



# Evaluation Report for Utah's Self-Direction Credit Program (PY 2012 through 2013)

Prepared for:  
Rocky Mountain Power



Prepared by:



Navigant Consulting, Inc.  
1375 Walnut Street  
Suite 200  
Boulder, CO 80302

303.728.2500  
[www.navigant.com](http://www.navigant.com)

In Partnership with:



EMI CONSULTING

EMI Consulting  
83 Columbia Street  
Suite 400  
Seattle, WA 98104

206.621.1160  
[www.emiconsulting.com](http://www.emiconsulting.com)



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## Table of Contents

<b>Executive Summary .....</b>	<b>1</b>
Program Background .....	1
Evaluation Objectives.....	1
Impact Evaluation.....	2
Summary of Impact Findings.....	2
Net-to-Gross (NTG) Ratio .....	2
Cost-Effectiveness .....	3
Process Evaluation.....	3
Program Evaluation Recommendations.....	4
<b>1 Introduction .....</b>	<b>5</b>
1.1 Program Description.....	5
1.2 Program Changes from 20012 to 2013.....	6
1.3 Program Participation .....	6
1.4 Program Theory and Logic Model.....	7
<b>2 Evaluation Methodology .....</b>	<b>12</b>
2.1 Impact Evaluation Methodology .....	12
2.1.1 Project File Reviews.....	12
2.1.2 Sampling Frame Development .....	13
2.1.3 Gross Energy and Demand Realization Rate Calculation.....	14
2.1.4 Program Cost-Effectiveness.....	15
2.2 Validity and Reliability of Impact M&V Findings.....	16
2.2.1 Reducing Uncertainty from Sample Selection Bias.....	17
2.2.2 Reducing Uncertainty from Physical Measurement Error.....	17
2.2.3 Reducing Uncertainty from Engineering Analysis Error.....	18
2.3 Net-to-Gross (NTG) Estimates .....	18
2.4 Process Evaluation Methodology .....	19
2.4.1 Overview of Steps in the Process Evaluation.....	19
2.4.2 Process Evaluation Research Questions .....	20
2.4.3 Program Documentation Review .....	20
2.4.4 Logic Model Verification .....	21
2.4.5 Process Data Collection Activities .....	21
<b>3 Impact Evaluation Findings.....</b>	<b>23</b>
3.1 Gross kW and kWh Savings .....	23
3.2 Program-Level Net Savings Results .....	26
3.3 Cost-Effectiveness Calibration and Analysis .....	26
<b>4 Process Evaluation Findings.....</b>	<b>29</b>



4.1	Participant Findings.....	29
4.1.1	Program Satisfaction.....	29
4.1.2	Program Awareness and Motivation.....	30
4.1.3	Program Process.....	31
4.1.4	Program Influence .....	32
4.1.5	Further Energy Efficiency Opportunities and Barriers.....	33
4.2	Overall Process Findings.....	34
<b>5</b>	<b>Program Evaluation Recommendations .....</b>	<b>36</b>
5.1	PY 2012-2013 Recommendations .....	36
5.2	PY 2009-2011 Recommendation Review .....	36

**Under Separate Attachment**

**Appendix A: Glossary of Terms**

**Appendix B: EM&V Best Practices**

**Appendix C: *wattsmart* Business Program Logic Model**

**Appendix D: Process Evaluation Survey Instrument**

## List of Figures and Tables

### Figures:

Figure 1. Utah Self-Direction Credit Program Logic Model (2011) .....	8
Figure 2. Parameters Verified Through Project File Reviews (Example).....	13
Figure 3. Overall Program Satisfaction.....	30
Figure 4. Factors Influencing Project Decisions.....	33

### Tables:

Table ES-1. Gross Program-Level Realization Rates for UT Self-Direct (PY 2012-2013).....	2
Table ES-2. UT Self-Direct Cost-Benefit Results – 2012-2013 Combined (1.04 NTG).....	3
Table 1. Utah’s Self-Direction Credit Measure Category Details for PY 2012-2013.....	7
Table 2. Indicators and Data Sources for Program Outcomes.....	11
Table 3. Overview of the Impact Evaluation Sampling Framework .....	14
Table 4. Details of Cost-Effectiveness Tests .....	16
Table 5. Process Evaluation Research Question Approach.....	20
Table 6. Sample Frame for Participant Surveys in 2012 and 2013.....	22
Table 7. Program-Level Realization Rates for Utah Self-Direct .....	23
Table 8. Utah’s Self-Direction Project-Level Energy (kWh) Realization Rates.....	24
Table 9. Self-Direction Credit Projects with High Variance in Realization Rates.....	24
Table 10. Utah’s Self-Direction Project-Level Demand (kW) Realization Rates .....	25
Table 11. Savings-Weighted Program Influence for PY2012-2013.....	26
Table 12. Program-Level Net Realization Rates for Utah’s Self-Direction Credit Program.....	26
Table 13. Utah Self-Direction Cost-Effectiveness Evaluation Input Values .....	27
Table 14. UT Self-Direct Cost-Effectiveness Results – 2012 (1.04 NTG).....	27
Table 15. UT Self-Direct Cost-Effectiveness Results – 2013 (1.04 NTG).....	28
Table 16. UT Self-Direct Cost-Effectiveness Results – PY 2012-2013 Combined (1.04 NTG) .....	28
Table 17. Primary Industry of Self-Direction Credit Respondents .....	29
Table 18. Opportunities for Further Energy Efficiency .....	33
Table 19. Barriers to Participants’ Future Energy Efficiency Plans.....	34

## Executive Summary

This report describes the findings from Navigant’s impact and process evaluation of Utah’s Self-Direction Credit program years 2012 through 2013 (PY 2012-2013), including program- and project-level gross and net realization rates, program cost-effectiveness results, and feedback from program participants concerning satisfaction and areas for improvement for the program as a whole. These evaluation results generated recommendations for improving program processes, methods, and delivery as Self-Direction Credit transitions to the *wattsmart* Business program.

### *Program Background*

The Self-Direction Credit program offered custom incentives and engineering services to Rocky Mountain Power’s (RMP) commercial and industrial (C&I) customers in Utah for the implementation of energy efficiency measures.<sup>1</sup>

The program allowed maximum customer control to self-direct the Customer Efficiency Services Charge into qualified cost-effective efficiency improvement projects. To be eligible for the program, customers must have met one of the two following requirements:

- » Minimum annual usage of 5,000,000 kilowatt-hours (kWh)
- » Minimum peak load of 1,000 kilowatts (kW)

Customers could aggregate commonly owned meters to meet the 5,000,000 kWh requirement, but the 1,000 peak kW load must have come from a single site. New construction projects were eligible for the program if the projected annual electricity use met one of the aforementioned requirements. Upon review and approval by RMP customers completing a Self-Direction Credit project received a credit for the Customer Efficiency Services Charge on their monthly electric bills. The total program cap for new projects was \$5 million in credits per year, with credits approved on a first-come, first-served basis. A third party program administrator, Nexant, Inc., (hereafter referred to as the program administrator) ran the Self-Direction Credit program on behalf of RMP.

### *Evaluation Objectives*

This evaluation addressed the following objectives:

- » Verify the annual and combined 2012 through 2013 gross and net energy and demand impacts of RMP’s Self-Direction Credit program
- » Review the effectiveness of program operations, highlight achievements, and identify opportunities for process improvements
- » Characterize participant motivations
- » Perform cost-effectiveness calculations on evaluated results for each year evaluated and in total

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<sup>1</sup> Self-Direction Credit program description information was adapted from RMP Annual Reports, program brochures and promotional material, descriptive content in prior evaluations, and interviews with program administrative staff.

## Impact Evaluation

The impact evaluation of RMP's Self-Direction Credit program involved the following activities:

- » Quantifying the impacts of all measures and activities on annual gross energy consumption while accounting for any interactions among technologies
- » Establishing post-implementation performance for installed measures and activities
- » Explaining discrepancies between the results of this study and the reported savings estimates

Evaluation metrics and parameters reported through this effort include the following:

- » Gross program demand and energy savings estimates and realization rates for projects
- » Energy usage profiles for C&I technologies obtained through measurement and verification activities

## Summary of Impact Findings

The evaluation team conducted a combination of in-depth project file reviews, spreadsheet reviews, weather-normalized utility meter analyses, interviews with facility staff, and on-site audits to evaluate the savings for each project sampled for the PY 2012-2013 evaluation period. The verification sample included 16 of the 59 projects that participated in PY 2012-2013 and represented 66 percent of reported program savings. This sample achieved a 90/4 confidence and precision at the program level.

The 2012 through 2013 program-level demand savings realization rate was 113 percent and the program-level energy savings realization rate was 91 percent. These numbers demonstrate the success the program has achieved. Table ES-1 provides the *program-level* reported and evaluated kW and kWh realization rates at the customer meter.

**Table ES-1. Gross Program-Level Realization Rates for UT Self-Direct (PY 2012-2013)**

Program Year	Program Reported kW	Gross Program Evaluated kW	Gross Program kW Realization Rate	Program Reported kWh	Gross Program Evaluated kWh	Gross Program kWh Realization Rate
2012	2,199	2,201	100%	15,514,585	14,557,457	94%
2013	2,907	3,594	124%	29,873,206	26,657,992	89%
<b>All</b>	<b>5,106</b>	<b>5,795</b>	<b>113%</b>	<b>45,387,791</b>	<b>41,215,449</b>	<b>91%</b>

## Net-to-Gross (NTG) Ratio

The evaluation team calculated an NTG ratio of 1.04 for Utah's Self-Direction Credit program for years 2012-2013. Section 3.3 provides further detail on the NTG results by program year and in total.

## Cost-Effectiveness

The evaluation team used a cost-effectiveness model, calibrated and updated with RMP’s input parameters, to produce results for five primary cost tests: PacifiCorp’s Total Resource Cost test (PTRC), Total Resource Cost test (TRC), Utility Cost Test (UCT), Rate Impact Measure test (RIM), and the Participant Cost Test (PCT), for calculating the program’s benefit/cost ratios. Table ES-2 provides the cost-effectiveness results for the five cost tests over the evaluated PY 2012-2013.

**Table ES-2. UT Self-Direct Cost-Benefit Results – 2012-2013 Combined (1.04 NTG)**

Benefit/Cost Test Performed	Evaluated Gross kWh Savings	Evaluated Net kWh Savings	Evaluated Costs	Evaluated Benefits	B/C Ratio
Total Resource Cost Test (PTRC)	41,225,955	42,874,993	\$12,817,188	\$32,761,431	2.56
Total Resource Cost Test (TRC)	41,225,955	42,874,993	\$12,817,188	\$29,783,119	2.32
Utility Cost Test (UCT)	41,225,955	42,874,993	\$10,056,082	\$29,783,119	2.96
Rate Impact Test (RIM)	41,225,955	42,874,993	\$37,907,870	\$29,783,119	0.79
Participant Cost Test (PCT)	41,225,955	42,874,993	\$11,361,814	\$35,835,746	3.15

## Process Evaluation

The process evaluation assessed the Self Direction Credit program from the perspective of program staff and participants in order to identify both existing strengths and areas for refinement that may better serve the Utah C&I market in future years. The evaluation team surveyed 22 participants in 2012 and 2013 and combined the results with information from program staff interviews to create a comprehensive view of the Self-Direction Credit program from 2012 to 2013. Notable findings include the following:

- » **Bill credits and energy savings were the most influential components of the program.** Respondents indicated that the RMP credit and the ability to save energy influenced them to participate in the Self Direction Credit program. Respondents also appreciated the supporting program information on measure payback, indicating it encouraged further the installation of additional energy efficiency measures (EEMs).
- » **Participants indicated they would like more communication with program administrators.** Two of six respondents suggested that more communication with program administrators would increase their overall satisfaction with the Self-Direction Credit program.
- » **Participants of the program are aware of further energy efficient project opportunities.** The majority (82 percent) of participants believed additional energy efficiency opportunities exist at their organization, and most planned to participate in the Self Direction Credit program again. These findings indicate that participants are engaged and seeking out further efficiency opportunities.



- » **Participants see costs as the primary barrier to conducting additional energy efficiency projects.** Of the participant respondents who thought they could take further energy-efficient actions, 33 percent reported costs to be a major barrier to conducting these projects. Specifically, these respondents cited high upfront costs and lack of access to capital as major barriers.
- » **The majority of participants were very satisfied with the program.** Overall, 81 percent of respondents were satisfied with the program; 63 percent were very satisfied and 19 percent were somewhat satisfied. Most respondents reported that the energy savings related to each measure met their expectations and that they had seen non-energy benefits as well.

### ***Program Evaluation Recommendations***

- » **Recommendation 1. Ensure measure classifications in database are correct.** Impact evaluation activities found incorrect measure classifications in the RMP program database. Ensuring correct classifications will help with future sampling efforts and file reviews. The shift to the improved procedures under the new *wattsmart* Business program will likely remedy this issue.

## 1 Introduction

This report describes the findings from Navigant Consulting, Inc.'s (Navigant's) impact and process evaluation of Utah's Self-Direction Credit program years 2012 through 2013 (PY 2012-2013). This section provides a description of Utah's Self-Direction Credit program, along with a review of the program theory and logic model that depicts the activities, outputs, and desired outcomes of the program.<sup>2</sup>

### 1.1 Program Description

The Self-Direction Credit program offers custom incentives to RMP's large commercial and industrial (C&I) customers to implement energy efficiency measures (EEMs).<sup>3</sup> The program's primary objective is to allow maximum customer control to self-direct the Customer Efficiency Services Charge on their monthly electric bill into qualified cost-effective efficiency improvement projects. To be eligible for the program, customers must meet one of the two following requirements: minimum annual usage of 5,000,000 kilowatt-hours (kWh) or a peak load of 1,000 kilowatts (kW). Customers may aggregate meters under common ownership to meet this requirement. New construction projects are eligible for the program if the projected annual electricity use meets one of the two requirements. Upon review and approval by RMP, customers completing a Self-Direction project will receive a credit for the Customer Efficiency Services Charge on their monthly electric bills. A third party program administrator, Nexant, Inc., runs the Self-Direction Credit program on behalf of RMP.

The following three project types are eligible under the 2012-2013 Self-Direction Credit program:

- » **Completed Projects.** Cost-effective electric conservation projects completed by customers between January 1, 2012, and December 31, 2013. Customers must not have received incentives for the project through any other RMP energy efficiency (EE) program. Approved projects receive a Self-Direction credit for 80 percent of eligible expenses, subject to a \$750,000 cap in any given year.
- » **Pre-Approved Projects.** Similar to "Completed Projects," except that customers complete a pre-approval process by submitting an application to the program administrator. Approved applications receive a Self-Direction credit of 80 percent of eligible expenses, reserved for a limited time, ensuring that 1) the customer's project will be approved (assuming execution of project as designed) and 2) funding will be available in the program upon completion of the project.
- » **Opt-Out Projects.** Customers who cannot demonstrate available remaining EE projects with a payback period of less than eight years are eligible for a 50 percent Self-Direction credit. Customers must perform a new energy audit to renew the credit every two years. This 50 percent credit will not be available to a customer during any time they are receiving another eligible credit under the program.

<sup>2</sup> In 2014, the program transitioned to become the custom portion of the *wattsmart* Business program and RMP no longer offers the program as Self Direction Credit. However, for purposes of the 2012-2013 program evaluation cycle, the Self Direction Credit program title, description, and theory still apply.

<sup>3</sup> Self-Direction Credit program description information was adapted from RMP Annual Reports, program brochures and promotional material, descriptive content in prior evaluations, and interviews with program administrative staff.

Customers interested in completing a Pre-Approved Self-Direction Credit Project first submit a Pre-Qualification Project Submittal and then repay any incurred engineering costs to RMP, if any. The program administrator may elect to perform an inspection based on the specifics of the project and would ultimately approve or reject the project. If approved, the customer signs and returns the Pre-Qualification Approval Letter and Program Agreement. The program administrator then reserves the credit funding for a limited time and the customer completes the project. After 24 months, the customer must re-apply for funds. For both pre-approved and completed projects, the customer submits a Complete Project Submittal to the program administrator, who arranges for an inspection and approves or rejects the project. For approved projects, the customer signs and returns the Approval Letter and Program Agreement and the program administrator credits the customer's account and notifies the customer of the final credit.

### **1.2 Program Changes from 2012 to 2013**

During the evaluated period from January 2012 to December 2013, there were two notable changes to the Self-Direction Credit program (Tariff 192). First, in May of 2012, the existing expiration date for the tariff related to the charge offset by the Self-Direction Credit (Tariff 193) was removed and the approach to changing the rate of the charge was modified to reduce adjustments. This change ensured that qualifying customers would still be motivated to participate in the program, and did not make any changes to the program theory or delivery. In May of 2013, the company filed a request to cancel the existing C&I EE programs and consolidate them into a new *wattsmart* Business program (Tariff 140). The Public Service Commission of Utah approved this shift with an effective date of July 1, 2013. Therefore, the Self-Direction Credit program ceased to start new projects after July 1, 2013, but projects already in progress could be completed under the program. Marketing had already shifted to the *wattsmart* brand before this evaluation period.

### **1.3 Program Participation**

PY 2012-2013 results included 59 Self-Direct completed projects in Utah: 33 projects in 2012 and 26 in 2013. The 59 projects included the installation of 61 EEMs and reported 45,387,791 kWh in energy savings over the two-year period. Table 1 summarizes the program project counts that included the installation of the associated measure category.<sup>4</sup>

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<sup>4</sup> Measure categories here are from the program database and do not adjust for any incorrect classifications.

**Table 1. Utah’s Self-Direction Credit Measure Category Details for PY 2012-2013**

Measure Category	Measure Type Counts <sup>5</sup>	Reported kWh Savings	Percentage of Total Savings
Lighting	38	18,220,510	40%
Motors	7	14,749,602	33%
HVAC	7	5,848,525	13%
Compressed Air	4	5,484,921	12%
Controls	3	709,030	2%
Other	2	375,203	1%
<b>All</b>	<b>61</b>	<b>45,387,791</b>	<b>100%</b>

### 1.4 Program Theory and Logic Model

Program logic models depict the primary program activities, actions required to implement the program, the outputs expected to result from each activity, and the expected short-, mid-, and long-term outcomes of those activities. This includes marketing, participant recruitment, and training, among others. The outputs depict tangible, tracked, or tallied “products” resulting from each primary activity (i.e., marketing materials, training documents, and databases of recruited participants). Outcomes represent the intended results of successful deployment of the identified activities.

Developing a logic model that clearly provides the theory of action and change is an important step in evaluation, allowing the evaluator and program actors to see inside the program “black box.”<sup>6</sup> Program logic models provide a framework for an evaluation by highlighting key linkages between program activities and expected outcomes. The process and impact evaluations focus on these linkages, particularly those on the critical path to achieving savings goals. The evaluation identifies properly working linkages in the program logic model, as well as weak or broken linkages that could cause program shortfalls in achieving the intended outcome(s).<sup>7</sup> With this foundation, the evaluation team can then make informed choices related to the prioritization and focus of evaluation resources. The evaluation team reviewed program documentation and spoke with program managers and administrators to verify the underlying theory for the Self-Direction Credit program logic model (Figure 1).<sup>8</sup>

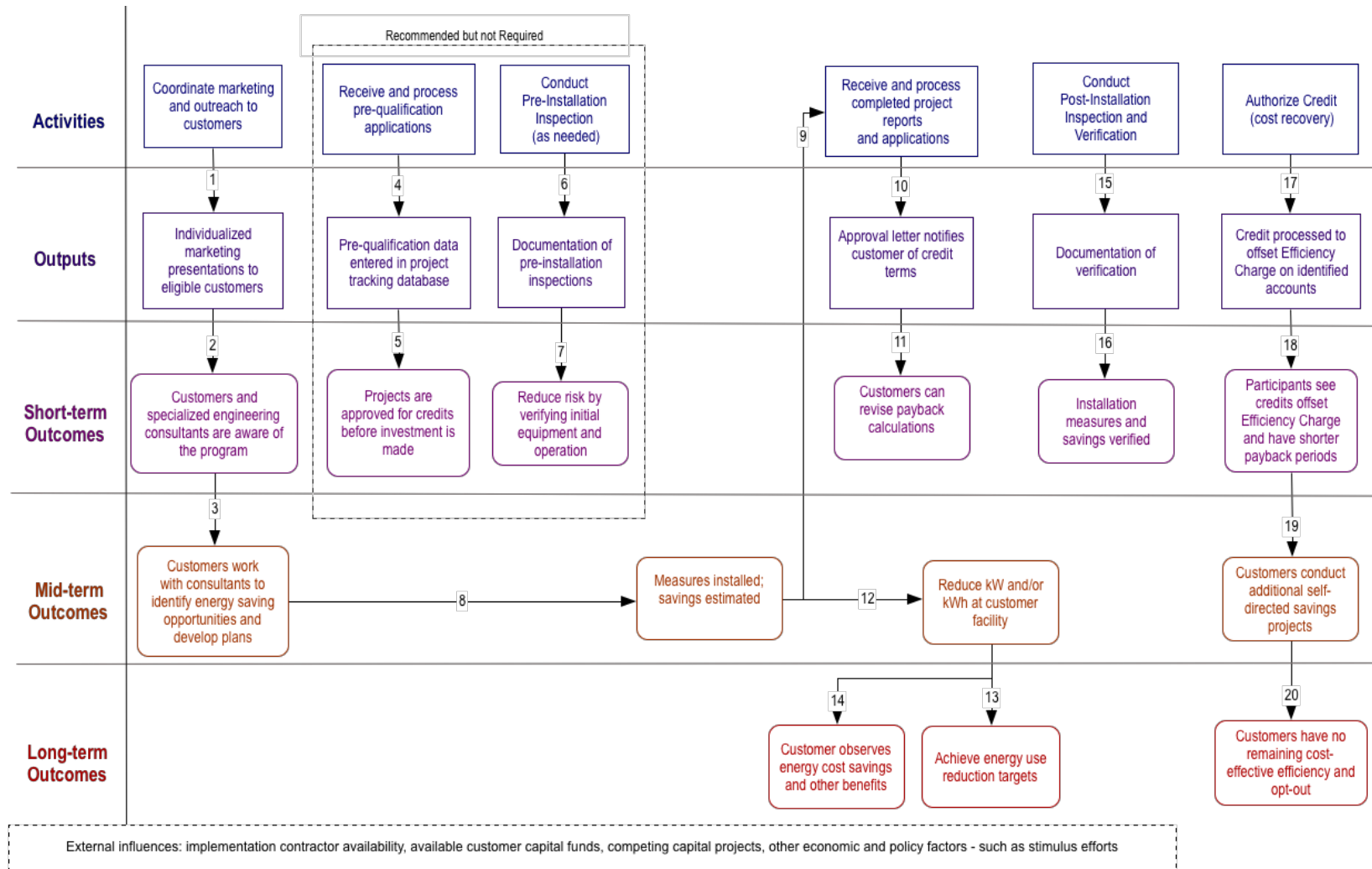
<sup>5</sup> For lack of a better term, Navigant uses “measure type counts” in this table even though these numbers more strictly align with *the number of line items in the tracking database* by measure category. A single project could have multiple line items in the tracking database for the same measure category, as well as include multiple measure categories.

<sup>6</sup> Sue Funnell and Patricia Rogers, 2011, *Purposeful Program Theory: Effective Use of Theories of Change and Logic Models*, John Wiley & Sons.

<sup>7</sup> Section 4.2, Question 3 provides more specifics on the logic model review.

<sup>8</sup> The Self-Direction Credit logic model described in this section depicts the program theory used for PY 2012-2013, but will become obsolete as the program transitions to the *wattsmart* Business program. Appendix C provides the new logic model and theory developed for the *wattsmart* program.

**Figure 1. Utah Self-Direction Credit Program Logic Model (2011)**



RMP designed their Self-Direction Credit program to provide credits to C&I customers who implement EE projects which can help overcome the common long payback period barrier that non-residential customers traditionally face. The following list describes the linkages within the program logic, with numbers corresponding to those shown in the logic model (Figure 1).

1. The RMP Project Manager (PM), program administrator, and account managers coordinate efforts to directly market the program to large customers. Individual presentations at the customer site provide comprehensive program information. The program administrator works with identified engineering firms to ensure they are aware of program requirements and have program-approved templates for project submittals.
2. Eligible customers and specialized engineering firms are aware of the program.
3. Customers identify projects that may qualify for the Self-Direction Credit, either alone, through RMP provided energy analyses, or through energy analyses performed by independent engineering firms.
4. Customers or their engineering firm may choose to submit a pre-qualification application to the program administrator to ensure the project qualifies before moving forward with implementation.
5. The project tracking database documents pre-qualification applications. Projects receive pre-approval, reducing uncertainty.
6. If deemed necessary, based on the project pre-qualification application, the program administrator may conduct an inspection of the customer facility before approving or rejecting the identified project.
7. Pre-qualification inspections reduce discrepancies between reported and verified energy savings by verifying initial equipment and operating conditions.
8. The customer or their contractor purchase and/or install EEMs.
9. Customers, or their engineering firm, submit project submittal reports and invoices to the program administrator. The program administrator reviews the project submittal report for quality control and insures the project qualifies. In general, engineering firms with existing program experience submit the project, easing communication constraints to ensure proper documentation. For projects that did not receive pre-qualification, this can be the first formal communication of the project between the customer and the program administrator. The program logic anticipates some projects transferring to the Self-Direction Credit program, including the buyout of engineering funded by RMP.
10. An approval letter notifies the customer of project acceptance for credits.
11. Customers can revise payback calculations to include the credits. This can free-up capital to invest in other projects.
12. EEMs reduce energy consumption at the customer's facility.
13. Reduced energy consumption contributes to meeting annual program targets.
14. Customers see energy cost reductions and possibly operations/maintenance benefits.

15. The program administrator (and sometimes the PM) inspect and verify installation of measures.
16. The final report documents verification. Verification ensures that expected savings occur.
17. The program administrator notifies RMP of project completion. The program administrator conducts a quality control review and assigns the project for cost recovery. RMP processes program credits to the customer account.
18. The customer receives program credit. Credit on monthly bills for length of credit term reduces the payback period for the project. RMP recovers cost for engineering analysis used to identify the project, if applicable.
19. Customers conduct additional self-directed capital improvements due to familiarity with costs and benefits of efficiency projects and success with credit on bills.
20. Customers can opt out of 50 percent of efficiency charge so long as they have no remaining cost-effective EE projects (cost-effective being with payback periods from one to five years before the credit).

As part of the program evaluation, the evaluation team compared program outcomes in place with the outcomes expected in the logic model. In order to make this comparison, the evaluation team identified indicators for each expected outcome as well as sources of indicator data. In some cases, these indicators are directly observable from program tracking data or other archives; in other cases, indicators are observed through analysis of survey or interview responses. Table 2 identifies key indicators and data sources for Utah's Self-Direction Credit program outcomes (short-, medium-, and long-term) shown in the logic model, above.

**Table 2. Indicators and Data Sources for Program Outcomes**

Outcome	Indicator	Data Source
<b>Short-Term Outcomes</b>		
Customers and specialized engineering consultants are aware of the program.	Non-participant awareness; energy engineers identified by RMP	Customer interviews; engineer resource list
Projects are approved for credits before investment is made.	Timeline for pre-approved projects	Program tracking data; customer interviews
Risk is reduced by verifying initial equipment and operation.	Site visits occurring for pre-approved projects	Program tracking data; customer interviews
Customers can revise payback calculations.	Customers use pre-approval in decision process.	Customer interviews
Installation of measures and savings is verified.	Verification in project file; inspection date	Project files; program tracking data
Participants see Credit offset Efficiency Charge and have shorter payback periods.	Customers receive credits; cost-recovery date	Program tracking data; customer interviews
<b>Mid-Term Outcomes</b>		
Customers work with specialized consultants to identify opportunities and establish plans.	Customers choose to self-direct savings through consultants.	Customer interviews
Measures are installed and savings are estimated.	Applications include measures and savings.	Customer interviews; energy engineer interviews
kW and/or kWh are reduced at customer facility.	Customers realize expected savings.	Customer interviews; ex post impact savings
Customers conduct additional self-directed savings projects.	Repeat participation	Program tracking data; customer interviews
<b>Long-Term Outcomes</b>		
Energy use reduction targets are achieved.	RMP meets targets.	Reported savings
Customers observe energy cost savings and other benefits.	Customers realize expected savings.	Customer interviews
Customers have no remaining cost-effective efficiency and opt out.	Opt out of participation	Program tracking database



## 2 Evaluation Methodology

The following section describes the evaluation methodologies used in Utah’s 2012-2013 Self-Direction Credit program. The evaluation team developed and informed these methods through an independent review of evaluation best practices.<sup>9</sup>

### 2.1 Impact Evaluation Methodology

This section summarizes the impact evaluation methods used to develop project- and program-level realization rates for the Self-Direction Credit program. Findings provide RMP staff with the feedback they need to increase program efficacy and to advance the research and policy objectives of the Utah Public Service Commission by providing an independent quantitative review of program achievements.

The impact evaluation of Utah’s Self-Direction program aimed to characterize energy and demand impacts for incented projects in the 2012 through 2013 program years, including the following:

- » Quantifying the impacts of all measures and activities on annual gross energy consumption while accounting for any interactions among technologies
- » Establishing post-implementation performance profiles for installed measures and activities
- » Explaining discrepancies between the results of this study and the reported savings estimates

Evaluation metrics and parameters reported through this study include the following:

- » Gross program demand and energy savings estimates and realization rates for incented projects
- » Energy usage profiles for C&I technologies metered through on-site measurement and verification (M&V) activities

See section 3 for gross and net impact results.

The Self-Direction programs include only custom projects. The evaluation team used a combination of International Performance Measurement and Verification Protocol (IPMVP) Options A and B as the most common evaluation methods employed for these projects, where the evaluation team either metered the individual equipment power consumption or light operation or obtained facility data showing records of equipment operation.<sup>10</sup>

#### 2.1.1 Project File Reviews

A thorough review of the Self-Direction project files allowed the evaluation team to increase the accuracy of calculated measure savings and demand reductions, thereby ensuring that they were representative of installed conditions.

<sup>9</sup> See Appendix B for detail on EM&V Best Practices.

<sup>10</sup> For more information regarding IPMVP options and definitions, see [http://www.evo-world.org/index.php?option=com\\_content&view=article&id=272&Itemid=397&lang=en](http://www.evo-world.org/index.php?option=com_content&view=article&id=272&Itemid=397&lang=en).

The evaluation team reviewed each project file, characterizing any data gaps, looking for consistency issues, and checking the accuracy of the information used to estimate project-level savings. The team also assessed the variability and uncertainty between RMP’s input assumptions and secondary studies, along with the relative impact on energy and demand savings. This type of sensitivity analysis was crucial in prioritizing and aligning task resources. The results of this effort informed the development of recommendations for input assumption revisions based on prior evaluation studies, upcoming policy requirements, and geographic factors.

Figure 2 presents an example of the overview of parameters verified through the project file review process. Overall, the evaluation team found the Self-Direction project files and assumptions to be sound and within industry standards. Note: the values below are fictitious and not actual examples from the RMP database.

**Figure 2. Parameters Verified Through Project File Reviews (Example)**

Site Name	Sample
Site Address	Address
Project #	SDC00_000081
Program	Utah Self-Direct
Customer Name	Contact name
Program Year	2013
Project Description	LED lighting retrofit
Measure Category(ies)	Lighting
Installation Date	May 2013
Incentive Amount	\$30,860
Navigant M&V Report Author	Navigant
Navigant Field Staff Present on Site	Navigant
Site Visit Date(s)	August 26, 2014
Site Visit Type	Verification and logger installation

### 2.1.2 Sampling Frame Development

For the evaluation of the Self-Direction Credit program, the evaluation team adopted a *ratio estimation* approach to sampling, which achieved increased precision and reliability by taking advantage of a relatively stable correlation between an auxiliary variable and the variable of interest (i.e., the ratio of actual savings to program-reported savings). This approach served to reduce the overall coefficient of variation within the population.

Moreover, the evaluation team proportionately stratified the sample by program-reported savings into three subgroups (i.e., strata). The evaluation team selected projects proportionately within each stratum to ensure the following:

1. The evaluation of the largest projects and contributors to program performance
2. The fair representation of medium and smaller projects in the evaluation

The impact evaluation achieved a 90/4 confidence and precision across PY 2012-2013 by energy (kWh) savings.<sup>11</sup> Table 3 provides an overview of the impact evaluation framework, representing 66 percent of the reported Self-Direction Credit program savings.

**Table 3. Overview of the Impact Evaluation Sampling Framework**

Sample Strata	kWh Threshold for Stratification (lower limit)	Total Number of Projects	Projects in Sample	Program Reported MWh	Gross Sample Reported MWh	Portion of Reported Savings Evaluated <sup>12</sup>
1	3,700,000	3	3	13,942	13,942	100%
2	900,000	7	6	16,456	14,057	85%
3	0	49	7	14,990	2,051	14%
<b>Total</b>	-	<b>59</b>	<b>16</b>	<b>45,388</b>	<b>30,050</b>	<b>66%</b>

### 2.1.3 Gross Energy and Demand Realization Rate Calculation

The impact evaluation team combined gross energy and demand realization rates for each project in the impact evaluation sample to form *program-level* realization rates for each program year. The team researched the following technical issues in order to accurately determine gross program impacts and realization rates:

- » The appropriateness of the pre-installation technology performance baseline via project file and secondary literature review
- » Installation and quantity of claimed measures
- » Baseline and measure performance characteristics of the measures installed, and revision of performance variables (i.e., operating hours) as needed

<sup>11</sup> The evaluation team planned for 90/10 by program and state.

<sup>12</sup> This percentage represents the portion of the reported program savings that fell within the bounds of the evaluation sample frame. It does not represent the relation between the reported and evaluated savings numbers in the prior two columns.

- » Load shapes for the EEMs installed through the programs
- » Demand savings (kW) and energy savings (kWh) impacts of the efficiency measures installed for sampled projects<sup>13</sup>

The program-level realization rate is the ratio of the product of case weights and *verified* savings estimates from sampled projects and the product of case weights and *reported* savings estimates, as illustrated in the following equation:

$$\text{Program Realization Rate}_i = \frac{\sum_{i=1}^n \text{Case Weight}_i \times \text{Verified Savings Estimate}_i}{\sum_{i=1}^n \text{Case Weight}_i \times \text{Reported Savings Estimate}_i}$$

See Section 3 for energy and demand realization rate results.

#### 2.1.4 Program Cost-Effectiveness

The cost-effectiveness of utility-funded programs in the state is typically analyzed using tests prescribed by the California Standard Practice Manual.<sup>14</sup> For the purposes of this evaluation, RMP specifically required the following cost-effectiveness tests:

- » PacifiCorp Total Resource Cost Test (PTRC)
- » Total Resource Cost Test (TRC)
- » Utility Cost Test (UCT)
- » Ratepayer Impact Measure Test (RIM)
- » Participant Cost Test (PCT)

The evaluation team worked with RMP to understand the PTRC and construct a tool that calculates the PTRC at measure, program, and portfolio levels. Table 4 presents details of the cost-effectiveness tests accepted by RMP.

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<sup>13</sup> The evaluation team combined individual measure-strata realization rates into a weighted average realization rate for the given measure, as well as for the sample as a whole. The team applied the sample-level weighted realization rate to measures in the population not reflected or under-represented in the sample. The team also applied measure-level weighted realization rates to measures with sufficient representation in the sample (i.e., lighting and PC Power management) in order to extrapolate them to the population.

<sup>14</sup> The California Standard Practice Manual is an industry-accepted manual identifying cost and benefit components and cost-effectiveness calculation procedures. Definitions and methodologies of these cost-effectiveness tests can be found at [http://www.energy.ca.gov/greenbuilding/documents/background/07-I\\_CPUC\\_STANDARD\\_PRACTICE\\_MANUAL.PDF](http://www.energy.ca.gov/greenbuilding/documents/background/07-I_CPUC_STANDARD_PRACTICE_MANUAL.PDF).

**Table 4. Details of Cost-Effectiveness Tests<sup>15</sup>**

Test	Acronym	Key Question Answered	Summary Approach
Participant Cost Test	PCT	Will the participants benefit over the measure life?	Comparison of costs and benefits of the customer installing the measure
Utility Cost Test	UCT	Will utility revenue requirements increase?	Comparison of program administrator costs to supply-side resource costs
Ratepayer Impact Measure	RIM	Will utility rates increase? Considers rate impacts on all participants, and potential for cross-subsidization	Comparison of program administrator costs and utility bill reductions to supply-side resource costs
Total Resource Cost Test	TRC	Will the total costs of energy in the utility service territory decrease?	Comparison of program administrator and customer costs to utility resource savings
PacifiCorp Total Resource Cost Test	PTRC	Will the total costs of energy in the utility service territory decrease when a proxy for benefits of conservation resources is included?	Comparison of program administrator and customer costs to utility resource savings including 10 percent benefits adder

## 2.2 *Validity and Reliability of Impact M&V Findings*

The evaluation team identified several sources of uncertainty associated with estimating the impacts of the Self Direction Credit program. Examples of such sources include the following:

- » Sample selection bias
- » Physical measurement bias (e.g., meter bias, sensor placement, and non-random selection of equipment or circuits to monitor)
- » Engineering analysis error (e.g., baseline construction, engineering model bias, and modeler bias)
- » Limited data (i.e., short-term trend data for facilities that may have long-term variations)

The evaluation team remained cognizant of these issues throughout the evaluation process and adopted methods to reduce the uncertainty arising from these sources, thereby improving the validity and reliability of study findings.

<sup>15</sup> “Understanding Cost Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy – Makers” NAPEE, November 2008.

<http://www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf>.

### 2.2.1 Reducing Uncertainty from Sample Selection Bias

Evaluators recognize the problem that selection bias creates for program evaluation, even when adhering to impact evaluation sample design protocols, if the selected projects did not choose to participate in the evaluation effort. In an effort to minimize non-response bias, the evaluation team established and implemented the following recruitment protocols:

- » Notified participants as early as possible in the evaluation process
- » Accurately characterized M&V activities and the duration of the evaluation process
- » Maintained brief and frequent communication with participants and informed them of any changes/additions to the evaluation effort

The intent of these protocols was to give each participant ample time to prepare documentation and secure the appropriate resources to support the evaluation effort. Brief and frequent contact with each participant ensured the participant remained engaged.

### 2.2.2 Reducing Uncertainty from Physical Measurement Error

Inevitable error occurs with all physical measurement. For the impact evaluation of the Self-Direction Credit program, a large measurement effort involved installing lighting/current/power loggers to determine the operating characteristics of incandescent technologies across a broad range of applications. The evaluation team took the following steps to minimize the possible introduction of uncertainty resulting from bias/error by this process:

- » **Backup Loggers:** Prior evaluation experience indicates that lighting loggers sometimes fail in the field due to flickering or battery issues. To account for this possibility, the evaluation team deployed backup loggers for each site to ensure meeting the sample size requirements even if a percentage of the loggers failed.
- » **Logger Calibration:** To minimize measurement error from improper calibration of the lighting/current/power loggers, the evaluation team checked all loggers used in the field to ensure proper calibration prior to deployment. Field staff received training to use consistent measurement intervals whenever possible, and to synchronize the logger deployment activities (i.e., time delay), to ensure proper data comparisons across a uniform period.
- » **Logger Placement:** The field staff used a prescribed protocol for the placement and installation of loggers on circuits (i.e., current transformer placement) and fixtures (i.e., uniform distance from the lamps) to minimize biases arising from the improper placement of loggers.
- » **Logging Period:** Usage patterns for retrofit measures may vary from month to month, so sampling for a short duration could introduce a degree of error into the overall results. The evaluation team reduced this type of error by typically deploying loggers for a minimum of four weeks, and supplemented them with available facility records (i.e., Energy Management System [EMS] trends, production logs). The team calibrated the facility records, which spanned multiple months or years, with the collected logger data.

- » **Logged Data Quality:** Poor quality data can also be a significant source of error and uncertainty. The evaluation team applied various quality assurance checks to minimize the potential impact of this problem, including the use of consistent spot measurements comparable against both the EMS and logger data, and qualified analysts review all logger files to ensure results represented the investigated technologies.
- » **Lighting Logger Review:** The evaluation team reviewed lighting loggers to identify inconsistencies in operating characteristics and/or extended periods of inactivity. The team followed up with field staff and facility managers to ensure that the suspicious findings were in fact reasonable, and removed inaccurate results from the analysis.

### 2.2.3 Reducing Uncertainty from Engineering Analysis Error

The evaluation team adopted the following protocols to minimize uncertainty from engineering analysis error in this study:

- » Peer review of all project analysis findings to ensure the consistent use of methods and assumptions throughout the impact evaluation
- » Data collection methods to yield appropriate inputs into the analysis models and review of all field observations with the evaluation team

## 2.3 Net-to-Gross (NTG) Estimates

The evaluation team used interviewee self-reported responses to assess the program’s influence on the participants’ decisions to implement EEMs and determine what would have occurred absent program intervention. This estimation included an examination of the program’s influence on three key characteristics of the project: its timing, its level of efficiency, and its scope (i.e., the size of the project). This estimate represents the amount of savings attributed to the program that would have occurred without its intervention, referred to as “*free-ridership*.”

The team’s measurement of net savings then estimated program influence on the broader market because of the indirect effects of the program’s activities. This estimate, referred to as “*spillover*,” represents the amount of savings that occurred because of the program’s intervention and influence but not currently reported by any PacifiCorp program. Navigant classified spillover savings into two categories based on measure types: “*like*” spillover and “*unlike*” spillover.

- » “**Like**” spillover – energy savings associated with additional high efficiency equipment installed outside of the program of the same end-use as what that participant installed through the program. For example, if the participant installed high-efficiency lighting fixtures as part of the program, “like” spillover would be limited to any additional high efficiency lighting installed without any assistance from RMP but influenced by program activity. This type of spillover is quantifiable using program tracking savings as a proxy.

- » **“Unlike” spillover** – the savings associated with any other high efficiency equipment installed outside of the program that are not of the same end-use category as what was installed through the program. Continuing the example above, if the participant installed high efficiency lighting through the program, the high efficiency HVAC equipment installed outside of the program would be considered “unlike” spillover as it is not the same end-use. This type of spillover is not quantifiable, but it is useful to document and track.

A program’s net savings are adjusted by both free-ridership and spillover savings at the measure level and then extrapolated to the program. The net savings are the program-reported savings minus any free-ridership savings, plus any identified spillover savings – as shown in the following equation:

$$\text{Net Program Savings} = \text{Gross Program Savings} - \text{Free-Ridership Savings} + \text{Spillover Savings}$$

Often, this finding is described as a “net-to-gross ratio,” defined as the net program savings divided by the gross program savings, or:

$$\text{Net-to-Gross (NTG) Ratio} = \text{Net Program Savings} / \text{Gross Program Savings}$$

The evaluation team calculated the Utah Self-Direction Credit NTG ratio of 1.04 using a different self-reported sample of 22 projects representing close to 23 percent of the total reported savings. Section 3.2 provides the results of the NTG analysis.<sup>16</sup>

## 2.4 Process Evaluation Methodology

This section describes the methodology used to complete the process evaluation.

### 2.4.1 Overview of Steps in the Process Evaluation

The evaluation team undertook the following activities in order to meet the objectives of this evaluation:

- » **Develop Process Evaluation Research Questions.** The evaluation team and RMP staff established key process evaluation questions through the development of the PY 2012-2013 evaluation plan.
- » **Review Program Documentation.** The evaluation team reviewed program documentation including regulatory filings, brochures, application forms, and websites.
- » **Verify Logic Model.** The evaluation team worked with program staff to verify that the logic model for the Self-Direction Credit program describes the intended program design, activities, outputs, and outcomes.

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<sup>16</sup> Where possible, Navigant adhered to the NTG guidelines as set forth by the Department of Energy (DOE) Uniform Methods Project (UMP) when calculating the NTG ratios. (Dan Violette and Pamela Rathbun, 2014, *Estimating Net Savings: Common Practices*, National Renewable Energy Laboratory [NREL]).



- » **Collect Process Data.** The evaluation team collected process data through interviews with program staff, interviews with near-participants, and telephone surveys with participating customers.
- » **Analyze and Synthesize Process Data.** The evaluation team assessed the effectiveness of the program processes by analyzing in-depth interview data and participant survey data.

#### 2.4.2 Process Evaluation Research Questions

Discussions with program staff and a review of the program theory and logic identified seven overarching research questions to guide the process evaluation:

1. What are the program goals, concept, and design?
2. Do program staff and administrators have the resources and capacity to implement the program as planned, and if not, what more is needed?
3. Is the program being delivered in accordance with the logic model?
4. Is the program marketing effective? Specifically, how do customers find out about the program?
5. What is the program influence on participant actions? Specifically, what do participants identify as most important to their projects (i.e., program information, incentive/credit, payback, engineering, and their own company goals)?
6. What barriers are preventing customers from taking actions to reduce energy consumption and demand, and which jeopardize program cost-effectiveness?
7. Are participants achieving planned outcomes? Specifically, are participants feeling satisfied?

Evaluation staff used a mixed-methods approach to explore these questions including, program documentation review, interviews of program staff, near-participants, and participants. Table 5 shows the seven research questions and associated methods used to answer each.

**Table 5. Process Evaluation Research Question Approach**

	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7
Program Documentation Review	X	X	X	X			
Program Staff and Administrator Interviews	X	X	X	X			
Participant Surveys				X	X	X	X

Section 4.2 provides the answers to these seven questions.

#### 2.4.3 Program Documentation Review

The evaluation team reviewed program marketing materials, websites, program manuals, savings measurement tools regulatory filings, annual reports, previous evaluations, and project tracking data.

This review was designed to identify how the program is marketed, how trade allies are supported, and how the process for enrollment, administration, and tracking works.

#### **2.4.4 Logic Model Verification**

The evaluation team verified that the existing program logic model, developed in 2011 for the Self-Direction Credit program in Utah, continued to represent the program theory during the current evaluation.<sup>17</sup> To do so, the team used results from program administrator interviews and reviewed evaluation findings to assess whether the program produced the intended activities, outputs, and outcomes as defined in the 2011 model.

#### **2.4.5 Process Data Collection Activities**

Interviews and surveys with program staff and participants supported the development of the program overview and logic model, as well as aided in the evaluation conclusions and recommendations for the Self-Direction Credit program. The evaluation team reviewed all interview response data for missing or erroneous entries before tabulating the frequency of similar responses within categories. After they analyzed data from each data collection activity individually for findings, the evaluation team identified common process findings across activities.

##### ***2.4.5.1 Program Staff and Administrator Interviews***

The evaluation team interviewed one program manager and one program administrator with the following objectives:

- » Understand the design and goals of the Self-Direction Credit program
- » Understand any program changes that have been implemented in Utah going into the 2012-2013 cycle, and changes occurring during this cycle
- » Follow up on how recommendations were implemented (or not) from previous evaluations
- » Support confirmation or revision of the existing program logic model
- » Identify program strengths from program staff perspective
- » Identify program weaknesses and opportunities for improvement from the program staff perspective
- » Identify other actionable ideas the program staff hopes to gain from the evaluation

##### ***2.4.5.2 Participant Interviews***

The evaluation team conducted four semi-annual telephone surveys. Due to a change in program evaluation objectives, these surveys were not identical. All four waves of surveys included questions about program influence and satisfaction. The last surveys also included additional process questions on

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<sup>17</sup> RMP recently revamped the Self-Direction Credit program in Utah to be a part of the *wattsmart* Business program. However, the program theory and logic model created for the 2011 Self-Direction Credit program remained current as of this writing. Appendix C displays the logic model for the new *wattsmart* Business program theory.

how customers learned about the program and the equipment installed.<sup>18</sup> The evaluation team did not re-sample from the measures completed during previous cycles.

Table 6 identifies the timing and sampling frame for the 22 participant surveys. Due to survey restructuring, the process team only asked the complete list of process questions to eight participants, those surveyed in the first half of 2012 and the second half of 2013.

**Table 6. Sample Frame for Participant Surveys in 2012 and 2013**

Time Period	Sample	Unique Sites	Program Projects
First Half 2012 (Projects completed Jan. 1, 2012-June 30, 2012)	6	12	15
Second Half 2012 (Projects completed July 1, 2012-Dec. 31, 2012)	9	14	17
First Half 2013 (Projects completed Jan. 1, 2013-June 30, 2013)	5	11	11
Second Half 2013 (Projects completed July 1, 2013-Dec. 31, 2013)	2	15	15
<b>Total</b>	<b>22</b>	<b>52</b>	<b>58</b>

Participant surveys were designed to do the following:

- » Describe how customers come to participate in the program
- » Understand overall customer satisfaction with the program, including (where appropriate) marketing, application materials, inspections, customer service, and the incentive or credit
- » Understand program influence on customer actions, including free-ridership and spillover
- » Identify barriers customers are facing that prevent increasing energy efficiency

<sup>18</sup> After the first semi-annual survey, conducted as interviews with Self-Direction Credit participants, the program evaluation direction was to focus only on net savings and drop the process evaluation. The program direction changed again before the last survey to re-include process evaluation.

### 3 Impact Evaluation Findings

This section summarizes the impact evaluation findings for projects included in the PY 2012-2013 impact evaluation sample.

The evaluation team characterized savings as “reported” and “evaluated.” Reported savings present project savings estimated at the time of measure installation. Evaluated savings represents sampled energy savings verified at the time of evaluation, with results extrapolated to the entire population.

#### 3.1 Gross kW and kWh Savings

The impact evaluation team conducted on-site verification activities for 16 of the 59 projects (representing 66 percent of reported savings) that participated during Utah’s Self-Direction Credit PY 2012-2013. The program-level *demand savings* realization rate was 113 percent, and the gross program *energy savings* realization rate was 91 percent. Table 7 provides the *program-level* reported and evaluated kW and kWh realization rates.

**Table 7. Program-Level Realization Rates for Utah Self-Direct**

Program Year	Program-Reported kW	Gross Program Evaluated kW	Gross Program kW Realization Rate	Program-Reported kWh	Gross Program Evaluated kWh	Gross Program kWh Realization Rate
2012	2,198	2,201	100%	15,514,585	14,557,457	94%
2013	2,907	3,593	124%	29,873,206	26,657,992	89%
All	5,106	5,794	113%	45,387,791	41,215,449	91%

The realization rates reflect the difference between expected savings at the time of installation and evaluated savings one to three years after project completion. However, customers often modify their operating profiles for reasons unrelated to program influence. For example, the C&I sector is particularly sensitive to economic changes as production throughput, occupancy, and customer demand drive operating schedules. Changes in equipment usage also affect the efficiency of the baseline and replacement technologies for completed projects in the Self-Direction Credit program. Throughout the impact evaluation, the evaluation team remained cognizant of these factors, which can influence project-level savings. Table 8 provides *project-level* energy savings and realization rates for the 16 projects in the impact evaluation sample.

**Table 8. Utah’s Self-Direction Project-Level Energy (kWh) Realization Rates**

Project ID	Year	Measure Group	Reported kWh	Evaluated kWh	Realization Rate
SDC00_000104	2013	Motors	6,344,299	1,341,154	21%
SDC00_000102	2013	Motors	3,848,762	4,362,003	113%
SDCSe_70144	2012	Lighting	3,749,344	4,392,183	117%
SDC00_000100	2013	HVAC	3,603,570	3,652,415	101%
SDC00_000103	2013	Compressed Air	2,853,791	2,450,757	86%
SDC00_000096	2013	Lighting	2,510,983	2,608,357	104%
SDC00_000080	2012	Lighting	2,114,046	2,642,215	125%
SDC00_000031	2012	Lighting	2,023,340	1,944,505	96%
SDC00_000081	2013	Lighting	951,172	890,508	94%
SDC00_000041	2013	Lighting	861,975	792,623	92%
SDC00_000060	2013	Lighting	589,428	496,713	84%
SDC00_000050	2012	HVAC	322,500	322,500	100%
SDC00_000063	2012	Controls	124,830	184,857	148%
SDC00_000067	2012	Lighting	89,276	77,412	87%
SDC00_000064	2012	Lighting	39,523	37,816	96%
SDC00_000082	2013	Motors	23,329	42,595	183%

Some projects included multiple measures with higher levels of realization rate variability. Table 9 displays the 4 projects that yielded evaluated energy savings that varied from reported values by more than 10 percent.

**Table 9. Self-Direction Credit Projects with High Variance in Realization Rates**

Project ID	Measure	kWh Realization Rates	Notes
SDC00_000104	Pump with VFD	21%	Gas pumps regularly cycled on and off at facility, reducing the verified connected load and hours of use. This, along with the lack of motor resizing as claimed, contributed to the low realization rate.
SDC00_000080	Package Lighting	125%	Occupancy sensors provided substantially more energy savings than expected.
SDC00_000063	Heated Air Dryer	148%	Dessicant dryer heat was cycling instead of running continuously.
SDC00_000082	Well Pump Motor Downsizing	183%	Substantial changes at facility resulted in reduced pump operation and increased savings. Demand savings decreased due to decommissioning of one affected pump.

Further explanation for a few of the more atypical *measure-level* realization rates are as follows:

- » Projects **SDC00\_000104** was a natural gas field with multiple pumps installing VFDs, but run hours were less than the *ex-ante* values resulting in reduced savings. The facility cycles the gas pumps on and off regularly and one pump, consisting of roughly one fifth of the claimed savings, was not operating during the verification site visit. The original project also claimed savings from resizing of motors which did not occur, further contributing to reduced savings.
- » Project **SDC00\_000082** was a production facility which had undergone substantial changes, resulting in reduced pump load and increased savings.

Table 10 displays the *project-level* demand (kW) savings and realization rates for the 24 projects in the impact evaluation sample.<sup>19</sup>

**Table 10. Utah’s Self-Direction Project-Level Demand (kW) Realization Rates**

Project ID	Year	Measure Group	Reported kW	Evaluated kW	Realization Rate
SDC00_000104	2013	Motors	363	176	48%
SDC00_000102	2013	Motors	214	360	168%
SDCSe_70144	2012	Lighting	551	570	103%
SDC00_000100	2013	HVAC	310	300	97%
SDC00_000103	2013	Compressed Air	77	292	379%
SDC00_000096	2013	Lighting	389	373	96%
SDC00_000080	2012	Lighting	215	204	95%
SDC00_000031	2012	Lighting	247	237	96%
SDC00_000081	2013	Lighting	161	166	104%
SDC00_000041	2013	Lighting	178	180	101%
SDC00_000060	2013	Lighting	55	56	102%
SDC00_000050	2012	HVAC	209	209	100%
SDC00_000063	2012	Controls	13	13	102%
SDC00_000067	2012	Lighting	7	19	268%
SDC00_000064	2012	Lighting	4	4	98%
SDC00_000082	2013	Motors	23	15	65%

<sup>19</sup> Sites with no claimed demand savings show a realization rate of “NA.”

### 3.2 Program-Level Net Savings Results

The evaluation team calculated an average NTG ratio of 1.04 using self-reported participant responses to free-ridership and spillover survey and interview questions for the current PY 2012-2013 evaluation (Table 11).

**Table 11. Savings-Weighted Program Influence for PY2012-2013**

Part of Year	Free-Ridership Score	Like Spillover Score	Unlike Spillover Score <sup>20</sup>	Net Savings Ratio
First Half 2012 (completed Jan. 1, 2012-June 30, 2012)	0.01	0.00	Yes, Not Scored	0.99
Second Half 2012 (completed July 1, 2012-Dec. 31, 2012)	0.05	0.03	Yes, Not Scored	0.99
First Half 2013 (completed Jan. 1, 2013-June 30, 2013)	0.00	0.37	Yes, Not Scored	1.37
Second Half 2013 (completed July 1, 2013-Dec. 31, 2013)	0.00	0.00	None	1.00
<b>Savings Weighted Total</b>	<b>0.01</b>	<b>0.05</b>	<b>NA</b>	<b>1.04</b>

Table 6 in section 2.4.5 provides the number of surveys completed during the identified timeframes.

Table 12 provides evaluated program-level demand and energy savings with the NTG ratio of 1.04 applied to evaluated savings estimates.

**Table 12. Program-Level Net Realization Rates for Utah’s Self-Direction Credit Program**

Program Year	Program Reported kW	Program Evaluated kW	kW Realization Rate	Program Reported kWh	Program Evaluated kWh	kWh Realization Rate
2012	2,199	2,289	104%	15,514,585	15,139,197	98%
2013	2,907	3,737	129%	29,873,206	27,735,796	93%
<b>All</b>	<b>5,106</b>	<b>6,026</b>	<b>118%</b>	<b>45,387,791</b>	<b>42,874,993</b>	<b>94%</b>

### 3.3 Cost-Effectiveness Calibration and Analysis

The evaluation team initialized and validated the cost-effectiveness model used for this evaluation using prior inputs and outputs from previous evaluation cycles, to ensure similar inputs yielded similar outputs for the current cycle. The evaluation team worked through a range of input assumptions pertaining to avoided cost data formats, financial assumptions regarding discount and escalation rates,

<sup>20</sup> Research determined whether unlike spillover was present; however, Navigant recommends further research to estimate potential savings. See Section 2.3 for additional detail on like and unlike spillover.

participant costs and benefits, and other input parameters. Table 13 provides an overview of cost-effectiveness input values used by the evaluation team in the cost-effectiveness analysis.

**Table 13. Utah Self-Direction Cost-Effectiveness Evaluation Input Values**

Input Description	2012	2013	2012-2013
Discount Rate	7.17%	6.88%	-
Inflation Rate	1.80%	1.90%	-
Commercial Line Loss	8.71%	8.71%	8.71%
Industrial Line Loss	5.85%	5.85%	5.85%
Measure Life	13 Years	13 Years	13 Years
Commercial Retail Rate	\$0.079	\$0.082	-
Industrial Retail Rate	\$0.054	\$0.056	-
Gross Customer Costs	\$4,485,732	\$6,876,082	\$11,361,814
Program Costs	\$4,161,510	\$5,894,571	\$10,056,082
Program Delivery	\$607,195	\$393,706	\$1,000,901
Incentives	\$3,554,316	\$5,500,865	\$9,055,181

*The discount rates and inflation rates are based on the 2011 IRP for 2012 and the 2013 IRP for 2013. Measure specific load shapes and the System Load Shape Decrement were used for all program years.*

*Program Delivery includes: engineering, program implementation, marketing, and utility administration costs.*

Table 14 through Table 16 illustrate the costs, benefits, and benefit/cost ratio for the cost-effectiveness tests used in this evaluation using the calculated NTG ratio of 1.04.

**Table 14. UT Self-Direct Cost-Effectiveness Results – 2012 (1.04 NTG)**

Benefit/Cost Test Performed	Evaluated Gross kWh Savings	Evaluated Net kWh Savings	Evaluated Costs	Evaluated Benefits	B/C Ratio
PacifiCorp Total Resource Cost Test (PTRC)	14,556,920	15,139,197	\$5,272,356	\$13,640,192	2.59
Total Resource Cost Test (TRC)	14,556,920	15,139,197	\$5,272,356	\$12,400,174	2.35
Utility Cost Test (UCT)	14,556,920	15,139,197	\$4,161,510	\$12,400,174	2.98
Rate Impact Measure Test (RIM)	14,556,920	15,139,197	\$14,118,079	\$12,400,174	0.88
Participant Cost Test (PCT)	14,556,920	15,139,197	\$4,485,732	\$13,127,939	2.93



**Table 15. UT Self-Direct Cost-Effectiveness Results – 2013 (1.04 NTG)**

Benefit/Cost Test Performed	Evaluated Gross kWh Savings	Evaluated Net kWh Savings	Evaluated Costs	Evaluated Benefits	B/C Ratio
PacifiCorp Total Resource Cost Test (PTRC)	26,669,034	27,735,796	\$7,544,832	\$19,121,239	2.53
Total Resource Cost Test (TRC)	26,669,034	27,735,796	\$7,544,832	\$17,382,945	2.30
Utility Cost Test (UCT)	26,669,034	27,735,796	\$5,894,571	\$17,382,945	2.95
Rate Impact Measure Test (RIM)	26,669,034	27,735,796	\$23,789,791	\$17,382,945	0.73
Participant Cost Test (PCT)	26,669,034	27,735,796	\$6,876,082	\$22,707,808	3.30

**Table 16. UT Self-Direct Cost-Effectiveness Results – PY 2012-2013 Combined (1.04 NTG)**

Benefit/Cost Test Performed	Evaluated Gross kWh Savings	Evaluated Net kWh Savings	Evaluated Costs	Evaluated Benefits	B/C Ratio
PacifiCorp Total Resource Cost Test (PTRC)	41,225,955	42,874,993	\$12,817,188	\$32,761,431	2.56
Total Resource Cost Test (TRC)	41,225,955	42,874,993	\$12,817,188	\$29,783,119	2.32
Utility Cost Test (UCT)	41,225,955	42,874,993	\$10,056,082	\$29,783,119	2.96
Rate Impact Measure Test (RIM)	41,225,955	42,874,993	\$37,907,870	\$29,783,119	0.79
Participant Cost Test (PCT)	41,225,955	42,874,993	\$11,361,814	\$35,835,746	3.15

## 4 Process Evaluation Findings

This section describes the findings from the Self-Direction Credit process evaluation data collection activities including participant surveys and interviews with program staff.

### 4.1 Participant Findings

The evaluation team surveyed 22 participants of the program’s 52 participants over the course of two surveys.<sup>21</sup> Respondents’ firms represented a range of industries, including manufacturing, public administration, arts, entertainment, and recreation, among others. The most common industry was manufacturing, which included 41 percent of respondents. Table 17 provides a distribution of industry types included in the process evaluation sample.

**Table 17. Primary Industry of Self-Direction Credit Respondents**

Primary Activity	Respondents	Percent
Manufacturing	9	41%
Arts, Entertainment, and Recreation	4	18%
Accommodation	1	5%
Health Care	1	5%
Nonprofits and Religious Organizations	1	5%
Public Administration/Governmental Services	1	5%
Mining and Oil	1	5%
Higher Education	1	5%
Food Processing	1	5%
Airport Services and Equipment	1	5%
Don't Know/Not Sure	1	5%
<b>Total</b>	<b>22</b>	<b>100%</b>

#### 4.1.1 Program Satisfaction

Participants reported high overall satisfaction with the program. The questions relating to participant satisfaction differed between the first and second participant surveys. Therefore, the evaluation team has reported satisfaction findings in two parts.

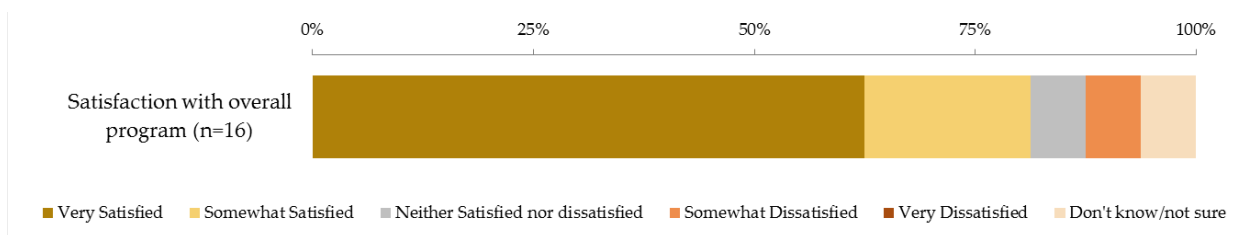
<sup>21</sup> While Navigant conducted four total surveys with participants, only the first and last survey included process-related questions. The respondents were not necessarily the same respondents for each survey; therefore, the *n* (number of respondents) may vary by question.

For the first participant survey, the evaluation team asked respondents whether they would participate in the program again. The team used these responses as a proxy for determining whether a respondent was satisfied with their previous program experiences. Five of the six participants in the first round reported that they would participate in the Self-Direction Credit program again, suggesting that they were satisfied with the program. The remaining respondent did not comment on future participation. When asked what changes they would like to see in the Self-Direction Credit program, two respondents offered the following suggestions:

- » More aggressive incentives to encourage increased participation
- » Increased communication with the program administrator

In the second survey, the evaluation team directly asked participants to what extent they were satisfied with the program. The majority (81 percent, or 13 of 16) reported relatively high satisfaction scores; 63 percent were very satisfied and 19 percent were satisfied (see Figure 3). The remaining three participants were reported neutral, dissatisfied, and not sure, respectively. For the respondent who was reportedly dissatisfied, this individual reported a preference for incentives over credits; under the new *wattsmart* Business program, these customers have a choice of a bill credit or an incentive. The participant who was reportedly neutral in terms of satisfaction stated that the program did not apply to their business; however, the participant qualified and directed their own measure through the program. .

**Figure 3. Overall Program Satisfaction**



#### 4.1.2 Program Awareness and Motivation

Six out of eight participants indicated word-of-mouth marketing by RMP staff (i.e., account representatives and others) as the primary driver to program awareness. Other responses included previous RMP program participation and discussions with other business colleagues.

Respondents primarily identified costs and energy savings as the primary reasons their organizations participated in the program. In particular, five respondents mentioned payback period and project cost reductions as their reason for participation. Another four mentioned energy use reduction, and one indicated that it was the right thing to do. As an example, when probed on the subject, one respondent stated, “we pay into this fund; a percentage of our power bill goes into this fund and we want to recapture some of that back.” Another respondent claimed, “[we are] a large user of electricity and this program gives us an opportunity to implement energy savings measures, making our dollar go further.”

### **4.1.3 Program Process**

The evaluation team asked respondents a series of questions related to the program process as it relates to participants. From the participant perspective, the process consists of four aspects: pre-qualification (optional), application process (including engineering support), installation of energy efficiency measures, and program interactions. Regardless of whether participants conduct pre-qualification steps, all participants must submit an application with invoices and savings information following installation.

When asked about their experience with the application process, participants reported no difficulty or concerns throughout the process, in either of the two participant surveys. In the first survey, the evaluation team asked whether respondents had initial concerns about participating in the program. Again, none of the six participants from the first survey reported having any initial concerns.

#### **4.1.3.1 Pre-Qualification**

Six participants were asked why they chose to apply for pre-qualification. Three respondents reportedly applied for pre-qualification because they thought that pre-qualification was a requirement. Another respondent had applied for pre-qualification because it gave him an opportunity to “fine tune things” and was an additional check in the process. The remaining two respondents reported that they were required to calculate the credit rebate in order to “sell” the project internally and justify it given the economic climate at the time.

#### **4.1.3.2 Application Process (Including Engineering Support)**

Although the Self-Direction Credit program does not require third-party involvement in the process, more than half of the survey respondents (five out of eight) consulted a third-party engineering firm before installing their project. The level of involvement from these firms varied; one firm only served as a design and construction advisor, while another handled all steps of the application and installation process. All respondents who identified a third-party firm were satisfied with the support they received, although one participant reportedly experienced a delay in the application process due to a misunderstanding about how to acquire the application form.

When asked whether they would recommend changes to the application process, only one respondent offered a suggestion. This respondent stated that the calculated savings estimates for the pre-inspection were difficult to assess. In particular, the respondent stated that RMP required savings estimates to match down to the kW and that, “It would be nice if [RMP] were a little looser on that process.” While Navigant does not recommend decreasing the rigor of savings calculations, bringing third-party firms formally into the application process could help participants to ensure that their savings estimates are accurate and rigorous.

#### **4.1.3.3 Installation of Energy Efficiency Measures**

The process team asked eight participants about the types of measures installed through the Self-Direction Credit program; five installed non-lighting equipment while three installed lighting. The non-lighting equipment included: four VFDs fan and motors, an economizer, process air, and a snowmaker. Despite the variety of measures, the eight interviewed participants described a similar process for

installation: identifying the project, hiring or engaging contractors, and reaching out to RMP. Internal employees or contractors install the majority of the measures.

The eight participants expressed satisfaction with the measures installed and plan to keep them operating. Two participants indicated a need to replace some lighting measures since their installation, but that is not uncommon for very large lighting projects; one project included more than 600 ballasts.

Participants stated that they knew what to expect for energy savings, either because they had installed similar equipment before or because they had trusted information from their contracted engineers. Most of the participants (seven out of eight) indicated that they believed the project was delivering the savings that they expected. The one respondent that said he was not realizing energy savings said, “It seems like the bill has even increased.”

Two respondents who had installed non-lighting projects had anticipated increased control and increased safety benefits. Both of the participants reported that they had seen these benefits since their projects were completed. No participants reported information on non-energy benefits for lighting measures.

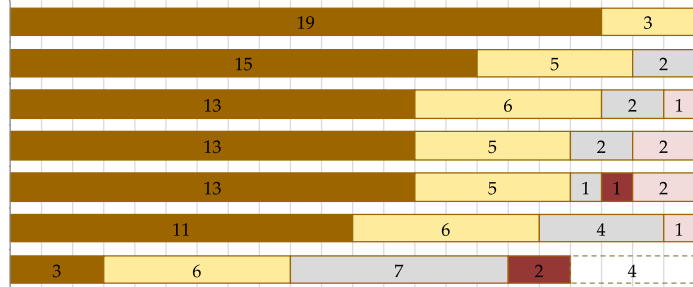
#### **4.1.3.4 Program Interactions**

The evaluation team asked participants about their interactions with RMP staff, including the context of the interactions and respondents’ satisfaction with them. Respondents reportedly interacted with program staff at various times throughout the program process, from initial contract set-up to final project approval. All six respondents who had interacted with staff claimed they were either “somewhat satisfied” or “very satisfied” with their experiences working with RMP representatives. Only one respondent voiced the concern that not all of the funds collected through the customer efficiency charge would be available for credit later.

#### **4.1.4 Program Influence**

The evaluation team asked participants several questions about the extent to which the program influenced their decision to install the measures that they implemented through the program. Respondents were asked to rate the importance of each of seven factors on a scale of one to five, with one being “not at all important” and five being “extremely important.” Relative influence varied across respondents for these factors, as shown in Figure 4.

**Figure 4. Factors Influencing Project Decisions**



Refused

The two most important factors in respondents’ choice of equipment were the “RMP credit” and “information on payback.”

**4.1.5 Further Energy Efficiency Opportunities and Barriers**

Participant surveys provided insight into the barriers to taking energy efficiency actions and respondents’ future energy efficiency plans (Table 18). Eighty-two percent of respondents claimed that their organizations could take additional actions to improve their energy efficiency. Potential projects included additional commercial lighting, controls, VFDs for pumps and fans, better monitoring, and sub-metering. Of the 18 respondents who mentioned additional projects, 11 currently are working on project plans with RMP. These responses indicate that these respondents are engaged and actively seeking energy efficiency opportunities.

**Table 18. Opportunities for Further Energy Efficiency**

Potential for Further Energy Efficiency	Count	Percent
No potential for energy efficiency	4	18%
Potential for energy efficiency, but no plans in place	6	27%
Energy efficiency plans with RMP	11	50%
Energy efficiency plans without RMP	1	5%
<b>Total</b>	<b>22</b>	<b>100%</b>

For the 18 respondents who could implement further projects, major barriers to implementing these projects included high upfront costs (33 percent) and lack of access to capital (33 percent). Another 15 percent of respondents said that there were no barriers in their way of further energy efficiency (see Table 19). One customer identified long payback periods, while another cited internal concerns that operational changes to increase energy efficiency may be too complex for the organization.

**Table 19. Barriers to Participants’ Future Energy Efficiency Plans**

Barriers to Energy Efficiency	Mentions	Most Important	Percent Most Important
High upfront cost	9	6	33%
Lack of access to capital	8	6	33%
None	4	4	22%
Operational procedure changes may be too complex	1	1	6%
Long payback period	3	1	6%
<b>Total</b>	<b>25</b>	<b>18</b>	<b>100%</b>

## 4.2 Overall Process Findings

Through program staff interviews and participant surveys, the evaluation team sought to answer seven process evaluation research questions. This section lists the questions and answers offered by program staff, and participants where appropriate.

### 1. What are the program goals, concept, and design?

The Self-Direction Credit program in Utah sought to improve energy efficiency of existing equipment at large commercial and industrial sites by offering on-bill credit to customers. RMP expects this credit to shorten payback periods and allow large customers to afford and pursue additional, custom energy efficiency projects.

### 2. Do program staff and administrators have the resources and capacity to implement the program as planned, and if not, what is needed?

Program managers and administrators indicated they had sufficient resources to implement the program as planned. Participants did not indicate any challenges related to staff resources or capacity.

### 3. Is the program being delivered in accordance with the logic model?

Yes, activities and expected outputs and outcomes occurred as planned. This resulted in customers participating in the program, installing equipment, and receiving credits on their bill. Energy savings mostly met the participants’ expectations. The majority (82 percent) believed they could take additional actions to further increase energy efficiency at their organization, and most of them planned to participate in the Self Direction Credit program again.

**4. Is the program marketing effective? Specifically, how do participants find out about the programs?**

Participants reported to learn about the program through word of mouth. Respondents stated they learned about the program from another business colleague or Rocky Mountain Power staff.

**5. What is the program influence on participant actions? Specifically, what do participants identify as most important to their projects (i.e. program information, incentive/credit, payback, engineering, their own company goals, etc.)?**

Participants indicated the potential to obtain a bill credit and the ability to save energy as the two most influential factors to program participation. The evaluation team asked respondents to rank the importance of certain factors in deciding which equipment to install for each project specified. The most important factors included the Rocky Mountain Power bill credit and information on payback. This implies that the financial and informational assistance provided by the program encouraged the installation of more efficient equipment.

**6. What barriers are preventing customers from taking actions to reduce energy consumption and demand, and which jeopardize program cost-effectiveness?**

Participant respondents who thought there were further actions they could take reported costs to be a major barrier to conducting more energy efficiency projects. Specifically, 33 percent of participant respondents each reported high upfront costs and lack of access to capital. These participants have previously participated in programs to improve project financials, and the program will continue to meet this need. The program cannot address internal challenges identified by respondents.

**7. Are participants achieving planned outcomes? Specifically, are participants feeling satisfied?**

Yes, participants are achieving planned outcomes. The majority (81 percent) of participant respondents were satisfied with the overall program: 63 percent were very satisfied and 19 percent were somewhat satisfied. The dissatisfied participant reported a preference for incentives over credits; under the new *wattsmart* Business program, these customers have a choice of a bill credit or an incentive. Most respondents reported that the energy savings related to each measure met their expectations.



## 5 Program Evaluation Recommendations

### 5.1 PY 2012-2013 Recommendations

RMP should consider undertaking the following steps to improve the program experience for participants, engineers, and program staff as the Self Direction Credit program transitions to the *wattsmart* Business program.

- » **Recommendation 1. Ensure measure classifications in database are correct.** Impact evaluation activities found incorrect measure classifications in the RMP program database. Ensuring correct classifications will help with future sampling efforts and file reviews. The shift to the improved procedures under the new *wattsmart* Business program will likely remedy this issue.

### 5.2 PY 2009-2011 Recommendation Review

The evaluation team reviewed the recommendations made in the prior PY 2009-2011 program evaluation to track any progress made by RMP. The following lists the prior recommendations and the results of this review.

- » **Extend outreach to inform more C&I customers that RMP provides technical assistance.** Just 5 percent of industrial class non-participants were aware that RMP offers technical assistance or energy analysis. Since about three-quarters of non-participants (73 percent) are not aware of things that their firm can do to improve efficiency further, identifying opportunities that resonate with this population may be key to expanding the program reach. RMP may best deliver this message via email, according to non-participant preference, or through other more proactive efforts to engage customers. Because reported energy savings exceeded targets in 2011, this effort to increase participation is forward-looking if the program seeks to expand.  
*Review Results* – RMP revised the marketing campaigns to roll out the *wattsmart* Business program. It would be appropriate to reevaluate Technical Assistance efforts in the next evaluation cycle, when the *wattsmart* Business program has been in place for the entire period.
- » **Require that participants provide data for verification purposes.** The evaluation team had difficulties obtaining data for verification from two projects, which comprised 27.7 percent of program savings. Lacking actual data introduces additional uncertainty into the evaluation results. Because of difficulties in obtaining data for these two projects, which were the largest in the program and not realistically replaceable in the sample, Navigant recommends that RMP require that customers provide evaluation data as a condition of participating in the Self Direction Credit program.  
*Review Results* – Clients were generally cooperative with the evaluation data needs, although some were slow in responding to requests due to other obligations. Navigant did not encounter any refusals as in the previous program cycle.



## Utah's Self-Direction Credit Program (PY 2012-2013)

### APPENDIX

Prepared for:  
Rocky Mountain Power



Prepared by:



Navigant Consulting, Inc.  
1375 Walnut Street  
Suite 200  
Boulder, CO 80302

303.728.2500  
[www.navigant.com](http://www.navigant.com)



EMI Consulting  
83 Columbia Street  
Suite 400  
Seattle, WA 98104

206.621.1160  
[www.emiconsulting.com](http://www.emiconsulting.com)



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## Table of Contents

<b>Appendix A</b>	<b>Glossary .....</b>	<b>A-2</b>
<b>Appendix B</b>	<b>EM&amp;V Best Practices .....</b>	<b>B-8</b>
<b>Appendix C</b>	<b><i>wattsmart</i> Business Program Logic Model.....</b>	<b>C-10</b>
<b>Appendix D</b>	<b>Process Evaluation Survey Instrument.....</b>	<b>D-14</b>

## Appendix A Glossary<sup>1</sup>

**Adjustments:** For M&V analyses, factors that modify baseline energy or demand values to account for independent variable values (conditions) in the reporting period.

**Allowances:** Represent the amount of a pollutant that a source is permitted to emit during a specified time in the future under a cap and trade program. Often confused with credits earned in the context of project-based or offset programs, in which sources trade with other facilities to attain compliance with a conventional regulatory requirement. Cap and trade program basics are discussed at the following EPA website: <<http://www.epa.gov/airmarkets/cap-trade/index.html>>.

**Assessment boundary:** The boundary within which all the primary effects and significant secondary effects associated with a project are evaluated.

**Baseline:** Conditions, including energy consumption and related emissions, that would have occurred without implementation of the subject project or program. Sometimes referred to as “business-as-usual” conditions. Defined as either project-specific baselines or performance standard baselines.

**Baseline period:** The period of time selected as representative of facility operations before the energy efficiency activity takes place.

**Bias:** The extent to which a measurement or a sampling or analytic method systematically underestimates or overestimates a value.

**Co-benefits:** The impacts of an energy efficiency program other than energy and demand savings.

**Coincident demand:** The metered demand of a device, circuit, or building that occurs at the same time as the peak demand of a utility’s system load or at the same time as some other peak of interest, such as building or facility peak demand. This should be expressed to indicate the peak of interest (e.g., “demand coincident with the utility system peak”). Diversity factor is defined as the ratio of the sum of the demands of a group of users to their coincident maximum demand. Therefore, diversity factors are always equal to one or greater.

**Comparison group:** A group of consumers who did not participate in the evaluated program during the program year and who share as many characteristics as possible with the participant group.

**Confidence:** An indication of how close a value is to the true value of the quantity in question. Confidence is the likelihood that the evaluation has captured the true impacts of the program within a certain range of values (i.e., precision).

---

<sup>1</sup> Glossary definitions are provided to assist readers of this report, and are adapted from the Model Energy Efficiency Program Impact Evaluation Guide, US Environmental Protection Agency, November 2007

**Cost-effectiveness:** An indicator of the relative performance or economic attractiveness of any energy efficiency investment or practice. In the energy efficiency field, the present value of the estimated benefits produced by an energy efficiency program is compared to the estimated total costs to determine if the proposed investment or measure is desirable from a variety of perspectives (e.g., whether the estimated benefits exceed the estimated costs from a societal perspective).

**Database for Energy-Efficient Resources (DEER):**

A California database designed to provide well-documented estimates of energy and peak demand savings values, measure costs, and effective useful life.

**Demand Side Management (DSM):** See “Energy efficiency.”

**Deemed savings:** An estimate of an energy savings or energy-demand savings outcome (gross savings) for a single unit of an installed energy efficiency measure that (a) has been developed from data sources and analytical methods that are widely considered acceptable for the measure and purpose and (b) is applicable to the situation being evaluated.

**Demand:** The time rate of energy flow. Demand usually refers to electric power measured in kW (equals kWh/h) but can also refer to natural gas, usually as Btu/hr, kBtu/hr, therms/day, etc.

**Direct emissions:** Direct emissions are changes in emissions at the site (controlled by the project sponsor or owner) where the project takes place. Direct emissions are the source of avoided emissions for thermal energy efficiency measures (e.g., avoided emissions from burning natural gas in a water heater).

**Effective Useful Life (EUL):** An estimate of the median number of years that the efficiency measures installed under a program are still in place and operable.

**Energy efficiency:** The use of less energy to provide the same or an improved level of service to the energy consumer in an economically efficient way; or using less energy to perform the same function. “Energy conservation” is a term that has also been used, but it has the connotation of doing without a service in order to save energy rather than using less energy to perform the same function. Demand Side Management (DSM) is also frequently used to refer to actively-managed energy efficiency initiatives.

**Energy Efficiency Measure (EEM):** A permanently installed measure which can improve the efficiency of the Customer’s electric energy use.

**Engineering model:** Engineering equations used to calculate energy usage and savings. These models are usually based on a quantitative description of physical processes that transform delivered energy into useful work such as heat, lighting, or motor drive. In practice, these models may be reduced to simple equations in spreadsheets that calculate energy usage or savings as a function of measurable attributes of customers, facilities, or equipment (e.g., lighting use = watts × hours of use).

**Error:** Deviation of measurements from the true value.

**Evaluation:** The performance of studies and activities aimed at determining the effects of a program; any of a wide range of assessment activities associated with understanding or documenting program performance, assessing program or program-related markets and market operations; any of a wide range of evaluative efforts including assessing program-induced changes in energy efficiency markets, levels of demand or energy savings, and program cost-effectiveness.

**Evaluation, Measurement and Verification (EM&V):** Data collection, monitoring, and analysis associated with the calculation of gross and net energy and demand savings from individual sites or projects which is performed in conjunction with a program or portfolio evaluation (see Evaluation).

**Evaluated savings estimate:** Savings estimates reported by an evaluator after the energy impact evaluation has been completed. Often referred to as “*Ex Post*” Savings (from the Latin for “after the fact”).

**Free driver:** A non-participant who has adopted a particular efficiency measure or practice as a result of the evaluated program.

**Free rider:** A program participant who would have implemented the program measure or practice in the absence of the program. Free riders can be total, partial, or deferred.

**Gross savings:** The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated.

**Impact evaluation:** An evaluation of the program-specific, directly induced changes (e.g., energy and/or demand usage) attributable to an energy efficiency program.

**Independent variables:** The factors that affect energy use and demand, but cannot be controlled (e.g., weather or occupancy).

**Interactive factors:** Applicable to IPMVP Options A and B; changes in energy use or demand occurring beyond the measurement boundary of the M&V analysis.

**Load shapes:** Representations such as graphs, tables, and databases that describe energy consumption rates as a function of another variable such as time or outdoor air temperature.

**Market effect evaluation:** An evaluation of the change in the structure or functioning of a market, or the behavior of participants in a market, that results from one or more program efforts. Typically, the resultant market or behavior change leads to an increase in the adoption of energy-efficient products, services, or practices.

**Market transformation:** A reduction in market barriers resulting from a market intervention, as evidenced by a set of market effects, that lasts after the intervention has been withdrawn, reduced, or changed.

**Measurement:** A procedure for assigning a number to an observed object or event.

**Measurement and Verification (M&V):** Data collection, monitoring, and analysis associated with the calculation of gross energy and demand savings from individual sites or projects. M&V can be a subset of program impact evaluation.

**Measurement boundary:** The boundary of the analysis for determining direct energy and/or demand savings.

**Metering:** The collection of energy consumption data over time through the use of meters. These meters may collect information with respect to an end-use, a circuit, a piece of equipment, or a whole building (or facility). Short-term metering generally refers to data collection for no more than a few weeks. End-use metering refers specifically to separate data collection for one or more end-uses in a facility, such as lighting, air conditioning or refrigeration. Spot metering is an instantaneous measurement (rather than over time) to determine an energy consumption rate.

**Monitoring:** Gathering of relevant measurement data, including but not limited to energy consumption data, over time to evaluate equipment or system performance (e.g., chiller electric demand, inlet evaporator temperature and flow, outlet evaporator temperature, condenser inlet temperature, and ambient dry-bulb temperature and relative humidity or wet-bulb temperature) for use in developing a chiller performance map (e.g., kW/ton vs. cooling load and vs. condenser inlet temperature).

**Net savings:** The total change in load that is attributable to an energy efficiency program. This change in load may include, implicitly or explicitly, the effects of free drivers, free riders, energy efficiency standards, changes in the level of energy service, and other causes of changes in energy consumption or demand.

**Net-to-gross ratio (NTGR):** A factor representing net program savings divided by gross program savings that is applied to gross program impacts to convert them into net program load impacts.

**Non-participant:** Any consumer who was eligible but did not participate in the subject efficiency program, in a given program year. Each evaluation plan should provide a definition of a non-participant as it applies to a specific evaluation.

**Normalized annual consumption (NAC) analysis:** A regression-based method that analyzes monthly energy consumption data.

**Participant:** A consumer that received a service offered through the subject efficiency program, in a given program year. The term “service” is used in this definition to suggest that the service can be a wide variety of services, including financial rebates, technical assistance, product installations, training,

energy efficiency information or other services, items, or conditions. Each evaluation plan should define “participant” as it applies to the specific evaluation.

**Peak demand:** The maximum level of metered demand during a specified period, such as a billing month or a peak demand period.

**Persistence study:** A study to assess changes in program impacts over time (including retention and degradation).

**Portfolio:** Either (a) a collection of similar programs addressing the same market (e.g., a portfolio of residential programs), technology (e.g., motor efficiency programs), or mechanisms (e.g., loan programs) or (b) the set of all programs conducted by one organization, such as a utility (and which could include programs that cover multiple markets, technologies, etc.).

**Potential studies:** Studies conducted to assess market baselines and savings potentials for different technologies and customer markets. Potential is typically defined in terms of technical potential, market potential, and economic potential.

**Precision:** The indication of the closeness of agreement among repeated measurements of the same physical quantity.

**Primary effects:** Effects that the project or program are intended to achieve. For efficiency programs, this is primarily a reduction in energy use per unit of output.

**Process evaluation:** A systematic assessment of an energy efficiency program for the purposes of documenting program operations at the time of the examination, and identifying and recommending improvements to increase the program’s efficiency or effectiveness for acquiring energy resources while maintaining high levels of participant satisfaction.

**Program:** A group of projects, with similar characteristics and installed in similar applications. Examples could include a utility program to install energy-efficient lighting in commercial buildings, a developer’s program to build a subdivision of homes that have photovoltaic systems, or a state residential energy efficiency code program.

**Project:** An activity or course of action involving one or multiple energy efficiency measures, at a single facility or site.

**Rebound effect:** A change in energy-using behavior that yields an increased level of service and occurs as a result of taking an energy efficiency action.

**Regression analysis:** Analysis of the relationship between a dependent variable (response variable) to specified independent variables (explanatory variables). The mathematical model of their relationship is the regression equation.



**Reliability:** Refers to the likelihood that the observations can be replicated.

**Remaining Useful Life (RUL):** An estimate of the remaining number of years that a technology being replaced under an early retirement program would have remained in place and operable. Accurate estimation of the RUL is important in determining lifetime program savings and cost effectiveness.

**Reported savings estimate:** Forecasted savings used for program and portfolio planning purposes. Often referred to as "*Ex Ante*" Savings (from the Latin for "before the event").

**Reporting period:** The time following implementation of an energy efficiency activity during which savings are to be determined.

**Resource acquisition program:** Programs designed to directly achieve energy and/or demand savings, and possibly avoided emissions.

**Retrofit isolation:** The savings measurement approach defined in IPMVP Options A and B, and ASHRAE Guideline 14, that determines energy or demand savings through the use of meters to isolate the energy flows for the system(s) under consideration.

**Rigor:** The level of expected confidence and precision. The higher the level of rigor, the more confident one is that the results of the evaluation are both accurate and precise.

**Spillover:** Reductions in energy consumption and/or demand caused by the presence of the energy efficiency program, beyond the program-related gross savings of the participants. There can be participant and/or nonparticipant spillover.

**Statistically adjusted engineering (SAE) models:** A category of statistical analysis models that incorporate the engineering estimate of savings as a dependent variable.

**Stipulated values:** See "deemed savings."

**Takeback effect:** See "rebound effect."

**Uncertainty:** The range or interval of doubt surrounding a measured or calculated value within which the true value is expected to fall within some degree of confidence.

## Appendix B EM&V Best Practices

The term “best practices” refers to practices that, when compared against other practices, produce superior results. In the context of this study, the evaluation team defined best practices to be those methods, procedures, and protocols that maximized the accuracy and statistical validity of impact evaluation findings. The specific best practices considered in this study were compiled through a review of secondary literature, a comparison of similar programs and evaluation outcomes, and prior evaluation experience. Table 1 details the specific evaluation, measurement, and verification (EM&V) studies reviewed for this effort.

**Table 1. EM&V Best Practice Studies Reviewed**

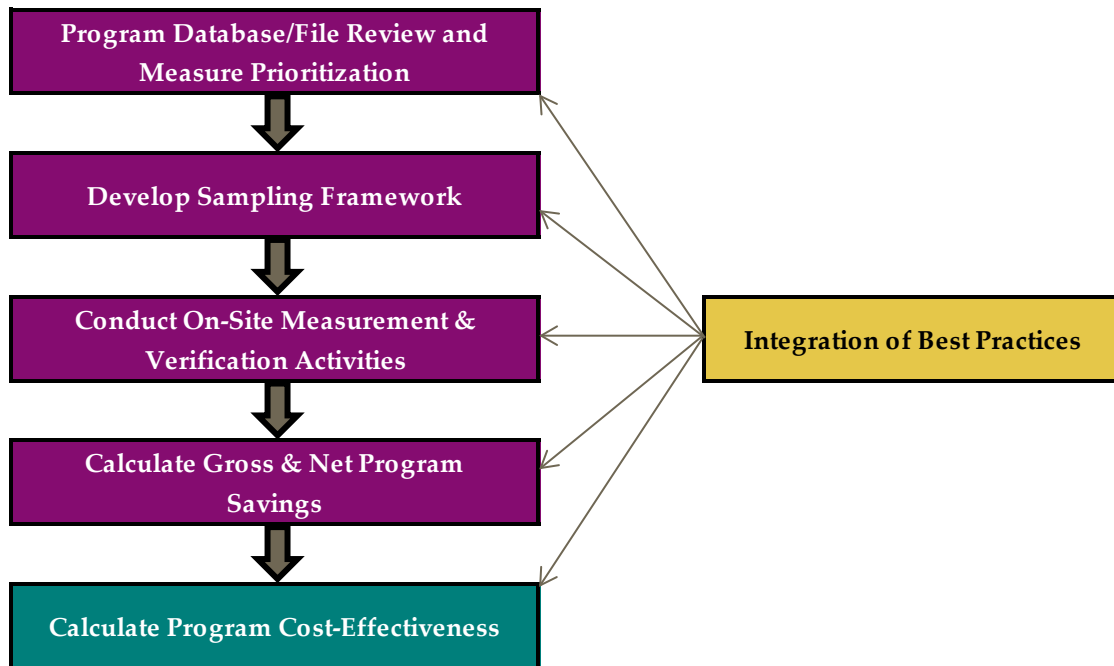
Organization	Study Name	Publication Year
National Renewable Energy Laboratory (NREL) Department of Energy (DOE)	The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures	2013
The Brattle Group	Measurement and Verification Principles for Behavior-Based Efficiency Programs	2011
Berkeley National Laboratory	Review of Evaluation, Measurement, and Verification Approaches Used to Estimate the Load Impacts and Effectiveness of Energy Efficiency Programs	2010
State of California, Public Utilities Commission	Best Practices Benchmarking for Energy Efficiency Programs	2009
Enbridge Gas Distribution	DSM Best Practices for Natural Gas Utilities: the Canadian Experience	2008
Consortium for Energy Efficiency	Energy Efficiency Program Evaluation: A Guide to the Guides	2008
Minnesota Office of Energy Security	Measurement and Verification Protocols for Large Custom CIP Projects - Version 1.0	2008
Northern California Power Agency	E, M & V Best Practices: Lessons Learned from California Municipal Utilities	2008
National Action Plan for Energy Efficiency Leadership Group	Model Energy Efficiency Program Impact Evaluation Guide: A Resource of the National Action Plan for Energy Efficiency	2007
State of California, Public Utilities Commission	California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals	2006
American Council for an Energy-Efficient Economy	America's Best: Profiles of America's Leading Energy Efficiency Programs	2003

Each report presented valuable insight into best practices within the field of EM&V. However, the evaluation team documented, characterized, and prioritized those best practices with the following properties:

- » Cross-cutting best practices with a high level of representation across each of the studies reviewed
- » Best practices consistent with past evaluation experience and interviews with program managers in other jurisdictions
- » Best practices demonstrating the most applicability towards Rocky Mountain Power's C&I Programs

The subsequent M&V methods developed for the Impact and Process Evaluation of Utah's 2011-2013 C&I Programs reflect the outcome of this independent review. Figure 1 provides an illustration of how the Best Practices Review informed the overall evaluation methods chosen for this effort.

**Figure 1. Overview of Impact Evaluation Strategy**



## Appendix C *wattsmart* Business Program Logic Model

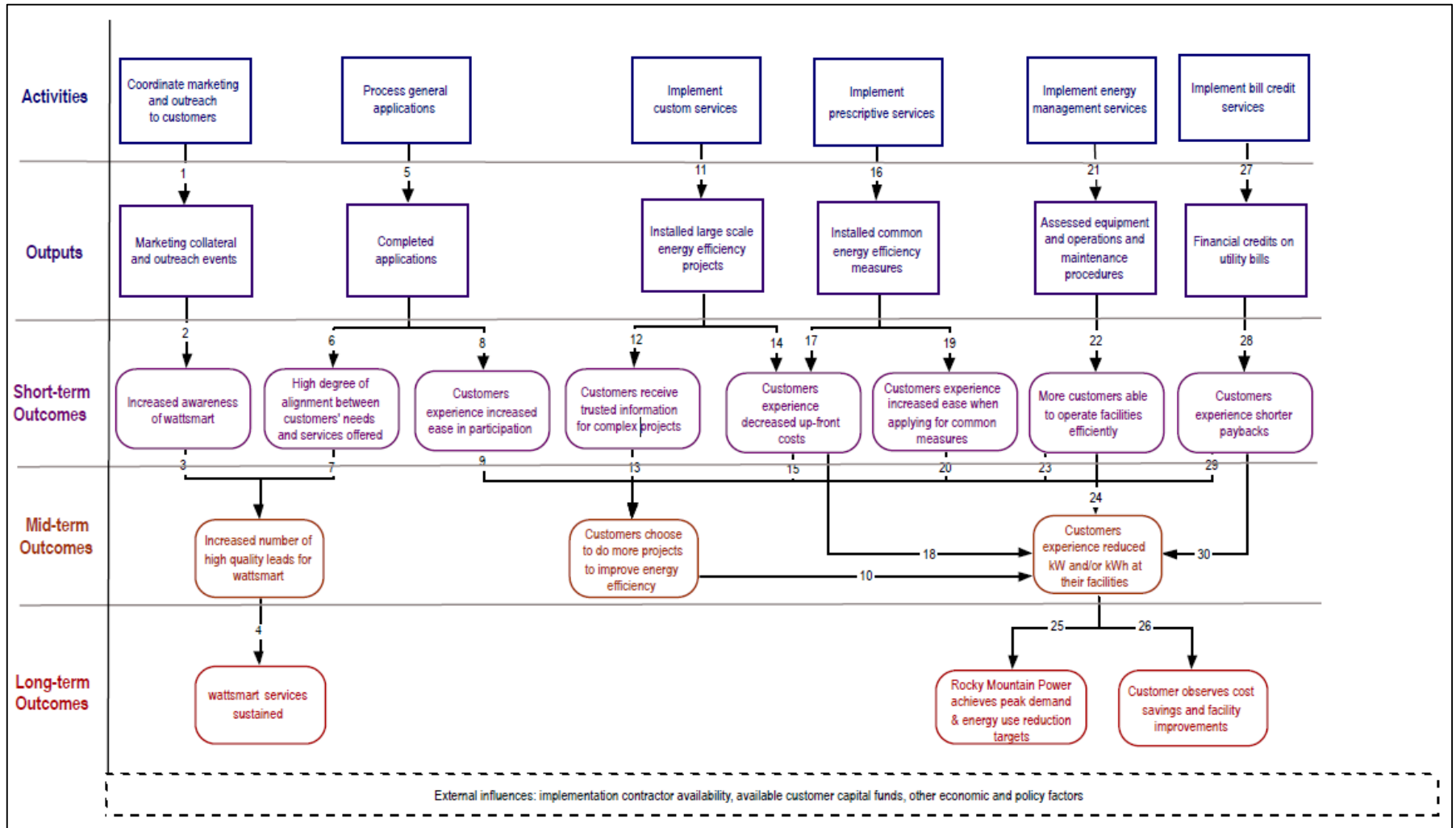
The *wattsmart* program is an umbrella program encompassing all of Rocky Mountain Power’s energy efficiency services. The *wattsmart* program provides customers with a suite of programs based on the former Rocky Mountain Power energy efficiency programs:

- » Energy FinAnswer – offered incentives for large-scale custom energy efficiency projects
- » FinAnswer Express – offers incentives for small-scale energy efficiency projects, including prescriptive measures
- » Energy Management Services (formally called Recommissioning) – offers incentives for optimizing equipment and operating and maintenance procedures
- » Bill Credit Services – offers financial credits on utility bills for energy efficiency projects

The logic model presented in Figure C-1, therefore, depicts the logic for each activity carried out by implementers as part of the *wattsmart* program.

The overall purpose of developing the *wattsmart* program is to offer customers with a streamlined application process for energy efficiency services. By offering one energy efficiency program, customers do not need to choose a specific energy efficiency program. Instead, customers submit one application and program staff can direct customers to the most applicable service. By providing a suite of services catered to unique customer needs, *wattsmart* intends the program to generate higher quality leads and encourage customers to carry out more energy efficiency projects. Ultimately, implementers expect the program to generate enough energy savings and demand reductions for Rocky Mountain Power to meet its energy use reduction targets. The list following Figure C-1 describes the detailed program theory by referencing the numbered links in the figure.

Figure C-1. *wattsmart* Business Program Logic Model (2013)



Each number in the following list corresponds to a linkage in the logic model diagram and provides further details for the *wattsmart* program theory.

1. Rocky Mountain Power staff coordinates marketing and outreach to customers through marketing collateral and outreach events.
2. Marketing and outreach functions increase customer awareness of *wattsmart*.
3. Increasing customer awareness of *wattsmart* increases the number of high quality leads, defined as eligible customers that can directly benefit from program services than would have occurred without any marketing or outreach.
4. Program sustainability over time improves with increased customer awareness of *wattsmart*.
5. Program staff processes general applications to ensure completeness and direct customers to the best *wattsmart* service.
6. Processing general applications ensures that customers' needs align with program services.
7. Aligning customers' needs with program services means that more customers can or are willing to participate in *wattsmart*, resulting in greater leads for program services.
8. Allowing customers to submit general applications for the entire *wattsmart* program is intended to ease the customers' experiences with the application process, making it simpler and more direct.
9. By making the application process simple, customers will be more likely to conduct more energy efficiency projects.
10. When customers conduct more energy efficiency projects, they continue to experience reduced demand and/or energy savings at their facilities.
11. Customers may use the custom offerings portion of the *wattsmart* Business program to install large-scale, site-specific energy efficiency projects.
12. The custom portion of *wattsmart* provides customers with trusted information on complex energy efficiency project that they would not receive otherwise.
13. Providing trusted information to customers on complex projects allows them to follow through with more energy efficiency projects than they would have otherwise.
14. Participation in the custom portion of *wattsmart* provides customers financial incentives which help decrease upfront costs for energy efficiency projects.
15. By decreasing upfront costs, participants are able to conduct even more energy efficiency projects.
16. Customers may use the prescriptive offerings portion of *wattsmart* to install common energy efficiency measures such as lighting and/or HVAC equipment.
17. The prescriptive service provides incentives for common energy efficiency measures, thereby decreasing customers' upfront costs for efficiency improvements.

18. By helping to cover some of the upfront costs, customers are able to install energy efficiency equipment and hence reduce their energy costs or demand at their facilities.
19. The purpose of offering an “express” program is to provide customers with a simple means to receive financial incentives for common measures.
20. When customers feel that the incentive process is easy, they are more likely to conduct more energy efficiency projects through *wattsmart*.
21. Program staff provides a variety of energy management services to assess customers’ operations and maintenance (O&M) procedures and equipment.
22. The overall purpose of providing energy management services is to help more customers operate their facilities efficiently.
23. By participating in this program, program staff identifies energy efficiency opportunities, which allow customers to install more energy efficiency projects in the future.
24. When customers operate their facilities efficiently, they generate demand reductions and energy savings.
25. When individual customers can generate demand reductions and energy savings, Rocky Mountain Power can achieve peak demand and energy use targets.
26. When customers are able to save energy, they also receive added benefits of energy cost savings and facility improvements.
27. Providing bill credit services allows customers to receive financial credits on their utility bills for energy efficiency projects.
28. Bill credits are intended to provide customers with shorter paybacks for energy efficiency projects.
29. Receiving bill credits allow customers to install more energy efficiency projects.
30. When install more energy efficient projects, they generate energy savings and reduced demand.

## Appendix D Process Evaluation Survey Instrument

### FX EF SD Participant Survey–REVISED 140331 for process and gap

#### Variables

Variable Name	Description	Type
&CONTACT	Respondent name	Text
&FIRM	Company name	Text
&PROGRAM	“FinAnswer Express” “Energy FinAnswer” “Self-Direction Credit”	Text
&PROG_CODE	1=“FinAnswer Express” 2=“Energy FinAnswer” 3=“Self-Direction Credit”	Numeric
&SITE	Address	Text
&YEAR	Year of project completion	YYYY
&PACIFICORP	“Rocky Mountain Power” or “Pacific Power”	Text
&PREDATE	Date of first inspection	Date MMYYYY
&POSTDATE	Date of post inspection	Date MMYYYY
&INSTALLED_MEASURES	List of installed measures	Text
&MEASURE_1	Name of Measure 1	Text
&MEASURE_2	Name of Measure 2	Text
&MULT_MEASURES	Flag for more than one measure	BINARY
&INCENTIVE	Amount paid for participation	Numeric
&PM	Flag for PM delivered project 1 = PM deliver project	BINARY
&NC	Flag for New construction project 1 = new construction project	BINARY

#### Introduction and Screen

**INTRO1.** Hello, this is INTERVIEWER, calling on behalf of &PACIFICORP. We are conducting an independent evaluation of &PACIFICORP’s energy efficiency programs. This is not a sales call. May I please speak with &CONTACT?

1. YES, THAT IS ME → **SKIP TO INTRO3**
2. YES, LET ME TRANSFER YOU
3. NOT NOW → **SCHEDULE APPT AND CALL BACK**
4. NO/REFUSED → **TERMINATE**

**INTRO2.** Hello, this is INTERVIEWER, calling on behalf of &PACIFICORP. We are conducting an independent evaluation of &PACIFICORP’s energy efficiency programs. This is not a sales call. &PACIFICORP is evaluating its &PROGRAM program and would appreciate your input.”

I’d like to let you know that this call may be monitored or recorded for quality assurance purposes. Also, all of your responses will be kept confidential and will not be revealed to anyone outside of the research



team. Do you have a few minutes to answer questions about your experience with the program? **[IF NEEDED, READ: "This survey is for research purposes only and will take about 15 minutes."]**

1. YES → **SKIP TO IS2**
2. NOT NOW → **MAKE APPT. TO CALL BACK**
3. NO/REFUSED → **TERMINATE**

**INTRO3.** &PACIFICORP is evaluating its &PROGRAM program and would appreciate your input. I'd like to let you know that this call may be monitored or recorded for quality insurance purposes. Also, all of your responses will be kept confidential and will not be revealed to anyone outside of the research team. Do you have a few minutes to answer questions about your experience with the program? **[IF NEEDED, READ: "This survey is for research purposes only and will take about 15 minutes."]**

1. YES → Thanks!
2. NOT NOW → **MAKE APPT. TO CALL BACK**
3. NO/REFUSED → **TERMINATE**

**[IF VERIFICATION NEEDED, THEY CAN CALL SHAWN GRANT AT 801-220-4196].**

**IS2a.** &PACIFICORP records indicate that your firm received an incentive from the &PROGRAM program in &YEAR after installing &INSTALLED\_MEASURES at &SITE, is this correct?

1. YES → **SKIP TO IS3**
2. NO, DID NOT PARTICIPATE
3. NO, ONE OR MORE MEASURES ARE INCORRECT → **SKIP TO IS2d**
4. NO, ADDRESS IS INCORRECT → **SKIP TO IS2e**
88. DON'T KNOW/NOT SURE → **TERMINATE**
99. REFUSED

**IS2b.** Is there someone else that might be familiar with this project?

1. Yes
2. No → **TERMINATE**
88. Don't know → **TERMINATE**

**IS2c.** May I speak with that person?

1. Yes → **RETURN TO INTRO2**
2. Not now → **SCHEDULE CALLBACK**
3. No → **TERMINATE**

**IS2d.** Which of these efficiency improvements were installed? [READ AND SELECT ALL THAT APPLY]

1. &MEASURE\_1
2. &MEASURE\_2
3. &INSTALLED\_MEASURES
4. None of these
88. DON'T KNOW/NOT SURE
99. REFUSED

[IF IS2a <> 4, SKIP TO IS3]

**IS2e.** What is the correct address where the equipment was installed?

1. **[RECORD RESPONSE]**
88. DON'T KNOW/NOT SURE
99. REFUSED

**IS3.** Are you the person most familiar with &FIRM's decision to move forward with this project?

1. YES
2. NO → **SKIP to IS2b**
88. DON'T KNOW/NOT SURE → **SKIP to IS2b**
99. REFUSED → **SKIP to IS2b**

### **Project Recall**

**PR1.** Today, I'm going to focus on the project I mentioned with the &INSTALLED\_MEASURES. To your knowledge, did you work with &PACIFICORP on other projects before this one?

1. YES
2. NO
88. DON'T KNOW/NOT SURE
99. REFUSED

**PR2.** And, to your knowledge, did you work with &PACIFICORP on other projects since this one?

1. YES
2. NO
88. DON'T KNOW/NOT SURE
99. REFUSED

### **Awareness & Participation**

**AP1.** How did you first become aware of &PROGRAM? **[DO NOT READ; CHECK ALL THAT APPLY]**

1. Account Representative or Other &PACIFICORP Staff
2. &PACIFICORP Radio Advertisement
3. &PACIFICORP Print Advertisement
4. &PACIFICORP Printed Materials/Brochure
5. &PACIFICORP Online Advertisement
6. &PACIFICORP TV Advertisement
7. &PACIFICORP Newsletter
8. &PACIFICORP Website
9. Previous Participation in &PACIFICORP Programs

- 10. Conference, Workshop, or Event [SPECIFY]
- 11. &PACIFICORP Sponsored Energy Audit or Technical Assessment
- 12. From Trade Ally, Vendor, or Contractor
- 13. Another Business Colleague
- 14. Family, Friend, or Neighbor
- 15. Another Energy Efficiency Program (CONFIRM NOT A PACIFICORP PROGRAM)
- 16. Other [SPECIFY]
- 88. DON'T KNOW/NOT SURE
- 99. REFUSE

**AP2. Why did your firm decide to participate in the program? [DO NOT READ; CHECK ALL THAT APPLY]**

- 1. To save money on electric bills.
- 2. To save money on maintenance costs
- 3. To obtain an incentive.
- 4. To replace old or poorly working equipment.
- 5. To replace broken or failed equipment.
- 6. To acquire the latest technology.
- 7. Because the program was sponsored by &PACIFICORP
- 8. Previous experience with &PACIFICORP
- 9. To protect the environment/be "green"
- 10. To save energy (no costs mentioned)
- 11. To comply with a standard or policy requirement
- 12. Recommendation by contractors/vendors
- 13. Recommended by colleague
- 14. Recommended by family, friend or neighbor
- 15. To improve operations, production, or quality
- 16. To improve value of property
- 17. To improve comfort
- 18. Other [SPECIFY]: \_\_\_\_\_
- 88. DON'T KNOW/NOT SURE
- 99. REFUSE

**[IF MORE THAN ONE RESPONSE TO AP2]**

**AP2a. Of those reasons, which one was most influential in the decision to participate in the program? [ALLOW ONLY ONE RESPONSE..]**

- 1. To save money on electric bills.
- 2. To save money on maintenance costs
- 3. To obtain an incentive.
- 4. To replace old or poorly working equipment.
- 5. To replace broken or failed equipment.
- 6. To acquire the latest technology.
- 7. Because the program was sponsored by &PACIFICORP
- 8. Previous experience with &PACIFICORP

- 9. To protect the environment/be “green”
- 10. To save energy (no costs mentioned)
- 11. To comply with a standard or policy requirement
- 12. Recommendation by contractors/vendors
- 13. Recommended by colleague
- 14. Recommended by family, friend or neighbor
- 15. To improve operations, production, or quality
- 16. To improve value of property
- 17. To improve comfort
- 18. Other [SPECIFY]: \_\_\_\_\_
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**Website Section**

**WW1.** Have you ever visited the &PACIFICORP *wattsmart* energy efficiency website?

- 1. YES
- 2. NO → **SKIP to EE1**
- 88. DON'T KNOW/NOT SURE → **SKIP to EE1**
- 99. REFUSED → **SKIP to EE1**

**WW2.** How many times have you visited the &PACIFICORP *wattsmart* energy efficiency website in the last year?

- 1. ONCE
- 2. SELDOM (LESS THAN ONCE PER MONTH; 2 to 10 TIMES)
- 3. ABOUT ONCE PER MONTH (10 to 13 TIMES)
- 4. FREQUENTLY (MORE THAN ONCE PER MONTH; MORE THAN 13 TIMES)
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**WW3.** Why did you visit the &PACIFICORP *wattsmart* energy efficiency website?

- 1. **[RECORD RESPONSE]**
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**WW4.** Were you able to find the information you needed on the *wattsmart* website?

- 1. YES
- 2. NO
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**Pre-Installation Section**

**[IF &PROG\_CODE=2 OR &PREDATE not NULL, ask EE1; ELSE, skip to EE3]**

**EE1.** When you first became involved with the &PROGRAM program, representative from &PACIFICORP came out to your facility to inspect existing equipment. Using a scale of 1 to 5 where 1 indicates ‘very dissatisfied’ and 5 indicates ‘very satisfied’, how satisfied were you with the energy engineer who came out to your facility?

1. VERY DISSATISFIED
2. SOMEWHAT DISSATISFIED
3. NEITHER SATISFIED NOR DISSATISFIED
4. SOMEWHAT SATISFIED → **SKIP TO EE3**
5. VERY SATISFIED → **SKIP TO EE3**
88. DON’T KNOW/NOT SURE → **SKIP TO EE3**
99. REFUSED → **SKIP TO EE3**

**EE2.** What could the representative have done differently that would have made you more satisfied?

1. **[RECORD RESPONSE]**
88. DON’T KNOW/NOT SURE
99. REFUSED

**EE3.** Using a scale of 1 to 5 where 1 indicates ‘very dissatisfied’ and 5 indicates ‘very satisfied’, how satisfied were you with the vendor you worked with on this project? [A vendor may be a retailer, engineer, or distributor]

1. VERY DISSATISFIED
2. SOMEWHAT DISSATISFIED
3. NEITHER SATISFIED NOR DISSATISFIED
4. SOMEWHAT SATISFIED → **SKIP TO EE5**
5. VERY SATISFIED → **SKIP TO EE5**
6. **DID NOT WORK WITH A VENDOR → SKIP TO EE5**
7. **DO NOT RECALL → SKIP TO EE5**
88. DON’T KNOW/NOT SURE → **SKIP TO EE5**
99. REFUSED → **SKIP TO EE5**

**EE4.** What could they have done differently that would have made you more satisfied?

1. **[RECORD RESPONSE]**
88. DON’T KNOW/NOT SURE
99. REFUSED

**[IF &PROG\_CODE=2 OR &PM=1, ASK EE5; ELSE, skip to IM1]**

**EE5.** As part of the program, you received a report from the energy analysis that included recommendations of equipment retrofits and other energy efficiency improvements. Did you find this report valuable?

1. YES → **SKIP TO IM1**
2. NO

- 3. DON'T RECALL RECEIVING A REPORT → **SKIP TO IM1**
- 88. DON'T KNOW/NOT SURE → **SKIP TO IM1**
- 99. REFUSED → **SKIP TO IM1**

EE6. Why not?

- 1. **[RECORD RESPONSE]**
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**Installed Measures**

**[IF &NC=1, SKIP to FR1]**

**READ:** I'm going to ask a few questions about the equipment that you installed.

**[SET &MEASURE\_# = &MEASURE\_1]**

**IM1.** Did the &MEASURE\_# installed through the program replace existing equipment or was it a new installation?

- 1. REPLACED EXISTING EQUIPMENT → **SKIP TO IM2**
- 2. TOTALLY NEW INSTALLATION → **SKIP TO IM3**
- 88. DON'T KNOW/NOT SURE → **SKIP TO IM1A**
- 99. REFUSED → **SKIP TO IM1A**

**IM1A.** Could you please provide contact information for someone who would know the specifics of the equipment installation?

- 1. **[COLLECT: IM\_CONTACT\_NAME, IM\_CONTACT\_PHONE, and IM\_CONTACT\_EMAIL]**  
→ **SKIP TO IC1**

**IM2.** What was the operating condition of the equipment that the &MEASURE\_# replaced?

- 1. EXISTING EQUIPMENT HAD FAILED
- 2. EXISTING EQUIPMENT WORKING BUT WITH PROBLEMS
- 3. EXISTING EQUIPMENT WORKING WITH NO PROBLEMS
- 4. OTHER **[SPECIFY]:** \_\_\_\_\_
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**IM3.** Have the energy savings related to this equipment met your expectations?

- 1. YES
- 2. NO
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**IM4a.** Did you anticipate any other benefits beyond energy savings from the \$MEASURE\_#?

- 1. YES
- 2. NO → **SKIP TO IM5**

- 88. DON'T KNOW/NOT SURE → SKIP TO IM5
- 99. REFUSED → SKIP TO IM5

**IM4b. What other benefits did you anticipate? [CHECK ALL THAT APPLY; DO NOT READ]**

- 1. Better lighting quality (lighting specific)
- 2. Quicker on/off (lighting specific)
- 3. Increased control (lighting specific)
- 4. Less frequent replacement (lighting specific)
- 5. Decreased heat output (lighting specific)
- 6. Increased water pressure (sprinkler specific)
- 7. Other [SPECIFY]
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**IM4c. Since the project was completed, have you seen those benefits?**

- 1. YES
- 2. NO
- 3. ONLY SOMEWHAT [SPECIFY]
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**IM5. Using a scale of 1 to 5 where 1 indicates 'very dissatisfied' and 5 indicates 'very satisfied', overall, how satisfied were you with the performance of the &MEASURE\_#?**

- 1. VERY DISSATISFIED
- 2. SOMEWHAT DISSATISFIED
- 3. NEITHER SATISFIED NOR DISSATISFIED
- 4. SOMEWHAT SATISFIED → SKIP TO P11
- 5. VERY SATISFIED → SKIP TO P11
- 88. DON'T KNOW/NOT SURE → SKIP TO P11
- 99. REFUSED → SKIP TO P11

**IM6. What would have made you more satisfied with the performance of this equipment?**

- 1. [RECORD RESPONSE]
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**[IF MULT\_MEASURES=1 SET &MEASURE\_#=&MEASURE\_2 GO BACK TO IM1; ELSE GO TO NEXT SECTION]**

**Post-Installation**

**[IF &PROG\_CODE =2 OR &PROG\_CODE=3 OR &POSTDATE not NULL, ask P11; else, skip to FR1]**

**P11.** After your project was installed, [IF &POSTDATE >0, "around &POSTDATE"], a program representative came out to your facility to verify your installation. Using a scale of 1 to 5 where 1 indicates 'very dissatisfied' and 5 indicates 'very satisfied', how satisfied were you with the inspection?

- 1. VERY DISSATISFIED
- 2. SOMEWHAT DISSATISFIED

- 3. NEITHER SATISFIED NOR DISSATISFIED
- 4. SOMEWHAT SATISFIED → **SKIP TO FR1**
- 5. VERY SATISFIED → **SKIP TO FR1**
- 88. DON'T KNOW/NOT SURE → **SKIP TO FR1**
- 99. REFUSED → **SKIP TO FR1**

**PI2.** What could the engineer have done differently that would have made you more satisfied with the inspection?

- 1. **[RECORD RESPONSE]**
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

### Free Ridership

**FR1.** With the &PROGRAM program, &FIRM received [IF &PM=1 or &PROG\_CODE=2 add “technical assistance identifying energy saving opportunities and”] financial incentives of &INCENTIVE for installing &INSTALLED\_MEASURES with the program.

On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, how important was each of the following factors in deciding which equipment to install. If a factor is not applicable to you, please say so. **[NOTE: Respondents can also state that a particular factor is Not Applicable, please code N/A as 6. ]**

- A. RECOMMENDATION FROM CONTRACTOR OR VENDOR
- B. INFORMATION PROVIDED BY &PACIFICORP ON ENERGY SAVING OPPORTUNITIES
- C. INFORMATION ON PAYBACK
- D. THE &PACIFICORP INCENTIVE [if &PROG\_CODE = 3, replace “Incentive” with “credit”]
- E. FAMILIARITY WITH THIS EQUIPMENT
- F. PREVIOUS PARTICIPATION WITH A &PACIFICORP PROGRAM
- G. CORPORATE POLICY REGARDING ENERGY REDUCTION

**[IF &MULT\_MEASURES=1, say “I’ll be asking the next questions first about &MEASURE\_1 and again for &MEASURE\_2]**

**[SET &MEASURE\_# = &MEASURE\_1]**

**[READ: “When answering these next questions, think specifically about &MEASURE\_# installed through the program.”]**

**[**

**FR2A.** Without the program, meaning without either the technical assistance or the financial incentive, would you have still completed the exact same &MEASURE\_# project?

- 1. YES
- 2. NO → **SKIP TO FR3**
- 88. DON'T KNOW/NOT SURE → **SKIP TO FR3**



99. REFUSED → **SKIP TO FR3**

**FR2B.** Without the program, meaning without either the technical assistance or the financial incentive, would you have still installed the &MEASURE\_# at the same time?

1. YES → **SKIP TO FR7**
2. NO → **SKIP TO FR4**
88. DON'T KNOW/NOT SURE → **SKIP TO FR4**
99. REFUSED → **SKIP TO FR4**

**FR3.** Without the program, would you have installed any &MEASURE\_# equipment?

1. YES
2. NO → **SKIP TO FR7**
88. DON'T KNOW/NOT SURE
99. REFUSED

**FR4.** Would you have installed this equipment within 12 months of when you did with the program?

1. YES
2. NO → **SKIP TO FR7**
88. DON'T KNOW/NOT SURE → **SKIP TO FR7**
99. REFUSED → **SKIP TO FR7**

**FR5.** Relative to the energy efficiency of &MEASURE\_# installed through the program, how would you characterize the efficiency of equipment you would have installed without the program?

1. Just as efficient as installed with the program
2. Lower than installed through the program, but better than the standard efficiency
3. Standard efficiency
88. DON'T KNOW/NOT SURE
99. REFUSED

**FR6.** Would you have installed more, less, or the same amount of &MEASURE\_#?

1. MORE → **Compared to the installed amount, how much more? [RECORD in FR61]**
2. LESS → **Compared to the installed amount, how much less? [RECORD in FR62]**
3. SAME
88. DON'T KNOW/NOT SURE
99. REFUSED

**FR7.** In your own words, can you please describe what impact the program had on your decision to complete these energy efficiency improvements for &MEASURE\_#??

1. **[RECORD RESPONSE]**
88. DON'T KNOW/NOT SURE
99. REFUSED

**[IF MULT\_MEASURES=1 SET &MEASURE\_#=&MEASURE\_2 GO BACK TO FR2A; ELSE GO TO NEXT SECTION]**

**Spillover**

**SP1.** Now I'd like to ask about energy efficiency improvements other than those you installed through the program. Since participating in this program, have you purchased or installed any additional energy efficiency improvements for your organization?

- 1. YES
- 2. NO → **SKIP TO B1**
- 88. DON'T KNOW/NOT SURE → **SKIP TO B1**
- 99. REFUSED → **SKIP TO B1**

**[IF &MULT\_MEASURES=1, say "I'll be asking the next questions first about &MEASURE\_1 and again for &MEASURE\_2]**

**[SET &MEASURE\_# = &MEASURE\_1]**

**SP2.** Did you purchase or install any energy efficiency improvements that are the same as &MEASURE\_#?

- 1. YES --> SP3
- 2. NO --> **[IF MULT\_MEASURES=1 SET &MEASURE\_#=&MEASURE\_2 GO BACK TO SP2; ELSE GO TO SP9]**
- 3. 88. DON'T KNOW/NOT SURE → **SKIP TO SP9**
- 4. 99. REFUSED → **SKIP TO SP9**

**SP3.** How many did you purchase or install?

- 1. **[RECORD RESPONSE]**
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED →

**SP4.** Relative to the energy efficiency of the equipment installed through the program, how would you characterize the efficiency of this equipment?

- 1. Just as efficient as installed within the program
- 2. Lower than installed through the program, but better than the standard efficiency
- 3. Standard efficiency
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**SP5.** Did you receive an incentive from &PACIFICORP or another organization for this equipment?

- 1. YES
- 2. NO → **SKIP TO SP7**
- 88. DON'T KNOW/NOT SURE → **SKIP TO SP7**
- 99. REFUSED → **SKIP TO SP7**

**SP6.** What program or sponsor provided an incentive?

1. &PACIFICORP
2. [RECORD RESPONSE]
88. DON'T KNOW/NOT SURE
99. REFUSED

**SP7.** I'm going to read a statement about the equipment that you purchased on your own. On a scale from 1 to 5, with 1 indicating that you "strongly disagree" and 5 indicating that you "strongly agree", please rate the following statement:

My experience with &PACIFICORP's &PROGRAM program influenced my decision to install additional high efficiency equipment on my own. Would you say you...[READ 1-5]

1. STRONGLY DISAGREE
2. SOMEWHAT DISAGREE
3. NEITHER AGREE OR DISAGREE
4. SOMEWHAT AGREE
5. STRONGLY AGREE
88. DON'T KNOW/NOT SURE
99. REFUSED

**[IF SP6 < 1]**

**SP8.** Why did you not apply for an incentive from &PACIFICORP for this equipment?

1. [RECORD RESPONSE]
88. DON'T KNOW/NOT SURE
99. REFUSED

**[IF MULT\_MEASURES=1 SET &MEASURE\_#=&MEASURE\_2 GO BACK TO SP2; ELSE GO TO SP9]**

**SP9.** Did you purchase or install any other equipment? **[DO NOT READ; CHECK ALL THAT APPLY. SPECIFY DETAILED INFORMATION ABOUT EQUIPMENT TYPE] [IF NEEDED:]** What type of equipment is that?

1. Lighting [SPECIFY]: \_\_\_\_\_
2. HVAC (heating and cooling) [SPECIFY]: \_\_\_\_\_
3. Variable drive [SPECIFY]: \_\_\_\_\_
4. Efficient motor [SPECIFY]: \_\_\_\_\_
5. Refrigeration [SPECIFY]: \_\_\_\_\_
6. Building envelope [SPECIFY]: \_\_\_\_\_
7. Compressed air [SPECIFY]: \_\_\_\_\_
8. Chiller [SPECIFY]: \_\_\_\_\_
9. Pump [SPECIFY]: \_\_\_\_\_
10. Irrigation (gaskets, drains, sprinklers) [SPECIFY]: \_\_\_\_\_
11. Automatic Milker Takeoffs [SPECIFY]: \_\_\_\_\_
12. Other [SPECIFY]: \_\_\_\_\_
88. DON'T KNOW/NOT SURE
99. REFUSED

**Barriers**

**B1.** Now I'd like to ask about other potential energy efficiency improvements. Do you think there are other changes that you could make to improve electric efficiency at &FIRM?

- 1. YES
- 2. NO → **SKIP TO IC1**
- 88. DON'T KNOW/NOT SURE → **SKIP TO IC1**
- 99. REFUSED → **SKIP TO IC1**

**B2.** Could you provide some examples of changes you think would improve electric efficiency at &FIRM?

- 1. **[RECORD RESPONSE: PROBE FOR ADDITIONAL]**
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**B3.** Are plans in place to make any of those changes?

- 1. YES
- 2. NO → **SKIP TO B5**
- 88. DON'T KNOW/NOT SURE → **SKIP TO B5**
- 99. REFUSED → **SKIP TO B5**

**B4.** Is assistance from &PACIFICORP part of those plans?

- 1. YES
- 2. NO
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**B5.** What factors could prevent &FIRM from making these changes? **[DO NOT READ; CHECK ALL THAT APPLY]**

- 1. HIGH UPFRONT COSTS
- 2. LACK OF ACCESS TO CAPITAL
- 3. LONG PAYBACK PERIOD; SLOW RATE OF RETURN
- 4. LOW PRIORITY/LACK OF INTEREST OF SENIOR/CORPORATE MANAGEMENT IN ENERGY EFFICIENCY
- 5. LACK OF INFORMATION ABOUT SAVINGS AND PERFORMANCE
- 6. LACK OF ASSIGNED ENERGY STAFF
- 7. OTHER [SPECIFY]
- 8. NONE
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**[IF MORE THAN ONE RESPONSE TO B5]**

**B6.** Which of these do you think is the most challenging factor? [IF B5 = 7 and > 2 “other” reasons, enter most important reason in option 8 at B6]

1. HIGH UPFRONT COSTS
2. LACK OF ACCESS TO CAPITAL
3. LONG PAYBACK PERIOD; SLOW RATE OF RETURN
4. LOW PRIORITY/LACK OF INTEREST OF SENIOR/CORPORATE MANAGEMENT IN ENERGY EFFICIENCY
5. LACK OF INFORMATION ABOUT SAVINGS AND PERFORMANCE
6. LACK OF RESPONSIBLE/ACCOUNTABLE ENERGY STAFF
7. DISPLAY OTHER FROM B6
8. OTHER (SPECIFY MOST IMPORTANT OTHER REASON IN B6, IF > 2 REASONS):
88. DON'T KNOW/NOT SURE
99. REFUSED

### Satisfaction

**IC1.** Using a scale of 1 to 5 where 1 indicates ‘very dissatisfied’ and 5 indicates ‘very satisfied’, how satisfied were you overall with the program?

1. VERY DISSATISFIED
2. SOMEWHAT DISSATISFIED
3. NEITHER SATISFIED NOR DISSATISFIED
4. SOMEWHAT SATISFIED → SKIP TO FB1
5. VERY SATISFIED → SKIP TO FB1
88. DON'T KNOW/NOT SURE → SKIP TO FB1
99. REFUSED → SKIP TO FB1

**IC1A.** What could the program have done that would have made you more satisfied with the program overall?

1. [RECORD RESPONSE]
88. DON'T KNOW/NOT SURE
99. REFUSED

### Firmographics

**FB1.** Now I have a few final, general questions about your company for comparison purposes only. Which of the following best describes your company’s primary activities?

1. ACCOMMODATION
2. ARTS, ENTERTAINMENT, AND RECREATION
3. CONSTRUCTION
4. DAIRY / AGRICULTURAL
5. EDUCATIONAL SERVICES
6. FINANCE AND INSURANCE
7. FOOD SERVICES
8. FOOD PROCESSING
9. HEALTH CARE
10. MANUFACTURING

- 11. MINING
- 12. NON-PROFITS AND RELIGIOUS ORGANIZATIONS
- 13. PROFESSIONAL, SCIENTIFIC, AND TECHNICAL SERVICES
- 14. PUBLIC ADMINISTRATION / GOVERNMENTAL SERVICES
- 15. OIL AND GAS
- 16. RETAIL
- 17. REFRIGERATED WAREHOUSE
- 18. REAL ESTATE / PROPERTY MANAGEMENT
- 19. REPAIR AND MAINTENANCE SERVICES
- 20. TRANSPORTATION
- 21. WAREHOUSES OR WHOLESALER
- 22. OTHER [SPECIFY]: \_\_\_\_\_
- 23. NOT COMPANY, RESIDENCE
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**FB2.** Approximately what percentage of your total annual operating costs does your electricity bill at this site represent?

- 1. [RECORD RESPONSE]
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**FB3.** About how many people does your firm employ at this site?

- 1. [RECORD RESPONSE]
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**END1.** Those are all of the questions that I have for you. Is there anything about your experiences with &PACIFICORP's &PROGRAM program you'd like to mention that we did not talk about today?

- 1. [RECORD RESPONSE]
- 88. DON'T KNOW/NOT SURE
- 99. REFUSED

**[THANK RESPONDENT AND TERMINATE SURVEY]**