the design parameters outlined in the Rocky Mountain Power Electric Service Schedule No. 118, State of Utah.
- ◆ Overall, savings from program participation are evaluated at 3,113,210 kWh for all three program years, 2010-2012. This amounts to 70% of planned participant energy savings of 4,435,686 kWh, as reported by Rocky Mountain Power across the 2010, 2011, and 2012 program years (See Table 1). The realization rate for this program is 70%. A breakdown of the program savings by year and the respective realization rates are provided in Tables 2-4.

³ Home Energy Assistance Target (HEAT). <http://jobs.utah.gov/housing/seal/heat.html>

⁴ Subgrantee agencies will tell customers to first qualify under HEAT and bring back an approved certification from HEAT before processing will begin for weatherization. However, if a customer goes to the HEAT office (usually, but not always in the same building, depending on location) and fails to qualify because they fall within 151%-200% of the FPL, the customer must return and insist on inclusion. At that point, the agencies are supposed to include them in processing for weatherization. The problem is mitigated to some extent because the income assessment for HEAT is more inclusive than the rules for weatherization income assessment. Still, this has the appearance of a potential barrier to service.

Table 1. Program Savings (at Site) by Measure 2010-2012

Measure	Reported Savings (kWh)	Evaluated Savings (kWh)	Gross Realization Rate
CFLs	2,676,358	2,007,003	75%
Refrigerator Replacements	1,658,170	987,602	60%
Weatherization Measures*	101,158	118,605	117%
Total	4,435,686	3,113,210	70%

*Weatherization measures include roughly 3% of total measures installed and included furnace fans, duct sealing, wall, ceiling, and floor insulation and/or windows categories.

Table 2. Program Savings (at Site) by Measure 2010

Measure	Reported Savings (kWh)	Evaluated Savings (kWh)	Gross Realization Rate
CFLs	1,140,132	796,475	70%
Refrigerator Replacements	747,450	356,694	48%
Weatherization Measures*	30,130	30,535	101%
Total	1,917,712	1,183,704	62%

*Weatherization measures include roughly 3% of total measures installed and included furnace fans, duct sealing, wall, ceiling, and floor insulation and/or windows categories.

Table 3. Program Savings (at Site) by Measure 2011

Measure	Reported Savings (kWh)	Evaluated Savings (kWh)	Gross Realization Rate
CFLs	1,025,815	716,615	70%
Refrigerator Replacements	613,060	341,681	56%
Weatherization Measures*	38,750	54,441	140%
Total	1,677,625	1,112,737	66%

*Weatherization measures include roughly 3% of total measures installed and included furnace fans, duct sealing, wall, ceiling, and floor insulation and/or windows categories.

Table 4. Program Savings (at Site) by Measure 2012

Measure	Reported Savings (kWh)	Evaluated Savings (kWh)	Gross Realization Rate
CFLs	510,411	493,914	97%
Refrigerator Replacements	297,660	289,227	97%
Weatherization Measures*	32,278	33,629	104%
Total	840,349	816,769	97%

*Weatherization measures include roughly 3% of total measures installed and included furnace fans, duct sealing, wall, ceiling, and floor insulation and/or windows categories.

- ◆ The program was found to be cost-effective under all test perspectives except the RIM. The Participant Cost Test (PCT) is determined “Not Applicable” for the purpose of evaluating a low-income program with a zero cost to the participant. Further description of the individual tests and respective results can be found in the Cost-Effectiveness Analysis section of this report.

Table 5. 2010-2012 Low-income Weatherization – Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs*	Benefits*	Net Benefits	Benefit/Cost Ratio**
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.024	\$641,518	\$2,558,025	\$1,916,507	3.99
Total Resource Cost Test (TRC) No Adder	\$0.024	\$641,518	\$2,325,477	\$1,683,960	3.62
Utility Cost Test (UCT)	\$0.024	\$641,518	\$2,325,477	\$1,683,960	3.62
Rate Impact Test (RIM)		\$3,067,315	\$2,325,477	(\$741,837)	0.76
Participant Cost Test (PCT)		\$0	\$2,907,868	\$2,907,868	N/A
Discounted Participant Payback (years)					N/A
Lifecycle Revenue Impact (\$/KWh)					\$0.00000097

*Smith & Lehmann provided evaluated costs and benefits necessary to calculating Cost-effectiveness

**Cadmus is responsible for results of the Cost-effectiveness summary

Table 6. 2010 Low-income Weatherization – Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs*	Benefits*	Net Benefits	Benefit/Cost Ratio**
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.024	\$258,422	\$1,036,048	\$777,626	4.01
Total Resource Cost Test (TRC) No Adder	\$0.024	\$258,422	\$941,862	\$683,440	3.64
Utility Cost Test (UCT)	\$0.024	\$258,422	\$941,862	\$683,440	3.64
Rate Impact Test (RIM)		\$1,205,512	\$941,862	(\$263,650)	0.78
Participant Cost Test (PCT)		\$0	\$1,152,882	\$1,152,882	N/A
Discounted Participant Payback (years)					N/A
Lifecycle Revenue Impact (\$/KWh)					\$0.00000114

*Smith & Lehmann provided evaluated costs and benefits necessary to calculating Cost-effectiveness

**Cadmus is responsible for results of the Cost-effectiveness summary

Table 7. 2011 Low-income Weatherization – Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs*	Benefits*	Net Benefits	Benefit/Cost Ratio**
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.024	\$245,567	\$954,102	\$708,535	3.89
Total Resource Cost Test (TRC) No Adder	\$0.024	\$245,567	\$867,366	\$621,799	3.53
Utility Cost Test (UCT)	\$0.024	\$245,567	\$867,366	\$621,799	3.53
Rate Impact Test (RIM)		\$1,144,441	\$867,366	(\$277,076)	0.76
Participant Cost Test (PCT)		\$0	\$1,070,893	\$1,070,893	N/A
Discounted Participant Payback (years)					N/A
Lifecycle Revenue Impact (\$/KWh)					\$0.00000115

*Smith & Lehmann provided evaluated costs and benefits necessary to calculating Cost-effectiveness

**Cadmus is responsible for results of the Cost-effectiveness summary

Table 8. 2012 Low-income Weatherization – Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs*	Benefits*	Net Benefits	Benefit/Cost Ratio**
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.024	\$176,828	\$725,542	\$548,714	4.10
Total Resource Cost Test (TRC) No Adder	\$0.024	\$176,828	\$659,583	\$482,756	3.73
Utility Cost Test (UCT)	\$0.024	\$176,828	\$659,583	\$482,756	3.73
Rate Impact Test (RIM)		\$911,859	\$659,583	(\$252,276)	0.72
Participant Cost Test (PCT)		\$0	\$867,998	\$867,998	N/A
Discounted Participant Payback (years)					N/A
Lifecycle Revenue Impact (\$/KWh)					\$0.00000102

*Smith & Lehmann provided evaluated costs and benefits necessary to calculating Cost-effectiveness

**Cadmus is responsible for results of the Cost-effectiveness summary

Recommendations

- ◆ Recall bias by weatherization recipients in answering survey questions is a concern. Participants were required to remember services they received more than two years prior to completing the survey. The long lag time between measure installation and participant feedback raises concerns regarding the reliability of responses to the client survey. Smith & Lehmann Consulting recommends Rocky Mountain Power conduct client surveys annually or semi-annually. Rocky Mountain Power will maximize survey reliability and minimize recall bias by conducting surveys between three and eight months following weatherization installation.
- ◆ Client survey results indicated a small number of CFLs were replaced by program participants. Of the 24 participants who replaced bulbs (an average of four CFLs per household, or 96 bulbs out of a total of 1,206 CFLs received by the 67 survey respondents), most reported replacement because the bulbs had burned out. This suggests a possible burn out problem; however, owing to the two year time lapse, we cannot verify that bulbs replaced were those purchased separately by the client or provided by RMP. If future client surveys confirm bulb burnout as a problem, procurement specifications should be revised to exceed Energy Star certification as Energy Star certification only ensures a minimum standard for energy savings.
- ◆ Client survey results indicate 7% of participants remember or recognize that Rocky Mountain Power contributed to the weatherization work they received. Rocky Mountain Power should consider whether it is important that customers recognize Rocky Mountain Power’s contribution to the weatherization services received. If so, Rocky Mountain Power should consider providing a branded item concurrently with weatherization services to increase customer recognition.

- ◆ Smith & Lehmann recommends UES values associated with furnace fans, “duct sealing/insulation,” and “insulation and/or windows” categories be updated for greater accuracy in a future study.
- ◆ Typically subgrantee agencies do not spend all available Rocky Mountain Power funding each year. These funds could be utilized by including additional measures such as repairs that would enable installation of energy efficient lighting fixtures. This would add support to dealing with the repair problem in the low-income housing stock as a program barrier. Smith & Lehmann Consulting recommends that Rocky Mountain Power include repairs that support installation of energy efficient measures as an efficient use of the unspent funds that would allow for weatherization of a larger number of eligible clients.
- ◆ Rocky Mountain Power and the Utah Commission currently use the Utility Cost Test (UCT) and the other related tests in examinations of low-income weatherization. Part of the value of using the UCT and related tests is that it enables comparison across DSM programs. There is no problem in Utah in the current use of the UCT test. However, looking towards the future, Smith & Lehmann Consulting believes it may be useful to consider modifications to the UCT test, and in particular to include Non-Energy Benefits (NEBs) and/or to lower the target for the benefit-cost ratio for low-income weatherization from 1.00 to 0.25, or some other appropriate level as seen in similar modifications in use across other jurisdictions.

IMPACT EVALUATION

Rocky Mountain Power's Low-Income Weatherization Program in Utah is directed towards improving energy efficiency and thereby reducing both energy usage and energy bills for the homes of qualifying low-income customers.⁵ Rocky Mountain Power's effort is coordinated with the federal/State Weatherization Assistance Program (WAP) to provide energy savings improvement measures at no cost to the low-income households. This government contribution to this program is funded and coordinated by the United States Department of Energy (USDOE) and United States Department of Health and Human Services (USDHHS), and administered by the Utah Division of Housing and Community Development (UTDHCD). Rocky Mountain Power contracted with Smith & Lehmann Consulting, Inc. to conduct a process and impact evaluation for program years 2010, 2011 and 2012. The impact evaluation assesses energy impacts and inputs to calculating program cost-effectiveness.

Since very few homes in Utah have electric heat, the primary Rocky Mountain Power measures installed by the program were energy-efficient electric lights (compact fluorescent light bulbs or CFLs) and energy-efficient refrigerators. Together, these comprised about 97% of the program energy savings over the three-year evaluation period. For this reason, a measure-based approach was used in the analysis.

Methodology

The analysis was performed to determine kWh savings and realization rates for the 2010, 2011, and 2012 program participation years. Smith & Lehmann performed the analysis in two parts: first, to verify accuracy of the program database and second, to perform an evaluation of per-unit-savings and adjusted gross savings. Prior to this evaluation, Rocky Mountain Power claimed program savings based on estimates deemed by the previous evaluator. This analysis seeks to incorporate additional program-specific and environment-specific data, as detailed below.

Impact evaluation data was derived from a number of different sources, including:

- ◆ **Program Database:** Rocky Mountain Power provided information regarding program participants and measures installed during the evaluation period. Specifically, these data included participant contact information and lists of measures installed per home, as well as associated energy savings.
- ◆ **BWR Data:** Building Weatherization Report (BWR) summary data on Rocky Mountain Power jobs from calendar 2010, 2011, and 2012 was requested to collect information on the number of bulbs installed, number of refrigerators installed, and number of refrigerators tested by the program, as well as associated program cost information. The State (UTDHCD) provided this information.

Smith & Lehmann incorporated primary BWR data collected by the agencies into the evaluation and energy savings calculations to enhance the representation of actual impacts occurring in participant

⁵ **Energy Efficiency** - The use of less energy to provide the same or an improved level of service to the energy consumer; or the use of less energy to perform the same function.

households. Specifically, this analysis provided improved savings estimates for CFLs and refrigerator replacements by using agency-collected data from 2010-2012 program participants. For the purpose of the evaluation, all other measures installed (e.g. furnace fans) by the program were assumed to provide a deemed energy savings value. This assumption was based on the low number of electrically heated homes in Utah; CFLs and refrigerators comprise 97% of program measures installed during 2010-2012.

Data and Document Review

The following data and information was reviewed to determine the average savings and participant levels as well as the distribution of measures installed over the 2010, 2011, and 2012 program years.

◆ Participant Data

Rocky Mountain Power provided the initial program accounting database of participant data in two separate groupings: 2010 and 2011-2012. This split was due to an upgrade of the system to new database software in 2011. This required merging of the new and old databases to properly assess the evaluation timeframe. Through this process it was discovered that the 2010 database had limited information and was missing the kWh savings information for all measures. Smith & Lehmann decided to use the 2010 information presented in the 2010 UT DSM Annual Report⁶ to supplement the database for that year.

The 2011-2012 database was comprehensive and included participant contact information, participant identifier, measures installed, kWh savings per measure, year of installation, and agency and cost information. Data were summarized by measure and year. An adjustment was made by the Company to change the kWh savings for CFLs counted in the database: in 2011 the program assumed 49 kWh per CFL; in 2012 the correction was made to reduce the kWh to 33 per CFL. Due to the limited information in the 2010 database it was assumed that in 2010 the Company reported 49 kWh-savings per CFL. This assumption was confirmed with the Program Manager at Rocky Mountain Power.

◆ Invoice Data

The program data provided by Rocky Mountain Power did not track invoice or project completion dates, and only included the dates the completed weatherized homes were entered into the database. Delays between completion dates, invoice dates, and the date the job was entered into the system made it difficult to determine which program year jobs were completed. It was determined that Rocky Mountain Power's protocol is to enter projects into the tracking system during the same month they are invoiced.

◆ Quantity and Cost Data Collection

The 2011-2012 database tracked measure codes, measures names, total measure cost, and quantity of the installed measure. Annual report data from 2010 provided this information for

⁶Rocky Mountain Power Annual Report. 2010. *2010 Annual Energy Efficiency and Peak Reduction Report- Utah*. Available at: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2010_UT_DSMAnnualReport_12-22-11.pdf

the 2010 program year. These two sources were used to estimate expected savings at the measure level and for the program in total over the three-year period, 2010-2012.

◆ **Primary Heating Fuel Flag**

Program data to track heating sources of homes weatherized was often not updated correctly in the old 2010 Rocky Mountain Power database. The primary heating fuel for each customer was updated in the new Rocky Mountain Power program database, beginning in 2011. The fuel type can now be entered in the database as a specific electric heat-type, such as baseboard or non-electric heat. While an entry is available in the database, data was not always entered and much of this information was incomplete for 2011 and 2012 program participants. This information is contained in the BWR submitted to USDOE, but should also be thoroughly tracked by the Company. UTDHCD reports weatherizing a maximum of two to five electrically heated homes per year. Rocky Mountain Power should prioritize the completion of this information in the current database.

◆ **Measure Tracking**

Despite difficulties with the old database, measures were tracked accurately in the 2011-2012 database. Measures installed were matched with annual numbers reported by the Company. The measures installed in 2011 and 2012 were consistent with information provided in the annual reports. Summary BWR information of the number of measures installed was requested for the evaluation timeframe, and allowed for reconciling of 2010 measures by subtracting out the installs verified for 2011 and 2012 program years.

Program Participation and Reported Savings

Table 9 displays the average savings and participation levels over the evaluation period, as well as for each program year. Minor discrepancies were observed when comparing participation levels reported by the Company in Annual Reports and those tracked in the Company's program database, as reported by the different weatherization agencies. Participation, as reported by Rocky Mountain Power's Utah Energy Efficient and Peak Reduction Annual Reports was, 1,273, 1,107, and 963, for 2010, 2011, and 2012 program years, respectively. These minor discrepancies in number of weatherized homes reported compared to those in Rocky Mountain Power's database (Table 9) are insignificant and could have been a result of the time delay in the reporting of weatherization participation by the Company and input of project completion to the database. Incorporation of the new database-system in 2011 increased the accuracy of results, and this is assumed to be the case for future evaluations. For calculations of evaluated energy savings, Smith & Lehmann used the number of weatherized homes and frequencies of measures as reported by Rocky Mountain Power's program database.

Table 9. Annual Savings and Participant Levels

Program Year	Participation*	Reported Energy Savings (kWh)
2010	1,339	1,917,712
2011	1,103	1,677,625
2012	962	840,349
Total	3,404	4,435,686

*Participant numbers are taken from Rocky Mountain Power’s program database

Program savings in Table 9, as reported by the utility, were compared to evaluated savings to derive the realization rate. Annual reported program savings were estimated from Rocky Mountain Power’s Annual Report information. Table 10 reports per unit savings for the different measures, as reported in Rocky Mountain Power’s program accounting databases. Differences between the old and new databases resulted in the use of Annual Report information to effectively fill-in the gaps for program year 2010. During program year 2012, the deemed savings of refrigerators was reduced from 1,510 kWh to 902 kWh. The discrepancies between measure-specific savings and total savings are owing to lump sum adjustments made in the accounting database by Rocky Mountain Power. Because these adjustments were made as lump sums rather than by unit, it is not possible to produce tables that can be reconciled between per-unit savings and total reported savings.

Table 10. Measure Specific Savings Reported in Rocky Mountain Power Accounting Database 2010-2012

Measure Type	Reported Per Unit kWh Savings			Total Reported kWh Savings
	2010	2011	2012	2010-2012
CFLs*	49	49	33	2,676,358
Refrigerator Replacements**	1,510	1,510	902	1,658,170
Furnace Fan	155	155	155	101,990
Duct Sealing/Insulation	193	193	193	1,544
Insulation and/or Windows	2,153	2,153	2,153	15,071
Total Reported Savings***				4,435,686

*Rocky Mountain Power adjusted reported CFL per unit savings on February 27, 2012 from 49 to 33 kWh.

**Rocky Mountain Power adjusted reported Refrigerator per unit savings in 2012 from 1,510 to 902 kWh.

***These numbers are based on final reported savings, which include measure-specific savings as well as accounting adjustments made by Rocky Mountain Power to reported energy savings. These adjustments mean that total reported savings will not equal the sum of individual measure totals.

Evaluated Energy Savings

Table 11 summarizes the overall evaluated kWh savings calculated in the analysis for each of the program years and for the evaluation timeframe as a whole. These results were compared to expected kWh savings, as reported by Rocky Mountain Power, resulting in a 70% realization rate for the total program evaluation period 2010-2012.

Table 11. Overall Savings and Realization Rate for Program Years 2010-2012

Program Year	2010	2011	2012	Total Evaluation (2010-2012)**
Reported kWh Savings*	1,917,712	1,677,625	840,349	4,435,686
Evaluated kWh Savings	1,183,704	1,112,737	816,769	3,113,210
Realization Rate	62%	66%	97%	70%

*Reported kWh savings values were estimated from Rocky Mountain Power Annual Report information

**Totals may not represent summation of column values due to rounding.

Table 12 provides measure-specific frequencies, evaluated per unit savings, and total program savings for the three-year evaluation period, 2010-2012. The frequencies reflect the number of homes receiving specific measures, and not the total number of individual measures installed through the program. Measure Type categories were specified by Rocky Mountain Power's Utah TRL database. Assumptions used in calculating measure-specific savings are discussed below. CFLs and refrigerator replacements made up 98% of total program savings for 2010, 97% for 2011, and 96% in 2012. All other measures amount to roughly 3.7% of total program savings over the three-year evaluation period (2010-2012). Due to the small amount of energy savings attributed to the additional measures, savings were estimated using deemed values.

Table 12. Measure-Specific Installations and Savings Summary 2010-2012

Measure Type	Frequency	Evaluated Per Unit kWh Savings			Total Evaluated kWh Savings 2010-2012
		2010	2011	2012	
CFLs	3,253	34	34	32	2,007,003
Refrigerator Replacement	1,230	721	833	879	987,602
Furnace Fan Duct Sealing/Insulation	658	164	164	164	101,990
Insulation and/or Windows*	8	193	193	193	1,544
Total	7	2,153	2,153	2,153	15,071
Total	5,156				3,113,210

*Insulation and/or windows is computed as a deemed savings per home that is claimed when any or all of the following measures are installed: wall, ceiling, floor insulation and windows⁷.

⁷ Deemed savings estimates were provided by Rocky Mountain Power's Utah TRL database

The frequency of installation for each measure was tracked for each participant household in Rocky Mountain Power’s program database. The frequencies listed in Table 12 and Table 13 both reflect the number of homes receiving different weatherization measures across the three program years: 2010, 2011, and 2012. Due to the low number of electrically heated homes in the service territory, instances of shell-measure installations were rare.

Table 13. Number of Homes Receiving Weatherization Measures

Measure Type	2010	2011	2012	Total Evaluation Period
*CFLs	1,273	1,058	922	3,253
Refrigerator Replacement	495	406	329	1,230
Furnace Fan	197	254	207	658
Duct Sealing/Insulation	0	0	8	8
Insulation and/or Windows**	0	7	0	7

*Number of homes receiving CFLs was tracked in the Rocky Mountain Power program database for 2011 and 2012. However, this information was not tracked for 2010 and it was therefore assumed that all participants received CFLs.

**Deemed value of 2,153 kWh as determined by Rocky Mountain Power to be the per unit savings.

Measure-Specific Methodology

This section provides details about assumptions used in the engineering analysis, which result in the various approaches used to evaluate kWh savings across the different measure groups.

BWR summary data was requested from the State to calculate inputs needed for evaluating the CFL and refrigerator replacement savings. For CFLs, this information was used to calculate the weighted-average change in energy consumed by the distribution of watts replaced by the program. For refrigerator replacements, agency data was used to calculate the average energy savings per new energy-efficient refrigerator.

CFL Savings Approach

An engineering equation was used to estimate total kWh savings associated with CFL installations. This equation is shown below. Use of this equation required developing the following inputs: number of CFLs installed over the evaluation timeline, average hours of use per bulb, average wattage per CFL installed, waste-heat factor, and the In-Service Ratio (ISR). All factors are explained in greater detail in this section, through a discussion of the evaluation of CFL-specific energy savings.

Unitary Energy Savings Calculation

$$\text{Annual Unitary Savings [kWh/yr.]} = \frac{(\text{AWI} - \text{AWC}) \times \text{ISR} \times (\text{HOU} \times 365) \times \text{WHF}}{1000 \text{ W/kW} \times \text{year}} = \text{kWh}$$

Where:

- ◆ AWI = average equivalent power (wattage) for the incandescent bulbs replaced
- ◆ AWC = average wattage of CFLs installed (or distributed) by the program
- ◆ ISR = the percentage of units that remained in-service
- ◆ HOU = daily hours of operation per bulb
- ◆ WHF = waste-heat factor accounts for the interactive effects with the home's heating and cooling systems

It was determined that Rocky Mountain Power's database contained the number of CFLs installed for 2011 and 2012, though not for 2010. The implementation of a new database in 2011 allowed for the specific tracking of measure quantities. The number of CFLs installed each program year was determined based on information from UTDHCD and Rocky Mountain Power's invoicing database. As a check, these quantities were compared with Rocky Mountain Power's annual reports. A discrepancy of 282 CFLs was found over the three-year period 2010-2012, which are claimed but not found in the purchase order information provided by the State. This was discussed with UTDHCD in an attempt to determine the particular year the discrepancy occurred; however, purchase order processing of CFLs is done in bulk orders distributed to the different agencies, and supplies typically last a few years.⁸ Therefore, it was impossible to determine which CFLs were installed during each individual program year from the purchase order information. This discrepancy was determined to be insignificant, and it was assumed that the number of CFLs claimed by the Company is correct.

Based on purchase order percentage distribution by watts, the evaluation team developed the average wattage for CFLs installed by the program. The average equivalent power (wattage) for the incandescent bulbs replaced by the program was dependent upon the wattage of the CFLs distributed, but followed common equivalency values and Energy Independence and Security Act (EISA) standard practices for developing the baseline wattage.

Calculation of Delta Watts

Smith & Lehmann used the lumens equivalence method to determine delta watts, which is consistent with UMP prescribed methodologies. Delta watts represents the difference between the Average Wattage of CFLs (AWC) installed and the baseline Average Wattage of Incandescent bulbs (AWI) replaced by the program. Following the recent 2011-2012 Utah Residential Home Energy Savings Evaluation, baseline wattage determinants were incorporated by EISA. EISA began with Phase I on January 1, 2012, and bans the manufacture or import of 100-watt incandescent bulbs.⁹ Due to EISA, the baseline wattages began to change in 2012, and subsequent phase-outs of the 75, 60, and 40-watt bulbs will be completed by 2014, altering the baseline values through 2015.¹⁰

Due to EISA's phase-out of manufacturing and importation of incandescent bulbs, baseline replacement wattage was developed separately for the 2012 program year. Based on Energy Star 2009 Partner Resource Guide and Energy Star Light Output Equivalency table (2009), the 13-watt CFLs replaces 40-

⁸ E-mail of Matthew Turner (UTDHCD) to Jenna Bagnall-Reilly, July 16, 2014.

⁹ Rocky Mountain Power Final Report: 2011-2012 Utah Residential Home Energy Savings Evaluation. *Cadmus*, January 2014.

¹⁰ Energy Independence and Security Act of 2007 – EPA FAQs. Available at:

http://www.energystar.gov/ia/products/lighting/cfls/downloads/EISA_Backgrounder_FINAL_4-11_EPA.pdf

watt incandescent, and 14-watt CFLs generally replace 60-watt incandescent bulbs.¹¹ According to the Energy Star table, 19-watt CFL bulbs replace 75-watt incandescent bulbs. The 23-watt bulbs generally replace the old 100-watt incandescent bulbs, or the newer 72-watt halogen bulbs once the older incandescent bulbs are phased out of production. It was determined that incandescent lights would still have been available to low-income customers through 2011. Therefore, incandescent wattage was used to determine the average lighting delta for 2010 and 2011 program years.

The Energy Independence and Security Act of 2007 (EISA) defined new energy-efficiency standards intended to gradually phase out incandescent light bulbs. Phase I of the law began on January 1, 2012 with the new energy standards being applied to 100-watt bulbs; followed by 75, 60, and 40-watt bulbs in 2013 and 2014.¹² In December 2011, Congress banned the expenditure of any federal funds to enforce the phase out.¹³ A recent residential Utah study indicates more than one-third (35%) of lighting customers purchased 100-watt incandescent bulbs in 2012.¹⁴ Reports of available 100-watt bulbs are also found in the Midwest and South.¹⁵

The 100-watt value is the baseline value for the incandescent light that is replaced by a 23-watt CFL for 2010 and 2011, but as the 100-watt is phased-out the baseline wattage for replacement transitions to the 72-watt halogen. For 2012, 100-watt (incandescent) baseline is replaced by 72-watt halogen bulbs, which is the new baseline bulb replaced by the 23-watt CFLs. This follows the recent 2011-2012 Utah Residential Home Energy Savings Evaluation, which adjusted baseline values in line with EISA.

Following conservative assumptions that the 13-watt replaced the 40-watt and the 23-watt replaced the 100-watt incandescent bulbs, we find the average lighting delta (displaced wattage) to be 50.07 watts for the 2010 and 2011 program years.¹⁶ After applying the above information, the average light delta for 2012 is 46.71 watts.

Hours-of-Use (HOU)

Hours-of-operation/use (HOU) was estimated to be two hours per day per bulb; a value that is consistent with the hours of use required for CFL installation by the Rocky Mountain Power Electric Service Schedule, 2012.¹⁷ To bound this value, the Universal Methods Protocol reports a range of

¹¹ 2009 Partner Resource Guide, Energy Star Qualified Light Bulbs, p5

¹² Energy Independence and Security Act of 2007 – EPA FAQs. Available at:

http://www.energystar.gov/ia/products/lighting/cfls/downloads/EISA_Backgrounder_FINAL_4-11_EPA.pdf

¹³ Congress Defunds Ban on Incandescent Light Bulbs but Doesn't Quite Save Them. ABC News, December 16, 2011. Available at <http://abcnews.go.com/blogs/politics/2011/12/congress-defunds-ban-on-incandescent-light-bulbs-but-doesnt-quite-save-them/>

¹⁴ Rocky Mountain Power Final Report: 2011-2012 Utah Residential Home Energy Savings Evaluation. January 20, 2014. pg 28.

¹⁵ Dayton Power and Light Company. "The Dayton Power and Light Company's Combined Notice of Filing Portfolio Status Report and Application to Adjust Baselines." Case No. 13-1140-EL-POR and Case No. 12-2266-EL-WVR. May 15, 2013. <http://dis.puc.state.oh.us/TiffToPdf/A1001001A13E15B61641D86507.pdf>

¹⁶ Average lighting delta was based on the distributional wattage of CFLs purchased by UTDHCD. Purchase of CFLs was made in bulk for the three-year period 2010-2012; therefore it was impossible to estimate the percentage of 13-watt, 14-watt, 19-watt, and 23-watt CFLs installed per year. Smith & Lehmann assumed a similar percentage of different CFL-watts were installed each year based on the percentage of CFLs purchased by UTDHCD.

¹⁷ Rocky Mountain Power Electric Service Schedule NO. 118 State of Utah, Low Income Weatherization, p5

observed hours-of-use (HOU), indicated by a variety of studies, from 1.5 to a high of 2.98 hours per day.¹⁸ Smith & Lehmann confirmed through discussions with agency administrators that all Utah agencies interview clients to ensure that CFLs installed by Rocky Mountain Power's program operate for a minimum of two hours per day.

Waste-Heat Factor (WHF)

The Waste-Heat Factor (WHF) was determined using recommendations from Universal Methods Protocol. The influence of climate zone on interactive effects depends on a variety of house-specific factors. Taking all of these factors into account, the net impact on lighting energy cost savings could be positive, negative, or neutral.^{19,20} In cooling-dominated climates, the interactive effects are positive, resulting in additional savings due to decreased cooling load. However, in heating-dominated climates, the interactive effects are negative, with decreased savings due to increased heating load.

Due to the potential impacts of interactive effects, the Residential Lighting Evaluation Protocol recommends these effects be included in evaluations of residential lighting programs. Smith & Lehmann used the value estimated in the recent 2011-2012 Rocky Mountain Power Residential Home Energy Savings Evaluation (1.007) for Utah's Waste-Heat-Factor.²¹

In-Service Rate

The In-Service Rate (ISR) was based on the program delivery mechanism, and was determined by the evaluation team using recommendations from Universal Methods Protocol. The ISR represents the percentage of residential lighting products (CFLs) that are ultimately installed by program participants. The following direction is given by the Universal Methods Protocol in regards to determining the appropriate ISR applicable to direct-installation program:

*"For **direct installation programs**, conduct verification (such as telephone survey or site visits) to assess installation and measure persistence, regardless of whether working bulbs were removed before they failed."*²²

Smith & Lehmann developed a specific series of survey questions pertaining to CFL lighting, which addressed installation and verified whether bulbs were removed and why. Data results from questions 7-14 in the client survey (Appendix) were used to determine the percentage of participants who replaced their CFLs and on average the total percentage of program-installed CFLs bulbs replaced. Smith & Lehmann used the following calculation for a conservative estimate of actual ISR, evaluating bulbs removed or replaced.

¹⁸ Dimetrosky, Scott. April 2013. "Universal Methods Protocol, Chapter 6: Residential Lighting Evaluation Protocol." National Renewables Energy Laboratory. pg 6-12 and pg 6-20.

¹⁹ Parekh, A.; Swinton, M.C.; Szadkowski, F.; Manning, M. (2005). "Benchmarking of Energy Savings Associated with Energy Efficient Lighting in Houses." National Research Council Canada. NRCC-50874.

²⁰ Parekh, A (2008). "Do CFLs Save Whole - House Energy?" Home Energy Magazine, November/December 2008, pp. 20-22.

²¹ For complete calculation of WHF, see Appendix L of 2009- 2010 Rocky Mountain Power Home Energy Savings Evaluation Report

²² Dimetrosky, Scott. April 2013. "Universal Methods Protocol, Chapter 6: Residential Lighting Evaluation Protocol." National Renewables Energy Laboratory. pg 6-18

In-Service Rate (ISR) Calculation

$$\text{CFL In-Service Rate [ISR \%]} = \frac{\text{CFLs Installed} - \text{Removed or Replaced}}{\text{Reported}}$$

The evaluation team determined, using Rocky Mountain Power program databases and Annual Report information, that each household received approximately 18 CFLs. Fifty-seven participants in the Smith & Lehmann client survey reported CFL installation, with an estimated 1,026 CFLs received by those customers (this is also assumed to be the number of CFLs installed). Forty-two percent (24 out of 57) of respondents replaced an average of 3.78 CFLs per household. To be conservative, and in considering possible survey biases, Smith & Lehmann assumed 3 CFLs were replaced per household. This results in a replacement estimate of 72 (or about 7%) of the 1,026 CFLs installed. In applying the above calculation, the ISR is estimated to be 93%. Table 14 provides a breakdown of the reported and evaluated CFL-specific savings for program years 2010-2012, as well as calculated realization rates.

Table 14. CFL-Specific Savings (at Site) and Realization Rates for Program Years 2010-2012

Program Year	2010	2011	2012	Total Evaluation (2010-2012)**
Reported kWh Savings*	1,140,132	1,025,815	510,411	2,676,358
Evaluated kWh Savings	796,475	716,615	493,914	2,007,003
Realization Rate	70%	70%	97%	75%

*Reported kWh savings values were estimated from Rocky Mountain Power databases

**Totals may not represent summation of column values due to rounding.

Refrigerator Replacement Savings Approach

Refrigerator replacement savings were calculated by subtracting the average consumption of the energy efficient replacement unit from the average consumption of the existing (baseline) unit. This information was provided by UTDHCD, and was based on the refrigerator metering data provided by the individual agencies. Utah’s weatherization protocols require metering every refrigerator for more than 72 hours, providing a highly reliable estimate of average consumption. UTDHCD’s calculations of usage of the efficient unit were based on the size and type of refrigerators replaced by the program. A weighted average of installed units was used to calculate average usage of the efficient unit replaced through the program. Using this approach, the average energy savings was determined to be 721 kWh, 833 kWh, and 879 kWh per refrigerator installed during program years 2010, 2011, and 2012, respectively. Table 15 provides a breakdown of the reported and evaluated refrigerator-specific savings for program years 2010-2012, as well as calculated realization rates.

Table 15. Refrigerator-Specific Savings (at Site) and Realization Rates for Program Years 2010-2012

Program Year	2010	2011	2012	Total Evaluation (2010-2012)**
Reported kWh Savings*	747,450	613,060	297,660	1,658,170
Evaluated kWh Savings	356,694	341,681	289,227	987,602
Realization Rate	48%	56%	97%	60%

*Reported kWh savings values were estimated from Rocky Mountain Power Annual Report quantities

**Totals may not represent summation of column values due to rounding.

Savings for Additional Measures

Deemed values for furnace fans, “duct sealing/insulation,” and “insulation and/or windows” categories per unit savings were used from Rocky Mountain Power’s 2011-2012 program database. Deemed values were used because the number of cases and percentage contribution to energy savings was very small (3%) due to the very small number of electrically heated homes in the Utah service territory. The exact quantity of the measures installed per dwelling was not reported in the Rocky Mountain Power database; therefore, deemed measures from Rocky Mountain Power’s Annual Reports were used. Database improvements have been made between the 2010 and 2011 program years. Future improvements in tracking that include details of measure installation will make it possible for the evaluator to report on evaluated savings for these measures.

Table 16. Additional Deemed Measure Savings

Measure Type	Per Unit kWh Energy Savings*
Furnace Fan	155
Duct Sealing/Insulation	193
Insulation and/or Windows	2,153

*Deemed values of kWh savings were determined by Rocky Mountain Power to be the per unit savings

Energy Savings Results and Conclusions

The impact analysis determined kWh savings and realization rates for the 2010, 2011, and 2012 program participation years. Smith & Lehmann verified the accuracy of program databases and performed an evaluation of per-unit-savings and adjusted gross savings. This section provides an overview of the results of the impact analysis

- ◆ Rocky Mountain Power did not include a Fuel Flag for the three program years included in this study, 2010-2012. However, this problem has been resolved and fuel type is now reported by agencies to Rocky Mountain Power. The new database allows for entry of a specific electric heating type, such as baseboard, and if the home is not electrically heated, “Non Electric” is entered.

- ◆ Overall, savings from program participation are evaluated at 3,113,210 kWh for all three program years, 2010-2012. This amounts to 70% of planned participant energy savings of 4,435,686 kWh, as reported by Rocky Mountain Power across the 2010, 2011, and 2012 program years (See Table 17). The realization rate for this program is 70%. A breakdown of the program savings by year and the respective realization rates are provided in Tables 18-20.

Table 17. Program Savings (at Site) by Measure 2010-2012

Measure	Reported Savings (kWh)	Evaluated Savings (kWh)	Gross Realization Rate
CFLs	2,676,358	2,007,003	75%
Refrigerator Replacements	1,658,170	987,602	60%
Weatherization Measures*	101,158	118,605	117%
Total	4,435,686	3,113,210	70%

*Weatherization measures include roughly 3% of total measures installed and included furnace fans, duct sealing, wall, ceiling, and floor insulation and/or windows categories.

Table 18. Program Savings (at Site) by Measure 2010

Measure	Reported Savings (kWh)	Evaluated Savings (kWh)	Gross Realization Rate
CFLs	1,140,132	796,475	70%
Refrigerator Replacements	747,450	356,694	48%
Weatherization Measures*	30,130	30,535	101%
Total	1,917,712	1,183,704	62%

*Weatherization measures include roughly 3% of total measures installed and included furnace fans, duct sealing, wall, ceiling, and floor insulation and/or windows categories.

Table 19. Program Savings (at Site) by Measure 2011

Measure	Reported Savings (kWh)	Evaluated Savings (kWh)	Gross Realization Rate
CFLs	1,025,815	716,615	70%
Refrigerator Replacements	613,060	341,681	56%
Weatherization Measures*	38,750	54,441	140%
Total	1,677,625	1,112,737	66%

*Weatherization measures include roughly 3% of total measures installed and included furnace fans, duct sealing, wall, ceiling, and floor insulation and/or windows categories.

Table 20. Program Savings (at Site) by Measure 2012

Measure	Reported Savings (kWh)	Evaluated Savings (kWh)	Gross Realization Rate
CFLs	510,411	493,914	97%
Refrigerator Replacements	297,660	289,227	97%
Weatherization Measures*	32,278	33,629	104%
Total	840,349	816,769	97%

*Weatherization measures include roughly 3% of total measures installed and included furnace fans, duct sealing, wall, ceiling, and floor insulation and/or windows categories.

PROCESS EVALUATION

Rocky Mountain Power's Low-Income Weatherization Program in Utah is directed towards improving energy efficiency and thereby reducing both energy usage and energy bills for the homes of qualifying low-income customers.²³ Rocky Mountain Power's effort is coordinated with the federal/State Weatherization Assistance Program (WAP) to provide energy savings improvement measures at no cost to the low-income households. This government contribution to this program is funded and coordinated by the United States Department of Energy (USDOE) and United States Department of Health and Human Services (USDHHS), and administered by the Utah Division of Housing and Community Development (UTDHCD). Rocky Mountain Power contracted with Smith & Lehmann Consulting, Inc. to conduct a process and impact evaluation for program years 2010, 2011 and 2012. The following process evaluation assesses program delivery and opportunities for improvement.

Rocky Mountain Power's contract for weatherization services is held by the State (UTDHCD). The State Program Manager oversees the administration of weatherization services provided by eight contracted agencies. Thus, weatherization services in the State of Utah are provided by eight separate agencies; one community action agency, five associations of local governments, and two additional weatherization program entities, all of which will be collectively referred to as "subgrantee agencies," "subgrantees," or "agencies" within this report.

UTDHCD and its agencies are the most important entities in this system because the agencies directly deliver the weatherization services to residential low-income customers and UTDHCD provides administration, policy direction and quality control. UTDHCD is also the link upwards to the USDOE and the USDHHS, which provide basic funding and guidance. One of the great advantages of utility cooperation with the federal/State WAP is that the WAP provides systematic policy, technical, and health and safety standards and helps ensure the availability of top-level training and certification of weatherization specialists and crews. From a utility perspective, coordination of utility support for low-income weatherization with WAP is a *best practice* because the substantial federal and State contributions are viewed as leverage. Similarly, the USDOE can provide the UTDHCD and its agencies a small amount of additional federal funding based on the leverage of the contribution provided by Rocky Mountain Power.²⁴ UTDHCD was awarded \$25,000 of additional funding in both 2011 and 2012 program years; however, no additional funding was awarded based on leveraging for the 2010 program year.

Agencies function as the coordination center by providing the weatherization specialists and crews to deliver the direct services. Each agency leverages funding from Rocky Mountain Power, the USDOE, the USDHHS, and other sources, to achieve comprehensive weatherization of the homes of low-income customers.

²³ **Energy Efficiency** - The use of less energy to provide the same or an improved level of service to the energy consumer; or the use of less energy to perform the same function.

²⁴ Coordinating utility and public program low-income weatherization program efforts can provide the most cost-effective low-income weatherization programs. Hill, Lawrence J. & Marilyn A. Brown, "Estimating the Cost Effectiveness of Coordinated DSM Programs." *Evaluation Review*, Vol. 19, No. 2, April 1995, Pp. 181-196.

Program Measures

Rocky Mountain Power's weatherization program focuses on the installation of electricity-saving and cost-effective measures, and is intended to maximize the efficient use of residential electricity requirements of customers that meet income guidelines.²⁵ Measures are categorized as either major or supplemental. Major measures are defined by the Rocky Mountain Power tariff to include ceiling insulation, wall insulation, floor insulation, and window replacement, applicable in dwellings with permanently installed operable electric space heating systems. Supplemental measures targeting other electrical end uses and measures not related to heating can be installed in homes without an electric heating system. For a complete list of measures, see Rocky Mountain Power Electric Service Schedule No. 118, State of Utah.

Program Operations

Agencies employ energy auditors to evaluate a home's energy performance based on certain efficiency indicators. The auditor uses an energy audit software tool chosen from a list of USDOE approved software, identifying energy-saving opportunities and determining the energy-saving measures to install in each home. All agencies follow USDOE WAP guidelines for installation, which require measures to achieve a Savings-to-Investment Ratio (SIR) of 1.0 or greater when funded by USDOE or Rocky Mountain Power sources. However, Low Income Home Energy Assistance Program (LIHEAP), a program funded by USDHHS, allows for installation of certain measures deemed beneficial to health or safety even when the SIR is less than 1.0.

Auditors address the health and safety of the home, for example, by adjusting for proper ventilation and providing other necessary health and safety improvements and by completing certain home repairs that are necessary to install the weatherization measures. Health and safety and repair work is simply a practical reality -- a necessary activity when working with the low-income portion of the State housing stock. It extends the life of the housing stock and keeps homes habitable. This part of the work effort contributes to project costs but generally not directly to the energy savings goals of each weatherization project.²⁶

After completing work on a home, the agencies submit invoices and documentation to Rocky Mountain Power and USDOE through UTDHCD. Rocky Mountain Power pays a rebate of 50% of the installed cost of all major measures and supplemental measures, and 50% of the cost related to refrigerator testing, as required by the Rocky Mountain Power tariff. Rocky Mountain Power also pays a reimbursement for administrative costs based on 10% of Rocky Mountain Power's rebate on installed measures. Additional measure reimbursement schedules include CFLs, which are reimbursed at 100% of purchase cost, and furnace fans, which are reimbursed at \$100 per home and are included in the installation of an efficient gas furnace.

²⁵ Rocky Mountain Power Electric Service Schedule No. 118, State of Utah, Low Income Weatherization, October 9, 2012

²⁶ In some cases, for example very old homes, the health and safety and repair costs may be too great, resulting in not treating a home (this is termed a "walkaway" or a "deferral").

Methodology

For the process evaluation, data collection consisted of telephone surveys of a sample of program participants, a discussion with Rocky Mountain Power's Weatherization Program Manager, a telephone interview with the Program Manager from the UTDHCD, and telephone interviews with the Directors of each of the eight different weatherization agencies in Utah.

◆ Participant Survey

For the participant surveys, Smith & Lehmann Consulting sampled Utah residents who received WAP services for which Rocky Mountain Power provided full or partial payment. The purpose of this telephone survey was to provide client-level data documenting and aiding in measurement of cost-effectiveness (*e.g.* providing data useful for approximation of an In-Service Rate), customer satisfaction, verification of program services, and opinions on various program components.

◆ Sample Selection

Clients who received services in 2010 or 2011 were expected to have greater recall bias than those who received services in 2012. This recall bias is typically exacerbated among the elderly, who usually constitute at least one-third of low-income energy program recipients. A sample of clients from all three years would therefore be subject to low reliability of data for at least two-thirds of the sample. Therefore, sampling was planned to be restricted to 2012 participants. There is a slight risk that the clients who received services in 2012 will not be fully representative of the clients who received services in 2010 or 2011. However, this risk is mitigated by the reduced recall bias when sampling is restricted to measures installed in 2012. The evaluation team completed 67 participant telephone surveys in July 2014, achieving 10% precision and 90% confidence. The sample for client surveys was randomly obtained from homes with measures installed in the most recent program year, 2012. Sampling was completed with replacement of participants.

◆ Stakeholder Interviews

Stakeholder interviews were conducted to provide qualitative data documenting processes, funding sources, and issues related to Utah's WAP. These interviews addressed evaluation questions regarding program participation and waiting lists. Program managers were selected from each of the following agencies, as well as with the Director of UTDHCD.

- Bear River Association of Governments
- Tri-County Weatherization
- Salt Lake Community Action Program
- Housing Authority of Utah County
- Six County Association of Governments
- Five County Association of Governments
- Uintah Basin Association of Governments
- Southeastern Utah Association of Local Governments

Process Evaluation Findings

Participant Survey

The client survey achieved 67 completed participant surveys and six incompletes out of 186 clients reached, yielding a 36% cooperation rate. Table 21 reports the target and achieved survey samples as compared to the total population. Ninety-seven respondents refused to participate or were not home at the time the interviewer called. Sixteen interviews could not be completed because the respondent was a Spanish-speaker. Out of the 540 phone numbers called, 141 were invalid, disconnected or the wrong number, while there was no answer from an additional 212 numbers. This proportion of invalid numbers is typical of surveys among the low-income population owing to frequent changes in residence, the general shift away from landline phones with a fixed phone number to cellular phones, and more frequent changes of phone numbers. This problem is exacerbated by the two-year lag time between weatherization and survey. The client survey protocol can be found in the Appendix of this report.

Table 21. Target and Achieved Survey Samples for Participant Survey

Total 2012 Population	Viable Population	Target Completes	Desired Precision at 90% Conf.	Achieved Completes	Achieved Precision at 90% Conf.
540	186	67	10%	67	10%

Survey response rates and cooperation rates were calculated according to the American Association for Public Opinion Research (AAPOR) standard definitions. For the purpose of this evaluation Smith & Lehmann calculated Response Rates (RR) following RR1 and RR2 AAPOR calculations.²⁷ These response rates consider all customers attempted, whether or not they could be reached. RR1 is the minimum response rate, while RR2 counts partial interviews as respondents. Cooperation rates represent the proportion of all cases interviewed based on all eligible customers who could be contacted. These are household-level cooperation rates based on all households that could be contacted. Low response rates are typical for current DSM programs, and for many household surveys response rates have been steadily declining for at least the past two decades.²⁸

Table 22. AAPOR Response and Cooperation Rates

RR1	RR2	COOP1	COOP2
7%	8%	36%	39%

²⁷ American Association for Public Opinion Research provided calculations for Response Rates (RR1 and RR2) and Cooperation Rates (COOP1 and COOP2). The American Association for Public Opinion Research. 2011. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. 7th edition. AAPOR. Pg. 44.

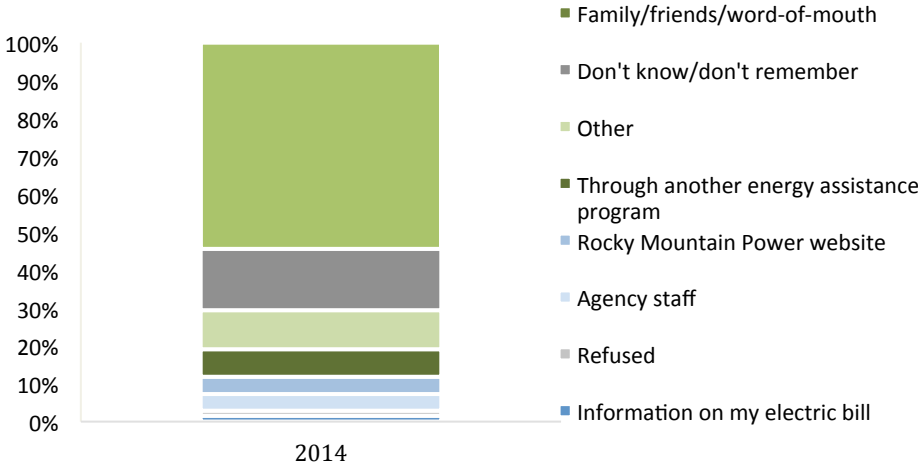
²⁸ National Academy of Sciences. 2013. *Nonresponse in Social Surveys: A Research Agenda*, pg.1. Available at: http://www.nap.edu/openbook.php?record_id=18293&page=1

Program Awareness

Interviewers asked participants how they heard about the program. Almost half, or 37 out of 67 participants (55%) said that they heard about the program from family, friends, or word-of-mouth. Four participants indicated that they heard about the program directly from the Rocky Mountain Power, either through the website (three participants) or from information on their electricity bill (one participant). Seven participants learned about the program through “other” sources. These sources varied across respondents, and included mention of a VA representative, the County Fair, church, and information on TV.

While 55% of participants heard about the program from family and friends, there was less awareness of the program’s funding source: 42% (28 out of 67) of participants had no knowledge of funding sources and 22% (15 out of 67) indicated they simply did not know or remember. Some participants responded with the agency that provided the services to their home (21% or 14 out of 67), but only five participants (7%) identified Rocky Mountain Power or the “power company” as the funding source. Seventy-six percent (76%) found it easy to apply for the weatherization program, while only 3% found it difficult. However, 40% reported wait times for weatherization services in excess of six months.

Figure 1. Program awareness – How Rocky Mountain Power clients heard about the program



Installation Verification

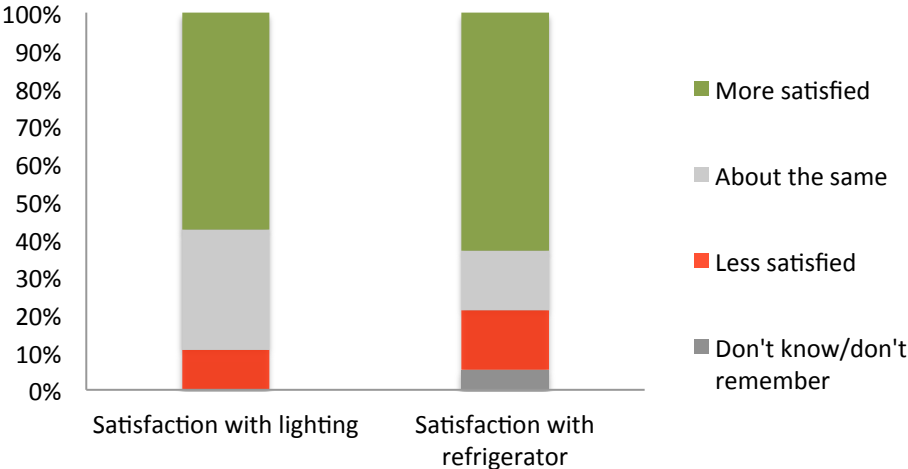
Most participants verified that they received the services indicated in Rocky Mountain Power’s records (87% or 58 out of 67). Seven participants indicated they did not receive light bulbs and/or a new refrigerator; however, they did receive other weatherization services and phone interviews were continued.

When a home has been weatherized typically a particular individual will have conducted the primary interaction with the weatherization agency. This person may or may not have been available for the phone survey; however, considerable effort was made by Smith & Lehmann Consulting to screen participants for accuracy of responses and level of engagement in the program/survey.

Measure Satisfaction

Clients were asked about their satisfaction with the lighting in their home and/or their new refrigerator, depending on which measure or mix of measures they received. Figure 2 shows that over half of participants were more satisfied with both their new lights and/or new refrigerators (57% or 33 out of 58 for lighting, 63% or 12 out of 19 for refrigerators). For Figure 2, the color green indicates a positive result, red as negative, and light gray as neutral.

Figure 2. Client satisfaction with services



Light Bulbs

Seventy-five percent (75%) of participants indicated that agency staff installed light bulbs directly into their fixtures (50 out of 67). Twenty-four participants (42% of bulb recipients) said that they have replaced some of their light bulbs, averaging almost four bulbs each. Seventeen bulb recipients (25%) installed new CFLs, three (5%) replaced the CFLs with LEDs, three (5%) replaced with incandescent bulbs, and two (3%) replaced with halogen light bulbs. The majority of participants who replaced bulbs indicated that they did so because the CFLs provided by the program burned out (33% of CFL recipients). Despite considerable efforts to minimize recall bias of participants, concerns remained within the evaluation team in regards to the accuracy of survey responses. Smith & Lehmann Consulting was unable to verify whether the bulbs that failed were those installed by Rocky Mountain Power’s WAP. Bulb failures could be due to a quality problem with the bulbs supplied by Rocky Mountain Power, or they could have been bulbs purchased and installed by the client.

After the survey was already underway, Smith & Lehmann added a question asking participants whether they have purchased and installed any additional energy-efficient light bulbs after receiving the CFLs from the agency. Fewer than half (43%) of the 50 participants asked this question indicated that they did purchase and install additional light bulbs. Fifteen of these participants indicated that they purchased CFLs (83%) while three (17%) purchased LEDs. This may indicate a change in behavior due to exposure and education of the program. However, more research on customer behavior prior to weatherization would be needed to confidently report that this represents a significant change.

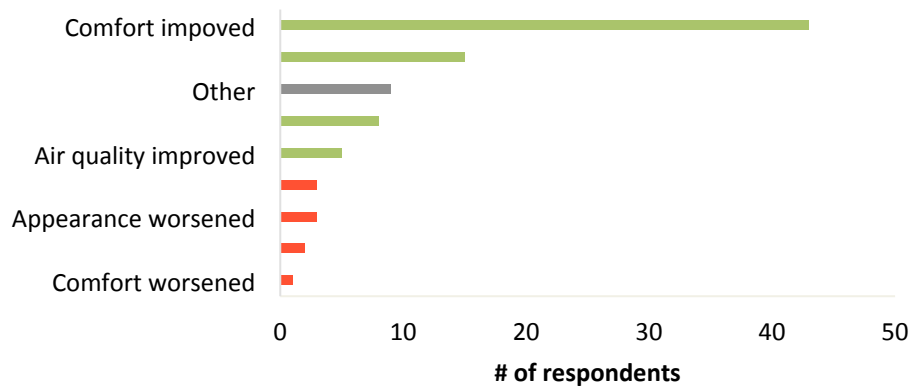
Refrigerator

Clients were asked about their satisfaction with their new refrigerator. Over half of the participants indicated that they were more satisfied with it compared to their old model (63% or 12 out of 19). This survey did not assess specific reasons for dissatisfaction with refrigerators. It is possible that general functions (*e.g.*, ice-maker or water dispenser features) of the original unit would not be duplicated in the replacement unit provided by the program. This could cause circumstantial dissatisfaction to be experienced by the participants.

Energy Information

Fifty-eight participants (87%) reported changes in their homes following weatherization. A majority of respondents (64%) reported improved comfort (*i.e.* cooler in the summer, warmer in the winter) (Figure 3). Slightly more than half of participants (58%) indicated their electric bill is more affordable after the completion of weatherization. Nine respondents (16%) provided interviewers with other benefits, such as experiencing less noise in their home owing to better windows or better doors on the water heater. Many of the participant's homes are gas heated, and they are likely to have received other non-electric weatherization measures paid for by other entities. Therefore, it is difficult to determine the degree to which participants are noticing effects of the Rocky Mountain Power-funded or non-electric weatherization measures.

Figure 3. Self-reported changes in clients' homes after weatherization measures completed



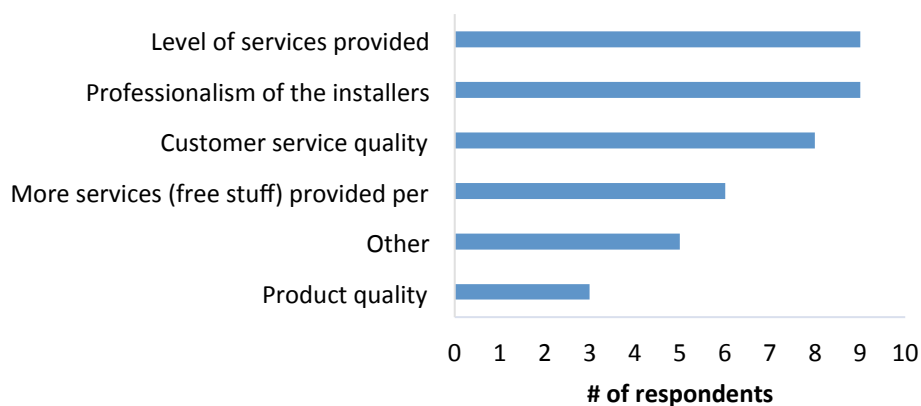
Participant Perspectives on Energy Efficiency

Participants were asked their opinions on energy usage and efficiency. When asked whether it was important or unimportant to save energy by reducing usage in the home, 91% of participants believed it was very important to save energy. Additionally, most participants (87%) strongly agreed that most people have things that could be done to improve the energy efficiency of their home.

Program Delivery and Satisfaction

Almost all clients (97%) would recommend the weatherization program to friends and family with two participants (3%) unsure whether they would recommend the program. Twenty clients (30%) believed that there could be improvements to the program. These participants indicated that professionalism of the installers, the level of services provided, and customer service quality were in most need of improvement (Figure 4). It is unclear whether these comments are in reference to Rocky Mountain Power’s program or to other programs.

Figure 4. Customer suggested program improvements



The time delay between measure installation and survey resulted in challenges in obtaining representative data. Challenges arose from disconnected phone numbers, participant inability to remember details of the weatherization installation, and possibly confusion of Rocky Mountain Power’s weatherization program with other home improvement programs.²⁹

Given that a variety of programs may be available to low-income households, the two-year lapse between services and survey increases the likelihood that participants will confuse services received by Rocky Mountain Power representatives with another entity’s program. Owing to these challenges and to our concerns about the reliability of respondent recall across a two-year gap, we recommend that Rocky Mountain Power adjusts the timing of surveys. It is recommended that client surveys be conducted annually to improve recall and survey results, ideally within six months of installation. This would greatly increase the ability to reach all members in the target population and increase the reliability of responses. Moreover, a two-year lapse provides minimal opportunity to either verify that there is a problem or to implement quality improvements that rectify the situation. Annual surveys will also allow Rocky Mountain Power to quickly assess whether there are actual service quality or CFL burnout problems and to respond quickly.

²⁹ One participant complained that “they overcharged for the services”. Since weatherization services were free for low-income participants, it is probable that this participant was thinking of other services he had received.

Stakeholder and Agency Interviews

Representatives of all Utah agencies were interviewed for the evaluation. The eight agency interviews followed a similar protocol, while the interview with the Director of UTDHCD followed a similar, yet shortened, pattern of questions. The agency interview protocol can be found in the Appendix of this report.

◆ Program Consistency

All agency administrators agreed the program's primary goals are to save energy and help reduce participants' utility bills. Due to the regulatory structure in Utah, all agencies operate under statewide guidelines, which help to streamline program processes and align agency practices across the State.

For example, the State of Utah initiated walkaway or "deferred service" guidelines to ensure that weatherization services and assistance are delivered safely and effectively. Utah's deferral policy and guidelines are provided in the Appendix of this report. Cases of walkaways seem to be rarer in this State than in others, and typically involve cases where the home is in need of extensive structural repair. Some agencies (such as Bear River Association of Governments) have a separately funded home emergency program that helps with minor repairs before the weatherization takes place on the home. If an agency cannot help a client, at minimum, they will be referred to other programs. Most agencies are adamant about weatherizing every home possible.

◆ Link Between WAP and LIHEAP

All Utah agencies are partnering with the Home Energy Assistance Target (HEAT) program, administered by UTDHCD to bring in clients and streamline their qualification process.³⁰ HEAT provides bill payment assistance to income eligible households with federal funds. All Utah weatherization agencies will accept a HEAT certificate as proof of income eligibility, and prefer that clients seek this method of qualification because it significantly reduces their own internal processing necessary to determine household eligibility.

The HEAT program qualifies participants based on total household income level at or below 150% of the Federal Poverty Level (FPL), in contrast with USDOE guidelines for weatherization, which allow for household income to be at or below 200% of the FPL.

LIHEAP (equivalent to HEAT program in Utah) has a highly streamlined income qualifying system for participants up to 150% FPL. In order to maximize service provision, capitalize on an existing system, and help clients obtain services from multiple funding sources, agency staff for Rocky Mountain Power's program refer potential applicants to HEAT offices to become certified through that process.

³⁰ Home Energy Assistance Target (HEAT). <http://jobs.utah.gov/housing/seal/heat.html>

HEAT certification can help applicants with incomes under 150% FPL access additional services. Applicants with incomes between 151% and 200% FPL are not helped by this additional step. Essentially, they must make three agency contacts in order to have their applications processed, rather than having it completed at the first contact. This introduces program access barriers for households within the upper eligibility range.

While income eligibility determination is outside the scope of Rocky Mountain Power's influence, it does have an impact on whether Rocky Mountain Power's customers all have equal access to weatherization under USDOE guidelines. Since HEAT's certification system is already well-established, UTDHCD may wish to explore whether it is feasible for the HEAT certifiers to take a greater role in centralized eligibility processing. An additional certification role could include flagging a household as "ineligible for HEAT, eligible for services up to 200% FPL." Such a flag would eliminate the necessity for the customer and the weatherization program to go through an additional certification process for those clients within 151% to 200% of FPL. This function could potentially be integrated into the new statewide database. Not only would this be a more streamlined use of resources across the State, it would also prepare agencies for use of the centralized reporting system planned for 2015.

◆ **Impact and Adequacy of Rocky Mountain Power Funding**

Utah agencies do not typically exhaust Rocky Mountain Power funding within each program year due to a low number of electrically heated homes in the area. According to the program manager at UTDHCD, the program serves as few as five electrically heated homes per year. The remainder of participant's heating sources is natural gas, propane, and/or other fuels.

◆ **Impact of American Recovery and Reinvestment Act**

Increased weatherization funding from the American Recovery and Reinvestment Act (ARRA) allowed for the completion of more homes, and investment in improvements to the organization and implementation of the existing program in Utah. During the 2010 and 2011 program-years, agencies reported difficulties with hiring and retaining the necessary staff to meet the increased volume of participants brought on by a push to spend funding and increased public awareness of the program. All agencies reported doubling the number of homes weatherized per year during the major ARRA funding years, 2009 and 2010. By 2011 funding began to drop off, and as reported by the Utah Department of Workforce Services (UTDWS), will be completely spent down by the UTDHCD by FY2014 (July 1 to June 30).³¹ The number of homes weatherized each year has also decreased following the decrease in funding.

During 2010 and 2011, a larger workforce warranted a larger training facility, which prompted the State of Utah to build a new training center, the Intermountain Weatherization Training Center in Clearfield, Utah. While many positive changes came from ARRA, many agencies also

³¹ Utah State Legislature, Issue Brief. January 30, 2014. *ARRA Funds Approval- Department of Workforce Services*. 2014 General Session, Social Services Appropriations Subcommittee

found it difficult to manage the funding leap and still spend utility funding.³² A report from the UTDWS states that UTDHCD was approved for \$1,020,000 of ARRA funds in FY2013; therefore, ARRA funding impacted agency operations from 2009 through 2012, encompassing the entire evaluation timeframe. This sudden inflated funding provided opportunities for better training and increased capacity, but also created management challenges in processing the large number of homes within the short timeframe and temporary staffing shortages. However, despite the challenges, most agencies felt confident in their completion of ARRA, and indicated weatherization has leveled off and is currently operating smoothly at pre-ARRA levels.

◆ **Provision of Energy Education**

The previous evaluation indicated that the State of Utah developed an energy education-training curriculum to implement at the new training center. Agencies are now required to provide specific education as well as basic information on behavioral changes that reduce energy use in their homes. During this round of interviews, all agency administrators mentioned participant education as an important piece of the program. While this was not a specific question in the interview process, it appears the education policy is being implemented.

◆ **Prioritization and Waitlists**

All agencies are following a priority list process that is set by the State to follow USDOE guidelines. Points are assigned to weatherization participants in typical need-base categories (such as elderly, disabled, and presence of children in the home) as well as for fuel type, energy user percentage, and participant energy burden percentage. Points are also awarded to every participant after each 6-month period on the waitlist.³³ A complete outline of Utah's weatherization priority rating system is provided in the Appendix of this report. It is standard practice to place customers on the waitlist as soon as they become eligible. All Utah agencies keep a single weatherization waitlist that consists of both gas and electric participants. Some agencies update their list on a 6-month basis, while five of the eight agencies update their list every month or less. Half of the agencies' waitlists are between 150 and 196 participants, while the remaining waitlists are around 100 each, with the exception of one rural agency with a waitlist of only six participants. Despite the differences in waitlist volume, most agencies report a timeframe of 12-16 months to weatherize everyone on the waitlist. This timeframe is likely due to variations in agency capacity, size of service areas, and relative need of the low-income housing stock. Only two agencies report weatherizing homes within the one-year term of HEAT certification, while all other agencies report the need to re-certify participants before completing the weatherization process. Since agencies compile all weatherization into a single waitlist it is difficult to determine the relative wait times for service experienced by Rocky Mountain Power customers.

³² Since ARRA was an economic stimulus program, agencies were required by law to spend out funding by certain dates. Especially with initial staffing shortages while training was being initiated this made it temporarily difficult to use utility provided resources that would otherwise have been used during this limited period.

³³ State of Utah, Department of Workforce Services. June 12, 2014. *Utah Weatherization Assistance Program Guidelines*. Section C.10.a. Available at http://jobs.utah.gov/housing/wap/documents/Utah_Weatherization_Guidelines_6-12-2014.pdf

◆ **Direct Install of CFLs**

Utah’s WAP Guidelines list CFLs under Operation and Maintenance Items (O&Ms), which agencies are encouraged to make every effort to install when possible. All agencies in Utah reported direct-installation of CFLs during the 2010, 2011, and 2012 program years. One agency reported issues with direct installation by the program’s current weatherization crews. In this case, Tri-County Weatherization has encountered recent issues with CFL direct installation by crews (e.g., clients wanting to clean fixtures upon replacement, needing to repair broken fixtures, disabled wiring, etc.). This practice did not affect CFLs installed over the 2010-2012 evaluation period; however, this may need to be accounted for in future evaluations.

◆ **Refrigerator Replacement Guidelines**

Refrigerator replacement guidelines are consistently applied across the State. Every refrigerator is tested for a minimum of 72 hours, and results are inputted to the audit software to determine the SIR (standard, as approved by USDOE). If the SIR is greater than 1, the agency replaces the refrigerator. Most agencies contract out the replacement of the refrigerator and some check to make sure the distributor properly recycles the old unit. The recycling process is typically contracted in the price of the new refrigerator. Most agencies do not report any difficulties or issues working with the State contractors. Some agencies purchase and store their own refrigerators. In this case, the old refrigerators are recycled and disposed of properly by the agency.

◆ **Invoicing and Payments**

Rocky Mountain Power began paying for 100% of CFL costs upfront. Each agency is allotted an inventory of CFLs to use in homes of Rocky Mountain Power customers. Agencies are required to document CFLs installed and report this information in the invoices submitted to the State. This process is still in place and is effectively supplying agencies with an adequate number of CFLs.

In order to receive payments, agencies submit monthly-invoices to the State. The State compiles data to submit the statewide invoice to Rocky Mountain Power, and the State of Utah received payments from Rocky Mountain Power based on their monthly-invoices. UTDHCD did not report any issues in receiving payments from Rocky Mountain Power.

◆ **Reporting and Monitoring**

Program reporting to Rocky Mountain Power occurs in conjunction with invoicing, as well as submitting a Building Weatherization Report (BWR) to the State for each home the agency performs work on. The BWR document includes:

- Report number
- Report County
- Date Submitted
- Customer name and address
- Agency information and job number
- Work start date

- Home occupant (owner versus renter)
- Occupant Type (disabled or children under 18)
- Percent of Poverty
- Building type (single-family, multifamily, manufactured home)
- Primary heat type
- Primary fuel vendor
- Electrical vendor (Rocky Mountain Power Project)
- Building improvements (measures installed, number of CFLs)
- Account number(s)
- Blower door results
- Material and labor costs
- Weatherization Supervisor
- Completion date

Agencies are also required to submit a one-page addendum to Rocky Mountain Power for each completed home. The addenda prepared for Rocky Mountain Power includes:

- Customer name and address (and owner's name and address in case of rental)
- Account number
- Home occupant (owner versus renter)
- Dwelling type (single-family, multifamily, manufactured home)
- Measures installed
- Material, labor, and total cost per measure
- Rocky Mountain Power rebate for each measure
- Agency administrative fee billed to Rocky Mountain Power
- Total reimbursement requested
- kWh savings estimated per measure and for total job
- Total cost of all measures.

The State of Utah's quality control process requires reviewing a minimum of 5% of homes to verify compliance with USDOE; however, UTDHCD typically exceeds this requirement by verifying between 10% and 15% of homes per year. Additional federal reporting was required with ARRA funding. UTDHCD hired additional staff to meet reporting requirements. New regulations, after federal assessment of ARRA, will require all homes weatherized after July 1, 2015 to be inspected by a Quality Control Specialist.

◆ **Program Achievements and Lessons Learned**

All agencies reported that the program was operating smoothly from 2010-2012. The most notable change during the evaluation period was the closeout of the ARRA support. Due to the decrease in funding levels, beginning in FY2011, agencies were forced to lay off many of the staff hired to handle the increased capacity brought about by the temporary ARRA funding. Despite management challenges, the weatherization program in Utah continues to serve a large number of homes, while improving its process, outreach, and operations.

Process Evaluation Conclusions

The participant survey and agency interviews provided a comprehensive overview of Rocky Mountain Power's weatherization program in the State of Utah. Overall program operations are running smoothly and operating in compliance with USDOE regulations.

◆ Client Survey Results

The results of the client survey suggested some possible CFL burnout issues. However, the gap of two years between measure installation and client survey has made it impossible to verify whether clients are referring to Rocky Mountain Power bulbs or services. In the future, conducting surveys within six months of weatherization services will enable Rocky Mountain Power to confidently determine whether services and products meet the utility's standards and to proactively respond to any client concerns that may be revealed.

◆ Rocky Mountain Power Recognition

Client survey results indicate 7% of participants remember or recognize that Rocky Mountain Power contributed to the weatherization work they received. Rocky Mountain Power should consider whether it is important that customers recognize Rocky Mountain Power's contribution to the weatherization services received. If so, Rocky Mountain Power should consider providing a branded item concurrently with weatherization services to increase customer recognition.

◆ Aligning WAP with HEAT (LIHEAP)

The WAP program requires customers to qualify at 200% poverty level, while the HEAT program sets the threshold at 150% poverty level. Therefore, some customers who qualify under the WAP program fall between the 150% and 200% poverty cutoffs, and may be subject to funding restrictions. The large majority of homes are not electrically heated, and would require leveraging of funds to complete weatherization. Depending on the level of USDOE funding, which is currently limited, this situation can create a backlog of participants when no USDOE funding is available for homes that are at the top of the waiting list. This scenario could also contribute to under-spending of Rocky Mountain Power funding, and hinder the program from reaching potential gains in energy efficiency.

This partnership is beneficial to both parties: the HEAT program certification streamlines the application process and the WAP helps clients to decrease their energy burden by weatherizing their home. This decreases not only the energy burden to the client but also the burden placed on the HEAT program to help that client over future heating seasons.

Qualifying participants along with LIHEAP efforts and using HEAT certificates as proof of eligibility, simplifies qualification effort for the agencies; however, Rocky Mountain Power

should be aware that some qualifying customers whose incomes place them between 151% and 200% of the FPL may not receive assistance.³⁴

◆ **Refrigerator Replacement Guidelines**

Rocky Mountain Power changed the required refrigerator measurement practice, effective August 1, 2014, to allow agencies to utilize a database of deemed values to determine replacement, instead of testing each one. This practice will likely reduce the time and money spent to determine refrigerator replacement, particularly decreasing the burden on rural agencies that previously were required to test every refrigerator. Eric Jorgensen, Housing Authority of Utah County states, “It takes an enormous amount of manpower to get the job done.” While this requirement did not come into effect until post-2012 (after the program years under evaluation), it is assumed to benefit the current program and effects on the frequency of refrigerator replacements can be assessed in future evaluations.

Another challenge is that kWh limits can hinder replacements of certain refrigeration units. Salt Lake Community Action Program reported that there is a problem with installing certain sizes of refrigerators. State weatherization guidelines place a limit on the Cubic-Foot (CF) size of the refrigerator depending on how many persons live in the home. If a family of three has an oversized freezer because they live in a rural area they will likely turn down a replacement refrigerator because of decreased capacity. This issue may hinder the program from replacing the maximum number of refrigerators and realizing potential energy savings.

◆ **CFL Installations**

All weatherization agencies in Utah reported direct installation of CFLs over the evaluation time period. However, due to the indication of recent policy changes associated with direct-installation by weatherization crews, this may need to be addressed in future evaluations.

◆ **Rocky Mountain Power Funding**

Typically subgrantee agencies do not spend all available Rocky Mountain Power funding each year. These funds could be utilized by including additional measures such as repairs that would enable installation of energy efficient lighting fixtures. This would add support to dealing with the repair problem in the low-income housing stock as a program barrier. Smith & Lehmann Consulting recommends that Rocky Mountain Power include repairs that support installation of energy efficient measures as an efficient use of the unspent funds that would allow for weatherization of a larger number of eligible clients.

³⁴ Subgrantee agencies will tell customers to first qualify under HEAT and bring back an approved certification from HEAT before processing will begin for weatherization. However, if a customer goes to the HEAT office (usually, but not always in the same building, depending on location) and fails to qualify because they fall within 151%-200% of the FPL, the customer must return and insist on inclusion. At that point, the agencies are supposed to include them in processing for weatherization. The problem is mitigated to some extent because the income assessment for HEAT is more inclusive than the rules for weatherization income assessment. Still, this is a potential barrier to service.

COST-EFFECTIVENESS

Rocky Mountain Power's Low-Income Weatherization Program in Utah is directed towards improving energy efficiency and thereby reducing both energy usage and energy bills for the homes of qualifying low-income customers.³⁵ Rocky Mountain Power's effort is coordinated with the federal/state Weatherization Assistance Program (WAP) to provide energy savings improvement measures at no cost to the low-income households. This government contribution to this program is funded and coordinated by the United States Department of Energy (USDOE) and United States Department of Health and Human Services (USDHHS), and administered by the Utah Division of Housing and Community Development (UTDHCD). Rocky Mountain Power contracted with Smith & Lehmann Consulting, Inc. to conduct a process and impact evaluation for program years 2010, 2011 and 2012. The impact evaluation assesses energy impacts and inputs to calculating program cost-effectiveness.

Cost-effectiveness was assessed using five different approaches. Smith & Lehmann Consulting provided inputs to the Cost-effectiveness calculations to Cadmus, who performed the calculations of Net Benefits, Benefit/Cost Ratio, and Levelized Cost for each of the program years and for the total evaluation period.

Cost Tests

Cost-Benefit analysis was conducted Cadmus using the five specified tests (PacifiCorp Total Resource Cost (PTRC) test, Total Resource Cost (TRC) test, Utility Cost Test (UCT), Ratepayer Impact Measure (RIM), and the Participant Cost Test (PCT). The inputs provided by Smith & Lehmann to evaluate cost-effectiveness are shown in Tables 24-26 below.

Cost-effectiveness perspectives of the five tests include:

- ◆ **PacifiCorp Total Resource Cost Test (PTRC):** This test incorporates program costs and benefits from the perspectives of both Rocky Mountain Power and Rocky Mountain Power Customers combined. Benefit measures include the present value of avoided energy, capacity costs, and line losses, plus a 10% adder to represent non-qualified benefits. Cost measures include both the costs to the participant and the utility.
- ◆ **Total Resource Cost Test (TRC):** This test approaches program costs and benefits from the perspectives of both Rocky Mountain Power and Rocky Mountain Power Customers combined. Benefit measures include the present value of avoided energy, capacity costs, and line losses. Cost measures include both the costs to the participant and the utility. In this case the cost to the participant is zero. Utility costs are all program costs including all administration, implementation, and incentives costs associated with funding the program.

³⁵ **Energy Efficiency** - The use of less energy to provide the same or an improved level of service to the energy consumer; or the use of less energy to perform the same function.

- ◆ **Utility Cost Test (UCT):** This test approaches costs and benefits from Rocky Mountain Power’s perspective. Benefits included avoided energy and capacity costs as well as line losses. Costs included all administration, implementation, and incentives costs associated with funding the program.

- ◆ **Ratepayer Impact Measure (RIM):** This test measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by the program. Rates or bills will go up to cover lost revenues. This test indicates the direction and magnitude of the expected change in customer bills or rate levels. Benefits include all avoided energy and capacity costs, as well as line losses. Costs included all Rocky Mountain Power program costs as well as lost revenues.

- ◆ **Participant Cost Test (PCT):** This test approaches costs and benefits from the participants perspective. In this case, the cost to the participant is zero. While benefits would include bill reductions, the result of the test would be undefined due to zero costs. Therefore, the result of the PCT was determined “Not Applicable.”

Table 23. Benefits and Costs Included in Various Tests

Test	Benefits	Costs
PTRC	Present value of avoided energy and capacity costs with 10% adder for non-qualified benefits	Program costs including administration and marketing
TRC	Present value of avoided energy and capacity costs	Program costs including administration and marketing
UCT	Present value of avoided energy and capacity costs	Program costs including administration and marketing; and incentive costs
RIM	Present value of avoided energy and capacity costs	Program costs including administration and marketing; plus the present value of lost revenues
PCT	Present value of bill savings	Participant share of measure costs (zero)
<p>Note 1: The present value of avoided energy and capacity costs includes avoided line losses from reduced energy use by program participants.</p> <p>Note 2: Federal and state coordinated contributions to project costs are treated as external to the calculation.</p> <p>Note 3: Any avoided capital and/or operating cost resulting from measures are included as a participant benefit.</p>		

Assumptions and Results

Cost-effectiveness for 2010 was tested using the 2008 IRP 46% east residential whole house decrement, and the 2011 IRP 35% east residential whole house load factor decrement was used for 2011 and 2012. Tables 24 and 25 include a breakdown of the agency and utility costs, as well as the discount rate, line loss, inflation rate, and residential energy rate. Table 26 lists the annual energy savings for each program year. The discount rate was provided by Rocky Mountain Power as reported in the Utah Annual Reports

for each of the program years: 2010, 2011, and 2012. The Annual Reports also provided the line losses and program costs. Funding for agency administration was greatly decreased in 2012, as compared to the previous program year. This reduction in funding can be attributed the completion of American Recovery and Reinvestment Act (ARRA) funding.

Table 24. Low-income Weatherization Financial Inputs

Parameter	2010 Value	2011 Value	2012 Value
Discount Rate	7.40%	7.17%	7.17%
Residential Line Loss	9.85%	9.85%	9.32%
Residential Energy Rate (\$/kWh)	\$0.0880	\$0.0906	\$0.0998
Inflation Rate	1.90%	1.90%	1.90%

Table 25. Low-income Weatherization Program Costs

Program	Utility Admin	Incentives	Total Utility Costs	Participant Incremental Cost
Low Income Weatherization 2010	\$52,630	\$205,792	\$258,422	\$0
Low Income Weatherization 2011	\$73,548	\$172,018	\$245,567	\$0
Low Income Weatherization 2012	\$43,861	\$132,966	\$176,828	\$0

Table 26. Low-income Weatherization Annual Savings

Program	Evaluated kWh Savings	Net-to-Gross Percentage	Net kWh Savings	Measure Life
Low Income Weatherization 2010	1,183,704	100%	1,183,704	12.0
Low Income Weatherization 2011	1,112,737	100%	1,112,737	11.7
Low Income Weatherization 2012	816,769	100%	816,769	11.7

Energy savings were drawn from the evaluated kWh savings portion of this analysis. Cost-effectiveness analysis incorporated a weighted average Measure Life for each of the different program years. Table 27 provides a comparative summary of the benefit/cost ratios from all five test perspectives by measure and year.

Table 27. Low-income Weatherization Benefit/Cost Ratios

Measure	PTRC	TRC	UCT	RIM	PCT
Low Income Weatherization 2010	4.01	3.64	3.64	0.78	N/A
Low Income Weatherization 2011	3.89	3.53	3.53	0.76	N/A
Low Income Weatherization 2012	4.10	3.73	3.73	0.72	N/A
Low Income Weatherization 2010-2012	3.99	3.62	3.62	0.76	N/A

Cost-Effectiveness Results

Table(s) 28-31 present the results of the program cost-effectiveness tests for each of the program years, and for the evaluation period 2010-2012. The PTRC includes a 10% conservation adder. All years are cost-effective from all test perspectives except the RIM.

Table 28. 2010-2012 Low-income Weatherization – Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.024	\$641,518	\$2,558,025	\$1,916,507	3.99
Total Resource Cost Test (TRC) No Adder	\$0.024	\$641,518	\$2,325,477	\$1,683,960	3.62
Utility Cost Test (UCT)	\$0.024	\$641,518	\$2,325,477	\$1,683,960	3.62
Rate Impact Test (RIM)		\$3,067,315	\$2,325,477	(\$741,837)	0.76
Participant Cost Test (PCT)		\$0	\$2,907,868	\$2,907,868	N/A
Discounted Participant Payback (years)					N/A
Lifecycle Revenue Impact (\$/KWh)					\$0.00000097

Table 29. 2010 Low-income Weatherization – Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.024	\$258,422	\$1,036,048	\$777,626	4.01
Total Resource Cost Test (TRC) No Adder	\$0.024	\$258,422	\$941,862	\$683,440	3.64
Utility Cost Test (UCT)	\$0.024	\$258,422	\$941,862	\$683,440	3.64
Rate Impact Test (RIM)		\$1,205,512	\$941,862	(\$263,650)	0.78
Participant Cost Test (PCT)		\$0	\$1,152,882	\$1,152,882	N/A
Discounted Participant Payback (years)					N/A
Lifecycle Revenue Impact (\$/KWh)					\$0.00000114

Table 30. 2011 Low-income Weatherization – Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.024	\$245,567	\$954,102	\$708,535	3.89
Total Resource Cost Test (TRC) No Adder	\$0.024	\$245,567	\$867,366	\$621,799	3.53
Utility Cost Test (UCT)	\$0.024	\$245,567	\$867,366	\$621,799	3.53
Rate Impact Test (RIM)		\$1,144,441	\$867,366	(\$277,076)	0.76
Participant Cost Test (PCT)		\$0	\$1,070,893	\$1,070,893	N/A
Discounted Participant Payback (years)					N/A
Lifecycle Revenue Impact (\$/KWh)					\$0.00000115

Table 31. 2012 Low-income Weatherization – Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.024	\$176,828	\$725,542	\$548,714	4.10
Total Resource Cost Test (TRC) No Adder	\$0.024	\$176,828	\$659,583	\$482,756	3.73
Utility Cost Test (UCT)	\$0.024	\$176,828	\$659,583	\$482,756	3.73
Rate Impact Test (RIM)		\$911,859	\$659,583	(\$252,276)	0.72
Participant Cost Test (PCT)		\$0	\$867,998	\$867,998	N/A
Discounted Participant Payback (years)					N/A
Lifecycle Revenue Impact (\$/KWh)					\$0.00000102

CONCLUSIONS

Rocky Mountain Power's Low-Income Weatherization Program in Utah is directed towards improving energy efficiency and thereby reducing both energy usage and energy bills for the homes of qualifying low-income customers.³⁶ Rocky Mountain Power's effort is coordinated with the federal/state Weatherization Assistance Program (WAP). Energy saving improvements and installation are provided at no cost to the low-income households. This government contribution to this program is funded and coordinated by the United States Department of Energy (USDOE) and United States Department of Health and Human Services (USDHHS), and administered by the Utah Division of Housing and Community Development (UTDHCD). This kind of coordination is considered a best practice because it provides substantial leverage to each utility dollar through a highly organized federal/state program that establishes high standards, provides training to weatherization specialists, ensures quality control and takes into account the health, safety and repair and replacement problems endemic to the low-income portion of the housing stock.

This evaluation demonstrates that Rocky Mountain Power's coordination of its weatherization efforts with the Utah Division of Housing and Community Development and with the U.S. Department of Energy and U.S. Department of Health and Human Services is cost effective from all test perspectives except for the RIM. The RIM test result is not unusual since the RIM test normally shows a less than cost effective result for energy saving programs.³⁷ Coordination of this kind is a utility best practice because it provides significant leverage for every utility dollar.

Rocky Mountain Power did not include a Fuel Flag for the three program years included in this study, 2010-2012. However, this problem has been resolved and fuel type is now reported by agencies to Rocky Mountain Power. The new database allows for entry of a specific electric heating type, such as baseboard, and if the home is not electrically heated, "Non Electric" is entered.

All Utah subgrantee agencies are partnering with the Home Energy Assistance Target (HEAT) program, administered by the State (UTDHCD) to bring in clients and streamline their qualification process.³⁸ HEAT provides bill payment assistance with federal LIHEAP funds to income eligible households at 150% of the Federal Poverty Level (FPL). Qualifying participants along with LIHEAP efforts, and using HEAT certificates as proof of eligibility simplifies qualification effort for the agencies; however, Rocky Mountain Power should be aware that some qualifying customers whose incomes place them between 151% and 200% of the FPL may not receive assistance.³⁹ Overall, this evaluation demonstrates that the

³⁶ **Energy Efficiency** - The use of less energy to provide the same or an improved level of service to the energy consumer; or the use of less energy to perform the same function.

³⁷ Rocky Mountain Power Utah Demand Side Management Advisory Group.

www.psc.state.ut.us/utilities/electric/09docs/

³⁸ Home Energy Assistance Target (HEAT). <http://jobs.utah.gov/housing/seal/heat.html>

³⁹ Subgrantee agencies will tell customers to first qualify under HEAT and bring back an approved certification from HEAT before processing will begin for weatherization. However, if a customer goes to the HEAT office (usually, but not always in the same building, depending on location) and fails to qualify because they fall within 151%-200% of the FPL, the customer must return and insist on inclusion. At that point, the agencies are supposed to include them in processing for weatherization. The problem is mitigated to some extent because the income assessment for HEAT is more inclusive than the rules for weatherization income assessment. Still, this is a potential barrier to service.

program is operating as planned within the design parameters outlined in the Rocky Mountain Power Electric Service Schedule No. 118, State of Utah.

RECOMMENDATIONS

- ◆ Recall bias by weatherization recipients in answering survey questions is a concern. Participants were required to remember services they received more than two years prior to completing the survey. The long lag time between measure installation and participant feedback raises concerns regarding the reliability of responses to the client survey. Smith & Lehmann Consulting recommends Rocky Mountain Power conduct client surveys annually or semi-annually. Rocky Mountain Power will maximize survey reliability and minimize recall bias by conducting surveys between three and eight months following weatherization installation.
- ◆ Client survey results indicated a small number of CFLs were replaced by program participants. Of the 24 participants who replaced bulbs (an average of four CFLs per household, or 96 bulbs out of a total of 1,206 CFLs received by the 67 survey respondents), most reported replacement because the bulbs had burned out. This suggests a possible burn out problem; however, owing to the two year time lapse, we cannot verify that bulbs replaced were those purchased separately by the client or provided by RMP. If future client surveys confirm bulb burnout as a problem, procurement specifications should be revised to exceed Energy Star certification as Energy Star certification only ensures a minimum standard for energy savings.
- ◆ Rocky Mountain Power should consider whether it is important that customers recognize Rocky Mountain Power's contribution to the funding of coordinated weatherization services. If so, Rocky Mountain Power may want to distribute a small branded item in conjunction with weatherization services to increase branding.
- ◆ Smith & Lehmann recommends UES values associated with furnace fans, "duct sealing/insulation," and "insulation and/or windows" categories be reviewed for greater accuracy in a future study.
- ◆ Typically subgrantee agencies do not spend all available Rocky Mountain Power funding each year. These funds could be utilized by including additional measures such as repairs that would enable installation of energy efficient lighting fixtures. This would add support to dealing with the repair problem in the low-income housing stock as a program barrier. Smith & Lehmann Consulting recommends that Rocky Mountain Power include repairs that support installation of energy efficient measures as an efficient use of the unspent funds that would allow for weatherization of a larger number of eligible clients.
- ◆ Rocky Mountain Power and the Utah Commission currently use the UCT test and the other related tests in examinations of low-income weatherization. Part of the value of using the TRC and related tests is that it enables comparison across DSM programs. There is no problem in

Utah in the current use of the UCT test. However, looking towards the future, Smith & Lehmann Consulting believes it may be useful to consider modifications to the UCT test.

Modifying this test would involve identifying quantifiable non-energy benefits (NEBs) associated with Low Income Weatherization program delivery, such as a decrease in reconnection fees, in the next program evaluation and/or lowering the benefit cost test target for low income weatherization from 1.00 to 0.25 or some other appropriate value. Unlike other DSM programs, low income weatherization programs have two components, a DSM component and an equity component. There is considerable variation across jurisdictions that provide working examples of other possible approaches. Failure to consider alternative use of the UCT is likely to result in low income programs being found not cost-effective in the very near future.

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APPENDIX

Interview Protocols

Client Survey

Participants: Utah residents who received Weatherization Assistance Program (WAP) services for which Rocky Mountain Power (RMP) provided full or partial payment.

Purpose: To provide qualitative data documenting and aiding in measurement of cost-effectiveness, customer satisfaction, verification of program services, and opinions on various program issues and perceived improvements.

Introductory Protocol

Hello, my name is [FIRST AND LAST NAME] from Smith & Lehmann Consulting and I am calling on behalf of Rocky Mountain Power. We are talking with people who received energy-saving or weatherization services from (The Agency) over the past few years.

Agency Selection: [It will be indicated which agency the participant applied through]

- Bear River Association of Governments (Box Elder, Cache, Rich counties)
- Tri-County Weatherization (Davis, Morgan, Weber counties)
- Salt Lake CAP (Salt Lake and Tooele counties)
- Housing Authority of Utah County (Utah, Wasatch and Summit counties)
- 6 County Association of Governments (Juab, Millard, Sanpete, Sevier, Piute and Wayne counties)
- 5 County Association of Governments (Beaver, Iron, Washington and Garfield counties)
- Uintah Basin Association of Governments (Uintah county)
- Southeastern Utah Association of Local Governments (Carbon, Grand and Emery counties)

May I speak with _____, or the person who remembers receiving energy efficiency services through [insert Agency]? This is a short survey and will take approximately 5 minutes.

- Agreed to participate
- Refused to participate
- Refused, person not home

[Background]

The survey is voluntary. You may decline to answer any of the questions, and may terminate the survey at any time. If you have questions regarding this survey, I can provide you with contact information for someone at Rocky Mountain Power [provide contact information if Respondent requests it]:

Shawn Grant, Project Manager

P: 801-220-4196

E: Shawn.Grant@rockymountainpower-pacificpower.net

Questions used to verify survey eligibility:

1. Our records indicate that you have participated in **(The Agency's)** weatherization/energy efficiency program, is this correct? [Note: use "weatherization", "energy efficiency", or "services" throughout, whichever the client understands better]
 - Yes
 - No [CONTINUE TO QUESTION 2]
 - Don't know/don't remember
 - Refused

2. Do you remember receiving [insert service/measure received by customer]? [This will be provided].
 - Yes
 - No [PROBE WITH SUPPLEMENTAL SCRIPT]
 - Supplement: Our records indicate that your home received [insert service] from [Agency]. Do you remember someone coming to your home in [month of service] 2012 and [replacing your refrigerator/replacing your light bulbs with energy-efficient new ones].
 - [If Yes:] SKIP to Q3
 - [If NO:] Is there someone else in your home who remembers this?
 - [If Yes:] May I speak with that person? [If yes, continue interview with other person]
 - [If No:] [Skip to interview termination script][Do not count this as completed interview]
 - Don't know/don't remember
 - Refused

3. Are you still living in the same home where you received the services?
 - Yes
 - No
 - Don't know/don't remember
 - Refused

Survey questions

4. How did you hear about this program/these services provided by [Agency]? [DO NOT READ THROUGH LIST]
 - Agency staff
 - Information on my electric bill
 - Rocky Mountain Power representative
 - Rocky Mountain Power website
 - Other website [SPECIFY]
 - Through another energy assistance program
 - Written materials at (Agency)
 - Family/friends/word-of-mouth

- Other [SPECIFY]
 - Don't know/remember
 - Refuse
5. When you applied for this program, did you find it easy, difficult, or in-between?
- Easy
 - Difficult
 - In-between
 - Don't know/remember
 - Refused
6. How long did you wait to receive weatherization/energy efficiency services [Clarify: from the time you applied for the program until service delivery]? [Don't read choices if a timeframe is volunteered]
- Less than one month
 - At least one month but less than three months
 - At least three months but less than six months
 - At least six months but less than a year
 - More than a year
 - Don't know/remember
 - Refused
7. [Ask question if light bulbs in record] Our records indicate that you received several new energy-efficient light bulbs. Did the agency staff install these directly into your fixtures?
- Yes, the new light bulbs were installed directly into the light fixture. [SKIP TO QUESTION 11]
 - No, the agency staff left the light bulbs for me to install. [CONTINUE TO QUESTION 8]
 - No, I didn't receive any new light bulbs. [SKIP TO interviewer data entry point before Q15]
 - Don't know/don't remember who installed the light bulbs [SKIP TO Q11]
 - Don't know/don't remember receiving light bulbs [SKIP TO interviewer data entry point before Q15]
 - Refused
8. Did you install these energy-efficient light bulbs?
- Yes
 - No [SKIP TO QUESTION 15]
9. If yes, then how many of the new energy-efficient light bulbs did you install?
- 0-5
 - 6-10
 - 11-20
 - More than 20
 - Other: [SPECIFY]
 - Don't know/remember
 - Refused

10. In what rooms did you install the energy-efficient light bulbs, and how many were installed in each room? [Indicate room type and number installed in each type]

- | Room Type: | Number Installed: |
|---|--------------------------|
| <input type="radio"/> Front room/den | |
| <input type="radio"/> Kitchen | |
| <input type="radio"/> Bathroom | |
| <input type="radio"/> Living-room | |
| <input type="radio"/> Bedroom | |
| <input type="radio"/> Hallways | |
| <input type="radio"/> Closets | |
| <input type="radio"/> Outside (porch-light) | |
| <input type="radio"/> Storage | |
| <input type="radio"/> Other: [SPECIFY] | |

11. Did you replace any of the new energy-efficient light bulbs with different ones? [For interviewer: did Client remove any of the CFL light bulbs that were installed by the Agency?]

- Yes
- No [SKIP TO QUESTION 15]
- Don't know/remember [SKIP TO QUESTION 15]
- Refused [SKIP TO QUESTION 15]

12. How many energy-efficient light bulbs did you replace?

Record Number:

13. What type of bulb did you replace it with? [DO NOT READ THROUGH LIST – PROBE TO IDENTIFY TYPE OF LIGHT BULB]

- Incandescent (old kind of light bulb)
- Halogen (looks like old type but isn't)
- Energy-saving (CFL) (the curly expensive type)
- Energy-saving (LED)
- Other: [SPECIFY]
- Don't know/remember

14. Why did you replace it/them?

- Not bright enough
- Bulb(s) failed
- Didn't like the quality
- Other: [SPECIFY]
- Don't know/remember

15. [Ask specifically based on records] Since the [Agency] performed this work in your home, are you more satisfied or less satisfied with the lighting in your home compared to the old bulbs? [SKIP QUESTION IF DON'T REMEMBER RECEIVING LIGHT BULBS OR SAYS THEY DIDN'T RECEIVE LIGHT BULBS]

- More satisfied
- About the same

- Less satisfied
 - Don't know/remember
 - Refused
16. [Ask specifically based on records] Our records show you received a new refrigerator from [Agency]. Since the [Agency] performed this work in your home, are you more satisfied or less satisfied with the refrigerator in your home compared to the old model?
- More satisfied
 - About the same
 - Less satisfied
 - Don't know/remember
 - Refused
17. Now I have some questions about the impact of weatherization on your home. Did you notice any changes in your home after the Weatherization was completed? [PROMPT: change in comfort, change in appearance, change in air quality, change in energy bill]
[IF Yes: could you tell me what changed?]
[DO NOT READ OPTIONS – CHECK ALL THAT APPLY]
- No change noticed
 - Comfort improved
 - Comfort worse
 - Appearance worse
 - Appearance improved
 - Appearance worse
 - Air quality improved
 - Air quality worse
 - Energy bill lower
 - Energy bill higher
 - Other [SPECIFY]
18. Since the [Agency] performed this work in your home, do you believe that your electric bill is more affordable or less affordable? [Do not ask if volunteered in #17, just choose answer]?
- More affordable
 - About the same
 - Less affordable
 - Don't know/remember
 - Refused
19. I would like to ask you if you agree or disagree with the following statement: Do you think it is important or unimportant to save energy by reducing the energy usage in the home? Do you think it is very [important/unimportant] or somewhat [important/unimportant]?
- Agree (strongly/somewhat)
 - Disagree (strongly/somewhat)
 - Neither agree nor disagree
 - Don't know/remember
 - Refused

20. I would like to ask you if you agree or disagree with the following statement: Most people probably have things that could be done to improve the energy efficiency of their home. Do you strongly [agree/disagree] or somewhat [agree/disagree]?
- Agree (strongly/somewhat)
 - Disagree (strongly/somewhat)
 - Neither agree nor disagree
 - Don't know/remember
 - Refused
21. Was there any work left uncompleted, or that was not fully completed?
- Yes [SPECIFY]
 - No
 - Don't know/remember
 - Refused
22. Would you recommend this weatherization/energy efficiency program to family and friends?
- Yes
 - No
 - Don't know
 - Refused
23. Is there anything about the program that needs to be improved?
- Yes
 - No [SKIP TO QUESTION 24]
 - Don't know [SKIP TO QUESTION 24]
 - Refused [SKIP TO QUESTION 24]
24. [If yes to 22] In what ways do you think the program can be improved? (Check all that apply)
- Customer Service Quality
 - Product Quality
 - Professionalism of the Installers
 - Level of services provided
 - More services (free stuff) provided per home
25. When the [Agency] performed this work on your home, were the agency staff courteous, and respectful towards you, your family, and your home?
- Yes
 - No
 - Don't know/remember
 - Refused
26. Did the work crew work carefully to protect your home, or was there damage to your home from the work crew?
- Home protected
 - Home damaged

- Don't know/remember
- Refused

27. What type of residence do you live in?

- Single family home
- Duplex
- Condominium
- Mobile or Manufactured Home
- Apartment
- Refused
- Other [SPECIFY]

28. Do you own or rent your residence?

- Own
- Rent
- Don't know
- Refused

29. Do you have an air conditioner in your home?

- Yes
- No [SKIP TO QUESTION 31]
- Don't know
- Refused

30. [If yes to 29] Is it a swamp cooler, window AC unit, or central AC?

- Swamp Cooler
- Window AC [SPECIFY UNITS]
- Central AC
- Other [SPECIFY]
- Don't know
- Refused

31. Do you know which organization provided the funding for the [Insert: measure received: CFLs, new refrigerator]?

- Yes, Rocky Mountain Power or "power company"
- Yes, Agency [SPECIFY]
- Yes, Other [SPECIFY]
- No
- Don't know/remember
- Refused

Utah Agency Interview Protocol

Participants: Program managers will be selected from each of the following agencies; Utah Housing & Community Development Division, Bear River Association of Governments (Box Elder, Cache, Rich counties), Tri-County Weatherization (Davis, Morgan, Weber counties), Salt Lake CAP (Salt Lake and Tooele counties), Housing Authority of Utah County (Utah, Wasatch and Summit counties), 6 County Association of Governments (Juab, Millard, Sanpete, Sevier, Piute and Wayne counties), 5 County Association of Governments (Beaver, Iron, Washington and Garfield counties), Uintah Basin Association of Governments (Uintah county), and Southeastern Utah Association of Local Governments (Carbon, Grand and Emery counties).

Purpose: To provide qualitative data documenting processes, funding sources, and issues related to Utah's Weatherization Assistance Program. These interviews will address PacifiCorp's evaluation questions regarding program participation and wait listing.

Introductory Protocol

Thank you for speaking with me today. I am from [Smith & Lehmann Consulting or H. Gil Peach & Associates] and am working with Rocky Mountain Power (a division of PacifiCorp), to find out more about how Rocky Mountain Power's Weatherization Assistance Programs (WAPs) operate in Utah. Our evaluation focuses on the 2010, 2011, and 2012 program years. The purpose of our evaluation is to measure the cost-effectiveness and general impacts of the program during those years, as well as assess program operations.

You were recommended as someone who plays an important role in administering WAP services provided by [Agency]. I have some questions that should take about 20 minutes to answer, is this still a good time to talk?

Do you mind if I record our call? This is just for note taking purposes; I will not share the recording or your individual answers with anyone outside of the project. None of the comments you share today will be attributed to you as an individual. They may, instead, be attributed to your organization.

Do you have any questions before we begin?

Potential Research Questions:

1. Please tell us your title and role in the weatherization program?
2. How long have you been at your position?
3. What were [your Agency's] biggest accomplishments during each of the program years: 2010, 2011, and 2012?
4. What were the major challenges [your Agency's] faced in each year: 2010, 2011, and 2012?
5. Were any significant changes made to the WAP during each of the program years: 2010, 2011, and 2012?
6. Please explain how your weatherization participant wait list is compiled. At what point in the

process is s a household moved to the wait list?

- When they first call in.
- After they are qualified by telephone or by interview
- After the home is audited and found to be eligible
- Other: _____

7. How many clients (they generally refer to the households they serve as clients) are now on your wait list?
8. How many Rocky Mountain Power customers are currently on the waiting list?
9. How far out in time does your wait list go (in other words, if you were to weatherize all of the homes currently on your wait list, about when would the last home be finished? Year: _____ Month: _____)
10. Does your agency revise/update the list as households move, etc.?
11. Does your agency have a time goal for weatherizing a home, once it is on the wait list?
12. Is this time target usually met?
13. Are there any points in the process where [Agency] routinely observes a backlog of participants/clients? [DO NOT READ THROUGH LIST]
 - Application processing
 - Home audits
 - Scheduling
 - Measure/Job completion
14. Does [your Agency] have any data sources with participant income or poverty level information (Explain that client data will be kept confidential, names/addresses will not be specified in our report, etc.)
 - What is the format of this data – excel, paper records?
 - Can we get copies of electronic files?
 - Would those files include the customer ID for Rocky Mountain Power?
15. When new energy-efficient lighting is included as a measure, or provided to the home, is agency policy to have staff install light bulbs directly? If, no what is agency policy in this case?
16. What rules or guidelines determine refrigerator replacement as a measure to be installed in a particular home?
 - Are measurements (usage monitored?) taken on every refrigerator that is a candidate for replacement or does the agency follow priority rules?
17. When an energy-efficient refrigerator is installed as a measure; who installs the new one?
 - Who takes away the old refrigerator and how is it disposed of?
18. How can we determine which houses that receive their electricity from Rocky Mountain Power were

funded by other sources (ex: ARRA funding, Questar)?

- Is this information available electronically for each Rocky Mountain Power customer?
- If not, how are the records of weatherization services maintained, and how could we access this information?

19. Where Savings to Investment Ratios (SIR Ratios) are being relied upon, are they reflecting total cost of each measure no matter which funding source or combination of funding sources are used, or are they calculated according to the USDOE approved optional discounted method (which permit the agency to disregard the non-federal portion of costs)?
20. What kinds of barriers limit participation in the program? [If any]
21. How is (the Agency) addressing any program participation barriers? What challenges has the Agency faced with these strategies to address barriers? What strategies have worked?
22. How does your [Agency] define a walkaway, or “deferral?”
23. How are walkaways/deferrals among potential weatherization clients addressed by the Agency?
24. What are some of the reasons for walkaways/deferrals?
25. What are the problems from the perspective of the Agency and how might these be solved?

Utah Weatherization Assistance Program Guidelines – Section C1. 10: Weatherization Priority Rating System

a. Priority Rating System

i. If there is less than a 2 month backlog assistance shall be provided on a first-in first- out basis.

ii. If there is more than a 2 month backlog the local agency shall create a Priority List.

iii. Upon qualification of an applicant the local agency will assign a priority using the format in Section C1. 10. b. This will determine placement on the agency’s Priority List.

iv. Definitions:

- **Energy User Percentage** - The most recent 12 consecutive month consumption, from date of application, of the applicant’s metered primary heating fuel divided by Utah average energy usage. (7993kWh and 75.6dth)
- **Energy Burden Percentage** – The sum of expenses of the most recent 12 consecutive month, from date of application, of the applicant’s metered utilities divided by their annualized household income. This would typically be natural gas & electricity.
- **Non-Metered Fuel** – A primary heating fuel that is not metered by a utility provider. These fuels would be:
 - Coal
 - Oil
 - Propane
 - Wood
- **Wood Fuel** – The primary heating fuel of the dwelling is a stove or fireplace burning wood, wood pellets or similar fuel source.
- **Elderly** - Any individual who is at least 60 years of age.
- **Disabled** - Any individual (1) who is a disabled individual as defined in Section 7(6) of the Rehabilitation Act of 1973, (2) who is under a disability as defined in Section 1614(a) (3)(A) or 223(d)(1) of the Social Security Act or in Section 102(7) of the Developmental Disabilities Services and Facilities Construction Act, or (3) who is receiving benefits under Chapter 11 or 15 of Title 38, U.S.C. (4) who has a letter from

a physician stating that the disability will exist longer than six months, (5) who has a visible confirmation by Weatherization staff that there is a disability, or (6) who has a disability confirmed by the HEAT program.

- **Pre-School age Children** - Anyone that is under the age of six (6) years old. These children are considered to be at additional health risk because of their young age and the fact that in many cases they will be in the non-weatherized dwelling during the entire day.

b. Priority Rating System

- a. The household has Elderly or Disabled living in residence. (25 points) _____

- b. Preschool children reside in the household add 3 points for each child under the age of six. _____

- c. For every 6 months the application has been on file add 10 points. _____

- d. Prior Weatherization of the dwelling unit subtract 10 points. _____

- e. Where household income is:
Under 75% of the poverty level add **40** points.
75% to 100% of poverty add **30** points
101% to 125% of poverty add **20** points
126% to 150% of poverty add **10** points
151% to 175% of poverty **0** points
176% to 200% of poverty **0** points _____

- f. Where Energy User Percentage is: 125% and greater add 20 points 120% to 124% add 15 points 115% to 119% add 10 points _____

- g. When the household is Non-Metered Fuel add 20 points _____

- h. Energy Burden Percentage is:

25% and greater add 20
points 20% to 24% add 15
points
15% to 19% add 10 points

TOTAL POINTS

c. Priority List Deviations:

A local agency may deviate from the Priority List when:

- i. Coordinating with housing rehabilitation with other entities or programs. (Self Help is not approved for this exception)

- ii. Coordination of agency services due to geographic reason.
Agencies with large geographic service areas may move clients up the Priority List, with documentation, when it is in the best interest of the program to conserve program funds.

- iii. Local agencies may weatherize a LIHEAP Crisis client when documented circumstances show it is in the best interest of the program. (e.g. post-weatherization furnace sizing would not be adequate to heat the home)

d. Client Moving

Approved clients living in an approved residence that move before receiving services will retain their original priority listing when they reapply.

e. Multiple Applications

Clients can apply multiple times. Clients may not have more than one active application at a time. Individuals receiving Weatherization assistance within the last twelve months while residing at another residence shall receive assistance at their present residence based upon the applications Priority List ranking of their current active application.

f. Income Re-qualification

Applicants waiting more than twelve months to be assisted must re-qualify their income based upon their current income and household size before the work can begin.

- The 12-month waiting period starts on the date of the income verification provided at the time of weatherization application and ends when the first work starts on the home (crisis work, audit, etc.). A copy of the re-certification documentation must be placed in the client file

Deferral of Service Notification

ATTACHMENT #24

State of Utah Weatherization Assistance Program

WAP: Deferral of Service Notification/Health & Safety Notification

Name: _____ Notification Date: _____
Address: _____ Weatherization Agency _____
City: _____ Agency Inspector: _____
Inspection Date: _____ Agency Signature: _____

Recently your home was inspected for Weatherization services. It is the policy of this Agency to provide Weatherization services when those services may be delivered effectively and safely, without undue hazards to our staff or our clients. Conditions were noted on ___ (date) which prevented the weatherization of your home at this time. Those conditions are noted below:

- _____ Structurally unsound dwelling or one that is condemned for human habitation.
 - _____ Evidence of persistent infestation of rodents, insects, and other vermin.
 - _____ Electrical or plumbing hazards that cannot be resolved prior to or as a part of the authorized WX work.
 - _____ The presence of sewage in any part of the dwelling unit.
 - _____ Evidence of environmental hazards such as: (Circle) serious moisture problems, mold & mildew, carbon monoxide, gas leaks, friable asbestos, or other hazardous materials, which cannot be resolved prior to the WX work.
 - _____ The presence of animal or human feces in an area of the dwelling unit where field staff must perform various WX measures.
 - _____ Excessive garbage and clutter build up in and around the dwelling unit where field staff must perform WX measures.
 - _____ Maintenance and housekeeping practices that are negligent to the point of limiting access of field staff to the dwelling or creating an unhealthy working environment.
 - _____ Threat(s) of violence, verbal abuse, physical abuse, or profanity towards any worker(s) or household member during the WX process.
 - _____ Evidence of the presence and/or use of any illegal/controlled substance in the dwelling unit.
 - _____ Evidence of drug cultivation, distribution, and/or manufacturing on the premises.
 - _____ A heating system in use has been determined to be unsafe or nonfunctional (through the determination of a qualified technician) and cannot be resolved through the normal efforts of the WX agency prior to the weatherization work or during the normal weatherization process.
 - _____ An un-vented space heater or other un-vented combustion appliances are present in the unit, which WX personnel have been unable to remove from the home.
 - _____ Other
-

We will reconsider weatherizing your home if you are able to meet the conditions by:

_____ (date)
(list specific steps which must be taken)

When you have met the conditions listed above, or if you believe a mistake has been made in this determination, please contact the party listed below and we will re-inspect your home within _____ working days of hearing from you.

(contact Name) (contact title) (contact information)

To assure that you have received this notice it has been sent to you by certified mail. The signature on the certified delivery receipt verifies your receipt of this notice

Please note that your financial eligibility for Weatherization services lapses on ____ (date) _____. If you have not contacted us prior to that date your application will be denied.

You have the right to appeal the decision to defer weatherization services. Included with this notification are the procedures to follow in order to file an appeal

State of Utah

Weatherization Deferred Service Guidelines

The State of Utah has the responsibility of ensuring that qualified individuals located throughout the state are able to receive energy assistance via the Weatherization Assistance Program administered by eight Local Government and Community Action Agencies. In order to ensure that these services and assistance are delivered effectively and safely “Walk-away/Deferred Assistance” guidelines shall be implemented statewide.

The Weatherization services outlined in the current Utah State Plan for the Weatherization Assistance Program shall be delivered effectively and safely, without undue hazards to the local agency staff or clients. The following “Walk-away/Deferred Assistance” guidelines have been developed for use by the local agencies in the state of Utah.

HEALTH & SAFETY ISSUES

All Weatherization Technicians must be able to perform all authorized Weatherization activities

& measures without undue threats or concerns regarding their health & safety. Conditions which may constitute undue threats or concerns to staff or client health & safety may include but are not limited to the following items:

- Structurally unsound dwellings that are condemned for human habitation.
- Evidence of substantial infestation of rodents, insects, and other vermin.
- Electrical or plumbing hazards that cannot be resolved prior to or as a part of the authorized Weatherization work.
- The presence of sewage in any part of the dwelling unit.
- Evidence of environmental hazards such as serious moisture problems, mold & mildew, carbon monoxide, gas leaks, friable asbestos, or other hazardous materials, which cannot be resolved prior to the Weatherization work.
- The presence of animal or human feces in any area of the dwelling unit where field staff must perform various Weatherization measures.
- Excessive garbage and clutter build up in and around the dwelling unit where field staff must perform Weatherization measures.
- Maintenance and housekeeping practices that are negligent to the point of limiting access of field staff to the dwelling or creating an unhealthy working environment.
- Any overt threat of violence, verbal abuse, physical abuse, or profanity towards any

Weatherization staff member or any household member during the Weatherization process.

- Evidence of the presence and/or use of any illegal/controlled substance in the dwelling unit.
- Evidence of drug cultivation, distribution, and/or manufacturing on the premises.
- A resident who is at least 18 years old must be present when any Weatherization staff is performing the Weatherization process.
- The dwelling is a mobile home that has serious structural problems that would make the completion of Weatherization measures impossible or impractical for the Weatherization field staff.
- A heating system in use has been determined to be unsafe or nonfunctional (through the determination of a qualified agency or technician) and cannot be resolved through the normal efforts of the Weatherization agency prior to the weatherization work or during the normal weatherization process.
- When an un-vented space heater or other un-vented combustion appliances are present in the unit, **NO** Weatherization work will be allowed unless the **Weatherization crew or contractor** is allowed to remove and dispose of the unit. Kitchen stoves/ranges are exempt from this policy.
- If an un-vented space heater is replaced with a vented heating system, during the weatherization process, the local agency **will** remove and dispose of the un-vented heater at the time the system is installed. The owner cannot retain ownership of the heater.

COST EFFECTIVENESS

Weatherization work should be performed in a cost effective manner whenever possible. Situations or conditions which may limit the cost effectiveness of any Weatherization work may include, but are not limited to the following:

- Structurally unsound dwelling unit where the costs associated with the repairs substantially exceeds the cost of the Weatherization measures.
- Major remodeling is currently in progress (and is not coordinated with a housing rehabilitation program), which would severely limit the proper completion of major Weatherization measures on the dwelling unit.
- Evidence of standing water in the basement or crawl space area.

A client or owner/authorized agent (landlord/property manager) refuses to allow a cost effective measure to be performed on the dwelling unit or to make necessary modifications to the dwelling unit to permit Weatherization measures to be completed.

- A Client or owner/authorized agent (landlord/property manager) demands Weatherization materials and measures that are not deemed to be cost effective and/or are not allowable measures through the Weatherization Assistance Program.
- Dwelling unit needs no major Weatherization measures and the cost of installing other

Weatherization measures exceeds the approved cost effectiveness projections and standards of the state or the local agency.

- The dwelling unit is vacant or is uninhabitable (as described in the federal guidelines for Weatherization).
- Obvious discrepancies have been found between the information supplied by the client on the Weatherization application and observed conditions at the time the Weatherization fieldwork commences.

ie: Client is renting basement as apartment and did not indicate this on the application.

- Presence of lead based paint that would cause the project to not be cost effective.

Any and all applicants who are denied Weatherization assistance will be assured an opportunity to have a fair administrative hearing regarding the denial of services pertaining to the above stated “Walk-away/Deferred Assistance” Guidelines. Appeals may be directed to the Utah Division of Housing and Community Development.

At any time that a local agency decides to “walk-away or defer assistance” from a given Weatherization project it is the obligation of the Agency to provide a detailed written notification to the owner or authorized agent in a timely manner. A copy of the Notice must be included in the client file for review by the Weatherization field manager during routine monitoring visits if desired. The written notice must include the following items:

- Nature & extent of the problem /concern related to the Weatherization of the dwelling
- Any corrective action required prior to the resumption of Weatherization work with a related time frame to correct the situation: and,
- An explanation regarding the right to appeal and the appeals process

If a local agency as part of their Standard Operating Procedures develops a more inclusive and detailed local policy related to the above stated “Walk-away/Deferred Assistance” guidelines, said policy must be submitted to the Utah Division of Housing and Community Development for review and written approval on an annual basis

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