



Evaluation Report for Washington's Energy FinAnswer Program (PY 2012 through 2013)

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Executive Summary

This report describes the findings from Navigant Consulting, Inc.'s (Navigant's) impact and process evaluation of Washington's Energy FinAnswer 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 Energy FinAnswer transitions to the *wattsmart* business program.

Program Background

The Energy FinAnswer program offers custom incentives and engineering services to Pacific Power's commercial and industrial (C&I) customers in Washington for implementation of energy efficiency measures (EEMs).¹

The EEMs can include both equipment installed as upgrades (i.e., retrofits) to existing equipment and equipment installed as part of new construction projects. Existing commercial sites must have a minimum size of 20,000 square feet per electric meter to be eligible. Commercial new construction and all industrial projects are eligible regardless of facility size Pacific Power project managers implement the Energy FinAnswer program, working with an established network of energy engineering firms under contract with Pacific Power. The program offering includes the following:

- » A vendor-neutral, investment-grade energy analysis to identify energy efficiency opportunities
- » Financial incentives equal to \$0.15 per kilowatt-hour (kWh) of first-year energy savings plus \$50 per kilowatt (kW) of average monthly demand savings (up to 60 percent of project costs)
- » For engineers and designers, design team honorariums and incentives for new construction projects that exceed the current Washington State Energy Code (WSEC) by a minimum of 10 percent

Evaluation Objectives

This evaluation addressed the following objectives:

- » Verify the annual and combined 2012 through 2013 gross energy and demand impacts of Pacific Power's Energy FinAnswer program
- » Review the effectiveness of program operations, highlighting achievements and identifying opportunities for process improvement
- » Characterize participant and near-participant motivations

¹Qualifying rate schedules are 24, 33, 36, 40, 47T, 48T, and 54.

- » Perform cost-effectiveness calculations on evaluated results for each year evaluated and in total

Impact Evaluation

The impact evaluation of Pacific Power's Energy FinAnswer program quantified energy and demand impacts for incented technologies, 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 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 & verification (M&V) activities

Summary of Impact Findings

A combination of in-depth project file reviews, interviews with facility staff, and on-site M&V activities involving spot measurements and end-use metering of incented equipment informed the evaluated savings estimates for each project sampled during the evaluation. The evaluation team conducted on-site verification activities at 27 of the 73 projects that participated during PY 2012-2013, representing 67 percent of reported savings. This sample achieved a 90/7.6 confidence and precision.

The 2012 through 2013 program-level demand savings realization rate was 94 percent and the program-level energy savings realization rate was 99 percent. 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 Washington's Energy FinAnswer

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	889	828	93%	12,080,854	11,989,689	99%
2013	1,025	976	95%	15,238,071	15,114,646	99%
All	1,914	1,804	94%	27,318,925	27,104,335	99%

Net-To-Gross (NTG) Ratio

The Washington Utilities and Transportation Commission requires cost-effectiveness tests be performed using an applied NTG ratio of 1.0. The evaluation team also calculated NTGR of 0.85 for the 2012-2013

Energy FinAnswer program in Washington to use for comparison purposes only. Appendix B provides further detail on these results.

Cost Effectiveness

The evaluation team used a cost-effectiveness model, calibrated and updated with Pacific Power’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. WA Energy FinAnswer Cost-Benefit Results – 2012-2013 Combined (1.0 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)	27,104,335	27,104,335	\$8,930,155	\$24,481,115	2.74
Total Resource Cost Test (TRC)	27,104,335	27,104,335	\$8,930,155	\$22,255,559	2.49
Utility Cost Test (UCT)	27,104,335	27,104,335	\$4,416,843	\$22,255,559	5.04
Rate Impact Test (RIM)	27,104,335	27,104,335	\$23,400,450	\$22,255,559	0.95
Participant Cost Test (PCT)	27,104,335	27,104,335	\$7,475,520	\$21,945,815	2.94

Process Evaluation

The process evaluation sought to assess the Energy FinAnswer program from the perspective of program staff, participants, and near-participants in order to identify both existing strengths and areas for refinement that may better serve the Washington C&I market in future years. The evaluation team surveyed 44 participants in 2012 and 2013 and interviewed nine near-participants in August 2014. The team combined survey and interview information from the participants and near-participants with results from program staff interviews to create a comprehensive view of the Energy FinAnswer program from 2012 to 2013. Notable findings include the following:

- » **Program satisfaction is high for both participants and near-participants.** Nearly all (91 percent) of participants were satisfied with the program with the majority (52 percent) being very satisfied. All of the nine near-participants were either satisfied or very satisfied with the program overall.
- » **Near-participants frequently canceled or delayed projects for financial reasons.** Four out of nine interviewees canceled their projects or put them on hold due to concerns with return on investment.
- » **Opportunities exist for both participants and near-participants to consider new energy-efficient projects.** Around one-third (32 percent) of participants indicated a potential for future energy-efficient projects but did not have any specific plans in place to implement them. Of the participants that did have plans in place, 92 percent included assistance from Pacific Power.

Four out of nine near-participants also had additional energy efficiency upgrade plans. These findings indicate an opportunity for the program to increase repeat participants.

Program Evaluation Recommendations

Based on the findings from this evaluation, the evaluation team has identified the following recommendation to enhance the delivery efficiency and effectiveness as the Energy FinAnswer program transitions to the *wattsmart* business program.

- » **Recommendation 1: Reduce load factor for motor baselines in ex-ante calculations.** Ex-ante calculations should use less than 100 percent load factor for motor baselines. Direct conversion from rated horsepower to kW typically overestimates energy usage since motor load factors are frequently only 60-70 percent whereas motor efficiency is above 90 percent. Navigant suggests 70 percent as a proxy.
- » **Recommendation 2: Ensure measure classifications in database are correct.** Impact evaluation activities found incorrect measure classifications in the Pacific Power program database for some of the measures in completed projects. Proper measure tracking is essential to accurately estimate program savings. With the launch of the new *wattsmart* Business program, PacifiCorp has sought to improve measure classification tracking in their new system. However, the evaluation team did not review this new system as a part of this evaluation.
- » **Recommendation 3: Increase awareness of program project opportunities to spur energy savings growth.** Forty-three percent of program participants surveyed reported no potential to develop energy efficiency plans for their organization and only 27 percent indicated some potential to develop energy efficiency plans.² Given that so few participants were able to identify potential energy efficiency project opportunities, increasing awareness of project opportunities through more visible marketing of program case studies could potentially enable the generation of future projects.
- » **Recommendation 4: Consider alternate funding or incentive options to overcome capital barriers for program participants.** Participants who indicated some potential for future energy efficiency projects reported barriers preventing the implementation of those plans, including a lack of access to capital (36 percent) and high upfront costs (27 percent). Based on these results, offering additional funding or incentive options, like on-bill financing or project loans, may help customers overcome these barriers and achieve energy savings.
- » **Recommendation 5: Review “delayed,” “canceled,” or “on hold” projects in order to identify future project leads.** Several near-participants interviewed indicated financial or company-related circumstances that delayed or canceled their projects. Since future conditions may change, ensuring timely project review, engagement, and support of these projects could lead to additional energy savings.

² *n* = 44

1 Introduction

This report describes the findings from Navigant Consulting, Inc.'s (Navigant's) impact and process evaluation of Washington's Energy FinAnswer program years 2012 through 2013 (PY 2012-2013). This section provides a description of Washington's Energy FinAnswer program, along with a discussion of the underlying program theory and logic model depicting the activities, outputs, and desired outcomes of the program.³

1.1 Program Description

The Energy FinAnswer program offers custom incentives and engineering services to commercial and industrial (C&I) customers in Washington for implementation of energy efficiency measures (EEMs).⁴

The EEMs can include both equipment installed as upgrades (i.e., retrofits) to existing equipment and equipment installed as part of new construction projects. Commercial retrofit projects must cover a minimum size of 20,000 square feet per electric meter to be eligible. Commercial new construction and all industrial projects are eligible regardless of facility size. Pacific Power project managers implement the Energy FinAnswer program, working with an established network of energy engineering firms under contract with Pacific Power. The program offering includes:

- » A vendor-neutral, investment-grade energy analysis to identify energy efficiency opportunities,
- » Financial incentives equal to \$0.15 per kWh of first-year energy savings plus \$50 per kilowatt (kW) of average monthly demand savings (up to 60 percent of project costs)
- » For engineers and designers, design team honorariums and incentives for new construction projects that exceed the current WSEC by a minimum of 10 percent

Incentives offered through this program are subject to a cap that prevents the incentive from reducing the payback period for a project below one year. In contrast, Washington's FinAnswer Express program handles any lighting-only projects.⁵ The Energy FinAnswer program includes a commissioning requirement and post-installation verification to document the energy savings and measure costs for installed measures. For comprehensive new construction and major renovation projects, where the whole building exceeds Washington building code by at least 10 percent, Energy FinAnswer includes design assistance, design team incentives, and an incentive based on energy savings.

³ In 2014, the program transitioned to become the custom portion of the *wattsmart* Business program and Pacific Power no longer offers the program as Energy FinAnswer. However, for purposes of the 2012-2013 program evaluation cycle, the Energy FinAnswer program title, description, and theory still apply.

⁴Qualifying rate schedules are 24, 33, 36, 40, 47T, 48T, and 54. See <https://www.pacificpower.net/about/rr/wri.html>.

⁵ The FinAnswer Express program was a prescriptive incentive program offered by Pacific Power to non-residential customers. However, in October 2014, this program transitioned to become the prescriptive portion of the *wattsmart* Business program and Pacific Power no longer offers the program as FinAnswer Express. For tariff schedules for the new *wattsmart* Business program in Washington, see Pacific Power's website (<https://www.pacificpower.net/bus/se/washington.html>).

1.2 Program Changes from 2012 to 2013

During the evaluated period from January 2012 to December 2013, there was one major change to the Energy FinAnswer program (Tariff 125) where the Commission approved co-funding for the Energy Project Manager. This modifies the offering to ensure that it keeps up with customer needs and the goals of the program. Pacific Power also began marketing the Energy FinAnswer program under the wattsmart campaign during PY 2012-2013 and in January, 2014 formally transitioned Energy FinAnswer to become the custom portion of the *wattsmart* Business program. Future evaluations will no longer include a separate Energy FinAnswer program as part of the evaluation portfolio.

1.3 Program Participation

PY 2012-2013 results included 73 Energy FinAnswer completed projects in Washington: 35 projects in 2012 and 38 in 2013. The 73 projects included the installation of 152 EEM categories as some projects included multiple measure types. Over the two-year period, the program-reported 27,318,925 kWh in energy savings; Table 1 summarizes the program project counts that included the installation of the associated measure category.⁶

Table 1. Washington’s Energy FinAnswer Measure Category Details for PY 2012-2013

Measure Category	Measure Type Counts ⁷	Reported kWh Savings	Percentage of Total Savings
Refrigeration	62	13,603,425	50%
HVAC	43	6,915,778	25%
Motors	13	3,163,966	12%
Custom Measures	11	2,179,842	8%
Compressed Air	5	587,054	2%
Lighting	8	518,748	2%
Controls	4	176,885	1%
Irrigation	2	122,197	<1%
Building Shell	3	49,214	<1%
Hot Water	1	1,816	<1%
Total	152	27,318,925	100%

Custom Measures included several pumping measures, a UPS, a misclassified HVAC project, and some filtering and mixing equipment measures.

⁶ Measure categories are from the program database and do not adjust for any incorrect classifications.

⁷ 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.

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.

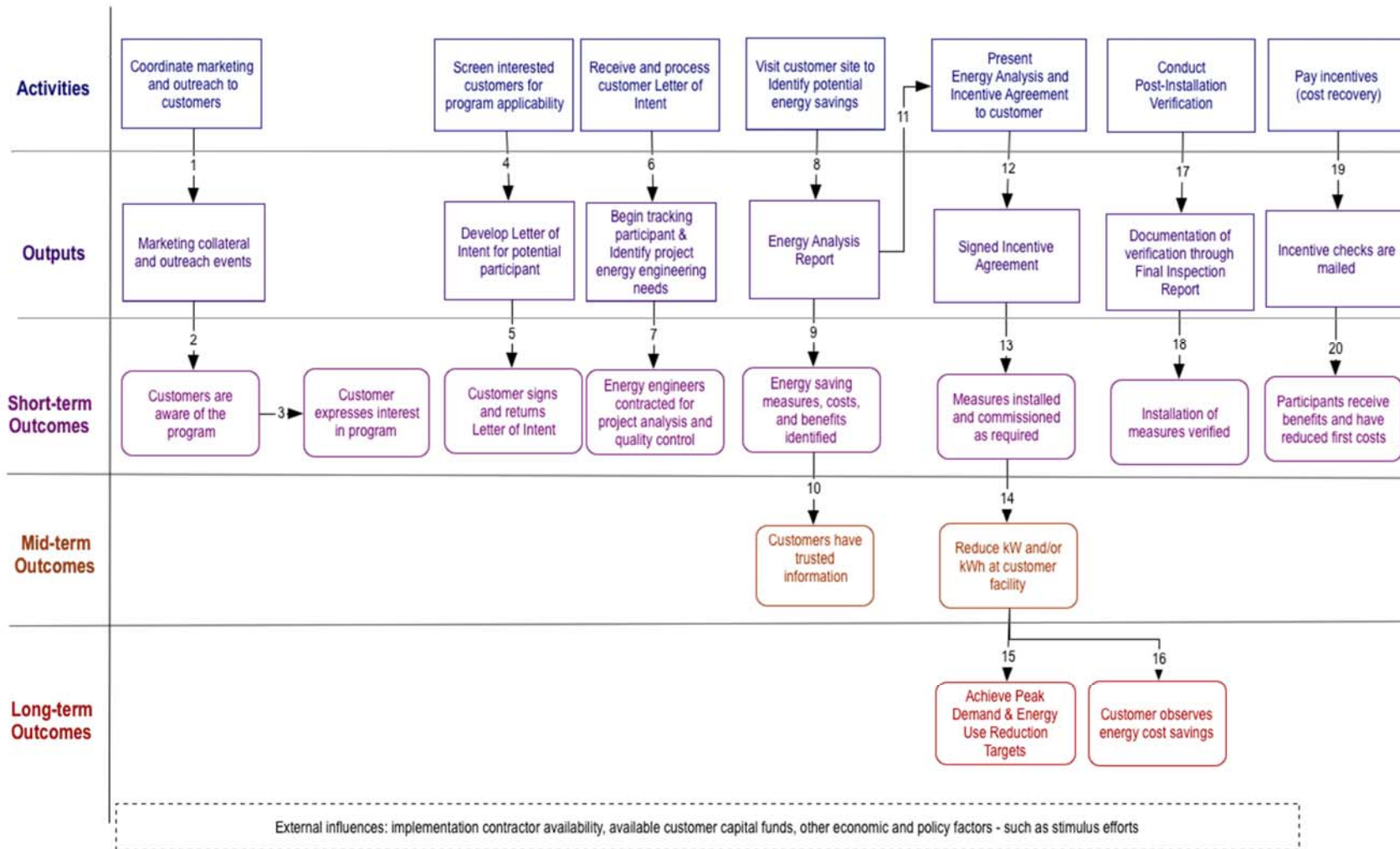
Developing a logic model that clearly provides the theory of action and change is an important step in evaluation, allowing the evaluator and program actors to see inside the program “black box.”⁸ Program logic models provide a framework for an evaluation by highlighting key linkages between program 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).⁹ 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 Energy FinAnswer program logic model (Figure 1).¹⁰

⁸ Sue Funnell and Patricia Rogers, 2011, *Purposeful Program Theory: Effective Use of Theories of Change and Logic Models*, John Wiley & Sons.

⁹ Section 4.3, Question 3 provides more specifics on the logic model review.

¹⁰ The Energy FinAnswer logic model described in this section correctly 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. Energy FinAnswer Program Logic Model (developed 2011)



Pacific Power designed the Energy FinAnswer program to overcome two C&I customer barriers to implementing energy efficiency projects: *lack of trusted information* and *high upfront capital costs*. The program's primary intervention for overcoming these barriers is through the provision of technical assistance and incentives. Incentives improve customer economics while technical assistance helps to quantify opportunities in advance of customer investment. The following list describes the linkages within the program logic, with numbers corresponding to those shown in the logic model (Figure 1).

1. Pacific Power coordinates marketing efforts and outreach through account managers. By design, individual programs are not marketed to customers. Instead, Pacific Power markets the portfolio of energy efficiency programs.
2. Customers become aware of the program through marketing and account managers.
3. Customers either directly submit Letters of Intent or express interest through the Pacific Power efficiency program's phone number, online inquiry form, email to the energy expert, or their customer or community manager. The majority of participants are expected to express interest in energy efficiency or demand reduction projects without being familiar with the Energy FinAnswer program by name.
4. Pacific Power project manager (PM) screens interested customers to identify projects that are candidates for Energy FinAnswer and meet program eligibility criteria.
5. PM drafts Letter of Intent (LOI) and provides it to the customer along with program information.
6. The customer submits signed LOI to begin the program process. Pacific Power receives and reviews applications. PM coordinates customer contacts with account manager, asks project screening questions, and determines the general scope of the project.
7. Pacific Power PM selects an appropriate energy engineer from a list of pre-qualified engineering firms that support Pacific Power. The PM contracts with the energy engineer to scope and analyze the project potential.
8. The energy engineer visits the customer's facility and identifies savings opportunities. The engineer develops an Energy Analysis Report (EAR) that includes EEMs that could improve efficiency as well as potential costs, savings, and any commissioning necessary to ensure proper EEM operation and savings.¹¹ In many cases, the energy engineer visits the customer's facility and submits an initial scoping report, called an Initial Site Visit Report (ISVR) or Preliminary Energy Analysis Report (PEAR), to the PM before conducting a detailed energy analysis. PM discusses scoping with customer, conducts further screening, and decides to move forward with energy analysis. Small or well-defined projects may go forward with a PEAR to avoid unnecessary analysis expense; the PM will make the determination to go ahead based on project timeline and size.

¹¹For some Energy FinAnswer projects, Pacific Power requires the customer to commission certain measures. The EAR provides details regarding these requirements on a measure-specific basis. If the customer chooses not to commission the project, when it is required, Pacific Power will base incentives on kWh savings and allowed project costs that are reduced by 20 percent. The customer must submit commissioning reports to Pacific Power, along with invoices and other documentation, before Pacific Power awards the incentive to the customer.

9. As a quality control measure, Pacific Power requires that EARs be peer-reviewed by a second energy engineering consultant before delivering the report to the customer. The EAR and peer review ensure that appropriate EEMs, along with costs and savings, are identified.
10. The customer can rely on this information to make decisions, reducing information barriers. Throughout the customer's participation, Pacific Power provides technical support, as needed, to ensure that implementation meets the intent and requirements of the program.
11. Pacific Power presents the EAR and the Incentive Agreement, a document highlighting incentives and stipulations for recommended measures, to the customer.
12. Pacific Power and the customer reach an agreement on which measures to implement, and the customer signs the Incentive Agreement for agreed-upon measures. Before purchasing or installing equipment, the customer is required to sign an Incentive Agreement with Pacific Power based on the EAR estimates.
13. The customer or their contractor implements the EEMs. Commissioning is completed for those EEMs for which commissioning was prescribed in the EAR. The customer notifies Pacific Power of project completion and the status of any expected commissioning.
14. EEMs reduce demand and/or energy consumption at the facility.
15. Reduced demand and/or energy consumption contribute to meeting annual program targets.
16. Customers experience reduced energy costs.
17. An energy engineer verifies proper installation of measures, reviews commissioning report (if any) and obtains invoicing information.
18. A Final Inspection Report (FIR) is submitted to Pacific Power. The FIR documents verification of energy savings; verification ensures that expected savings occur.
19. Pacific Power processes incentives after final incentive calculation.
20. Pacific Power mails incentive checks to the customer. These incentives reduce customer costs for the project.

As part of the program evaluation, the team assesses program outcomes and compares these actual outcomes with the outcomes expected in the logic model. In order to make this comparison, the team identifies 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 can be assessed through data collection and analysis of survey or interview responses. The evaluation team can assess program outcomes by reviewing key indicators. Table 2 identifies both key indicators and data sources for each of the Energy FinAnswer program outcomes (short-, medium-, and long-term) shown in the logic model (Figure 1).

Table 2. Indicators and Data Sources for Program Outcomes

Outcome	Indicator	Data Source
Short-Term Outcomes		
Customers are aware of the program	Non-participant awareness	Customer surveys
Customer expresses interest in the program	Program attracts interested participants, participation	Customer surveys, program tracking data, non-participant data
Customer signs and returns LOI	LOI in project file	Project files, customer surveys
Energy engineers selected for project analysis and quality control	Engineers identified for projects	Program tracking data, energy engineer interviews
Energy saving measures, costs, and benefits identified	EAR includes measures, costs, and benefits	Project files, customer surveys, energy engineer interviews
Measures installed and commissioned as required	Commissioning report in project file, FIR; invoices	Project files, customer surveys, energy engineer interviews
Installation of measures verified	Verification in project file	Project files, energy engineer interviews
Customers receive benefits and have reduced first costs	Customers receive benefits	Cost-recovery in program tracking data, customer surveys
Mid-Term Outcomes		
Customers have trusted information	Customers find technical assistance valuable	Customer surveys
Reduce kW and/or kWh at customer facility	Customers realize expected savings	Customer surveys
Long-Term Outcomes		
Achieve peak demand and energy use reduction targets	Pacific Power meets targets	Program goals, program tracking data
Customers observe energy cost savings	Customers realize expected savings	Customer surveys

2 Evaluation Methodology

The following chapter describes the evaluation methodologies used in Washington’s Energy FinAnswer program over PY 2012-2013. The evaluation team developed and informed these methods through an independent review of evaluation best practices.¹²

2.1 Impact Evaluation Methodology

This section summarizes the impact evaluation methods used to develop project- and program-level realization rates for the Energy FinAnswer program. Findings provide Pacific Power staff with the feedback to increase program efficacy and to advance the research and policy requirements of the Washington Utilities and Transportation Commission by providing an independent quantitative review of program achievements.

The impact evaluation of Washington’s Energy FinAnswer program aimed to characterize energy and demand impacts for incented projects in PY 2012-2013, 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 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 & verification (M&V) activities
- » Net program savings estimates and realization rates as a function of both spillover and free-ridership

See section 3 for gross and net impact results.

The Energy FinAnswer programs include only custom projects. The most common evaluation method employed for these projects involves a combination of International Performance and Measurement Verification Protocols (IPMVP) Options A and B in which the evaluation team either metered the individual equipment power consumption, or obtained facility data showing records of equipment operation.¹³ The large number of controlled atmosphere storage refrigeration projects in this evaluation were primarily evaluated using a combination of Options A and B with long-term (yearly or more) data

¹² See Appendix B for detail on M&V best practices.

¹³ 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.

from the facility trend systems for many of the affected systems. In cases where the project affected a significant portion of energy use on a utility meter, such as with pumps in isolated locations, the evaluation team employed IPMVP Option C for savings analysis, normalized by equipment usage records from the facility. The evaluation team employed IPMVP Option A for equipment operating at a constant power level on a known schedule and for projects such as high-speed doors in refrigerated warehouses where limited data were available.

2.1.1 Project File Reviews

A thorough review of the Energy FinAnswer project files allowed the evaluation team to increase the accuracy of calculated measure savings and demand reductions, thereby ensuring that they were representative of installation conditions. 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 Pacific Power's input assumptions and secondary studies, along with the relative impact on energy and demand savings. This primarily involved weather data from the National Oceanic and Atmospheric Administration (NOAA) and typical meteorological year collection 3 (TMY3) but also included a comparison of the high-speed door calculations used by PacifiCorp to that of the Industrial Assessment Center (IAC) at Oregon State University.

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

Figure 2. Parameters Verified through Project File Reviews (Example)

Site Name	Sample
Site Address	Address
Project #	EF000_000697
Program	Washington Energy FinAnswer
Customer Name	Contact name
Program Year	2012
Project Description	New Controlled Atmosphere - VFDs
Measure Category(ies)	HVAC
Installation Date	10/1/2012
Incentive Amount	\$11,567
NCI M&V Report Author	Navigant
NCI Field Staff Present On-Site	Navigant
Site Visit Date(s)	9/4/2014
Site Visit Type	Verification and trend data collection

2.1.2 Sampling Frame Development

For the evaluation of the Energy FinAnswer 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 two 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 90/7.6 confidence and precision across PY 2012-2013 by energy (kWh) savings.¹⁴ Table 3 provides an overview of the impact evaluation framework representing 73 percent of the reported Energy FinAnswer 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 kWh	Gross Sample Reported kWh	Portion of Reported Savings Evaluated ¹⁵
1	1,000,000	7	7	9,101,822	9,101,822	100%
2	525,000	13	9	9,560,190	8,141,026	85%
3	0	53	11	8,656,913	2,807,329	32%
Total	-	73	27	27,318,925	20,050,177	73%

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 (e.g., operating hours) as needed
- » Load shapes for the EEMs installed through the programs
- » Demand savings (kW) and energy savings (kWh) impacts of the efficiency measures installed for sampled projects¹⁶

¹⁴ The evaluation team planned for 90/10 confidence by program and state.

¹⁵ 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.

¹⁶ 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.

The program-level realization rate is the ratio of the product of case weights and *verified* savings estimates 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.¹⁷ For the purposes of this evaluation, Pacific Power specifically required the following cost-effectiveness tests:

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

¹⁷ 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.

The evaluation team worked with Pacific Power 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 Pacific Power.

Table 4. Details of Cost-Effectiveness Tests¹⁸

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

Section 3.2 provides the cost-effectiveness results and findings for each of the evaluated program years.

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 Energy FinAnswer 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)

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.

¹⁸ Navigant modified Table 2-2 from: NAPEE, November 2008, *Understanding Cost-effectiveness of Energy efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy – Makers*, <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 Energy FinAnswer 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 (e.g., 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 (e.g., 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 protocols that yielded appropriate inputs into the analysis models and review of all field observations with the evaluation team

2.3 *Process Methodology*

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

2.3.1 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 Pacific Power staff established key process evaluation questions through the development of the 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 Energy FinAnswer program describes the intended program design, activities, outputs, and outcomes.
- » **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.

2.3.2 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
Near-participant Interviews				X		X	

2.3.3 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.

2.3.4 Logic Model Verification

The evaluation team verified that the existing program logic model, developed in 2011 for the Energy FinAnswer program in Washington, continued to represent the program theory during the current

evaluation.¹⁹ 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.

2.3.5 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 Energy FinAnswer program.

2.3.5.1 Program Staff Interviews

The evaluation team interviewed two program management staff with the following objectives in mind:

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

2.3.5.2 Participant Surveys

The evaluation team conducted four semi-annual telephone surveys. Changes in program evaluation objectives required slight alterations between these surveys, but all three rounds of surveys included questions about program influence and satisfaction. The last survey also included additional process questions on how customers learned about the program, the equipment installed, its operation, and interaction with trade allies.²⁰ The evaluation team did not re-sample from the measures completed during previous cycles.

¹⁹ Pacific Power recently revamped the Energy FinAnswer program in Washington to be a part of the *wattsmart* Business program. However, this change occurred just after the completion of the 2012-2013 process evaluation; therefore, the program theory and logic model created for the 2011 Energy FinAnswer program remained current as of this writing. Appendix C displays the logic model for the new *wattsmart* Business program theory.

²⁰ After the first semi-annual survey, 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.

Table 6 provides the timing and sampling frame for participant surveys. The evaluation team surveyed a total of 44 participants but only 17 completed surveys that contained all of the process evaluation questions.

Table 6. Sample Frame for Participant Surveys in 2012-2013

Time Period	Sample	Program Unique Sites	Program Projects
First Half 2012 (Projects completed Jan. 1, 2012-June 30, 2012)	10	12	13
Second Half 2012 (Projects completed July 1, 2012-Dec. 31, 2012)	16	22	22
First Half 2013 (Projects completed Jan. 1, 2013-June 30, 2013)	11	16	17
Second Half 2013 (Projects completed July 1, 2013-Dec. 31, 2013)	7	18	20
Total	44	68	72

Participant survey research objectives included 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

2.3.5.3 *Near-Participant Interviews*

The evaluation team conducted ten in-depth telephone interviews with near-participants in Washington to collect data on near-participant experiences with Energy FinAnswer. Seventy-eight unique customers who attempted participation in the Energy FinAnswer program in Washington during PY 2012-2013 remained near-participants at the end of 2013.

The evaluation team developed the near-participant interview sample using a Pacific Power database of all projects identified as “on hold” or “canceled,” by randomly sorting the list of measures and attempting to reach each unique contact in order. The evaluation team attempted to reach each target contact up to three times before moving on and offered a \$25 Amazon gift card to near-participants for participating in the interview. The team targeted a minimum of nine near-participant interviews.²¹

²¹ The evaluation team did not construct a statistically significant sample because no quantitative analysis was included in these results.

The evaluation team designed the interview questions to be open-ended to allow interviewees to describe their full range of experiences. The interviewer coded responses following each interview to make generalizable observations and comparisons between near-participants.

2.3.6 Process Data Analysis and Synthesis

The evaluation team reviewed all interview response data for missing or erroneous entries before tabulating the frequency of similar responses within categories. After analyzing data from each data collection activity individually, the evaluation team identified common process findings across activities.

3 Impact Evaluation Findings

This section summarizes the impact evaluation findings for projects included in the 2012 through 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 27 of the 73 projects (representing 73 percent of reported savings) that participated during Washington’s Energy FinAnswer PY 2012-2013. The program-level demand savings realization rate was 94 percent, and the gross program energy savings realization rate was 99 percent. Table 7 provides the *program-level* reported and evaluated kW and kWh realization rates.

Table 7. Program-Level Realization Rates for Washington Energy FinAnswer

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	889	828	93%	12,080,854	11,989,689	99%
2013	1,025	976	95%	15,238,071	15,114,646	99%
All	1,914	1,804	94%	27,318,925	27,104,335	99%

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 Energy FinAnswer program. Throughout the impact evaluation, the evaluation team remained cognizant of these factors, which can influence project-level and measure-level savings. Table 8 provides *project-level* energy savings and realization rates for the 24 projects in the impact evaluation sample.

Table 8. Washington’s Energy FinAnswer Project-Level Energy (kWh) Summary

Project ID	Year	Reported kWh	Evaluated kWh	Realization Rate
EF000_000492	2013	1,575,174	72,937	5%
EF000_000485	2013	1,553,601	1,803,998	116%
EF000_000207	2012	1,389,791	1,573,217	113%
EF000_000344	2013	1,253,397	1,427,620	114%
EF000_000101	2012	1,167,278	613,352	53%
EF000_000400	2013	1,108,078	1,038,502	94%
EF000_000021	2012	1,054,503	1,179,435	112%
EFSen_7384	2013	937,022	616,879	66%
EF000_000103	2012	901,656	1,072,451	119%
EF000_000205	2012	813,549	579,019	71%
EF000_000697	2013	748,563	648,544	87%
EFSen_3969	2012	744,521	338,216	45%
EF000_000733	2013	726,190	532,572	73%
EF000_000345	2013	713,376	753,987	106%
EF000_000525	2013	672,462	864,378	129%
EFSen_9016	2012	574,198	649,675	113%
EFSen_9017	2012	504,796	630,283	125%
EF000_000483	2013	457,650	767,720	168%
EF000_000710	2013	311,814	462,388	148%
EFSen_8390	2012	256,057	231,981	91%
EF000_000275	2012	186,480	191,298	103%
EFSen_9015	2012	158,239	166,164	105%
EFSen_8736	2012	109,480	103,184	94%
EF000_000009	2012	93,387	70,981	76%
EFSen_8652	2012	86,275	77,165	89%
EF000_000528	2013	75,779	108,718	143%
EF000_000544	2012	14,671	11,622	79%

Some projects included multiple measures with high levels of realization rate variability. Table 9 provides a breakdown of the measures within a project that yielded evaluated energy savings that varied from reported values by more than 30 percent. The table includes the *measure-level* reported kWh and realization rates, as well as the *project-level* reported kWh and realization rate for reference. Note: Table 9 does not include all measures within a listed project since some measures do not fall outside the +/-30 percent variability threshold.

Table 9. WA Energy FinAnswer Measure-Level kWh Realization Rate Explanations

Project ID	Project Reported kWh	Project Realization Rate	Measure within Project	Measure Reported kWh	Measure Realization Rate	Notes
EF000_000492	1,575,174	5%	Filtered Water Booster Pump with VFD	1,575,174	5%	Process changes at the facility required re-enabling the 300 HP pump which accounted for the original savings. Ex post savings are for VFDs on two smaller pumps.
EF000_000207	1,389,791	113%	CO2 Scrubbers Replacement	83,706	175%	Scrubbers measured more operating hours than originally estimated.
			Condenser Fan VFD	23,165	193%	Fans measured much lower actual loads than originally estimated in the ex-ante calculator.
			Fast-Acting Doors	12,766	509%	Navigant feels the implementer greatly underestimated the impact for this measure. The evaluation team calculated savings using an internal calculator (developed by the IAC) which showed very similar savings to those using the PacifiCorp high-speed door calculator.
EF000_000101	1,167,278	53%	Evaporator Fan VFD	617,637	45%	Fan measured at higher speeds and fewer operating hours than claimed in the ex-ante savings.
			CO2 Scrubbers	527,902	59%	Scrubbers measured fewer operating hours than originally estimated.
EF000_000400	1,108,078	94%	Compressor VFD	75,812	39%	Operates for many fewer hours than reported in the EAR; 8016 hours/year in EAR and 1217 hours/year from trending data.
			Condenser Upgrades	24,307	137%	Condenser measured at a lower load/fewer operating speed than claimed in the ex-ante savings.
EFSen_7384	937,022	66%	R22 System Evaporator Fan VFDs	388,897	24%	Fans running at near max speed resulting in decreased VFD savings.
			Amm. Sys Including Suction Press	119,743	36%	Fans running at near max speed resulting in decreased VFD savings.
			R22 System Increase Suction	23,961	191%	Trending data showed higher load in the baseline resulting in more savings.
EF000_000103	901,656	119%	RCS on Refrigeration System R	622,984	143%	The refrigeration controls appeared to be running more efficiently than predicted. Both the compressor and condenser portions showed increased savings compared to the <i>ex-ante</i> values.
			Enhanced RCS Controls Refrigeration CI	99,253	0%	The defrost controls had been disabled due to problems. The facility was working with their contractor to repair them but it was unclear when this would be resolved.

Project ID	Project Reported kWh	Project Realization Rate	Measure within Project	Measure Reported kWh	Measure Realization Rate	Notes
EF000_000205	813,549	71%	CO2 Scrubber	478,741	65%	Much lower operating hours. Evaporator fans operate 4853 hours in the trending data versus 7300 hours from the EAR.
			Condenser Fan VFDs	16,105	51%	Much lower operating hours. Evaporator fans operate 4853 hours in the trending data versus 7300 hours from the EAR.
EFSen_3969	744,521	45%	Evaporator Fan VFD (Rms. 1-9)	474,970	42%	EAR overestimated baseline energy use.
			Evaporator Fan VFD (Rms. 10-14)	269,551	52%	EAR overestimated baseline energy use.
EF000_000733	726,190	73%	Thermo-siphon Oil Cooling - CI	157,290	53%	Base minimum head pressure is lower, and EE minimum head pressure is higher than estimated in the EAR. This results in less energy use in the baseline condition and more energy use in the EE condition.
			Condenser Fan VFDs	9,713	219%	Fans are much less loaded and operating at a lower partial load, resulting in higher savings.
EFSen_9017	504,796	125%	HVAC Upgrade	390,270	134%	Baseline cooling load did not account for internal heat gains from occupants.
EF000_000483	457,650	168%	Evaporator Fan VFD	232,352	259%	Fans run at a lower minimum speed than estimated in the EAR for more hours in the year resulting in significantly more energy savings.
			Screw Compressor VFD	164,228	67%	Compressor running at higher loads resulting in less partial load savings.
EF000_000710	311,814	148%	Evaporator Fan VFD	285,916	155%	Fans operating more hours than reported in the EAR; 8760 hours in the trending versus 4855 hours in the EAR.
EFSen_8390	256,057	91%	FIM2 - AHUR DX Cooling	20,778	165%	AHUs running at lower load than anticipated. VFDs perform better at a part load and therefore increase savings.
EFSen_9015	158,239	105%	Windows	908	892%	Significant underestimation of ex-ante savings due to a change in size of installed HVAC equipment. However, the efficiency of the HVAC equipment remained constant and is the only variable affecting the window savings.
EFSen_8736	109,480	94%	Cooling Tower Fan VFD	14,536	57%	Lower fan load at maximum speed resulting in lower baseline energy usage and lower energy savings.
EF000_000528	75,779	143%	Evaporator Fan VFD	75,779	143%	Fans operating at higher power in baseline condition, resulting in increased energy savings.

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

- » The largest project in the evaluation, **EF000_000492**, involved the planned shutdown of a continuously operating 300 HP pump used as part of the facility's production process. The site

- installed two 15 HP pumps on variable frequency drives (VFDs) to enable this shutdown. However, a few months after project completion the facility changed products, which required additional pumping, so they re-enabled the 300 HP pump. Based on discussions with the facility, the evaluation team determined that had the facility not already installed the two new 15 HP pumps with VFDs, they would have installed equivalent pumps without VFDs and throttled them while still running the 300 HP pump. The savings for this project are from the VFDs on the two new 15 HP pumps, which are significantly less than the expected 300 HP pump shutdown. PacifiCorp has since discussed the issues with the facility and they are revisiting the project to determine if additional savings can be obtained in alignment with the current production requirements.²²
- » Project number **EFSen_9015** involved new window and wall surrounds for which the FIR vastly underestimated savings. The FIR offers no clear explanation as to why the claimed savings is so low, however, it does mention lowering savings from 1,452 kWh in the EAR to 908 kWh in the FIR due to the installation of larger heating, ventilating, and air conditioning (HVAC) equipment than was originally quoted. In actuality, HVAC unit *efficiency* is the only variable affecting window upgrade savings, and the HVAC unit efficiencies remained constant between the smaller and larger units. The measure quadrupled the R-value for 8000 square feet of windows and walls, saving approximately 1 kWh per square foot of retrofitted window/wall per year.

Table 10 displays the *project-level* demand (kW) savings and realization rates for the 24 projects in the impact evaluation sample.²³

²² This project constitutes 8.7% of the *ex-ante sample* energy savings and 5.8% of the *ex-ante program* energy savings. It also accounts for only 1.4% of the *ex-ante sample* demand savings and 0.8% of the *ex-ante program* demand savings.

²³ Sites with no claimed demand savings show a realization rate of “NA.”

Table 10. Washington’s Energy FinAnswer Project-Level Demand (kW) Summary

Project ID	Year	Reported kW	Evaluated kW	Realization Rate
EF000_000492	2013	16.0	4.0	25%
EF000_000485	2013	89.0	103.3	116%
EF000_000207	2012	89	102.7	115%
EF000_000344	2013	154.0	167.0	108%
EF000_000101	2012	171.0	31.1	18%
EF000_000400	2013	252.0	58.9	23%
EF000_000021	2012	40.0	44.7	112%
EFSen_7384	2013	420.0	51.1	12%
EF000_000103	2012	84.0	27.1	32%
EF000_000205	2012	135.0	32.2	24%
EF000_000697	2013	172.0	58.0	34%
EFSen_3969	2012	50.0	11.4	23%
EF000_000733	2013	126.0	31.4	25%
EF000_000345	2013	64.0	90.5	141%
EF000_000525	2013	38.0	48.8	128%
EFSen_9016	2012	90.0	42.1	47%
EFSen_9017	2012	90.0	42.0	47%
EF000_000483	2013	75.0	42.4	57%
EF000_000710	2013	34.0	25.5	75%
EFSen_8390	2012	417.0	76.0	18%
EF000_000275	2012	39.0	13.6	35%
EFSen_9015	2012	24.0	7.3	30%
EFSen_8736	2012	6.0	2.6	43%
EF000_000009	2012	0.0	0.0	NA
EFSen_8652	2012	12.0	5.0	42%
EF000_000528	2013	4.0	5.7	143%
EF000_000544	2012	6.0	4.8	79%

3.2 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, participant costs and benefits, and other input parameters. Table 11 provides an overview of cost-effectiveness input values used by the evaluation team in the cost-effectiveness analysis.

Table 11. Washington Energy FinAnswer 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	9.53%	9.53%	-
Industrial Line Loss	8.16%	8.16%	-
Measure Life	14 Years	14 Years	14 Years
Commercial Retail Rate	\$0.077	\$0.077	-
Industrial Retail Rate	\$0.065	\$0.065	-
Gross Customer Costs	\$4,063,489	\$3,412,031	\$7,475,520
Program Costs	\$2,373,349	\$2,043,495	\$4,416,843
Program Delivery	\$863,876	\$590,760	\$1,454,635
Incentives	\$1,509,473	\$1,452,735	\$2,962,208

The discount rates, inflation rates, line loss factors, and retail 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 12 through Table 14 illustrate the costs, benefits, and benefit/cost ratio for the cost-effectiveness tests used in this evaluation for 2012 and 2013, as well as for the combined 2012-2013 years using the 1.0 NTG.

Table 12. WA Energy FinAnswer Cost-Effectiveness Results – 2012 (1.0 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)	11,989,689	11,989,689	\$4,927,365	\$12,788,461	2.60
Total Resource Cost Test (TRC)	11,989,689	11,989,689	\$4,927,365	\$11,625,873	2.36
Utility Cost Test (UCT)	11,989,689	11,989,689	\$2,373,349	\$11,625,873	4.90
Rate Impact Test (RIM)	11,989,689	11,989,689	\$10,785,819	\$11,625,873	1.08
Participant Cost Test (PCT)	11,989,689	11,989,689	\$4,063,489	\$9,921,944	2.44

Table 13. WA Energy FinAnswer Cost-Effectiveness Results – 2013 (1.0 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)	15,114,646	15,114,646	\$4,002,791	\$11,692,655	2.92
Total Resource Cost Test (TRC)	15,114,646	15,114,646	\$4,002,791	\$10,629,686	2.66
Utility Cost Test (UCT)	15,114,646	15,114,646	\$2,043,495	\$10,629,686	5.20
Rate Impact Test (RIM)	15,114,646	15,114,646	\$12,614,630	\$10,629,686	0.84
Participant Cost Test (PCT)	15,114,646	15,114,646	\$3,412,031	\$12,023,871	3.52

Table 14. WA Energy FinAnswer Cost-Effectiveness Results – 2012-2013 Combined (1.0 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)	27,104,335	27,104,335	\$8,930,155	\$24,481,115	2.74
Total Resource Cost Test (TRC)	27,104,335	27,104,335	\$8,930,155	\$22,255,559	2.49
Utility Cost Test (UCT)	27,104,335	27,104,335	\$4,416,843	\$22,255,559	5.04
Rate Impact Test (RIM)	27,104,335	27,104,335	\$23,400,450	\$22,255,559	0.95
Participant Cost Test (PCT)	27,104,335	27,104,335	\$7,475,520	\$21,945,815	2.94

4 Process Evaluation Findings

This section describes the findings from the Energy FinAnswer process evaluation data collection activities, including trade ally, participant, and program staff interviews.

4.1 Participant Findings

The evaluation team surveyed 44 program participants over the four survey cycles for PY 2012-2013.²⁴ Based on the survey fielding methodology, this sample is representative of the population. The respondents completed a total of 67 measures, one lighting measure and 66 non-lighting measures.

Participating firms represented a number of different industries, including manufacturing, dairy/agricultural, and public administration. Table 15 provides the distribution of program participating industries.

Table 15. Primary Industry of Energy FinAnswer Survey Respondents

Primary Industry	Participant Count	Percentage
Dairy/Agricultural	20	45%
Manufacturing	10	23%
Food Processing	3	7%
Public Administration/Governmental Services	3	7%
Educational Services	2	5%
Refrigerated Warehouse	2	5%
Construction	1	2%
Health Care	1	2%
Professional, Scientific, and Technical Services	1	2%
Warehouses or Wholesaler	1	2%
Total	44	100%

The evaluation team asked respondents to identify the portion of operating expenses represented by electricity costs in order to understand the value of electric efficiency to participants. Responses ranged from six to 47 percent, with the median portion of operating expenses at 19 percent and the average at 21 percent. Nineteen of the 44 respondents (43 percent) were able to estimate the percentage of total annual operating costs attributable to electricity.

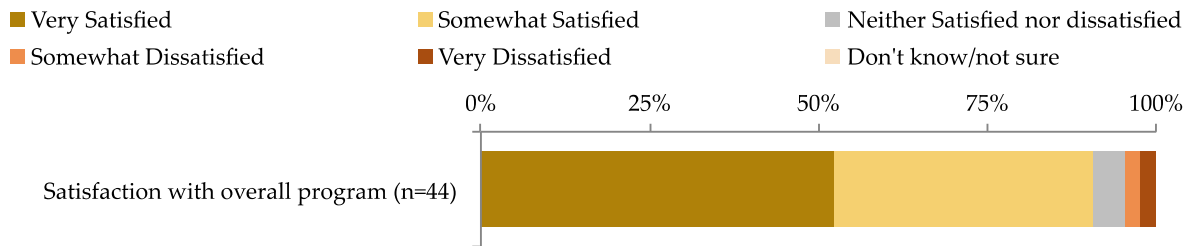
²⁴ The first and fourth survey included process questions. The second and third surveys only included basic project questions and overall satisfaction. Therefore, the number of respondents varies greatly by question.

4.1.1 Program Satisfaction

The majority of respondents indicated being very satisfied with multiple aspects of the program. Surveys polled satisfaction with program overall, installed measures, energy savings benefits, and non-energy benefits.

Satisfaction of the program overall is very high where 91 percent of respondents indicated being satisfied with the program (52 percent very satisfied, 39 percent somewhat satisfied). A small minority (5 percent) indicated dissatisfaction. Those respondents who were dissatisfied or neutral were asked what could be changed that would improve their perspective. They indicated that they want an easier process (two) and access to assistance at the beginning of their projects (one). The one who was very dissatisfied did not offer any way that they would have been more satisfied.

Figure 3. Overall Satisfaction (n=44)



The Energy FinAnswer program provides participants with an Energy Analysis Report (EAR) that describes the energy analysis of the project. Nearly all (16 of 17 respondents) thought the report was valuable; the remaining one respondent was not sure.

Measure-specific questions covered measure satisfaction, the condition of the replaced equipment, and expected and received benefits. The 17 respondents were asked about 22 measures. Respondents were satisfied or very satisfied with a majority (73 percent) of measures. For four measures, they did not know. One respondent with two measures was dissatisfied. This respondent was asked what could change about the measure performance to improve satisfaction; the response was that they were misinformed about the incentive – this is a program process rather than a performance complaint.

Table 16. Satisfaction with Measure Performance (n=22)



None of the measures installed through the program during PY 2012-2013 replaced failed equipment. The one lighting measure replaced existing equipment that was working just fine. The majority of non-lighting equipment was new (62 percent), but more measures installed through the program replace

equipment working fine than failing. This indicates a strong desire for participants to look to save energy by upgrading non-lighting equipment, even if it may not be in danger of failing. Table 17 provides the distribution of responses.²⁵

Table 17. Operating Condition of Replaced Equipment by Measure Type

	Lighting (n = 1)	Non-Lighting (n = 66)
Existing equipment had failed	0%	0%
Existing equipment working but with problems	0%	12%
Existing equipment working with no problems	1%	26%
Totally new installation	0%	62%

Most respondents reported that the energy savings related to each measure met their expectations. Fourteen out of 22 measures (64 percent) said that the energy savings for all measures met their expectations. Of the remaining measures, only one measure (five percent) did not meet savings expectations; other respondents did not know or refused to answer (32 percent).

Participants also reported whether they anticipated other benefits beyond energy savings related to each measure (i.e., increased control over light and less frequent replacement). Respondents said they anticipated other benefits for 12 of 22 measures. For four measures, respondents did not provide a description of these other benefits, and for one measure, the benefit described was the program incentive. Respondents mentioned anticipating increased control, less frequent replacement, and savings on other input costs (purchasing and disposing of lime). Table 18 highlights these benefits.

Table 18. Anticipated Non-Energy Benefits from Program Participants

Non-Energy Benefits Anticipated	Participant Count	Percentage
Increased control	3	43%
Less frequent replacement	2	29%
Savings on other input costs	2	29%
Total	7	100%

Finally, participants reported whether they had seen these non-energy benefits since completing the project; for 10 out of 12 (83 percent) measures, respondents said they had experienced these benefits.

²⁵ Four respondents initially stated that the operating condition was “other” than these. However, their responses indicate that the replaced equipment was working, but was less efficient.

4.1.2 Program Awareness and Motivation

Participants responded to questions about sources of program awareness. The most common source was previous participation (45 percent) followed by Pacific Power staff (25 percent), as shown in Table 19. This is in keeping with the program logic model. One respondent learned about the program from the opt-in newsletter for customers.

Table 19. Sources of Program Awareness (n=17)

Source of Awareness	Mentions	Percentage
Previous Participation in Pacific Power Programs	9	45%
Account Representative or other Pacific Power Staff	5	25%
Another Business Colleague	2	10%
Trade Ally, Vendor, or Contractor	2	10%
Pacific Power Newsletter	1	5%
"Knew about it already"	1	5%
Total	20	100%

Multiple responses were allowed.

4.1.3 Program Influence

The evaluation team found many influential factors motivating program participants, and no reason stood out with a majority of respondents. The most important reasons were obtaining an incentive, saving money on electric bills, and saving energy, as shown in Table 20.

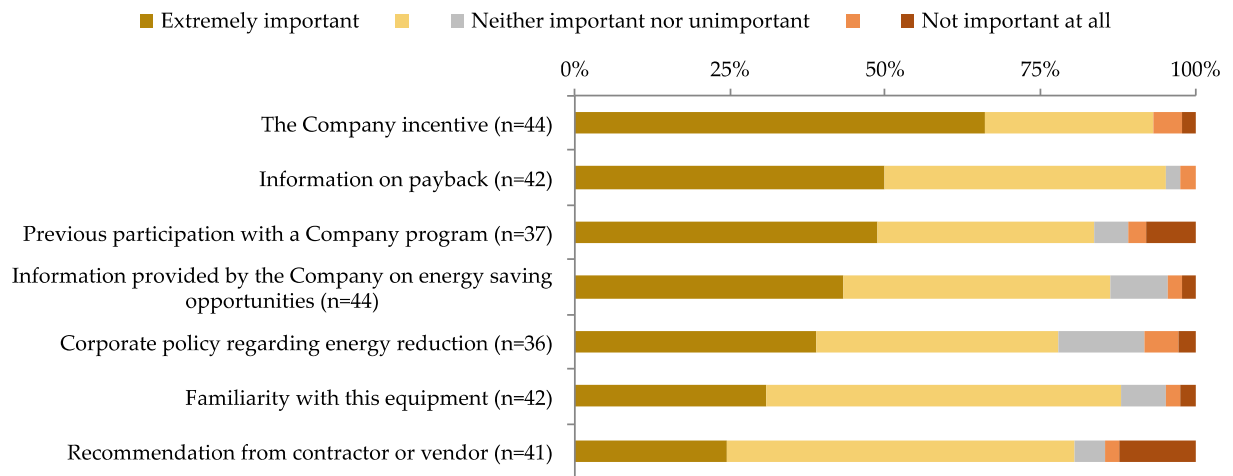
Table 20. Reasons for Participating in the Program (n=17)

Reasons for Participation	Mentions	Most Important	Percent Most Important
To obtain an incentive	6	4	24%
To save money on electric bills	6	3	18%
To save energy (no costs mentioned)	5	3	18%
To save money on maintenance costs	4	2	12%
Because the program was sponsored by Pacific Power	2	2	12%
Previous experience with Pacific Power	1	1	6%
To protect the environment, be "green"	1	1	6%
To comply with a standard or policy	1	1	6%
To improve operations, production, or quality	2	0	0%
The payoff was attractive	2	0	0%
To acquire the latest technology	1	0	0%
Total	31	17	100%

More than one response was allowed; eight respondents gave more than one reason. One respondent gave four reasons.

Respondents ranked the importance of certain factors in deciding which equipment to install for each project specified. Figure 4 highlights these findings. The most important factors included the company incentive (66 percent) and information about payback (50 percent). This implies that the assistance provided by the program (both financial and informational) encouraged the installation of more efficient equipment. Figure 4 does not display responses that were unknown or not applicable.

Figure 4. Importance of Factors for Participants to Decide to Install Equipment



4.1.4 Further Energy Efficiency Opportunities and Barriers

Participant surveys provided insight into the barriers that prevented participants from taking action and about future plans for energy efficiency projects. Respondents shared their current plans, potential plans, and whether current plans included assistance from Pacific Power. Respondents also listed specific examples for energy-efficient plans and selected factors that may prevent them from pursuing these plans.

Many respondents (43 percent) indicated no potential to develop energy efficiency plans for their organization. Nearly one-third (27 percent) indicated some potential to develop plans, but no plans are yet in place. Of the 13 respondents that indicated having current plans for energy efficiency projects, 12 respondents (92 percent) had plans that included Pacific Power’s assistance. This information suggests that participants are happy with the program, but it may not encourage them to think about new projects. Table 21 combines multiple responses concerning participants’ current and future energy-efficient plans.

Table 21. Potential Further Energy Efficiency Measures

Potential for Energy Efficiency	Participant Counts	Percentage
No potential for energy efficiency	19	43%
Potential for energy efficiency, but no plans in place	12	27%
Energy efficiency plans with Pacific Power	12	27%
Energy efficiency plans without Pacific Power	1	3%
Total	44	100%

The 25 respondents who thought there was potential were asked what kind of projects they were considering. Seventeen of them were able to describe specific technologies or mechanisms for their future projects. The most common response was more efficient lighting (10); a few respondents indicated doors, either rapid or roll up, and a couple of respondents indicated compressed air and VFDs. Other ideas, mentioned by single respondents, were: pumps, irrigation management, chiller, controls, HVAC, motors, and pumps.

Respondents who indicated at least some potential for implementing energy-efficient projects (25) were asked what might prevent implementation of those plans; 19 were able to answer. The most common response (28%) was that there was nothing hindering moving forward. The most influential barriers for those that anticipated them were lack of access to capital (22 percent) and high upfront costs (17 percent). Table 22 lists the barriers reported by respondents.

Table 22. Barriers to Electric Efficiency Improvements

Barrier to Future Energy Efficiency	Mentions	Most Important	Percent Most Important
None	5	5	28%
Lack of access to capital	5	4	22%
High upfront cost	5	3	17%
Long payback period	2	2	11%
Low priority/lack of interest of management	1	1	6%
Lack of information about savings and performance	1	1	6%
Manpower	1	1	6%
No incentive	1	1	6%
Timing and availability of equipment	1	0	0%
Total	22	18	100%

More than one response was allowed; three respondents gave more than one barrier.

4.2 Near-Participant Findings

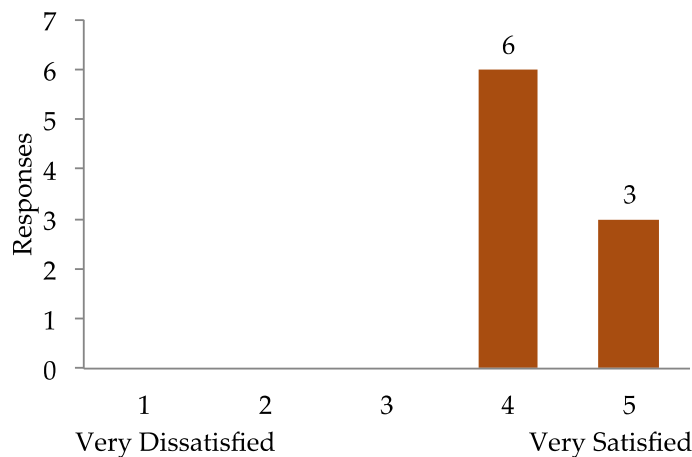
The evaluation team interviewed nine Energy FinAnswer near-participants in Washington. Seventy-eight unique customers attempted participation in the Energy FinAnswer program in Washington during PY 2012-2013 and received an “on hold” or “canceled” status at the end of 2013.

Five of the nine interviewees represented the agricultural sector of a unique set of Pacific Power’s service area including four fruit processing or packing firms with large refrigerated warehouses, and one dairy farm. The remaining four fell into the categories of municipal, manufacturing, and education. Five of the nine firms in the sample had participated in other Pacific Power programs in the past.

4.2.1 Program Satisfaction

Near-participants in Washington consistently rated their overall satisfaction with Energy FinAnswer highly, answering with a four or five on a satisfaction scale from one to five (Figure 5).²⁶

Figure 5. Near-Participant Overall Satisfaction with Energy FinAnswer (n = 9)



Participants who were very satisfied had all completed multiple projects through the program in the past, and mentioned the successful outcomes of these projects. Additionally, interviewees mentioned the usefulness of information provided by Pacific Power and their engineering partners ($n = 2$), as well as that the participation was very low-risk for the company ($n = 1$).

²⁶ The team used a satisfaction scale from one to five, where 1 = Very Dissatisfied, 2 = Somewhat Dissatisfied, 3 = Neutral, 4 = Somewhat Satisfied, and 5 = Very Satisfied.

The evaluation team prompted those who rated the program as a four, as to why they did not rate it a five. Reasons included the following:

- » Overall process and timeline was too slow ($n = 2$)
- » Logistics and implementation were confusing ($n = 1$)
- » Wanted greater incentives ($n = 1$)

The evaluation team asked for suggestions to improve the program for future participants, but only two provided an answer and recommended allowing more flexibility on timeline, such as post-purchase approval, and streamlining the overall process.

4.2.2 Causes of Non-Completion

Nearly half of the interviewees canceled or delayed projects for financial reasons such as concern with payback. Others delayed projects for internal reasons (i.e., change in company ownership) and felt there was nothing the utility could have done to move the project forward. Table 23 summarizes the statuses of near-participants' projects.

Table 23. Status of Projects

Project Status	Count ($n=9$)	Reasons
Canceled	4	Payback or return on investment (ROI)
On hold (indefinitely)	1	Staffing
On hold (delayed)	2	Payback Change in ownership
Completed (without program support)	1	Completed before approval
Completed (through Pacific Power program)	1	Completed through the <i>watts</i> mart Business program

4.2.2.1 Canceled Projects

Four interviewees definitively canceled their projects because they did not meet company payback period or return on investment requirements. One interviewee additionally mentioned that his company had already pursued many of the most cost-effective measures, so the remaining available upgrades could no longer meet the company's payback requirement.

4.2.2.2 Projects Indefinitely on Hold

One interviewee put his project on hold indefinitely, mentioning that he did not currently have enough staffing resources to pursue the project. However, he also hoped to continue the project by taking advantage of the co-funded energy manager position through Pacific Power.

4.2.2.3 *Projects on Hold due to Delay*

Two interviewees said their projects were in process but delayed. One interviewee, representing a state agency, said she had discretion to borrow funds for projects that met certain payback requirements. Although the project did not meet the requirement, she was able to request capital through a separate process for necessary upgrades. The other interviewee reported that his company had recently changed ownership, and the company had put all capital projects on hold—including energy efficiency projects. However, he believed that the company would likely pursue the measures in the future.

4.2.2.4 *Projects Completed without Program Support*

One interviewee completed his project without program support. The interviewee was on a tight schedule and could not get the project approved by Pacific Power in time. This interviewee was frustrated that he was not able to receive the incentive due to the slow program timeline.

4.2.2.5 *Projects Completed through Pacific Power*

Finally, one interviewee had completed his project through the *wattsmart* Business program. While Pacific Power reported this project on hold, the interviewee reported no problems completing the project.

4.2.3 **Program Awareness and Motivation**

Interviewees frequently cited previous participation in Pacific Power programs as the main source of program awareness. For those who cited previous participation, the evaluation team asked how they had originally heard of the program offerings. Although some interviewees could not remember, responses included:

- » Pacific Power account representative ($n = 2$)
- » Through contractor or engineering firm ($n = 2$)
- » Word of mouth ($n = 2$)
- » State agency mandate to seek out and pursue financial incentives ($n = 1$)

Interviewee motivation for participating in the Energy FinAnswer program included previous program participation ($n = 9$), cost savings ($n = 6$), and needed upgrades ($n = 4$). Interviewees frequently reported the Pacific Power financial incentives as necessary for making the decision to upgrade the equipment or to purchase higher quality equipment. Of the interviewees who cited cost savings as a source of influence, one interviewee mentioned having plans to complete the project before becoming aware of the program or any financial incentives.

4.2.4 Further Energy Efficiency Opportunities and Barriers

The evaluation team inquired about additional energy efficiency opportunities at the interviewee’s facilities. As shown in Table 24, four interviewees were aware of additional opportunities and were pursuing energy-efficient measures, three interviewees knew of opportunities but were not currently pursuing them, and two interviewees were not aware of any additional opportunities.

Table 24. Awareness of Additional Opportunities for Energy Efficiency

Reported Awareness	Participant Count (<i>n</i> = 9)
Yes and pursuing additional measures	4
Yes but not pursuing additional measures currently	3
No	2

Many near-participants mentioned plans for pursuing energy efficiency opportunities in the future, including the following measures:

- » Lighting (*n* = 4)
- » Variable frequency drives (*n* = 3)
- » HVAC (*n* = 2)
- » Energy management (*n* = 1)

The evaluation team also asked about barriers that might stand in the way of completing future projects and interviewees reported the following:

- » Upfront costs (*n* = 4)
- » Payback period (*n* = 3)

Interviewees reported that although these barriers may delay projects, they would not preclude them from eventually moving forward. One interviewee, who reported payback period barriers, described a situation unique to state agencies, where capital funding required state legislature authorization. This usually caused project delays and ultimately took the final decision out of her organization’s control.

4.3 Overall Process Findings

The evaluation team sought to answer seven process evaluation research questions. This section includes these questions along with short summary answers.

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

The Energy FinAnswer program in Washington sought to improve energy efficiency of existing equipment at C&I sites by offering custom incentives and engineering services to customers for implementing large energy efficiency projects. Program engineers conduct site visits and calculate energy savings for these larger projects that customers could not do themselves.

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

Yes, staff reported that they had resources and capacity to implement the program as planned. Additionally, none of the participants or near-participants reported any problems relating to staff resources and capacity; rather, the majority of respondents expressed satisfaction with the program overall.

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

Yes, program delivery is in accordance with the logic model. All activities and expected outputs and outcomes occurred. With high marks for value, the program efforts to conduct initial inspections and provide the Energy Analysis Report appears to be working particularly well. Participants who were not satisfied and one near participant may have been better off if the program worked faster and was less complicated. The shift to the *wattsmart* Business program may offer a more direct path for these customers.

4. Is the program marketing effective? Specifically, how do customers find out about the program?

The majority of participant and near-participant interviewees reported to have learned about the program through Pacific Power staff or through prior participation in programs. Additional sources of awareness, although less commonly cited, included colleagues, trade allies, or the Pacific Power newsletter. These data show that customers most often learned about the Energy FinAnswer program through word of mouth, rather than through indirect marketing channels, such as advertisements.

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.)?

No one reason dominated participant motivations for participants. Program participants identified the potential for obtaining an incentive (24 percent) and saving money on electric bills (18 percent) and saving energy (18 percent) as the most influential reasons for participating in the Energy FinAnswer program. However, there was a lot of variability in the data and

participants also cited the following influencing factors: to save money on maintenance costs, to comply with a standard or policy, and to protect the environment or be green. Participant respondents ranked the importance of certain factors in deciding which equipment to install for each project specified. The most important factors included the company incentive (66 percent) and information on payback (50 percent). 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?

Financial concerns continue to be a major barrier preventing customers from taking energy efficiency actions. Four of nine near-participants reported to cancel their projects because of a high rate of return or long payback. The evaluation team also asked participants and near-participants about barriers they faced in conducting additional energy efficiency projects. The most common response for participants was that there were no barriers. Respondents who saw barriers most commonly reported financial concerns: lack of access to capital, high upfront costs, and long payback periods. Many participant respondents (43 percent) indicated no potential for future energy efficiency projects at their site. While they may have exhausted all opportunities for energy efficiency, it could indicate that customers were simply not aware that additional energy efficiency opportunities might exist.

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

Yes, participants are achieving planned outcomes. The majority of participant respondents (91 percent) reported to be satisfied with the program (52 percent were very satisfied and 39 percent were somewhat satisfied); however 7 percent of participant respondents were dissatisfied. Respondents felt the Energy Analysis Report was valuable. Also, 73 percent of respondents were satisfied with the performance of the installed measures. Most respondents reported that the energy savings related to the installed measures met their expectations and that they experienced additional non-energy benefits, including increased control and less frequent replacements.

5 Program Evaluation Recommendations

5.1 PY 2012-2013 Recommendations

The evaluation team recommends that Pacific Power consider undertaking the following steps to improve the program experience for participants, engineers, and program staff as the Energy FinAnswer program transitions to the *wattsmart* Business program.

- » **Recommendation 1: Reduce load factor for motor baselines in ex-ante calculations.** Ex-ante calculations should use less than 100 percent load factor for motor baselines. Direct conversion from rated horsepower to kW typically overestimates energy usage since motor load factors are frequently only 60-70 percent whereas motor efficiency is above 90 percent. Navigant suggests 70 percent as a proxy.
- » **Recommendation 2: Ensure measure classifications in database are correct.** Impact evaluation activities found incorrect measure classifications in the Pacific Power program database for some of the measures in completed projects. Proper measure tracking is essential to accurately estimate program savings. With the launch of the new *wattsmart* Business program, PacifiCorp has sought to improve measure classification tracking in their new system. However, the evaluation team did not review this new system as a part of this evaluation.
- » **Recommendation 3: Increase awareness of program project opportunities to spur energy savings growth.** Forty-three percent of program participants surveyed reported no potential to develop energy efficiency plans for their organization and only 27 percent indicated some potential to develop energy efficiency plans.²⁷ Given that so few participants were able to identify potential energy efficiency project opportunities, increasing awareness of project opportunities through more visible marketing of program case studies could potentially enable the generation of future projects.
- » **Recommendation 4: Consider alternate funding or incentive options to overcome capital barriers for program participants.** Participants who indicated some potential for future energy efficiency projects reported barriers preventing the implementation of those plans, including a lack of access to capital (36 percent) and high upfront costs (27 percent). Based on these results, offering additional funding or incentive options, like on-bill financing or project loans, may help customers overcome these barriers and achieve energy savings.
- » **Recommendation 5: Review “delayed,” “canceled,” or “on hold” projects in order to identify future project leads.** Several near-participants interviewed indicated financial or company-related circumstances that delayed or canceled their projects. Since future conditions may change, ensuring timely project review, engagement, and support of these projects could lead to additional energy savings.

²⁷ *n* = 44

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 Pacific Power. The following lists the prior recommendations and the results of this review.

Include energy and demand savings calculations in a spreadsheet format. By providing this information in one consolidated location, future evaluation efforts will be more efficient and reduce the potential for comparing verified savings to incorrect or outdated project assumptions.

- » Although each project properly documented the reported energy and demand savings estimates, the absence of savings calculations (particularly for demand savings) reduces the transparency of reported savings, along with the efficiency of evaluation efforts. **Provide both the input assumptions and savings calculation methodologies**, which will ensure the comparability and accuracy of reported and evaluated savings and will reduce associated evaluation costs.

Review Results – The evaluation team found only slight improvement to the inclusion of calculation spreadsheets in the project files.

- » **Include the clearly identified final energy savings table in project files for the evaluation.** The data should include both baseline and current energy and demand usage, as well as savings estimates. Utilizing consistent formats based on the *final* numbers is important for all follow up activities. This practice will provide decision makers the key information needed to quickly assess the situation and take appropriate action relative to the inspections conducted. The evaluation team notes that the key elements are included in the documentation for each project, but it is often difficult to identify the final set of parameters used because the project files capture multiple changes/revisions to the application process.

Review Results – The evaluation team found improvement to the FIRs, but mostly from the EARs.

Appendix A Glossary²⁸

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).

²⁸ 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 Net-To-Gross Analysis

The Washington Utilities and Transportation Commission requires cost-effectiveness tests be performed using an applied NTG ratio of 1.0. The evaluation team used the required NTG of 1.0 for 2012-2013 Energy FinAnswer program evaluation, but also calculated a NTG of 0.85 to use for comparison purposes.

5.3 Program-Level Net Savings Results

Table 25 provides the NTG analysis scores resulting from the four waves of participant surveys during PY 2012-2013.

Table 25. Weighted Program Influence for PY 2012-2013

Part of Year	Free-Ridership Score	Like Spillover Score	Unlike Spillover Score	Net Savings Ratio
First Half 2012 (completed Jan 1, 2012-June 30, 2012)	0.15	0.00	None	0.87
Second Half 2012 (completed July 1, 2012-December 31, 2012)	0.29	0.00	Yes, Not Scored	0.72
First Half 2013 (completed Jan 1, 2013-June 30, 2013)	0.07	0.00	Yes, Not Scored	0.92
Second Half 2013 (completed July 1, 2013-December 31, 2013)	0.14	0.00	Yes, Not Scored	0.86
Weighted Total	0.15	0.00	--	0.85

Table 26 provides evaluated program-level demand and energy savings with the NTG ratio of 0.85 applied.

Table 26. Program-Level Net Realization Rates for Washington Energy FinAnswer

Program Year	Program Reported kW	Net Program Evaluated kW	Net kW Realization Rate	Program Reported kWh	Net Program Evaluated kWh	Net kWh Realization Rate
2012	889.0	703.9	79%	12,080,854	10,191,235	84%
2013	1,025.0	829.3	81%	15,238,071	12,847,449	84%
All	1,914.0	1,533.2	80%	27,318,925	23,038,685	84%

5.4 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, participant costs and benefits, and other input parameters. Table 27 provides an overview of cost-effectiveness input values used by the evaluation team in the cost-effectiveness analysis.

Table 27. Washington Energy FinAnswer 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	9.53%	9.53%	-
Industrial Line Loss	8.16%	8.16%	-
Measure Life	14 Years	14 Years	14 Years
Commercial Retail Rate	\$0.077	\$0.077	-
Industrial Retail Rate	\$0.065	\$0.065	-
Gross Customer Costs	\$4,063,489	\$3,412,031	\$7,475,520
Program Costs	\$2,373,349	\$2,043,495	\$4,416,843
Program Delivery	\$863,876	\$590,760	\$1,454,635
Incentives	\$1,509,473	\$1,452,735	\$2,962,208

The discount rates, inflation rates, line loss factors, and retail 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 28 through Table 30 illustrate the costs, benefits, and benefit/cost ratio for the cost-effectiveness tests used in this evaluation for 2012 and 2013, as well as for the combined 2012-2013 years using the 1.0 NTG. Table 31 through Table 33 shows the same information using the evaluated 0.85 NTG.

Table 28. WA Energy FinAnswer Cost-Effectiveness Results – 2012 (1.0 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)	11,989,689	11,989,689	\$4,927,365	\$12,788,461	2.60
Total Resource Cost Test (TRC)	11,989,689	11,989,689	\$4,927,365	\$11,625,873	2.36
Utility Cost Test (UCT)	11,989,689	11,989,689	\$2,373,349	\$11,625,873	4.90
Rate Impact Test (RIM)	11,989,689	11,989,689	\$10,785,819	\$11,625,873	1.08
Participant Cost Test (PCT)	11,989,689	11,989,689	\$4,063,489	\$9,921,944	2.44

Table 29. WA Energy FinAnswer Cost-Effectiveness Results – 2013 (1.0 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)	15,114,646	15,114,646	\$4,002,791	\$11,692,655	2.92
Total Resource Cost Test (TRC)	15,114,646	15,114,646	\$4,002,791	\$10,629,686	2.66
Utility Cost Test (UCT)	15,114,646	15,114,646	\$2,043,495	\$10,629,686	5.20
Rate Impact Test (RIM)	15,114,646	15,114,646	\$12,614,630	\$10,629,686	0.84
Participant Cost Test (PCT)	15,114,646	15,114,646	\$3,412,031	\$12,023,871	3.52

Table 30. WA Energy FinAnswer Cost-Effectiveness Results – 2012-2013 Combined (1.0 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)	27,104,335	27,104,335	\$8,930,155	\$24,481,115	2.74
Total Resource Cost Test (TRC)	27,104,335	27,104,335	\$8,930,155	\$22,255,559	2.49
Utility Cost Test (UCT)	27,104,335	27,104,335	\$4,416,843	\$22,255,559	5.04
Rate Impact Test (RIM)	27,104,335	27,104,335	\$23,400,450	\$22,255,559	0.95
Participant Cost Test (PCT)	27,104,335	27,104,335	\$7,475,520	\$21,945,815	2.94

Table 31. WA Energy FinAnswer Cost-Effectiveness Results – 2012 (0.85 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)	11,989,689	10,191,235	\$4,317,841	\$10,870,191	2.52
Total Resource Cost Test (TRC)	11,989,689	10,191,235	\$4,317,841	\$9,881,992	2.29
Utility Cost Test (UCT)	11,989,689	10,191,235	\$2,373,349	\$9,881,992	4.16
Rate Impact Test (RIM)	11,989,689	10,191,235	\$9,523,949	\$9,881,992	1.04
Participant Cost Test (PCT)	11,989,689	10,191,235	\$4,063,489	\$9,921,944	2.44

Table 32. WA Energy FinAnswer Cost-Effectiveness Results – 2013 (0.85 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)	15,114,646	12,847,449	\$3,490,986	\$9,938,756	2.85
Total Resource Cost Test (TRC)	15,114,646	12,847,449	\$3,490,986	\$9,035,233	2.59
Utility Cost Test (UCT)	15,114,646	12,847,449	\$2,043,495	\$9,035,233	4.42
Rate Impact Test (RIM)	15,114,646	12,847,449	\$11,028,960	\$9,035,233	0.82
Participant Cost Test (PCT)	15,114,646	12,847,449	\$3,412,031	\$12,023,871	3.52

Table 33. WA Energy FinAnswer Cost-Effectiveness Results – 2012-2013 Combined (0.85 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)	27,104,335	23,038,685	\$7,808,827	\$20,808,948	2.66
Total Resource Cost Test (TRC)	27,104,335	23,038,685	\$7,808,827	\$18,917,225	2.42
Utility Cost Test (UCT)	27,104,335	23,038,685	\$4,416,843	\$18,917,225	4.28
Rate Impact Test (RIM)	27,104,335	23,038,685	\$20,552,909	\$18,917,225	0.92
Participant Cost Test (PCT)	27,104,335	23,038,685	\$7,475,520	\$21,945,815	2.94

Appendix C 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 34 details the specific evaluation, measurement, and verification (EM&V) studies reviewed for this effort.

Table 34. EM&V Best Practice Studies Reviewed

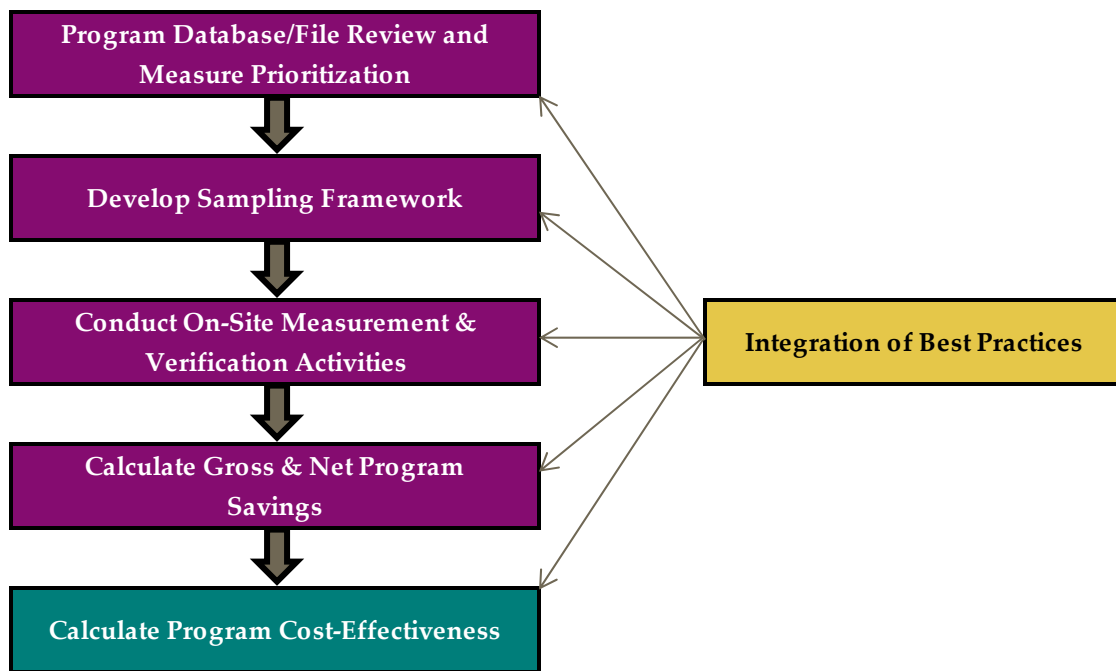
Organization	Study Name	Publication Year
National Renewable Energy Laboratory (NREL) Department of Energy (DOE)	The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures	2013
The Brattle Group	Measurement and Verification Principles for Behavior-Based Efficiency 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 Pacific Power’s C&I Programs

The subsequent M&V methods developed for the Impact and Process Evaluation of Washington’s 2012-2013 C&I Programs reflect the outcome of this independent review. Figure 6 provides an illustration of how the Best Practices Review informed the overall evaluation methods chosen for this effort.

Figure 6. Overview of Impact Evaluation Strategy



Appendix D *wattsmart* Business Program Logic Model

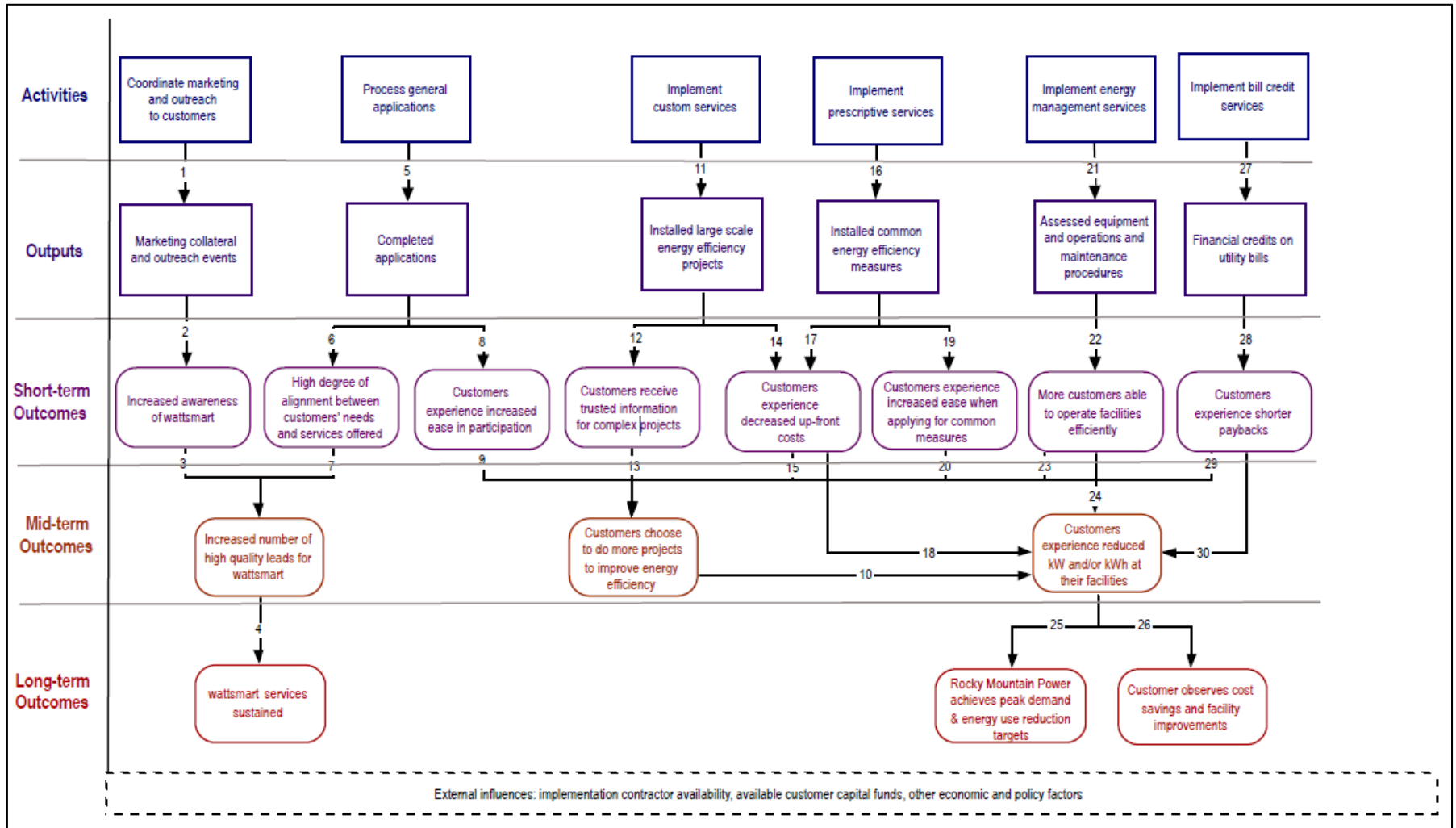
The *wattsmart* program is an umbrella program encompassing all of Pacific Power’s energy efficiency services. The *wattsmart* program provides customers with a suite of programs based on the former Pacific Power energy efficiency programs:

- » Energy FinAnswer – offers incentives for large-scale 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 7, therefore, depicts the logic for each activity carried out by implementers as part of the *wattsmart* program. As shown, implementers perform marketing and outreach, processes applications, and implement the four energy efficiency services (Energy FinAnswer, FinAnswer Express, Energy Management Services, and Bill Credit Services).

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 Pacific Power to meet its energy use reduction targets. The list following the logic model describes the detailed program theory by referencing the numbered links in the figure.

Figure 7. 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. Pacific 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, Pacific 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 E Energy FinAnswer Participant Survey

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]

PI1. 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]

Appendix F Energy FinAnswer Near Participant Interview Guide

F.1 Introduction

As part of the evaluation of the 2012-2013 Recommissioning Program, EMI Consulting will be conducting interviews with the census of near participants in Utah (N=529). Near participants are defined as those customers who began a Recommissioning project but cancelled it or had the project on hold for longer than six months, at the time the participant data was collected for this evaluation.

Objectives for the near participant interviews are identified in the below bullets:

- Describe how customers come to participate in the program
- Characterize the current status of projects identified as on hold or cancelled
- Understand overall customer satisfaction with the program, while participating
- Understand what it would take to motivate near participants to participate
- Understand barriers customers are facing that prevent increasing energy efficiency
- Characterize near-participant firms

Interview Instructions

The evaluation team plans to interview near participants in Utah (n=10), Washington (n=10), and Wyoming (n=10). To solicit interviews and unbiased responses, the evaluation team will offer a \$25 Amazon gift card to customers who complete an interview.

Prior to calling each interviewee, the interviewer will confirm from which utility the interviewee is buying their power. Washington interviewees will be Pacific Power customers while Wyoming and Utah interviewees will be Rocky Mountain Power customers.

The evaluation team designed the interview questions to be open-ended. The interviewer will code responses following the interviews. The interviewer understands that the program name in UT and WA has now changed from Energy FinAnswer to Wattsmart. Because of this change, the interviewer will attempt to frame questions in terms of incentivized equipment rather than referring specifically to the Energy FinAnswer Program.

²⁹ Note: There are six projects listed in the “on hold-cancelled” list, but one of those projects was listed as canceled because it was a duplicate entry; therefore the evaluation team did not include them as a qualifying near participant for these interviews.

F.2 Interview Guide

Introduction and Screen

- IS1.** Hello, this is [INTERVIEWER'S NAME] from EMI Consulting, calling on behalf of Rocky Mountain Power. May I please speak with [CONTACT]?
- IS2.** We are conducting an independent evaluation of Pacific Power's energy efficiency programs and I understand that you considered getting financial support from Pacific Power for an energy efficiency upgrade, but did not complete the project through the program and get an incentive, is this correct?

[IF NO, ASK IF SOMEONE ELSE IS FAMILIAR WITH THE PROJECT. PROBE TO LEARN ANY MORE DETAILS THAT WOULD EXPLAIN DATA AND THEN TERMINATE.]

- IS3.** Are you the person most familiar with your firm's decision to begin this project?

[IF NO, ASK IF SOMEONE ELSE IS BETTER POSITIONED TO RESPOND TO QUESTIONS.]

- IS4.** Do you have a few minutes to answer questions about your experience with the program? This survey is for research purposes only. It will take about 15-20 minutes and as a thank you, we will provide a \$25 Amazon.com gift card.
- IS5.** Great thanks. All of your responses will be kept confidential and will not be revealed to anyone outside of the research team. Is it OK if I record the conversation for note taking purposes?

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

Awareness & Participation

- AP1.** How did you first become aware of the financial incentives offered through Pacific Power?
- AP2.** Why did you initially decide to participate in the program?
- PROBE:** Were there other reasons or driving factors?
- PROBE IF MULTIPLE REASONS:** Of those reasons, which one was most influential in your initial decision to participate in the program?

Near Participant

- NP1.** What is the status of the [EQUIPMENT] project today? (i.e. Is the project still on hold or was it canceled?)
- NP2. [IF NP1= PROJECT IS ON HOLD/DELAYED]** Why was the project delayed?
- PROBE:** Will the project be completed under a Pacific Power program?
- [IF YES]** What are the next steps to completing the project? (i.e. Who would you contact and how?)
- [THEN SKIP TO B1]**

NP3. [IF NP1= COMPLETED BUT WITHOUT UTILITY INCENTIVE] Why did you decide to do the project without participating in a Pacific Power program?

NP4. [IF NP1= PROJECT WAS CANCELED] Why did you decide not to do the project?

NP5. Can you think of anything that would need to change for you to participate in a Pacific Power program?

Barriers

B1. Do you think there are any changes you could make at your organization to improve electric efficiency at your organization?

[IF YES]: Can you provide some examples?

[IF NO, SKIP TO S1]

B2. Are plans in place to make any of those changes?

PROBE: Do you plan to apply for incentives from Pacific Power or another organization? If yes, how would you go about it? (i.e. Who would you contact and how?)

B3. What factors could prevent your organization from making these changes?

PROBE IF MORE THAN ONE RESPONSE: Which of these do you think is the most challenging factor?

Satisfaction

S1. I understand you did not *complete* a project through Pacific Power, but I am interested in your overall experience and interactions with the program. Using a scale of 1 to 5 where 1 indicates 'very dissatisfied' and 5 indicates 'very satisfied', how satisfied were you with your experiences with the program?

PROBE: Why would you give it that score?

S2. When you were considering applying for a financial incentive from Pacific Power for the [EQUIPMENT] project, did you ever contact Pacific Power with questions or requests for assistance?

[IF NO, SKIP TO F1] What did you discuss?

S3. Were Pacific Power and its representatives timely in addressing your questions regarding the program?

PROBE if not: Can you explain or provide an example?

S4. Were Pacific Power and its representatives knowledgeable regarding the program and the program eligibility requirements?

PROBE if not: Can you explain or provide an example?

S5. Do you have any suggestions for how Pacific Power could improve its program?

Firmographics

F1. Now I have a few final, general questions about your company for comparison purposes only. What is the primary activity at your organization?

PROBE: How would you classify your organization's facilities?

F2. Has [FIRM] participated in any other energy efficiency programs?

[IF YES, ASK FOLLOWING PROBES]

Did Pacific Power sponsor the programs? **[IF NOT, who sponsored the programs?]**

F3. Approximately what percentage of your overall operating costs does electricity represent?

F4. About how many people does your firm employ?

F5. Does your organization have a staff person whose role is to manage energy usage?

IF NOT FULL TIME: What percentage of that person's role is energy and energy efficiency?

F6. Does your organization have a specific policy regarding energy efficiency or conservation?

IF YES: What is it?

End

END1. Those are all of the questions that I have for you. Is there anything about your experiences with the Pacific Power energy efficiency programs you'd like to mention that we did not talk about today?

END2. Great. Thank you very much for your input and time. In order to send the gift card, can you please provide me with your email address?

IF DECLINED: Would you be interested in donating the \$25 to a non-profit or charity?

Thanks again. You should receive the gift card in the next few weeks.