



2016–2017 Washington
wattsmart Business
Program Evaluation

FINAL REPORT

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Glossary of Terms

Custom Energy Savings Calculation Methodology

Energy savings calculated using a custom methodology require project and site-specific inputs, such as operating hours, average load, and equipment performance. These projects typically do not meet requirements for deemed or prescriptive calculations (described below), and are commonly industrial/process-related. Metered and/or trend data are typically collected during the analysis and/or post-inspection phase of custom projects.

Deemed Energy Savings Calculation Methodology

Energy savings calculated using deemed values refer to one savings factor-per-measure unit for all projects, regardless of facility types, equipment end uses, or operating hours. For example, Pacific Power uses a deemed value of 1,160 kWh/horsepower for all HVAC variable frequency drive.

Demand Side Management Central

Demand Side Management Central (DSMC) is Pacific Power's project management and reporting database, which provides project management tools, validation check on each project, and a data warehouse with reporting capability.

Evaluated Savings

Evaluated savings represent the total program savings, based on the validated savings and installations, without an adjustment for behavioral effects such as freeridership or spillover. They are most often calculated for a given measure 'i' as:

$$\text{Evaluated Savings}_i = \text{Verified Installations}_i * \text{Unit Consumption}_i$$

Freeridership

Freeridership in energy efficiency programs is represented by participants who would have adopted the energy-efficient measure in the program's absence. This is often expressed as the freeridership rate, or the proportion of evaluated savings that can be classified as freeridership.

Realization Rate

The realization rate is the ratio of evaluated savings to the savings reported (or claimed) by the program.

In-Service Rate

The in-service rate (also known as the installation rate) is the proportion of measures that received incentives that were actually installed.

Prescriptive Energy Savings Calculation Methodology

Energy savings calculated using a prescriptive methodology or calculator require more than one input to determine energy savings (e.g., HVAC equipment performance, operating hours, and capacity).

Spillover

Spillover is the adoption of an energy efficiency measure induced by the program's presence, but not directly funded by the program. As with freeridership, this is expressed as a fraction of evaluated savings (or the spillover rate).

T-Test

In regression analysis, a t-test is applied to determine whether the estimated coefficient differs significantly from zero. A t-test with a p-value less than 0.10 indicates that there is a 90% probability that the estimated coefficient is different from zero.

Technical Resource Library

The Technical Resource Library is the official database repository of measure assumptions, which is linked to Pacific Power's DSMC project database.

Trade Ally

For the purposes of the process evaluation, trade allies include any market actors who provide design services, as well as contractors, distributors, manufacturers, and vendors who provide facility evaluations and/or supply or install energy-efficient measures that received incentives through the program.

Executive Summary

Through its **wattsmart**[®] Business program, Pacific Power offers services and incentives to help commercial, industrial, and agricultural/irrigation customers maximize the energy efficiency of their equipment and operations through midstream (distributors/suppliers) and downstream (customer) incentive mechanisms. Incentives are available for retrofit projects and new construction and major renovation projects. During the 2016 and 2017 program years, the **wattsmart** Business program reported electricity savings of 56,745,687 kWh.

Pacific Power offers program measures and services to customers through four delivery channels: Trade Ally, Small Business Enhanced Incentive Offer, Midstream/Lighting Instant Incentive Offer, and Project Manager. Pacific Power contracts with two program administrators (Cascade Energy and Nexant) to manage the day-to-day operations of the Trade Ally, Small Business Enhanced Incentive, and Midstream/Lighting Instant Incentive delivery channels, where program offerings are primarily marketed and delivered to customers through local trade allies. Through the Project Manager delivery channel, Pacific Power's Energy Efficiency Project Manager delivers, primarily, technical energy analysis services and custom incentives to large managed account customers engaged in more complex projects that are not covered under one of the other offerings.¹

Pacific Power contracted with the Cadmus team (comprising Cadmus, ADM Associates, and VuPoint Research) to conduct impact and process evaluations of the Washington **wattsmart** Business program for the 2016 and 2017 program years. Cadmus subcontracted a portion of the impact evaluation to ADM Associates, and VuPoint Research performed the process evaluation telephone surveys. For the impact evaluation, the team assessed energy impacts, net-to-gross (NTG), and program cost-effectiveness. For the process evaluation, the team assessed program delivery and efficacy, bottlenecks, barriers, and opportunities for improvements. At Pacific Power's request, Cadmus evaluated program participants and nonparticipants, and reported the 2016-2017 evaluation findings under the following categories:²

- **wattsmart Business: (Typical Upgrades and Custom Analysis):** This category includes projects delivered through the Trade Ally delivery and Project Manager delivery channels. Pacific Power offered customers prescriptive incentives (Typical Upgrades), for measures including agricultural (farm and dairy, irrigation), compressed air, HVAC, lighting, motors, building envelope, food service equipment, refrigeration, wastewater, and controls. It also offered custom incentives (Custom Analysis), for verified first-year energy savings resulting from the installation of qualifying capital equipment upgrades not covered by the Typical Upgrades incentives, or any other **wattsmart** Business program delivery offering.
- **Small Business Enhanced Incentive Offer:** Pacific Power provided free facility assessments and incentives for small business customers who installed qualifying LED lighting and lighting

¹ Managed accounts are typically accounts larger than 1 MW.

² To report NTG, Cadmus surveyed **wattsmart** Business Typical Upgrades and Custom Analysis participants using the same measure strata used by the impact team.

controls upgrades, T5 and T8 fluorescent fixture retrofits and T12 conversions. A network of program-approved contractors performed the assessments and installed lighting upgrades for this offer.

- **Midstream/Lighting Instant Incentive Offer (Lighting Instant Incentives):** Pacific Power offered instant point-of-purchase incentives for qualifying LED and reduced wattage fluorescent lamps purchased from a participating lighting distributor. Customers purchasing from nonparticipating suppliers may still apply for incentives post-purchase.
- **Energy Management:** As a subset of the Program Manager delivery channel, Pacific Power offered expertise and custom incentives for verified savings achieved through improved operations, maintenance, and management practices to customers participating in its Recommissioning, Industrial Recommissioning, Persistent Commissioning, or Strategic Energy Management (SEM) offerings.

Key Findings

Key Impact Evaluation Findings

In general, Cadmus deferred to current Regional Technical Forum (RTF) measure workbooks and saving estimation methodologies, where available. The RTF uses a market baseline to calculate evaluated measure-level savings—a baseline more efficient than federal or state minimum code requirements. This market baseline provides a snapshot in time and represents values such as the average efficiency. In many instances, reported savings were based on as-found conditions. For both baselines (market and as-found), Cadmus reviewed the baseline—and, if available, the methodology used to derive the baseline—for reasonableness.

For the impact evaluation, the Cadmus team analyzed 91 projects that contributed 30% of the 2016 and 2017 program savings. Table 1 provides a summary of the evaluation findings, including the number of unique projects, evaluated savings, and achieved precision. Overall, the realization rate was 92.3% for the two program years, though variability occurred between measure categories. The impact evaluation achieved $\pm 6.5\%$ precision with 90% confidence overall. The report's

Evaluated Savings Results by Strata section describes specific details and findings per strata. Two strata, Lighting and Refrigeration, account for over 83% of the savings in Washington. The key findings for those strata are described in the following bullet points.

- Lighting accounts for 56% of all reported energy savings in Washington. Cadmus evaluated 20 projects accounting for 12% of reported energy savings within the lighting strata, resulting in a realization rate of 90% within that strata. The differences in savings primarily resulted from discrepancies in the reported hours of use.
- Refrigeration projects make up the second highest strata, with 27% of all reported energy savings. Cadmus evaluated 12 of the refrigeration projects accounting for 50% of reported energy savings within the refrigeration strata, and the realization rate was 101% within the strata. The team found most projects achieved savings very close to 100%, with minor deviations due to changes in setpoints or equipment load profiles.

Table 1. 2016 and 2017 wattsmart Business Program Savings^a

Strata	Unique Projects ^b	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate	Precision*
Lighting	734	31,870,165	28,540,483	90%	9.3%
Refrigeration	56	15,414,618	15,521,820	101%	2.8%
Agricultural	62	1,461,091	1,722,516	118%	13.5%
Recommissioning	11	2,081,933	2,081,933	100%	0.0%
Compressed Air	23	1,931,108	1,852,150	96%	9.6%
Wastewater	4	1,924,052	255,838	13%	366.5%
HVAC	33	1,243,101	1,654,671	133%	5.2%
Other	43	819,620	739,060	94%	7.5%
Total	966	56,745,688	52,398,470	92.3%	6.5%

^a Poor precision values are the result of large variability within sampled projects.

^b A Unique Project is defined as each unique project ID per strata. In some cases, a project may involve measures implemented in multiple strata; these would be counted as multiple Unique Projects.

Table 2 and Table 3 show impact evaluation findings by program year, for 2016 and 2017, respectively. The Cadmus team combined the 2016 and 2017 program years to perform the analysis and applied the overall realization rates to the reported savings for each year.

Table 2. 2016 wattsmart Business Program Savings^a

Strata	Unique Projects	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Lighting	407	17,829,274	15,966,535	90%
Refrigeration	29	5,603,090	5,642,057	101%
Agricultural	32	882,530	1,040,436	118%
Recommissioning	6	1,571,461	1,571,461	100%
Compressed Air	13	1,457,871	1,398,262	96%
Wastewater	4	1,924,052	255,838	13%
HVAC	22	962,554	1,281,239	133%
Other	27	312,727	293,436	94%
Total	540	30,543,559	27,449,264	89.9%

^aTotals may not sum due to rounding.

Table 3. 2017 wattsmart Business Program Savings^a

Strata	Unique Projects	Reported Savings (kWh)	Evaluated Savings (kWh)	Realization Rate
Lighting	327	14,040,890	12,573,948	90%
Refrigeration	27	9,811,528	9,879,763	101%
Agricultural	30	578,561	682,080	118%
Recommissioning	5	510,472	510,472	100%
Compressed Air	10	473,237	453,887	96%
Wastewater	0	0	0	N/A
HVAC	11	280,547	373,431	133%
Other	16	506,893	475,624	94%
Total	426	26,202,128	24,949,206	95.2%

^aTotals may not sum due to rounding.

Key Process Evaluation Findings

The key process evaluation findings follow. This report’s *Process Evaluation* section provides more nuanced descriptions of these key findings.

Participant Experience

- Participants receiving Typical Upgrade or Custom Analysis incentives reported high levels of satisfaction with the different elements of the program and with Pacific Power. One hundred percent of participants reported they were very satisfied (70%) or somewhat satisfied (30%) with the program overall (n=53), and very satisfied (60%) or somewhat satisfied (40%), with the incentive amount (n=50). Ninety-eight percent of participants reported being very satisfied (83%) or somewhat satisfied (15%) with the equipment they installed, with 2% reporting they were not too satisfied due to early bulb burnout (n=53). Participants also said they were very satisfied (65%), somewhat satisfied (29%) or not too satisfied (6%) with the timing of the incentive payment (n=51). Those not too satisfied thought one to two months was the appropriate amount of time. Among participants who interacted with Pacific Power, the majority (85%) were very satisfied, 9% were somewhat satisfied, and 6% were not too satisfied, saying the process to participate took too long (n=33). Overall, 87% of participants reported no challenges to participation in the program (n=52). Those reporting challenges cited funding upfront costs, understanding the scope and savings projections of their project, or completing their projects within the required timeframe.
- The majority of participants in the Small Business Enhanced Incentive Offer also expressed high levels of satisfaction with the contractor, the program overall, and the equipment installed (11, 10, and 9, respectively, reporting very satisfied, n=12). Eight of 12 participants found no challenges participating; the four who did, reported confusion about incentive limits, difficulty funding upfront costs, and coordinating paperwork between the contractor and Pacific Power, as well as installation delays.

- Participants in Lighting Instant Incentives (4) and Energy Management (2) reported high levels of satisfaction with the program elements and no barriers to participation.
- Six of nine partial participants completed their projects without the program incentives.
- Lack of funds and suboptimal communication between customers and program staff were factors in partial participant not completing projects or receiving incentives through the program. Three of nine said they were likely to participate again within six months.

Nonparticipants

- Forty-three percent of nonparticipants were aware, prior to the survey call, that Pacific Power provided technical services and financial incentives to customers. Of those aware of the incentives, equipment costs were the most often cited barrier to participation.
- Seventy percent of surveyed nonparticipants were small businesses operating one location in Washington (n=64) and employing between one and 10 staff members (n=60).

Program Design and Implementation

- On multiple occasions, Pacific Power adapted the **wattsmart** Business program offerings throughout 2016 and 2017 in response to a changing Integrated Resource Plan (IRP), changing market factors, equipment costs, and to align with applicable standards and codes, while maintaining overall program cost-effectiveness.
- Pacific Power increased the rigor of data verifications completed by their Demand Side Management Central (DSMC) reporting database on all projects since the last evaluation and noted that identified errors in projects uploaded from the program administrators have decreased overall since the 2014-2015 evaluation cycle.
- In March 2017, Pacific Power launched the **wattsmart** Business Vendor Network, which replaced the Energy Efficiency Alliance and enforced stricter requirements for program vendors, requiring vendors to re-register with the program. This reduced the number of approved contractors and distributors participating in the program.
- Administrators of the Small Business Enhance Incentive Offer were challenged to identify projects that were cost-effective when viewed individually.

Marketing and Outreach

- Participants, partial participants, and nonparticipants learned about the program through multiple sources, frequently citing their electricians/contractors, Pacific Power marketing efforts, **wattsmart** Business program representatives, and word of mouth. Survey respondents named the primary source that fit the delivery channel outreach according to program design. For example, nonparticipants most frequently reported they learned about the program incentives through Pacific Power marketing, and Typical Upgrades participants citing electrical contractors most often, followed by word of mouth and Pacific Power marketing.
- Overall, the **wattsmart** Business program's business and communication objectives are sound and a good base to work from, as are the communication strategies.

- Print, Radio, TV, and digital display ads are well designed and communicate effectively. Minor improvements can be made to enhance these further.
- The marketing and outreach calendar is comprehensive and provides detailed outreach campaign scheduling and links to related messaging, collateral materials, radio spots, case studies, and other materials utilized.
- Vendor eblasts announcing changes to the program throughout the year, are not reflected on the calendar.
- The Energy Insights newsletter ceased publication early in 2017, eliminating one delivery mechanism through which customers receive case studies.

Project Data

- Measures containing the word “custom” in their name, appeared in the columns Measure Subtype, Measure Name and Measure Custom Name, however, these designations did not match across columns or with those in the Measure Type column.
- Contact information for Instant Incentive participants was not included in the Pacific Power project database. This information was provided under separate request from the program administrator.

Cost-Effectiveness Results

As shown in Table 4, the program proved cost-effective in the 2016 and 2017 evaluation years from all test perspectives, except for the Ratepayer Impact Measure test. The program was cost-effective from the PacifiCorp Total Resource Cost Test perspective, with a benefit/cost ratio of 1.84.

Table 4. 2016–2017 Evaluated wattsmart Business Program Cost-Effectiveness Summary^a

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PacifiCorp Total Resource Cost Test (PTRC) (TRC + 10% Conservation Adder)	\$0.042	\$21,871,544	\$40,186,420	\$18,314,876	1.84
Total Resource Cost Test (TRC) No Adder	\$0.042	\$21,871,544	\$36,533,109	\$14,661,565	1.67
Utility Cost Test (UCT)	\$0.023	\$11,863,910	\$36,533,109	\$24,669,199	3.08
Ratepayer Impact Measure (RIM) Test		\$56,661,951	\$36,533,109	(\$20,128,842)	0.64
Participant Cost Test (PCT)		\$16,282,696	\$51,073,102	\$34,790,406	3.14
Lifecycle Revenue Impacts (\$/kWh)				\$0.000415331	
Discounted Participant Payback (years)					2.90

^aThe cost-effectiveness calculations assume a net to gross of 1.0 in Washington because of the use of the market baseline.

The RIM test measures program impacts on customer rates. Most energy efficiency programs do not pass the RIM test because, although energy efficiency programs reduce energy delivery costs, they also reduce energy sales. As a result, the average rate per unit of energy may increase. A RIM benefit/cost ratio greater than 1.0 indicates that rates, as well as costs, will go down due to the program. Typically, this only happens for demand response programs or programs targeted to the highest marginal cost hours (when marginal costs are greater than rates).

Recommendations

Based on the impact and process evaluation interviews, surveys, site visits, measurements, and other analyses, the Cadmus team drew the following recommendations (this report's *Conclusions and Recommendations* section provides a more complete discussion of the findings and associated recommendations).³

Savings Considerations

Recommendation: Consider increasing the deemed savings for prescriptive HVAC Variable Frequency Drive (VFD) fan and pump motor projects. Cadmus found reported savings were low compared to other evaluations. To evaluate the energy savings for these projects, the Cadmus team used deemed savings values from Cadmus' 2016 *Variable Speed Drive Loadshape Project* report, created for the Northeast Energy Efficiency Partnership (NEEP), shown in Table 24 of the Savings Considerations section. The NEEP study relied on extensive on-site data collection and metering for over 400 VSD installations on HVAC equipment across eight states. Because ventilation requirements for occupants do not vary between different climates, HVAC fan load profiles derived from the study are expected to match fan load profiles in Washington. Using the deemed savings values from the NEEP study resulted in realization rates greater than 100% for the two largest VFD projects. The Cadmus team recommends using these deemed values for HVAC fan motor projects.

For central equipment (e.g., hot/chilled water pumps, condenser water pumps, cooling tower fans), the quantity of evaluated projects were insufficiently high to draw conclusions on the current deemed savings value.

Marketing and Outreach

Recommendation: Consider the following opportunities and incorporate those that can be done cost-effectively.

- Re-institute the Energy Insights newsletter or identify a similar vehicle to distribute case studies
- Provide links in print ads, directing customers to case studies or other sources of more detailed information
- Use images within the text of the program brochure to convey information visually as well as through text.
- Format eblasts consistently to ensure customers identify them all with the program
- Issue eblasts throughout the year, concurrent with program changes.
- Update case studies from 2014 if new information is available or create additional studies

³ Cadmus reports no conclusions for the Energy Management (Recommissioning), and Instant Incentive offerings, due to the very low participant populations and survey response rates for those two delivery channels.

Project Data

Recommendation: Establish one protocol for using the custom designation and apply it across Pacific Power's, the program administrators', and their subcontractors' project data.

Recommendation: Include contact information for participants in the Instant Incentives offer, in the program participant database provided to the program evaluation team.

Introduction

Program Description

Pacific Power offers **wattsmart** Business program measures, services, and incentives through these delivery channels:

- Trade Ally (Typical Upgrades and Custom Analysis)
- Small Business Enhanced Incentive Offer
- Midstream/Lighting Instant Incentives (Lighting Instant Incentives)
- Project Manager

Through the Typical Upgrades offering, Pacific Power provides prescriptive incentives primarily for small and midsize customers, although large customers may also receive these incentives. Pacific Power contracted with Nexant and Cascade Energy to coordinate with trade allies, provide training and support, and conduct application processing services for these prescriptive incentives.

wattsmart Business' Small Business Enhanced Incentive Offer provides incentives to small business customers, delivered through program-approved trade allies. Nexant managed these trade allies for all participants.

Through the Lighting Instant Incentives, Pacific Power targets the lighting maintenance market by offering customers instant point-of-purchase incentives on qualified LEDs, reduced wattage fluorescent lamps, and retrofit kits purchased through a participating lighting distributor. Customers purchasing through a nonparticipating distributor do not receive an instant discount, but they may apply to Pacific Power for incentives post-purchase. Nexant also manages the participating distributors delivering this offering.

Pacific Power targets custom incentives to large energy users that generally offer multiple opportunities for energy efficiency upgrades and those with projects that require custom analysis. Midsize and smaller customers, however, may participate in custom incentives. Pacific Power provides energy efficiency analysis and verification of custom savings through a precontracted group of engineering firms.

Through the Energy Management offering (e.g., Recommissioning, Industrial Recommissioning, Persistent Commissioning, SEM), participating customers may receive expertise and custom incentives for verified savings achieved through improved operations, maintenance, and management practices.

Program Delivery

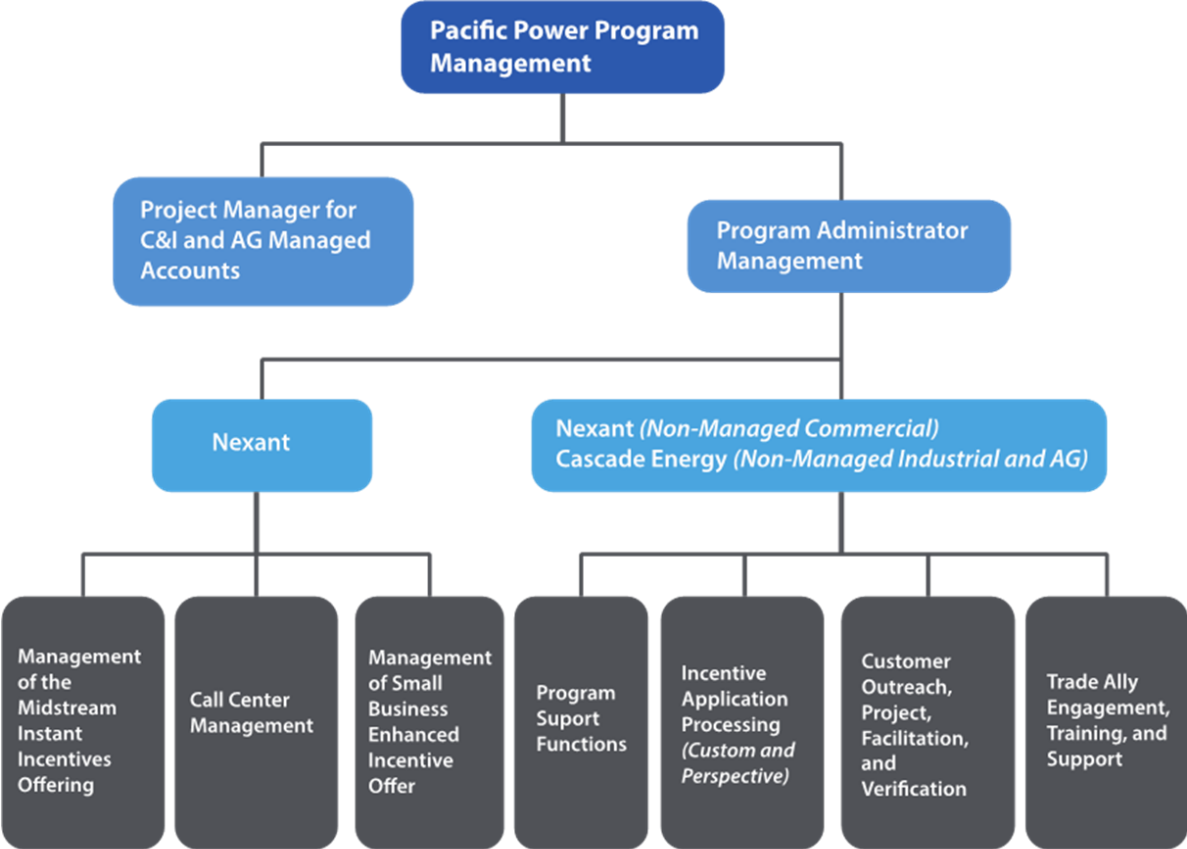
The Pacific Power program manager oversees the **wattsmart** Business program in Washington and contracts with and manages the program's administrators (i.e., Cascade Energy and Nexant and subcontractor Evergreen Consulting Group). In addition, the program manager oversees in-house delivery and cost-effectiveness, achieves and monitors program performance and compliance, conducts program marketing, and recommends changes to the program's terms and conditions.

Pacific Power’s in-house project manager and regional business managers conduct the outreach and delivery of projects to its managed accounts (typically accounts larger than 1 MW). Nexant and Cascade also may conduct direct customer outreach, project facilitation, and measurement and verification for custom projects to non-managed accounts, and, on occasion, may provide project facilitation to managed accounts at Pacific Power’s request.⁴

Pacific Power delivers the Energy Management offerings through assigned Energy Management Providers. These providers are drawn from contracted third-party engineering services providers with expertise appropriate to individual projects. Nexant and Cascade are two of the contracted engineering services providers; their focus, when providing these services, is on non-managed accounts.

Figure 1 provides an overview of the program management responsibilities.

Figure 1. wattsmart Business Program Delivery Roles



⁴ Managed accounts are typically accounts larger than 1 MW. A Pacific Power Energy Efficiency Project Manager handles these accounts individually. Non-managed accounts are typically those less than 1 MW.

Evaluation Objectives

The Cadmus team assessed the **watt**smart Business program incentives to determine savings and cost-effectiveness, and, where applicable, identified areas to improve program delivery and customer involvement and satisfaction. Table 5 lists the evaluation goals, along with the corresponding evaluation activities employed to achieve those goals.

Table 5. Evaluation Objectives and Activities

Pacific Power Evaluation Objectives	Management Interviews	Participant Surveys	Partial Participant and Nonparticipant Surveys	Site Visits	Engineering Measurements	Site-Level Billing Analysis	Net-to-Gross Analysis	Reporting
Document and measure program effects	✓	✓	✓	✓	✓	✓	✓	✓
Verify installation and savings		✓		✓	✓	✓	✓	
Evaluate the program process and the effectiveness of delivery and efficiency	✓	✓	✓					
Understand motivations of participants, nonparticipants, and partial participants		✓	✓					
Provide data support for program cost-effectiveness assessments		✓		✓	✓	✓	✓	
Identify areas for potential improvements	✓	✓	✓	✓	✓	✓	✓	
Document compliance with regulatory requirements								✓

Data Collection and Evaluation Activities

The Cadmus team performed on-site visits and engineering analysis for 91 projects to achieve 90% confidence and ±10% precision at the portfolio level. The team’s process evaluation included a thorough review of program operations, marketing materials, and data tracking. The team interviewed program managers and administrators to thoroughly understand and document the program’s history, objectives, and operations. In addition, the team surveyed program participants, partial participants, and nonparticipants regarding program delivery and operations.⁵

Impact Sampling and Extrapolation Methodology

Through the Washington **watt**smart Business program, Pacific Power provides incentives for the 31 measure types shown in Table 6. The Cadmus team stratified these 31 measure types into the eight strata shown in the table and designed the strata to account for the largest amount of savings and

⁵ Participants are customers completing a project through the program during the 2016 and/or 2017 evaluation period. Partial participants are customers initiating a project through the program in 2016 or 2017, but not completing that project. Nonparticipants are customers that have never initiated or completed a project through the program (at least not in 2016 or 2017).

quantity of projects per strata. The team designed the sampling plan for 2016 and 2017 combined participation to achieve approximately $\pm 20\%$ precision at 80% confidence per strata, and to exceed $\pm 10\%$ precision at 90% confidence at the nonresidential portfolio level. To account for the wide range of project sizes, the team created a plan to divide each end-use strata into a selected group, from which it hand-selected a few very large sites, and then randomly sampled the remaining projects.

Table 6 shows the total measures and energy savings reported in the tracking database, total reported energy savings, and sampled projects.

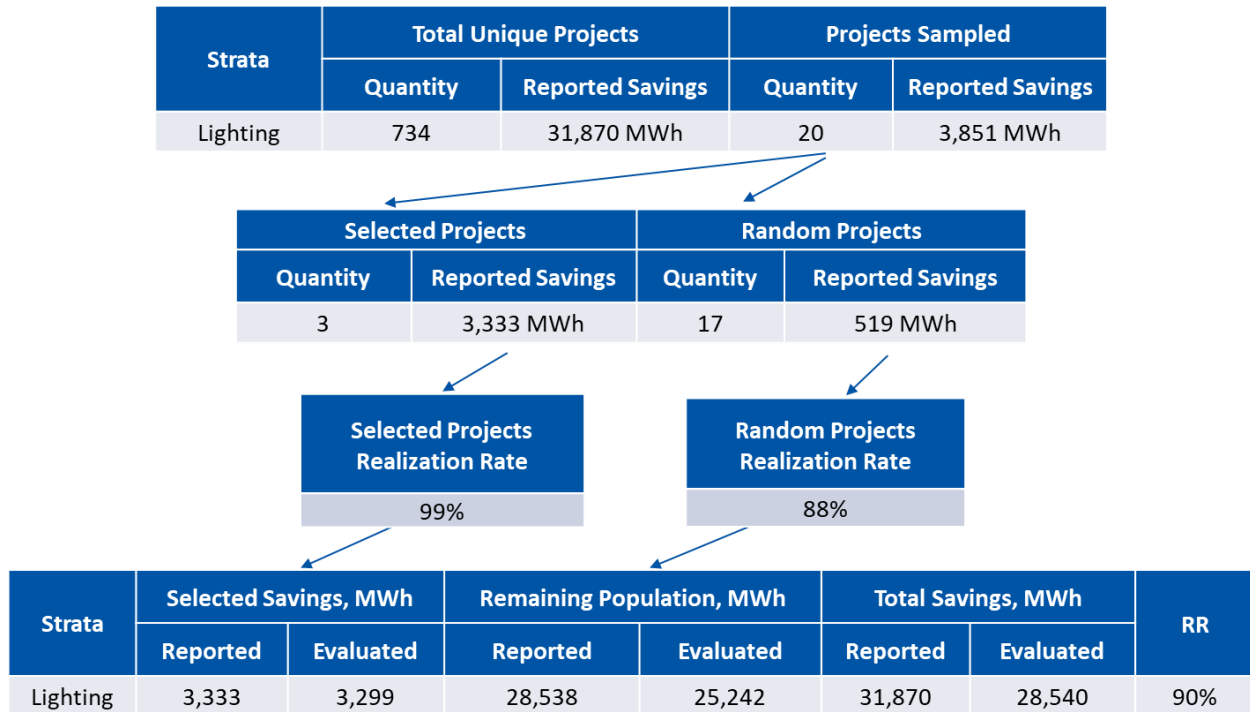
Table 6. Washington 2016-2017 wattsmart Business Program Impact Sampling

Strata	Measure Type	Number of Incentivized Measures	Energy Savings (kWh)	Unique Sampled Projects
Lighting	Controls	125	31,870,165	20
	Exterior Lighting	58		
	General Illuminance	1,047		
	Lighting	535		
	Non-General Illuminance	54		
Refrigeration	Additional Measures	1	15,414,618	12
	Controls	3		
	Custom	34		
	Fast Acting Door	33		
	Motors	1		
	Refrigeration	30		
Agricultural	Custom	1	1,461,091	14
	Irrigation	2		
	Irrigation Pumps	25		
	Motors	2		
	Refrigeration	1		
	Vacuum Pump	2		
	Water Distribution Equipment	92		
Recommissioning	Custom	6	2,081,933	6
	Energy Management	6		
Compressed Air	Compressed Air	32	1,931,108	10
	Custom	3		
Wastewater	Additional Measures	6	1,924,052	2
	Low Power Mixer	2		
	Motors	3		
HVAC	Cooling	40	1,243,101	11
	Custom	2		
	Heat Pump	7		
	HVAC	5		
	Motors	16		

Strata	Measure Type	Number of Incentivized Measures	Energy Savings (kWh)	Unique Sampled Projects
Other	Building Shell	1	819,620	16
	Cooking Equipment	4		
	Custom	7		
	Dishwashers	1		
	Green Motor Rewinds	17		
	Grocery Refrigeration	1		
	Holding Cabinet	2		
	Ice Machine	3		
	Insulation	7		
	Motors	1		
	Refrigeration	1		
	Roof	8		
	Windows	1		
Total		2,228	56,745,688	91

The Cadmus team divided sampled projects into two categories: selected and random. Random projects were chosen randomly, and the evaluated results were extrapolated to the rest of the population within the stratum. Selected projects were hand-picked from the projects with the highest claimed energy savings per strata. The team evaluated these projects individually and included the results within each stratum, but it did not extrapolate the associated realization rates to the population. Figure 2 provides an example of the Cadmus team’s application of realization rates for selected and random sites within the lighting stratum to the population, per strata.

Figure 2. Realization Rate Extrapolation



RR = realization rate

Table 7 shows the total quantity of projects sampled, the associated reported energy savings, and the percentage this sample represented out of the population.

Table 7. Washington 2016–2017 wattsmart Business Program Impact Sampling Summary

Strata	Sample Type	Unique Projects Sampled	Reported Energy Savings (kWh)		Percentage kWh Sampled
			Sampled Projects	All Projects	
Lighting	Selected	3	3,332,514	31,870,165	12.1%
	Random	17	518,822		
Refrigeration	Selected	5	6,420,998	15,414,618	50.4%
	Random	7	1,353,493		
Agricultural	Selected	5	275,045	1,461,091	25.5%
	Random	9	97,159		
Recommissioning	Selected	2	1,308,956	2,081,933	81.0%
	Random	4	376,971		
Compressed Air	Selected	3	561,895	1,931,108	52.1%
	Random	7	444,147		
Wastewater	Selected	0	0	1,924,052	49.7%
	Random	2	956,079		
HVAC	Selected	4	689,127	1,243,101	69.6%
	Random	7	176,263		
Other	Selected	1	198,105	819,620	56.5%
	Random	15	264,763		
Total		91	16,974,337	56,745,688	29.9%

Process Sample Design and Data Collection Methods

The Cadmus team conducted the process evaluation by grouping projects into the following four categories, defined through conversation with Pacific Power, to achieve Pacific Power's reporting objectives for the process evaluation:

- **wattsmart** Business (included projects receiving Typical Upgrades and Custom Analysis incentives)
- Small Business Enhanced Incentive Offer
- Lighting Instant Incentives
- Energy Management

The team developed samples for three customer populations—participants, partial participants, and nonparticipants—using simple random sampling within each category.⁶ Participants included customers who completed a Typical Upgrade, Custom Analysis, Small Business Enhanced Incentive Offer, Lighting Instant Incentives, or Energy Management project through the program during the evaluation period for program years 2016 and 2017. Partial participants included customers who initiated a Typical Upgrades or Custom Analysis project through the program in 2016 or 2017 but did not complete those projects. The team did not stratify these customers by measure category or other strata; rather, it selected projects for review using simple random sampling.

Finally, nonparticipants were customers who never initiated or completed a project through the program or who had not done so in 2016 and 2017. The team selected projects for review using simple random sampling. Table 8 shows the final sample disposition for each data collection activity.⁷ The *Surveys* section of the *Process Evaluation* chapter provides a detailed methodology for each surveyed population.

⁶ At Pacific Power's request, to prevent survey fatigue from other planned or ongoing survey activity, the team removed all managed accounts from the populations prior to stratification or sampling.

⁷ Cadmus contracted with VuPoint Research to conduct the participant, partial participant, and nonparticipant surveys. VuPoint is a third-party research company experienced in conducting both residential and nonresidential quantitative and qualitative research in the Northwest. VuPoint applied industry-recognized best practices, including using experienced recruiters and dialing customer contacts up to six times during different times of the workday, on different workdays of the week, until achieving the designated quota for each customer segment or exhausting the sample.

Table 8. Washington 2016–2017 wattsmart Business Program Data Collection and Sampling

Data Collection Activity	Population	Sampling Frame ^a	Target Completes	Achieved Completes
Pacific Power Program Staff Interviews	N/A	N/A	N/A	4
Program Administrator Interviews	N/A	N/A	N/A	6
wattsmart Business Participant Surveys (Typical Upgrade or Custom Analysis)	Segmented Below	Segmented Below	Segmented Below	Segmented Below
Lighting (other than Small Business Enhanced Incentive or Lighting Instant Incentives)	1520	308	28	28
Refrigeration	102	24	14	9
Agriculture	125	49	19	9
Compressed Air	35	19	12	3
Wastewater	11	2	2	0
HVAC	70	25	14	1
Other ^b	54	23	13	3
Participant Surveys (Small Business Enhanced Incentive)	155	45	27	12
Participant Surveys (Lighting Instant Incentives)	144	32	22	4
Participant Surveys (Energy Management)	12	9	8	2
Participant Subtotal	2,228	536	159	71
Partial Participant Surveys	405	135	45	9
Nonparticipant Surveys	9,370	6,176	68	68
Total	12,003	6,847	272	148

^a The team based the sampling frame on unique customers with contact information, after removing duplicates and managed accounts.

^b Other included Additional Measures, Motors, Building Shell, and Food Service Equipment.

Impact Evaluation

This chapter provides the impact evaluation findings for the **wattsmart** Business program that resulted from the Cadmus team’s data analysis. The team incorporated the following activities:

- Site visits
- Engineering measurements
- Site-level billing analysis

Reported savings are electricity savings (kWh) that Pacific Power reported in the 2016 and 2017 *Washington Annual Reports on Conservation Acquisition* (annual reports).⁸ To determine evaluated savings, the Cadmus team applied step 1 through step 4 shown in Table 9 and described in more detail below.

Table 9. Impact Steps to Determine Evaluated Savings

Savings Estimate	Step	Action
Evaluated Savings	1	Tracking Database Review: Validate the accuracy of data in the participant database and assess whether savings match annual reports
	2	Verification: Adjust savings based on actual installation rates
	3	Unit Energy Savings: Validate saving calculations (i.e., engineering review, analysis, and meter data)
	4	Realization Rates: Extrapolate realization rates to the population

Step 1: In the first step of verifying the accuracy of data in the participant database, the Cadmus team reviewed the program tracking database to ensure that participants and reported savings matched annual reports.

Step 2: Next, the team selected a sample of sites from the Pacific Power program database, stratifying the distribution of measures among sampled sites, primarily by end-use type: agricultural, compressed air, HVAC, lighting, other, recommissioning, refrigeration, and wastewater. The team completed 92 site visits as part of the 2016 and 2017 program evaluation to verify measure installations.

Step 3: After reviewing all project documentation, the Cadmus team developed an EM&V plan, and performed site visits to verify the installation, specifications, and operation of measures that received incentives. The team installed light loggers at six sites and power metering equipment at eight sites within the sample, and collected trend data from building/facility management systems that provided historical performance for thirteen projects.

⁸ These reports are available online:
http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2016/2017_WA_Annual_Report.pdf
http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2017/WA_AnnualReport_FINAL-Report-CORRECTED_050815.pdf

Step 4: This step involved reviewing measure savings assumptions, equations, and inputs, which included billing analysis for selected measures. For complicated or custom measures, the team conducted an engineering analysis using the appropriate measurement and verification options within the International Performance Measurement and Verification Protocol. For sites where light loggers or power meters were installed, the team used the logger data to determine hours of use or power consumption for the metered equipment types. In some instances, customers provided trend data from their building management systems, which the team used to determine equipment load profiles, hours of use, and performance characteristics.

Site Visits and Engineering Measurements

The Cadmus team reviewed all project documentation available from Pacific Power. This documentation included project applications, equipment invoices, reports published by third-party energy engineering consultants, and savings-calculation spreadsheets.

The team used a data collection form at each site visit and performed the following tasks:

- Verified the installation and operation of equipment that received incentives, confirmed that installed equipment met program eligibility requirements, and verified that the quantity of installed measures matched program documentation.
- Collected additional data to inform the savings analyses and performed a detailed review of site project files to collect additional data for each site.
- Where applicable, the team interviewed facility personnel involved with the project, gathering information (e.g., type of equipment replaced, hours of operation) that could not be verified on site or through documentation reviews or metering.

Overall Evaluated Savings Results

Table 10 lists reported and evaluated savings for the 2016 and 2017 program years, with an overall realization rate of 92.3%.

Table 10. Reported and Evaluated Savings by Program Year

Program Year	Program Savings (kWh)		Program Realization Rate
	Reported	Evaluated	
2016	30,543,559	27,449,264	89.9%
2017	26,202,128	24,949,206	95.2%
Total	56,745,688	52,398,470	92.3%

Table 11 provides the evaluation results for reported and evaluated savings, along with realization rates by measure type.

Table 11. Reported and Evaluated *wattsmart* Business Program Savings by Strata (2016-2017)

Strata	Program Savings (kWh)		Realization Rate	Precision ^a
	Reported	Evaluated		
Lighting	31,870,165	28,540,483	90%	9.3%
Refrigeration	15,414,618	15,521,820	101%	3.0%
Agricultural	1,461,091	1,722,516	118%	22.6%
Recommissioning	2,081,933	2,081,933	100%	0.0%
Compressed Air	1,931,108	1,852,150	96%	9.6%
Wastewater	1,924,052	255,838	13%	21.2%
HVAC	1,243,101	1,654,671	133%	5.2%
Other	819,620	769,060	94%	7.5%
Total	56,745,688	52,398,470	92.3%	6.3%

^a Precision is calculated at 80% confidence per strata and 90% confidence for the program overall

Evaluated Savings Results by Strata

Lighting

Pacific Power provides incentives for four types of lighting projects: exterior lighting, general illuminance, lighting, and non-general illuminance. These projects are either for retrofits, major renovations, or new construction, and involve high-efficient lighting technologies such as LEDs and or T8s.

Pacific Power provided incentives for 1,819 lighting measures within 734 unique projects, and reported 31,870,165 kWh in energy savings for the 2016 and 2017 years. Lighting projects that received incentives accounted for 12.1% of all reported energy savings in Washington.

Methodology

The Cadmus team evaluated 20 lighting projects, accounting for 12.1% of all reported energy savings within the lighting strata. Pacific Power used the prescriptive *wattsmart* Business lighting calculator to determine incentive amounts for all of the lighting projects in Washington.⁹ The lighting calculator documents customer information, project locations, light-fixture specifications, energy-saving calculations, and financial information. Critical inputs used to calculate energy savings included the following:

- Lighting operation schedule
- Space name, type, and area

⁹ Pacific Power combined two programs under the *wattsmart* Business umbrella. The Energy FinAnswer and FinAnswer Express programs were rolled into the Custom Analysis and Typical Upgrades offerings, respectively, within the *wattsmart* Business program.

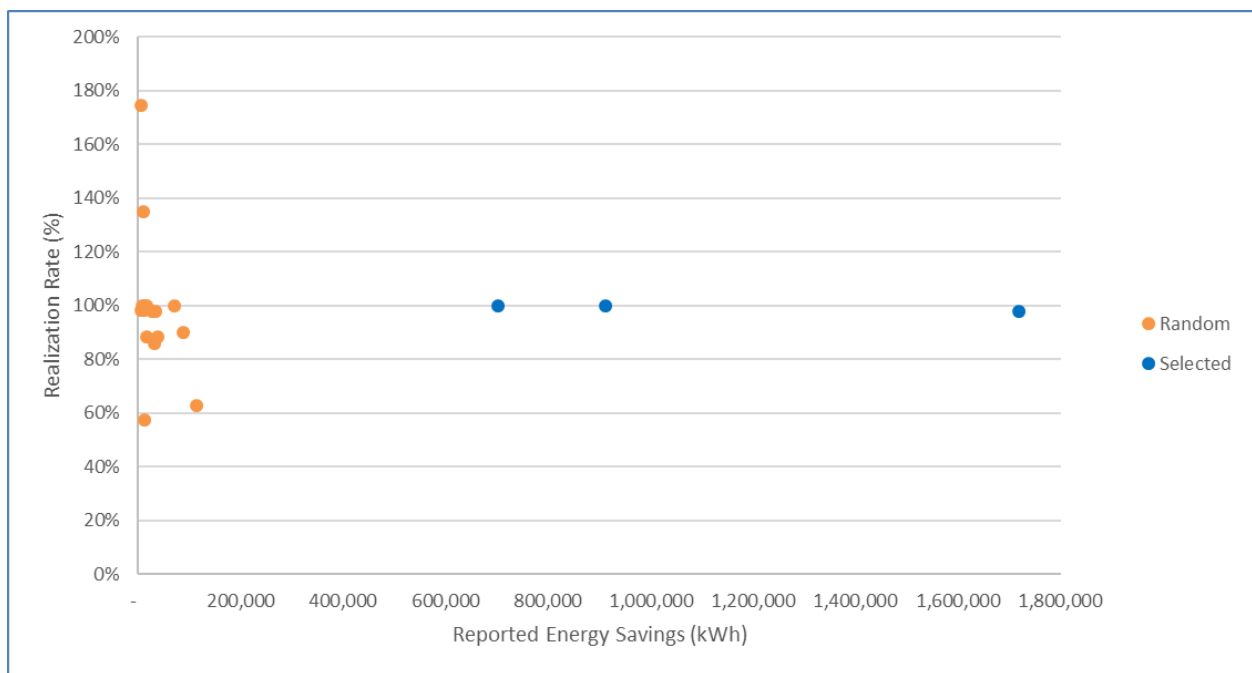
- Baseline lighting fixture location, type, quantity, controls, and wattage
- Proposed lighting fixture location, type, quantity, controls, and wattage

The Cadmus team reviewed the calculator methodology and assumptions to determine their applicability for each sampled project. The team also performed site visits at each of the sampled projects to inspect and document the installed lighting equipment. For six of the 20 projects visited, the team installed light loggers to document hours of use where lighting fixtures that received incentives were installed. Projects were prioritized for light logger analysis based on total reported energy savings and minimal diversity of spaces within each project. The team installed two to six light loggers per facility in representative spaces, and determined these representative spaces as the areas with fixtures where the highest energy savings were claimed. After leaving the loggers in place for a minimum of three weeks, the team then retrieved and analyzed the data, extrapolating measured hours of use to annual hours of use and updating the prescriptive calculators with the revised values.

Findings

Figure 3 shows realization rates and associated claimed energy savings for each of the sampled lighting projects.

Figure 3. Lighting—Sample Results



Two sites exhibited a less than 80% realization rate, and two sites exhibited a greater than 120% realization rate. For the remaining sites, the Cadmus team found no (or a nominal) difference between the evaluated savings and the reported savings. For sites with evaluated energy savings less than 80% or greater than 120%, the differences in savings resulted from discrepancies in the quantity of fixtures or the claimed hours of use. Table 12 shows specific details.

Table 12. Lighting—Sample Detailed Findings

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
WLEDWA_63744	Upstream Lighting	6,229	10,875	175%	Light loggers indicated higher-than-expected hours of use
WSBWA_67039	Package lighting retrofit	11,090	14,942	135%	Hours of use updated based on site interview
WSBWA_65978	Package lighting retrofit	113,874	71,741	63%	Site observations indicated lower hours of use than expected (3,373 vs 7,180 hours of use)
WAFX2_001117	Package lighting retrofit	11,918	6,837	57%	Light loggers indicated lower-than-expected hours of use (1,249 vs 2,158 hours of use)

All projects with low and high realization rates are the result of lighting hours of use data found through light loggers or a site interview.

- For the upstream lighting project, WLEDWA_63744, reported hours of use are determined by facility type within the upstream lighting calculator. Cadmus installed light loggers at this facility and the measured hours of use were higher than the average hours of use for a retail facility.
- Staff interviewed for two projects, WSBWA_67039 and WSBWA_65978, indicated the facility hours of use were more than 30% higher or lower than the reported hours of use in the incentive documentation. For WSBWA_67039, interviewed hours of use were higher than reported. For WSBWA_65978, interviewed hours of use were lower than reported.
- The Cadmus team analyzed light logger data for one project, WAFX2_001117, and found it exhibited lower hours of use than reported.

Refrigeration

Pacific Power provided incentives for 102 refrigeration measures within 51 unique projects, consisting of evaporator and condenser fan (VFDs), optimized refrigeration controls, fast acting doors, and process cooling system upgrades. Pacific Power reported energy savings of 15,414,618 kWh, accounting for 27.2% of all reported energy savings for the 2016 and 2017 program years.

Methodology

The Cadmus team evaluated 12 refrigeration projects, accounting for 50.4% of all reported energy savings within the refrigeration strata. Pacific Power’s energy engineers performed custom project calculations of energy efficiency savings for all evaluated projects. For some complicated and large energy-saving projects, the engineers installed power meters to measure performance before and after measure implementation.

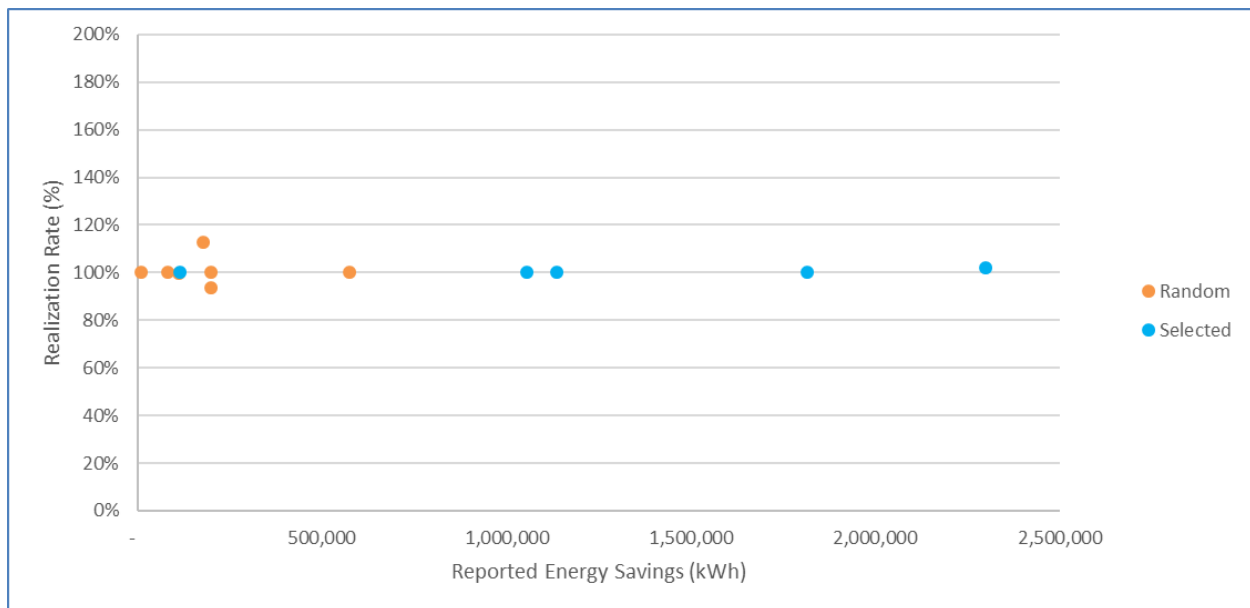
The team reviewed the custom calculation workbooks for the energy savings methodology, inputs, assumptions, and accuracy. Further, the team performed site visits for all evaluated projects and documented equipment specifications and control setpoints. For three projects, the team collected one year of hourly equipment performance trend data through the facility management system or

refrigeration control system. The Cadmus team reviewed all site-collected documentation and compared it to the savings verification reports. Where deviations occurred, the team created custom calculations to determine the evaluated energy savings.

Findings

Figure 4 shows realization rates and associated energy savings for each of the sampled projects.

Figure 4. Refrigeration Sample Results



No projects were found to exhibit realization rates greater than 80% or less than 120%. The Cadmus team retrieved hourly historical trend data for three projects and installed power meters on two projects. The team observed variations in fan speeds, pump speeds, refrigeration load profiles, and pressure setpoints on site and through an analysis of the trend data. Often, these variations in performance occurred after the initial verification site visit and prior to the evaluation site visit. For the remaining sites, the Cadmus team found minimal differences between evaluated and reported savings.

Agricultural

Pacific Power provides incentives for four types of agricultural projects: dairy farm equipment, irrigation hardware, irrigation pumps, and water distribution equipment. In all, Pacific Power provided incentives for 125 measures in 62 unique projects, reporting 1,461,091 kWh in energy savings for the 2016 and 2017 program years. Agricultural projects that received incentives accounted for 2.6% of all reported energy savings in Washington.

Methodology

To determine savings for agricultural projects that received incentives in Washington, Pacific Power used prescriptive or custom calculations or deemed savings values. The Cadmus team evaluated 14 agricultural projects, accounting for 25.5% of the reported energy savings within the agricultural strata.

From the evaluated projects, Pacific Power used deemed savings for seven projects, prescriptive calculations for six projects, and custom calculations for one project.

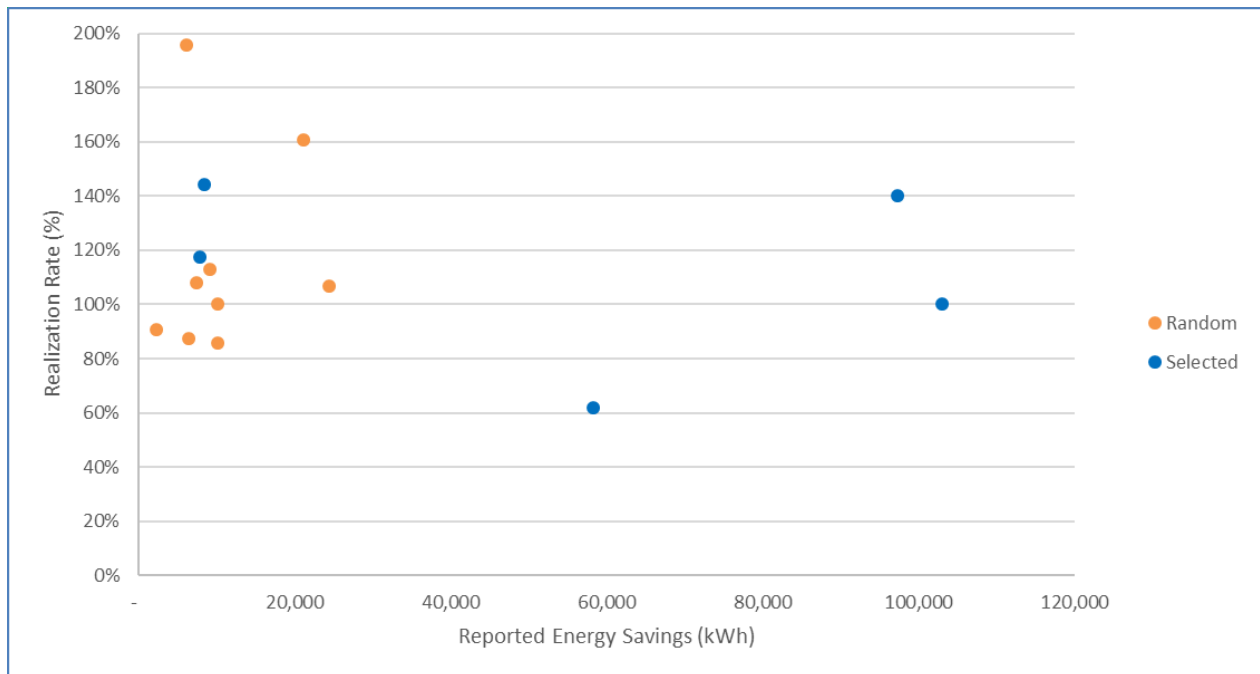
Seven evaluated projects involved upgrading or replacing irrigation hardware equipment, including gaskets, sprinklers, nozzles, hoses, and regulators. These projects claimed savings by using a deemed savings value per unit. The team evaluated these projects by using the savings methodology provided within RTF’s irrigation hardware measure. Critical inputs to these calculations included the quantity of equipment, hours of operation per season, and pump pressure.

For the seven projects with prescriptive calculations for installing VFDs on irrigation pumps, the administrator determined claimed savings using the Irrigation Pump VFD Savings Estimator v1.4 calculator. The Cadmus team evaluated savings for these projects by initially reviewing the irrigation calculator for its methodology and assumptions. While on site, the team inspected the installed equipment, interviewed farmers, identified crops and irrigated acreage, and developed an understanding of the irrigation control strategy. The team updated the irrigation Pump VFD Savings Estimator v1.4 calculator with all findings. For systems with equipment that received incentives exclusive to the utility meter, the team conducted a utility billing analysis using billing data from January 2012 to September 2016, in addition to the data collected during site visits.

Findings

Figure 5 shows realization rates and associated energy savings for each sampled project.

Figure 5. Agricultural Sample Results



Four sites exhibited realization rates greater than 120%, while realization rates fell below 80% for one site. Table 13 provides specific details related to these projects.

Table 13. Agricultural Sample Detailed Findings

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
WAC01340	Drop tube, gooseneck, low pressure sprinkler replacement	6,181	12,093	196%	Variations due to higher flow rates or system pressure
WAC01310	Drop tube, low pressure sprinkler replacement, pressure regulator	21,086	33,893	161%	Variations due to higher flow rates or system pressure
WAC01516	Drop tube, gooseneck, low pressure sprinkler replacement, pressure regulator	8,414	12,128	144%	Variations due to higher flow rates or system pressure
WAC01459	Gasket for wheel line, hand line, or portable main line, impact sprinkler	97,296	136,177	140%	Variations due to higher flow rates or system pressure
WAC01311	Irrigation pump VFD	58,359	36,035	62%	Observed system pressure setpoint of 80 psi. Incentive documentation indicated 55psi. Higher VFD speeds observed onsite as well.

Further explanations follow for the more atypical measure-level realization rates:

- Pacific Power uses deemed savings for irrigation hardware projects (drop tubes, sprinkler replacement, pressure regulators, etc.). The deemed savings are based average values within the Regional Technical Forum (RTF) irrigation hardware efficiency measure workbook calculator. The Cadmus team collected site-specific data for irrigation hardware projects including flow rates, system pressure, and hours of use and updated these data points in the RTF workbook to determine evaluated energy savings. Variations in the realization rates for irrigation hardware measures arose from the difference in the average values and the site-specific values in the irrigation hardware calculator.
- One project, WAC01311, involved the installation of a new irrigation pump and VFD. On-site observations indicated the pump was operating at a system pressure of 80 psi, instead of 55 psi indicated in the incentive documentation. Based on the observed higher system pressure, the project exhibited lower energy savings than expected.

Recommissioning

Pacific Power provided incentives for 11 recommissioning projects that involved investigation and implementation of 12 energy efficiency measures within each facility. For the 2016 and 2017 program years, Pacific Power reported 2,081,933 kWh in energy savings from these projects. Recommissioning projects that received incentives accounted for 3.7% of all reported energy savings in Washington.

Methodology

Pacific Power used custom calculations to determine savings for all recommissioning projects that received incentives in Washington. The Cadmus team evaluated six recommissioning projects,

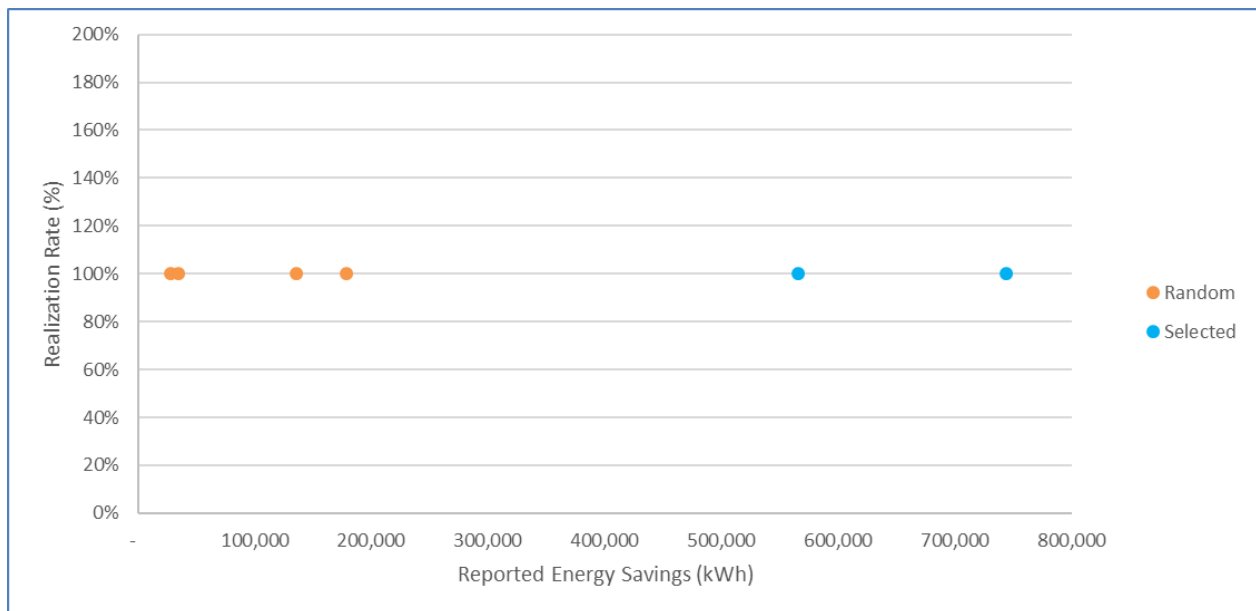
accounting for 81% of the reported energy savings within the recommissioning strata. The evaluated projects involved the implementation of two to six individual energy efficiency measures within each project. Customers provided spreadsheet calculations, workbooks, and energy simulation models. All project documentation included an energy analysis report that identified potential energy efficiency measures and associated savings as well as a savings verification report that documented the success of implemented measures and associated changes to claimed energy savings.

The Cadmus team evaluated recommissioning measures by reviewing the energy analysis and savings verification reports and identifying equipment quantity, capacity, efficiency, performance characteristics, control strategies, and proposed changes for each energy efficiency measure. The team performed site visits for each sampled project and physically verified all critical information on the site and/or reviewed these data through the building management system. Where possible, the team collected trend data from the building management system to review system performance over an extended period.

Findings

Figure 6 shows realization rates and associated energy savings for each sampled project.

Figure 6. Recommissioning Sample Results



All sites exhibited realization rates of 100%. Setpoint and equipment changes made through the recommissioning effort have been maintained and appeared to operate as intended. Consequently, the team found no reductions in performance or energy savings.

Compressed Air

Pacific Power provides incentives for several types of compressed air projects: VFDs serving air compressors, refrigerated cycling dryers, compressed air system setpoint and sequence optimizations, and zero-loss condensate drains. In all, Pacific Power provided incentives for 35 measures within

23 projects and reported 1,931,108 kWh in energy savings for the 2016 and 2017 program years, accounting for 3.4% of all reported energy savings in Washington.

Methodology

The Cadmus team evaluated 10 compressed air projects, accounting for 52.1% of all reported energy savings within the strata. For these evaluated projects, Pacific Power used prescriptive calculations for seven projects and custom calculations for three projects.

For all projects, the Cadmus team reviewed the prescriptive calculator (NW Regional Compressed Air Tool v3.0) methodology and assumptions to determine their applicability. The prescriptive calculator documents customer information, compressed air system specifications, and expected performance.

Critical inputs used to calculate energy savings include the following:

- Compressor type and load control
- Compressor horsepower
- Rated flow
- Receiver volume and dryer specifications
- System pressure setpoints
- Hours of operation

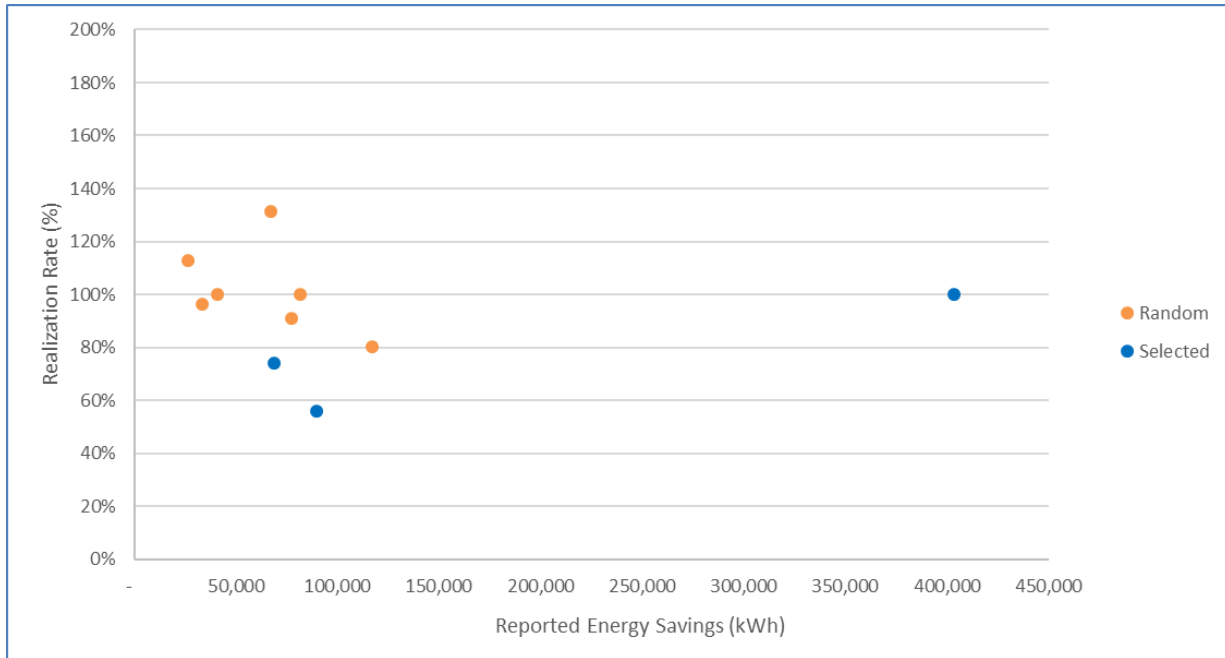
The Cadmus team performed site visits to inspect and document the installed system specifications and operational setpoints. When variations existed between project data and site findings, the team updated the NW Regional Compressed Air Tool v3.0 with the revised inputs to calculate evaluated savings.

To evaluate projects with claimed savings determined using custom calculations, the team installed power metering equipment where possible (five of the 10 sampled custom projects) and recreated custom calculations based on trend data and site findings. For three of the projects without power metering equipment installed, the team reviewed the energy analysis report and verification report for methodology and accuracy. The team used the site findings to revise calculation inputs exhibiting variations.

Findings

Figure 7 shows realization rates and associated energy savings for each sampled project.

Figure 7. Compressed Air Sample Results



Two sites produced realization rates below 80%, and one site produced a realization rate above 120% (Table 14). The Cadmus team found nominal or no differences in reported savings for the remaining sites.

Table 14. Compressed Air System Sample Results

Project	Project Measure	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
WAC01482	VFD air compressor	67,113	88,078	131%	Analysis of power metering data from air compressor performance indicate higher-than-expected hours of use, resulting in greater energy savings.
WAC01524	Refrigerated cycling dryer with compressor	68,817	50,889	74%	Analysis of power metering data from air compressor performance indicate higher-than-expected average speeds, resulting in reduced energy savings.
WAC01379	VFD air compressor	89,514	50,020	56%	Analysis of power metering data from air compressor performance indicate higher-than-expected average speeds, resulting in reduced energy savings.

The Cadmus team installed power meters at the three compressed air projects exhibiting high and low realization rates. Energy savings for these projects are based on the expected load profile in the application data. Typically, greater energy savings are realized when compressors are operating at low

speeds as compared to on/off load control or inlet modulation in the baseline condition. The Cadmus team analyzed the power meter data to determine the hours of use at all compressed air VFD speeds. For the three compressed air projects with low and high realization rates, the power meter data indicated differences in hours of use at each VFD speed when compared to the expected performance from the application data.

Wastewater

Pacific Power provides incentives for several types of wastewater projects including ultraviolet lamps and aeration system controls. Overall, Pacific Power provided incentives for 11 measures within 4 projects and reported 1,924,052 kWh in energy savings for the 2016 and 2017 program years, accounting for 3.4% of all reported energy savings in Washington.

Methodology

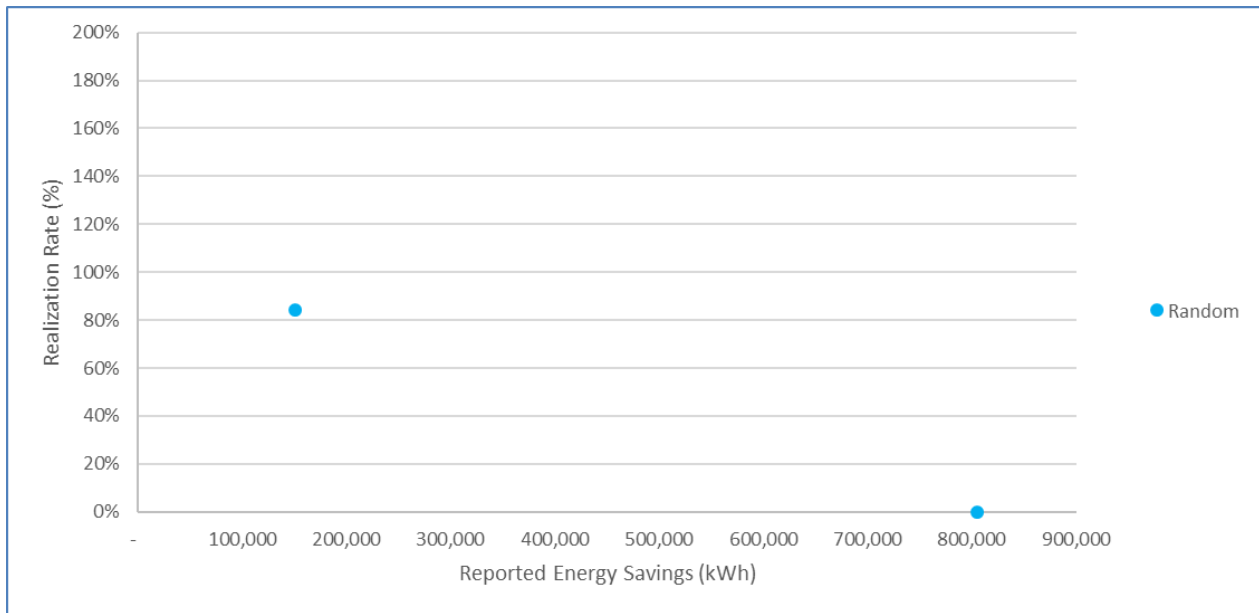
Pacific Power provided incentives for four unique projects consisting of eleven measures in 2016 and 2017. These measures include VFDs, high-efficiency pumps, and optimized controls. All projects used custom calculations to determine reported energy savings. The Cadmus team evaluated two projects, accounting for 49.7% of the reported energy savings within the wastewater strata.

Because wastewater projects often involve multiple measures with interactive effects and reported savings through custom calculations, the Cadmus team evaluated these projects using a similar methodology to the recommissioning and refrigeration strata, verifying that equipment was installed and operational, system setpoints matched incentive documentation, and that system load profiles and/or capacity trends remained consistent. Where possible, the team collected trend data.

Findings

Figure 8 shows realization rates and associated energy savings for each sampled project.

Figure 8. Wastewater Sample Results



One sampled project exhibited a realization rate below 80%. Table 15 provides specific details related to this project.

Table 15. Wastewater Sample Detailed Findings

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
WBWA_8016	Aeration control system upgrade with VFD	805,055	0	0%	Adjusted savings based on actual metered power consumption from control system. Baseline changed to reflect actual Biological Oxygen Demand (BOD) load.

This wastewater project, WBWA_8016, involved the installation of optimized controls and VFDs on a process wastewater treatment plant. The Cadmus team collected daily system load and power consumption data for a year after the project was completed. The team measured system efficiency from the baseline and proposed periods and calculated the energy savings as the difference in the baseline and post-implementation efficiency, multiplied by the post-implementation system load. Because the system efficiency did not improve after the project was completed, no energy savings occurred, resulting in a 0% realization rate.

HVAC

Pacific Power provided incentives for 70 HVAC measures within 33 unique projects. These projects consisted of chillers, economizers, pump and fan motor VFDs, air-handling units, air-source and ground-source heat pumps, packaged terminal heat pumps, and controls upgrades. Pacific Power reported energy savings of 1,243,101 kWh, accounting for 2.2% of all reported energy savings for the 2016 and 2017 program years.

Methodology

The Cadmus team evaluated 11 HVAC projects, accounting for 69.6% of all reported energy savings within the HVAC strata. Of the evaluated projects, Pacific Power used prescriptive calculations for six projects, deemed savings for two projects, and custom calculations for three projects. Pacific Power used its HVAC calculator or Pacific Power chiller calculator to determine the costs, energy savings, and incentive amounts for prescriptive HVAC projects.

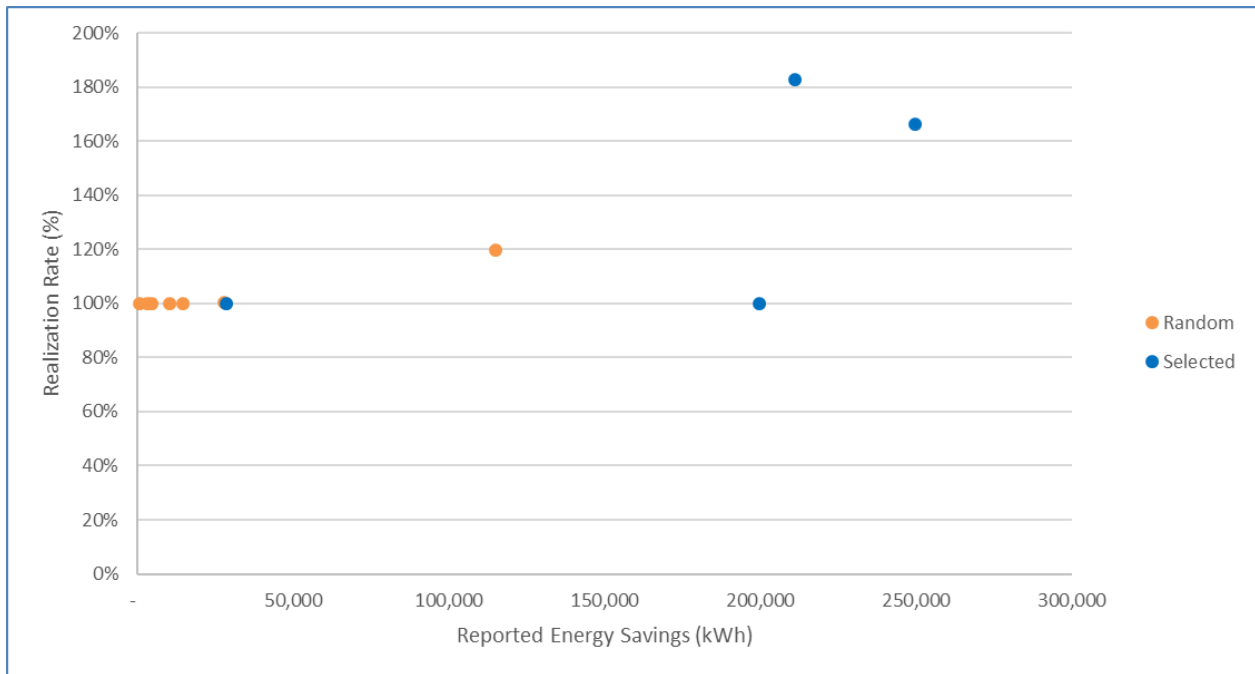
These prescriptive calculators documented the customer information, project location, equipment specifications, and energy savings calculations. The Cadmus team reviewed the methodology and assumptions for each prescriptive calculator to determine the applicability for each project sampled. Then, for each of the sampled projects, the team performed site visits to inspect and document the installed equipment, interview facility staff, and review the expected performance characteristics. The team then used the collected data to update the prescriptive calculators and determine evaluated savings.

For projects where the administrator used custom calculations, the team reviewed the energy analysis reports and verification reports for the energy savings methodology, inputs, assumptions, and accuracy. If site findings deviated from claimed equipment quantities, performance specifications, or hours of use, the team recreated the custom calculations with the updated information. The team also installed power metering equipment for one project and analyzed the meter data to develop a load profile and to determine hours of use.

Findings

Figure 9 shows realization rates and associated energy savings for each sampled project.

Figure 9. HVAC Sample Results



Two sites exhibited realization rates above 120%. The Cadmus team found minimal differences in reported savings for the remaining sites. Table 16 provides specific details for the two sites with realization rates greater than 120%.

Table 16. HVAC Sample Results

Project	Project Measure	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
WSBWA_69952	VFDs (HVAC fans and pumps)	211,280	386,270	183%	Evaluated savings based on Cadmus VFD analysis workbook. Those assumptions resulted in savings much higher than reported.
WAFX2_001159	VFDs (HVAC fans and pumps)	249,608	414,558	166%	Differences in deemed savings values: Pacific Power TRL savings were significantly lower than those assumed in Cadmus' calculator.

Both projects exhibiting high realization rates were VFD projects installed on HVAC fans and pumps. Pacific Power uses a deemed savings value of 1,082 kWh per controlled motor horsepower for VFDs installed on HVAC fans and 996 kWh per controlled motor horsepower for VFDs installed on HVAC pumps. The team evaluated these projects by referencing a 2014 variable-speed drive load shape

study¹⁰ and applying deemed savings specific to HVAC supply fans, return fans, and exhaust fans. The revised deemed savings amounts were higher than Pacific Power’s deemed savings values.

Other

Pacific Power provides incentives for projects within the Other category: building shell measures (insulation, windows); controls; food service equipment (cooking equipment, dishwashers), motors, and envelope measures. Overall, Pacific Power provided incentives for 54 measures within 43 unique projects and reported 819,620 kWh in energy savings for the 2016 and 2017 program years. Other projects that received incentives accounted for 1.4% of all reported energy savings in Washington.

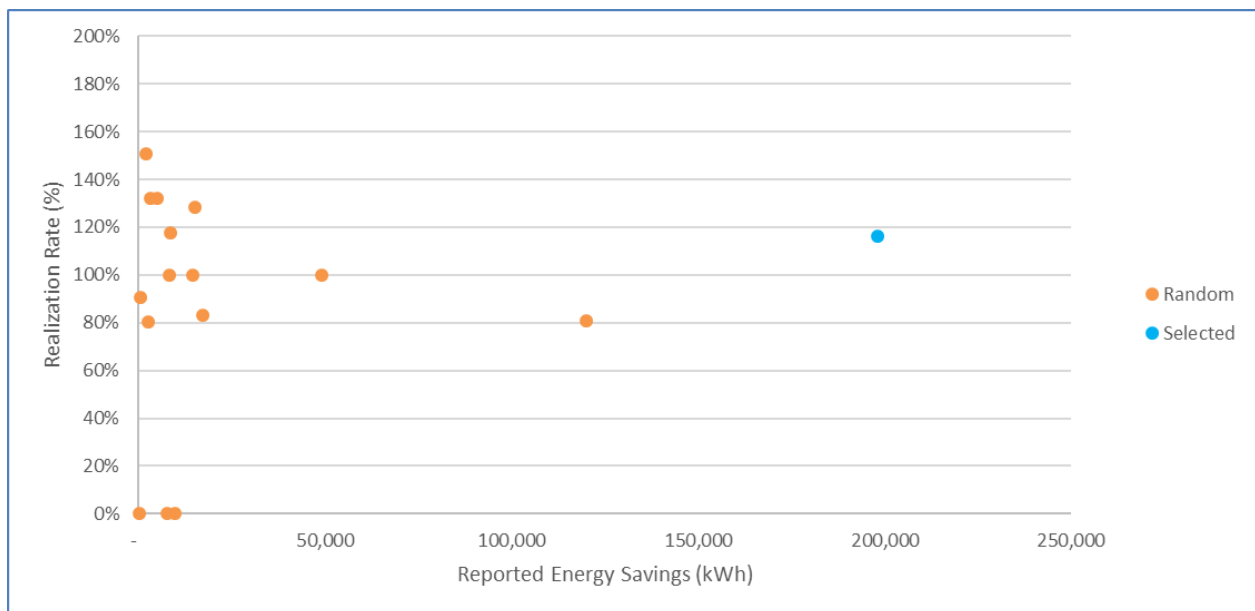
Methodology

For other projects that received incentives in Washington, Pacific Power used custom calculators and deemed savings values to determine reported energy savings. The Cadmus team evaluated 16 projects, accounting for 56.5% of the reported energy savings within the Other strata. From the evaluated projects, Pacific Power used deemed savings for fourteen projects and custom calculations for two projects.

Findings

Figure 10 shows realization rates and associated energy savings for each sampled project.

Figure 10. Other Sample Results



Four projects achieved realization rates above 120%, and three projects fell below 80%. Table 17 provides specific details related to projects with high and low realization rates.

¹⁰ Cadmus. *Variable Speed Drive Loadshape Project*. August 2014. Available online: <https://neep.org/variable-speed-drive-loadshape-study-final-report>

Table 17. Other Sample Detailed Findings

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
WAFX2_001074	Green Motor Rewinds	2,005	3,021	151%	Calculated using RTF, with inputs updated based on site observations.
WSBWA_66129	Green Motor Rewinds	4,972	6,563	132%	Calculated using RTF, with inputs updated based on site observations.
WSBWA_67152	Cool Roof	3,276	4,334	132%	Refrigerated warehouse cool roof project. Evaluated savings based on refrigerated warehouse study in California ^a .
WAC00318	Washer and Dryer	15,253	19,589	128%	Calculated using RTF. Daily load inputs to calculator based on site interview.
WAFX2_001101	Cool Roof	230	0	0%	The product installed for the cool roof is a black, not white, and does not meet the ENERGY STAR [®] requirements or provide cooling savings.
WAFX2_001372	Green Motor Rewinds	9,804	0	0%	Motor is in storage. No hours of use.
WAFX2_001374	Green Motor Rewinds	7,848	0	0%	Motor is in storage. No hours of use.

^a http://www.energy.ca.gov/title24/2008standards/prerulemaking/documents/2007-02-26-27_workshop/supporting/2007-02-14_REFRIGERATED_WAREHOUSES.PDF

Because of the wide variety of project types utilizing deemed savings for reported savings, high levels of variability were expected. The Green Motor Rewind projects and Cool Roof projects exhibited the largest variability in realization rates, as detailed below:

- Customers who take advantage of the Green Motor Rewind incentive often operate large industrial facilities with many motors in storage. These motors are typically immediately placed in use once an operating motor fails. The failed motor may go through the green motor rewind process and are often placed in storage upon return. Customers who use the Green Motor Rewind incentive are required to report when the motor is expected to be placed back in service. However, the Cadmus team found these dates to be inaccurate as most customers place the motor that they received incentives for in storage until another operating motor fails. The team evaluated five green motor rewind projects in Washington and found two motors in storage and three motors in use. Based on these findings, the team calculated an overall realization rate of 43% for the Green Motor Rewind incentive.
- The Cadmus team evaluated two Cool Roof projects that produced atypical findings. One cool roof, WSBWA_67152, was installed on a refrigerated warehouse. Because refrigerated warehouses have unique seasonal operation characteristics and condition requirements when compared to a typical office building, the deemed savings value was found to underrepresent

the energy savings. This project exhibited a 132% realization rate. Another cool roof project, WAFX2_001101, was found to install a black roofing product that does not meet the incentive requirements.

Process Evaluation

This section outlines the detailed findings from the Cadmus team’s process evaluation of the **wattsmart** Business program. The team based these findings on analysis of data collected through materials and database review, program staff interviews, and participant and nonparticipant surveys. In conducting the evaluation, the team assessed the following:

- Effectiveness of the program design, marketing, and processes
- Participant and partial participant experience and satisfaction
- Barriers to customer participation

The Cadmus team focused its research activities on key research topics consistent with the 2014-2015 evaluation, as well as on topics of interest identified by program stakeholders. Table 18 lists primary research questions used.

Table 18. Research Areas and Questions

Research Areas	Researchable Questions and Topics
Program Status	How did the program perform in 2016 and 2017, and what opportunities and challenges do program staff foresee for future program years?
Awareness	How did customers learn about the Pacific Power wattsmart Business program incentives?
Participation/Motivations and Barriers	What key factors influenced participants’ and partial participants’ decisions to participate in the program? What were the key factors in any customer’s decision to install energy efficiency improvements? What were the participation barriers for participants, partial participants, and nonparticipants?
Satisfaction	How satisfied were participants and partial participants with the program and with the program measures, incentives, and services?
Freeridership and Spillover ^a	How influential was the program on participants’ and partial participants’ decisions to participate? How influential was the program on any customer’s decision to install energy efficiency equipment without program incentives or services?
Firmographics	What are the business characteristics of participants in each program offering? How do participant awareness and business size compare by program delivery channel?

^a Appendix A and B include the methodology and results for the freeridership and spillover analyses.

Methodology

The following sections provide an overview of the methodology the Cadmus team used to conduct a process evaluation of program performance in 2016 and 2017.

Materials and Database Review

The team reviewed the following materials and program components:

- The *Washington Annual Report on Conservation Acquisition* (for January 1, 2016, to December 31, 2016; and for January 1, 2017 to December 31, 2017).
- Exhibits that Pacific Power provided to the Cadmus team; originally provided to the Washington Utilities and Transportation Commission, these exhibits described planned program updates during the 2016-2017 evaluation period.
- The **wattsmart** Business program website.

- The 2017 **watt**smart advertising and outreach calendar (and associated collateral)
- The participant and partial participant databases.
- Pacific Power’s nonresidential customer database.

The *Program Implementation and Delivery* section, below, includes the results from these reviews within the applicable subsections: *Design, Implementation, Marketing and Outreach*, and *Database Interface and Data Management*.

Utility and Administrator Staff Interviews

The Cadmus team developed stakeholder interview guides and collected information about key topics from program management staff. The team conducted four interviews with program staff at Pacific Power and six interviews with program staff at Cascade, Nexant, and Evergreen (the program administrators and a subcontractor for the program’s contracted delivery portions). These interviews covered the following topics:

- Changes in stakeholder roles and responsibilities
- Program goals and performance
- Program design and implementation changes
- Marketing and outreach
- Program delivery and management
- Data management and quality assurance
- Barriers and areas for improvement

Surveys

The Cadmus team surveyed three customer populations: participants, partial participants, and nonparticipants, all detailed below.

Participant Telephone Surveys

The team conducted telephone surveys with 71 participants who installed measures through the **watt**smart Business program. The surveys included 51 participants in Typical Upgrades, two in Custom Analysis, 12 participants in the Small Business Enhanced Incentive Offer, four in Lighting Instant Incentives, and two in Energy Management. The team designed survey instruments for each participant group and collected data about the following process evaluation topics:

- **Customer perceptions and motivations**
 - Program awareness
 - Reasons and motivations for participation
 - Perceived value of the program
- **Customer experience**
 - Effectiveness of the program delivery including marketing, outreach, and delivery channels

- Customer interaction with trade allies, program staff, program funded third-party technical service providers
- Customer satisfaction regarding specific program elements and the **watt**smart Business program overall
- Customers' participation challenges
- **Program influence:** freeridership and spillover
- **Customer information:** firmographic information

Participant Sample Detail

To ensure the maximum possible sample in the categories with fewer participants, the team prioritized participants into the measure category or offering with the smallest populations. Participants who installed more than one measure type were selected into the measure type for which they showed the largest kWh savings. The following list shows the prioritization from highest priority (smallest population) to lowest priority (largest population):

- Wastewater
- Recommissioning
- Compressed Air
- Small Business Enhanced Incentive Offer
- HVAC
- Lighting Instant Incentives
- Other
- Refrigeration
- Agricultural
- Lighting

VuPoint then randomly selected participants for surveys within each reporting category, attempting to fulfill individual quotas for each category.

Nonparticipant and Partial Participant Telephone Surveys

The Cadmus team conducted telephone surveys with 68 nonparticipants and nine partial participants. The surveys addressed the following process evaluation topics:

- **Customer perceptions and motivations**
 - Program awareness
 - Reasons for and barriers to make energy-efficient improvements
 - Likelihood of requesting an incentive in the future
- **Customer experience**
 - Reasons partial participants did not complete specific projects
- **Customer information:** firmographic information and fuels used for space and water heating

Nonparticipant Sample Detail

The Cadmus team removed participants, partial participants, and managed accounts from the master list of nonresidential customers provided by Pacific Power. For the remaining population, the team randomly called nonparticipants for surveys.

Partial Participant Sample Detail

Pacific Power, Nexant, and Cascade provided the Cadmus team with lists of 2016 and 2017 partial participants from each of their respective program responsibility areas. The team checked this list against the list of program participants, removing any customers who, within that same timeframe, appeared on the participant list for another project; this eliminated any possibility of double sampling these individuals. The team also removed any managed accounts identified by Pacific Power. For partial participants who began but did not complete multiple projects during the evaluation period, the team included projects with the greatest estimated kWh savings and randomly selected partial participants from that sampling frame for surveys.

Program Implementation and Delivery

Drawing on stakeholder interviews, program annual reports, and participant survey data, this section outlines changes in the **wattsmart** Business program's implementation and delivery during the 2016-2017 evaluation period.

Program Overview

Effective January 1, 2016, and again on July 11, 2016, Pacific Power made a number of changes to the program eligible measures, incentives, and deemed baselines. This was in response to declining costs for LED technology and to align the program with more stringent federal standards, the Washington State Energy Code (2015), or changes in third-party specifications (e.g., Consortium for Energy Efficiency, RTF unit energy savings values/protocols, and market data). Under a managed transition to reduced lighting and HVAC incentives, customers participating under the old program version, and expecting the older, higher incentives were given a 45-day notice of the impending change and had 90 days to build and finish projects; this, according to Pacific Power, brought in some projects from customers wanting to receive the older incentive rates.

Pacific Power continued implementing programmatic changes on three occasions in 2017 to refine measure offerings and eligibility requirements, adjust incentives to reflect market cost data, align the program with current RTF analysis and with federal standards, and maintain cost-effectiveness. Even though the 2017 IRP reflected lower avoided costs, Pacific Power anticipates the **wattsmart** Business program will remain cost-effective through 2019.

Pacific Power and administrators also reported that staff prioritized customer satisfaction in 2016 and 2017, with Nexant, and a third-party survey firm conducting satisfaction surveys beginning in 2017.

Customers provided feedback on their satisfaction with the following topics:

- Vendors’ knowledge about the program incentives and information provided (i.e., energy savings options, project costs and benefits)
- Vendor communications
- Product/project installations

The survey asked participants whether they would participate in the program again or recommend it to others. Nexant collected, monitored, and used customer responses to provide performance feedback and coaching to vendors, and, beginning in October 2017, began providing quarterly survey results reports to Pacific Power.

Design

In addition to the changes described above, effective January 1, 2017, Pacific Power added smart plug strips and thermostat measures to the Small Business Enhanced Incentive Offer, and in April, redirected incentives for these measures from contractors to customers. However, Nexant reported, “the availability of smart plug strip technology changed drastically due to the introduction of more expensive, but more controllable, wireless plug strip replacements.” As a result, Nexant focused on lighting measures to ensure they achieved the annual program targets.

Effective April 28, 2017, Pacific Power also made the following modifications to the Small Business Enhanced Incentive Offer:

- Added incentives for delamping existing fixtures
- Added incentives for replacement LED high bay fixtures/lamps and ballasts
- Increased incentives for high-intensity discharge replacement lamps
- Set wattage reduction requirements for LED lighting retrofits

Pacific Power’s project manager reported an increase in Energy Management projects, primarily for fruit storage refrigeration (which represents a significant load in Washington). Refrigeration customers are increasingly willing to evaluate control setpoints modifications to maximize energy savings. As a result, Energy Management projects are gaining traction, particularly in Yakima Valley and Walla Walla.

Implementation

In March 2017, Pacific Power launched the **watt**smart Business Vendor Network, which replaced the Energy Efficiency Alliance and enforced stricter requirements for program vendors (i.e., increased minimum participation requirements, industry training, proof of insurance). In the fall of 2017, Pacific Power added a premium vendor status, giving lighting vendors the opportunity to obtain exclusive recognition by meeting specific criteria, including lighting certification or credentials. The primary certification is NEEA’s NXT Level 1 designation.

The network provided customers with a trained pool of local trade allies (e.g., architects, contractors, distributors, manufacturers, engineers, other vendors) to assist them in identifying and implementing energy efficiency projects. **wattsmart** Business program vendors promoted the program to their customers, assisted customers with their projects, provided recommended upgrades, created proposals and bids, assisted with paperwork, and supplied and/or installed the upgrades.

Cascade and Nexant recruited and managed trade allies, each in their respective markets. For Cascade, these were trade allies delivering industrial and agricultural measures. For Nexant, these were trade allies delivering commercial measures, vendors delivering the Small Business Enhanced Incentive Offer, and lighting distributors participating in Lighting Instant Incentives.

Administrator staff reported that the reregistration process caused some confusion and elicited a negative response from trade allies already approved by the program. Some trade allies were lost in the transition, but staff worked with trade allies to re-register and said some trade allies came back to the program, and they now had a reliable and engaged group, especially for lighting. Trade allies who did not re-register and receive the designation of a **wattsmart** Business vendor could submit projects to the program, but they are not listed as **wattsmart** Business vendors on the customer-facing Find a Vendor search on the program website.

As Cascade's trade allies deliver prescriptive and custom non-lighting measures, and Cascade prepares all savings and incentive calculations for its trade allies to insure quality control, Cascade did not require trade allies to register with the program.

Cascade reported that in 2016 and 2017 they assisted industrial and agricultural customers in completing applications for some non-lighting Typical Upgrades measures (e.g., variable speed air compressors, fast-acting doors), requiring savings calculations to determine the incentive. Cascade explained, however, that its process was built to provide such assistance, and applications for typical measures not requiring these calculations (i.e., those using deemed savings) were processed easily.

Marketing and Outreach

PacifiCorp, Nexant, and Cascade shared responsibilities for marketing and outreach to customers in Pacific Power territory during the 2016-2017 evaluation period. In addition to radio, TV, print, paid digital display and search advertising, direct mail, email and social media deployed by Pacific Power, the company's project manager provided direct outreach to managed accounts. In May 2017, Pacific Power discontinued the use of the Energy Insights newsletters. Trade ally partners, managed by the program administrators, were responsible for direct boots-on-the-ground marketing of the program to all **wattsmart** Business small and mid-sized customers, as well as large customers other than those managed directly by Pacific Power account managers.

Pacific Power marketed the Lighting Instant Incentives program directly to end users to ensure customers purchasing eligible lighting knew of incentives provided by Pacific Power, and that they were Pacific Power customers. Additionally, lighting distributors were responsible for marketing Lighting Instant Incentives to their customers, although administrator staff noted some distributors did not

promote instant incentives to prevent upsetting trade allies (installation contractors), who were also their customers and may sell lighting to the same end users.

Nexant (in conjunction with its subcontractor) provided marketing communications and materials to registered trade allies and coordinated messaging with Pacific Power communications staff. In late 2016, Nexant began providing marketing materials to registered trade allies through the trade ally portal, allowing trade allies access to materials and cobranding; this change eliminated the prior bottle neck of obtaining materials directly from Nexant or Pacific Power. Nexant also hosted annual events for lighting and non-lighting program trade allies.

Somewhat different than Nexant's broad marketing to many trade allies, Cascade conducts direct business-to-business and face-to-face outreach to industrial and irrigation trade allies, and often identifies new trade allies through networking with the area U.S. Department of Agriculture office, agricultural expositions, networking with customers, or a Google search. Given the number of trade allies in, for example, compressed air, dairy, and irrigation pumping, tend to be fewer and farther between than lighting and HVAC contractors, Cascade found it more effective to develop one-on-one relationships with trade allies through repeated personal visits, phone calls, and sometimes joint-visits with trade allies to their customers, than from organizing formal training sessions for each group.

Cascade also conducted outreach directly to customers, locating project leads for trade allies or offering scoping services to identify savings opportunities for customers. Likewise, when a trade ally identified a potential customer for **wattsmart** Business incentives, Cascade provided engineering support to assist the trade ally in engaging the customer, preparing the necessary calculations to show the customer's potential savings, and advising the trade ally on how to achieve higher savings from a project.

Marketing Strategy

The program's 2017 marketing strategy reflected a strong focus on a contracted demand-side management (DSM) delivery channel utilizing a network of trade allies, contractors, and vendors and broadening the program's reach through program and non-program contractors, with whom customers could have existing relationships. Pacific Power provided oversight into marketing conducted by program administrators or administrators' subcontractors.

As each administrator was responsible for meeting its program goals, each used a separate marketing effort, which provided some control over attaining the program goals. Pacific Power reported that keeping all teams on the same page and maintaining the same brand presentation proved a bit challenging, due to some turnover in the teams. Pacific Power's marketing staff acknowledged that understanding the administrators' desire to control their own marketing, while bringing it all in-house to Pacific Power, would simplify quality control and reduce the need to re-train administrator staff as they changed position, doing so would also require adding in-house staff. Such a change, marketing staff said, was not urgent, but perhaps something to consider in the future.

In 2016, Pacific Power's in-house project manager executed an enhanced, direct, customer outreach effort. This included project managers providing more recognition for customers conducting large projects, such as offering a plaque or a check presentation ceremony.

In reviewing Pacific Power’s annual reports, Cadmus saw **wattsmart** Business communication impressions from TV, radio, and newspaper/magazines declined somewhat between 2016 and 2017, while online advertising and social media increased. Pacific Power explained that it shifted more money into digital and social media, but that the overall budget did not change; this money came out of print media funds. Pacific Power made the change based on research showing that more people were online and, subsequently, **wattsmart** Business had a click-through rates comparable to national averages on Google Search or similar sites. Pacific Power tried Linked-In in 2016 without much effect, shifting its focus to Facebook in 2017. Furthermore, Pacific Power reported few responses to email blasts, unless the recipient list was huge or targeted with a great offer, and that people did not tend to open or respond to unsolicited emails, regarding them as junk mail.

Pacific Power also utilized a direct-mail campaign twice per year, targeting irrigation customers. This included a customer letter and one-page application form to raise awareness of program incentives. Pacific Power reports these campaigns effectively drove customers to sign up for the program. The program also offered customer recognition events during spring and early summer, and a finance offer webinar in late October/early November.

Marketing Messaging

As part of the 2016-2017 evaluation, the Cadmus team reviewed the program’s website, the advertising and outreach calendar, and marketing materials, in addition to interviewing Pacific Power’s marketing staff.

Evaluation of the Program Website

On multiple occasions, the Cadmus team referenced information provided on the program website. The team considered the site visually easy to navigate and the information provided within each measure category useful in achieving a high-level understanding of the steps necessary to initiate a project, as well as brochures, case studies, detailed incentive lists, policy papers, and other linked documents explaining requirements of the program. However, the team encountered some layout issues making it difficult for a customer to navigate—particularly with respect to lighting. For example, a customer wanting to replace lighting cannot intuitively determine which lighting category their project fits into without exploring each category and the linked brochures (Typical Upgrades, Instant Incentives, Small Business Lighting).

wattsmart Advertising and Outreach Calendar

Following interviews with Pacific Power and the program administrators’ staff, Cadmus’ reviewed the 2017 Washington **wattsmart** advertising and outreach calendar, along with the campaign materials linked in the calendar. The calendar was comprehensive, providing detailed outreach campaign scheduling and links to related messaging, collateral materials, radio spots, case studies, and other materials. Specific findings identified during the review of these elements are provided below.

Key Messages

Pacific Power’s stated key messages for **wattsmart** Business customers were well reflected in the advertising and outreach messaging (print ads, eblasts, radio, etc.).

Calendar

- Program changes: Changes impacting the customer incentive or experience should be communicated throughout the year when the changes take effect. This could be done via email. Currently they are shown only prior to January 1, changes.
- The Energy Insights newsletter was not published after March 2017.

Marketing materials

- General: Many materials provided a generic link (bewattsmart.com), leading to the main energy efficiency page; however, these documents did not include Washington business-specific vanity URLs.
- Print ads: These featured actual business customers who saved through the **wattsmart** Business program, but there was no copy or link directing customers to case studies or other sources describing what the featured customer did to achieve the savings.
- Digital display ads: These incorporate strong messaging and creative use of the ad space.
- Program brochure: This lacks a defined structure, making it challenging to follow.
- Overview: This incorporates text but lacks an image on the first page. (Materials for Lighting Instant Incentives and Small Business Lighting provide good examples of image integration).
- Radio and TV ads: These are well made and communicate the marketing messages effectively.
- Eblasts (electronic communications): electronic communications included Washington-specific language; however, each eblast is formatted slightly differently. The geo-targeted emails provide a good formatting example to follow.
- Case studies: case studies reflected a good mix of topics, although all were somewhat dated (2014).

Database Interface and Data Management

During the 2014-2015 program evaluation, Pacific Power consolidated its nonresidential DSM programs under the **wattsmart** Business program umbrella and transitioned data management to its new DSMC software. A transition now complete and operating, program administrators, Nexant and Cascade Energy, complete weekly bulk uploads of project data into DSMC. Within the 2016-2017 evaluation period, Nexant also began using DSMC software and can now enter Small Business Enhanced Incentive Offer project data directly into its system and then upload these to Pacific Power's database.

Data Quality Assurance

Pacific Power evaluates data quality assurance on an ongoing basis and has increased the rigor of data verifications completed by DSMC on all projects since the last evaluation. Pacific Power data management staff said errors in projects uploaded from the program administrators have decreased overall since the 2014-2015 evaluation period.

Evaluation of the Program Database

Data inconsistencies identified by the Cadmus team during the 2014-2015 evaluation, that made the program participant data difficult to evaluate, have substantially declined. Participant database headings

and program and measure name entries are far more consistent under the **watt**smart Business program umbrella. While the team found the data easier to use for the 2016-2017 process evaluation, it found some issues with the different program databases provided by Pacific Power and the administrators that made the program evaluation somewhat challenging:

- Missing contact information for Lighting Instant Incentives participants (this data had to be pulled from separate files provided by the program administrator as it did not appear in the participant data provided by Pacific Power)¹¹
- Esoteric addresses for agricultural customers. This may be unavoidable due to the nature of rural locations (e.g., farm fields, barns), where equipment is installed.
 - Addresses included information that was not part of the actual address (#pumps, #gym, #market, etc.).
- Descriptions of partial participant project status varied between Pacific Power and each administrator, meaning project designations included in the survey sample could vary year over year depending on the evaluator’s interpretation.
- Projects carrying a custom designation appeared in the Measure Type column. Measures containing the word “custom” in their name appeared in the columns Measure Subtype, Measure Name and Measure Custom Name, however, these designations did not match across columns or with those in the Measure Type column.

Program Challenges and Successes

Pacific Power program management staff and the program administrators reported that, for the most part, they had the resources needed to deliver the program in 2016 and 2017. Staff from both Pacific Power and the administrators cited the following program strengths:

- Washington is a tight geographic area and Cascade’s program manager maintains a full project pipeline due to good contacts and frequent customer outreach.
- Pacific Power staff delivering the **watt**smart Business program have worked together as a team for more than 20 years and have found a good path for engaging customers in the program.
- Pacific Power’s prescriptive lighting program is robust with little fraud.

Program management and implementation staff also noted the following challenges that they anticipate will affect the program going forward:

- Customers’ hesitation to engage with the multiyear commitment of SEM, citing time and staff requirements.
- Distributors’ reluctance to compete with trade allies by marketing Lighting Instant Incentives direct to end-use customers.

¹¹ The 2016-2017 evaluation included 32 projects for which the team could pull contact information from the project files.

- The difficulty some distributors have obtaining customer signatures on the program application document, particularly when the customer purchasing the lighting is not authorized to sign on behalf of their company.
- Pre-approvals that the program requires for typical incentives add time to projects. Distributors no longer stock quantities of all products, requiring customers or trade allies to order products, which can add six to eight weeks to a project after pre-approval. In turn, this extends the time between a customer starting a project and their receiving a check.
- Reaching the small business sector cost-effectively is challenging for Pacific Power and the trade allies.
- The numerous criteria required by the program is a bottleneck to contractors: “Why do all this work to get projects if they can get work without it.”
- Requiring each Small Business Enhanced Incentive Offer project be cost-effective, rather than evaluating cost-effectiveness across all small business projects combined.

Customer Response – Participants

The Cadmus team conducted telephone surveys with 71 **watt**smart Business program participants—53 receiving Typical Upgrades or Custom Analysis incentives, 12 receiving incentives through the Small Business Enhanced Incentive Offer, four receiving Lighting Instant Incentives, and two receiving Energy Management incentives. This section focuses primarily on Typical Upgrades, Custom Analysis, and Small Business Enhanced Incentive Offer. Small sample populations for Energy Management incentives and Lighting Instant Incentives resulted in insufficient response rates to draw conclusions; however, the team reported those responses in this section. The team also reported on survey responses from nine partial participants and 68 nonparticipants.

Wattsmart Business Typical Upgrades and Custom Analysis

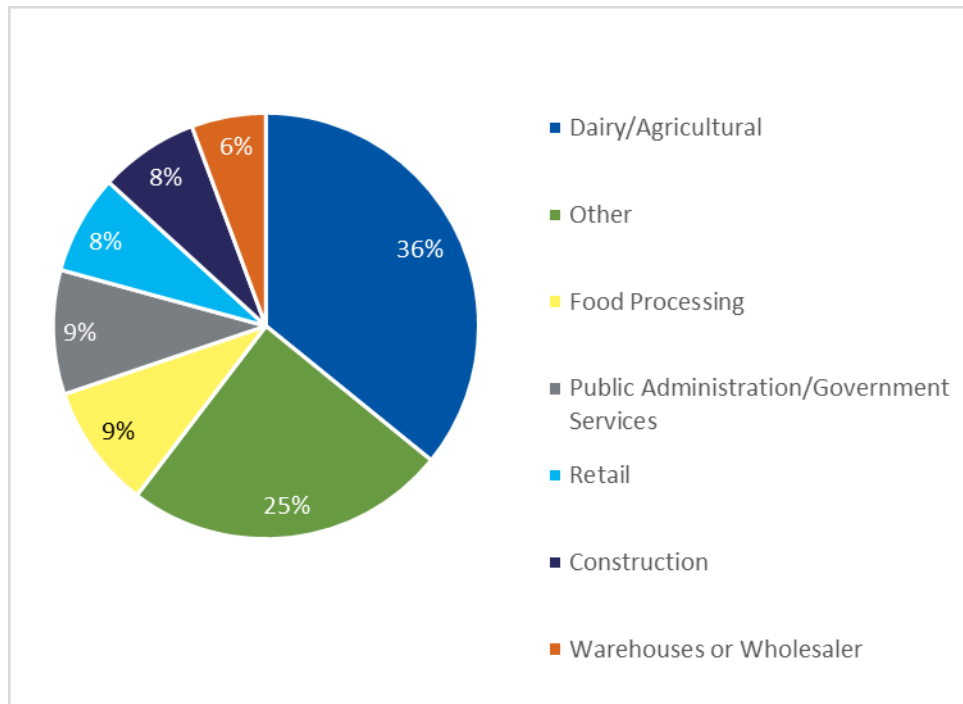
The Cadmus team surveyed **watt**smart Business Typical Upgrades or Custom Analysis participants in six measure categories:

- Lighting (28)
- Refrigeration (9)
- Agricultural (9)
- Compressed Air (3)
- HVAC (1)
- Other (3)

Just over a third of respondents belonged to the Dairy/Agriculture business sector (36%, n=53). Food Processing and Public Administration/Government Services, represent 9% each. The Retail, and

Construction sectors represent 8% each, and Warehouse/Wholesalers represent 6% of respondents (Figure 11).¹²

Figure 11. Respondents by Business Sector

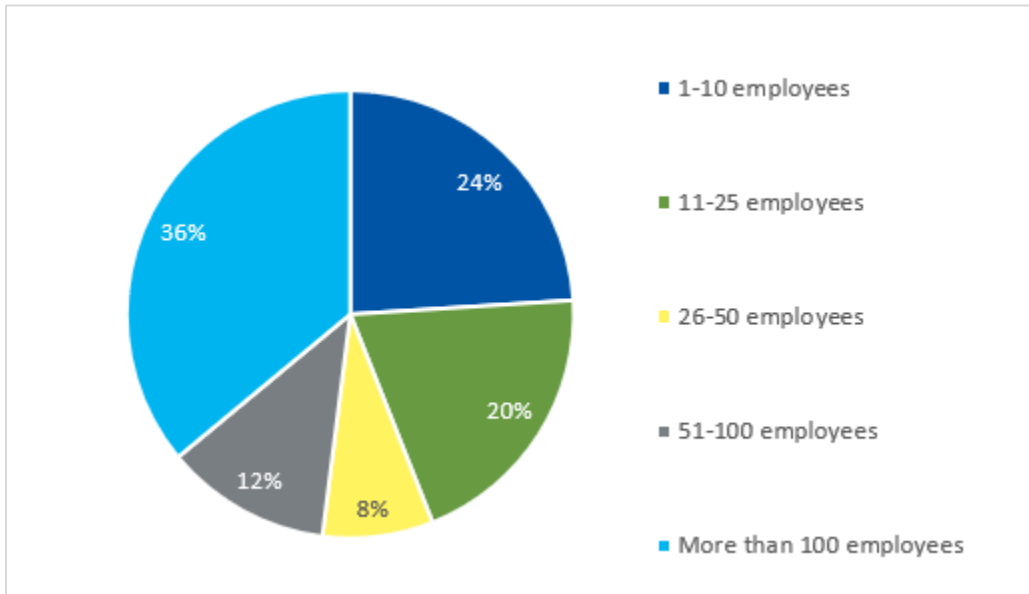


Source: Pacific Power **wattsmart** Business Program 2016–2017
wattsmart Business Participant Survey QF1. (n=53)

Most participants (76%, n=51) operated in three or fewer locations in Washington, with the majority (51%) operating only in one location, and 74% of participants owned rather than leased their facilities. As shown in Figure 12, the number of employees varied greatly, with 24% of businesses having just one to 10 employees, 20% having 11 to 25 employees, 20% having 26 to 100 employees, and 36% of businesses having more than 100 employees.

¹² The Other category consisted of respondents in Oil and Gas, Finance, Food Service, Real Estate/Property Management, Transportation, Manufacturing, Repair Maintenance Service, and Nonprofit and Religious Organizations

Figure 12. Number of Employees



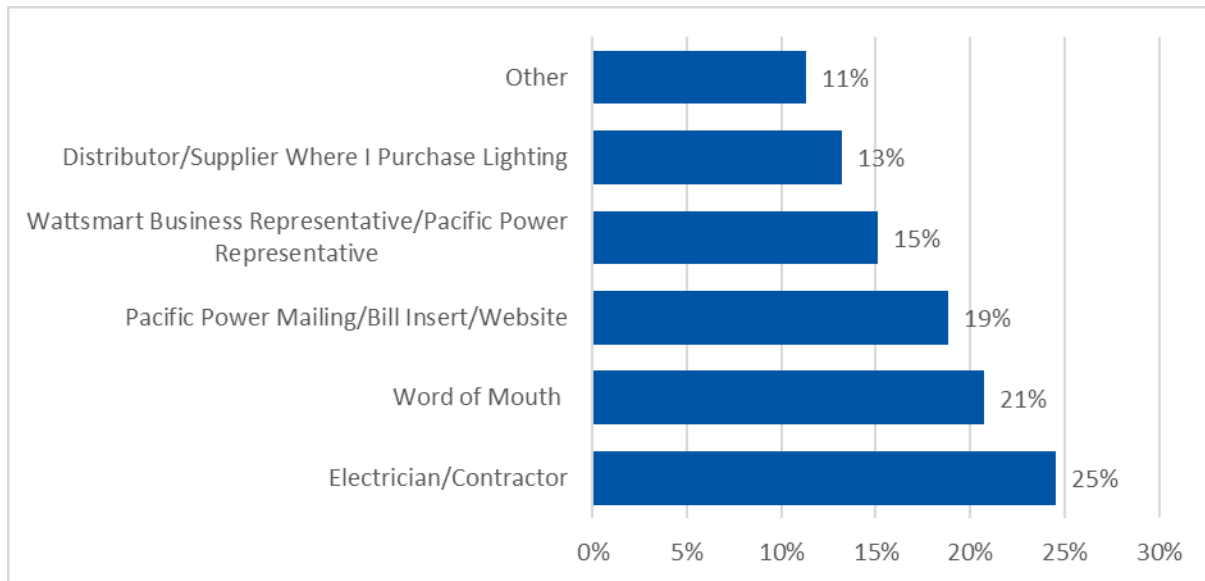
Source: Pacific Power **wattsmart** Business Program 2016–2017
wattsmart Business Participant Survey QF4. (n=50)

Awareness and Communication

Participants reported learning about the available incentives through a variety of information sources, with no source responsible for more than a quarter of participation. Participants most frequently learned about available incentives through their Electrician/Contractor (25%) and word of mouth (21%, n=53).¹³ Figure 13 shows the frequency of all information sources combined. Information sources reported as Other included trade associations, a Sustainable Living center, past experiences, and TV.

¹³ This “n” represents the number of respondents or responses to the question. For example, if the reference is 20% (n=100), this indicates 100 responses or respondents were included after removing nonrelevant answers (e.g., don’t know or refused).

Figure 13. Typical Upgrades and Custom Analysis Participants’ Information Sources



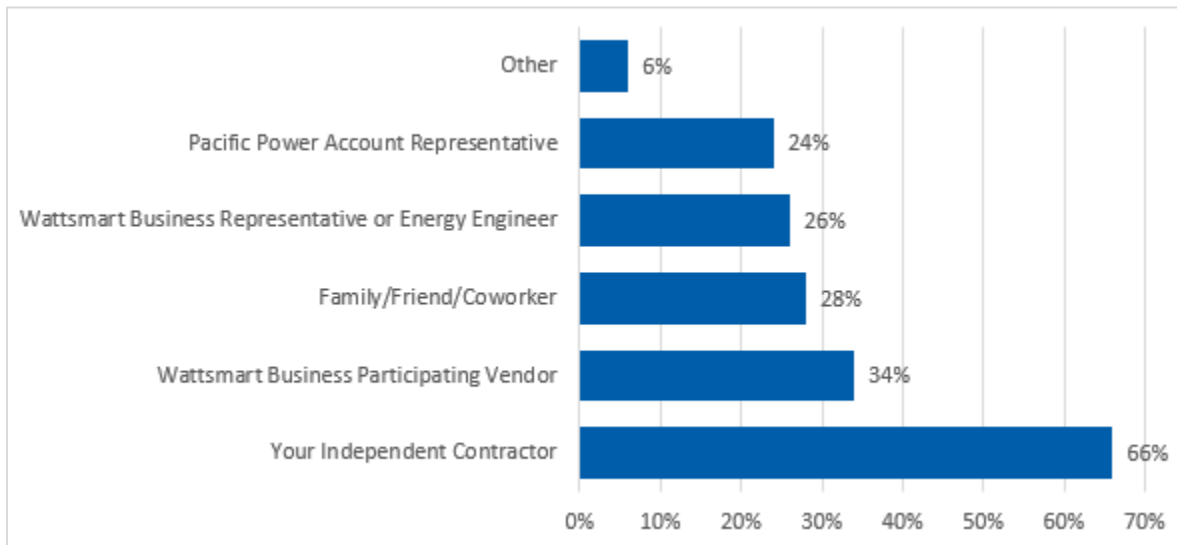
Source: PacifiCorp **wattsmart** Business Program 2016–2017 Participant Survey QB3. Don’t know and refused responses removed. Multiple responses allowed. (n=53)

Although participants most frequently learned about program incentives from their electrician or contractor or word of mouth, most customers (85%, n=48) receiving Typical Upgrades or Custom Analysis incentives preferred to be kept informed about upcoming opportunities through a Pacific Power mailing, email, newsletter, bill insert, or the website. Thirteen percent preferred to be informed through their **wattsmart** Business or Pacific Power representative, and just 4% preferred to be informed through their contractor.

Project Initiation and Installation

As shown in Figure 14, a majority (66%, n=50) of respondents said their independent contractor helped them to initiate their project. Other common sources of assistance included **wattsmart** Business Participating Vendors, a family member, friend, and coworker, or a **wattsmart** Business representative or Pacific Power account representative. Within the Other category shown in the figure, just two participants (representing one refrigeration and one irrigation project), said they initiated their projects without outside help.

Figure 14 Typical Upgrade and Custom Analysis Participants' Assistance Source



Source: PacifiCorp **wattsmart** Business Program 2016–2017 Participant Survey QC1. Don't know and refused responses removed. Multiple responses allowed. (n=50)

Ninety-eight percent of participants (n=52) found it easy to complete their project applications, reporting the process as *very easy* (62%) or *somewhat easy* (37%). Eight people offered suggestions about making the process easier: These included shortening and simplifying the application form and providing more time to complete the application after installing the equipment. These participants said, the workbook is tricky, and the terminology is confusing, the paperwork asked for information that they did not have, and the turnaround time to submit the paperwork was tight. The Cadmus team found no correlation between participants reporting difficulties and a single measure category or source of project initiation help.

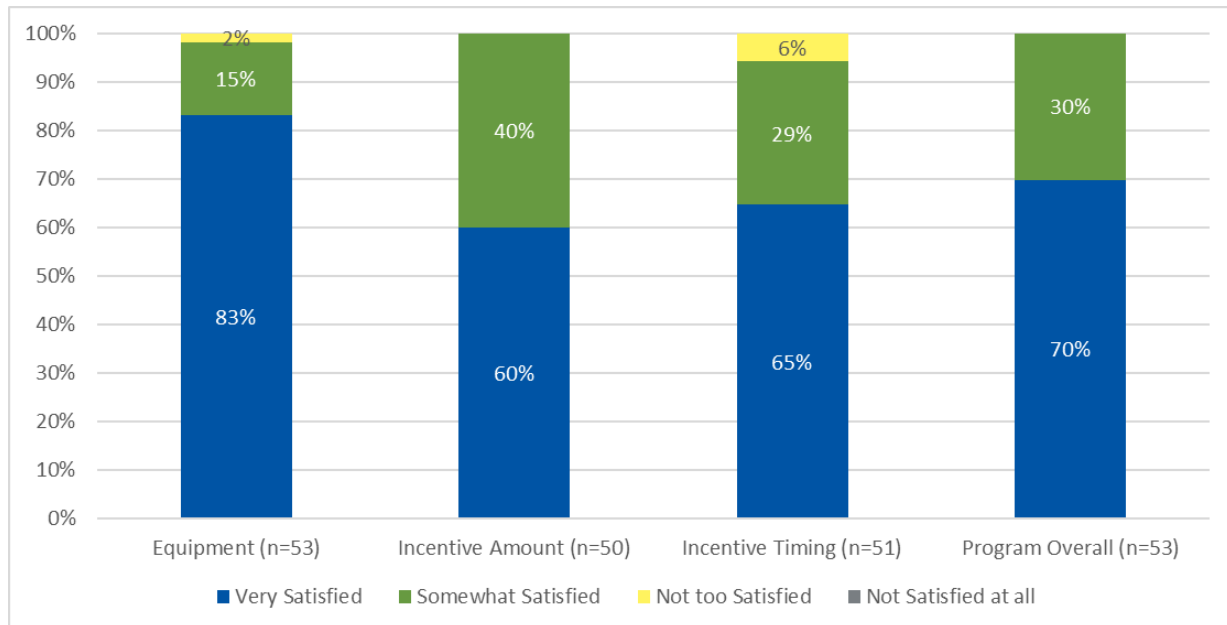
Satisfaction

As shown in Figure 15, 100% of respondents were *very satisfied* or *somewhat satisfied* with the program overall (70% and 30%, respectively, n=53), and most were satisfied with the key program components. Fewer participants were *very satisfied* with the incentive amount (60%, n=50) and incentive timing (65%, n=52) than with the equipment they installed (83%, n=53). No participants reported that they were *not satisfied at all* with the program or any of the key program components.

Three respondents who were less than *very satisfied* with their equipment expressed issues with bulbs burning out early, some in less than three months after installation.

Of the six participants who used a **wattsmart** participating vendor, all reported they were *very satisfied* with their contractor's work.

Figure 15. Participant Satisfaction Levels



Source: Pacific Power **wattsmart** Business Program 2016–2017 **wattsmart** Business Participant Survey QC4, QC6, QC12, and QG1. Don't know and refused responses removed.

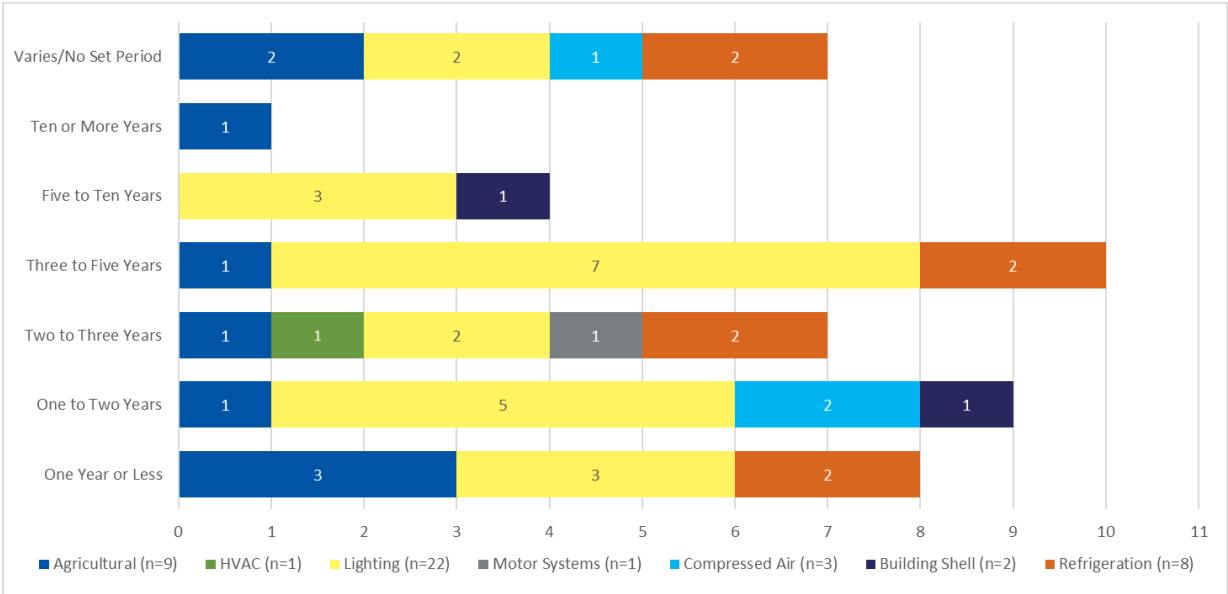
Seven participants reported that there was other energy-efficient equipment that they wanted to install but did not qualify for that **wattsmart** Business incentives. These seven participants would have liked to have installed the following equipment: air ventilation, ceiling fans, and monitoring equipment; a CO₂ scrubber; hybrid cooling equipment with liquid ammonia; fast acting doors; a prefinished roof panel; an icemaker; and variable-speed drive irrigation pumps. Three of these measures, VFDs for irrigation pumps, fast-acting doors, and ice machines were eligible for incentives through the program. However, information provided by the participants did not indicate if the specific equipment they preferred was covered under the program.

When asked what payback periods their companies looked for in projects, responses varied from less than one year to 10 years or more. Of all participants reporting, 52% expected projects to payback in three years or less, and 22% expected projects to pay back within three to five years. Figure 16 shows the breakout by measure category and payback period. Projects classified as Other included a VFD motor retrofit and a refrigeration case LED lighting retrofit.

The two projects receiving Custom Analysis incentives produced payback expectations as follows:

- VFD motor retrofit—three years or under
- Package refrigeration—stated that it varies by project

Figure 16. Project Payback Period Expectations

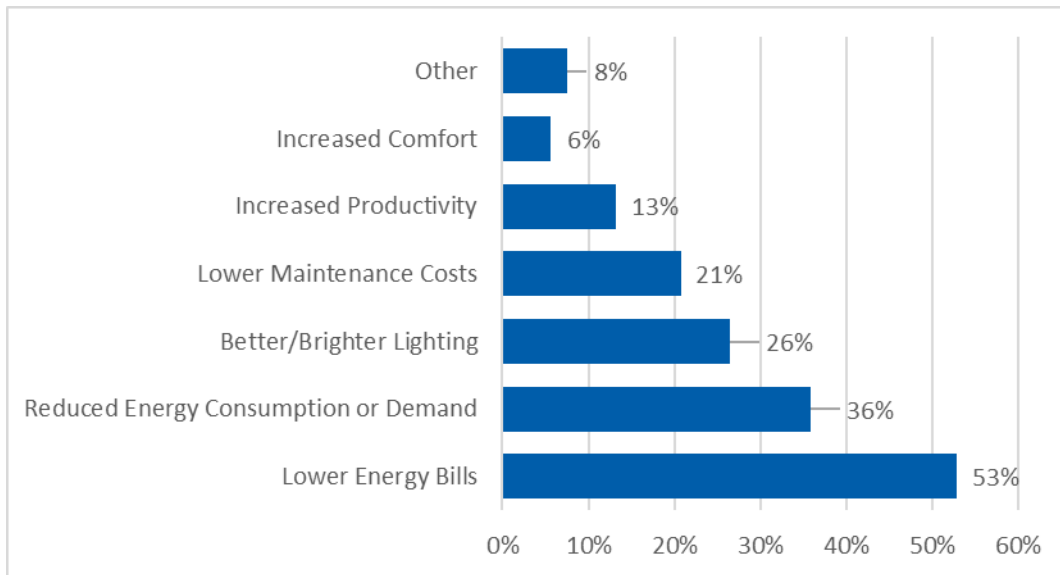


Source: Pacific Power **wattsmart** Business Program 2016–2017 **wattsmart** Business Participant Survey QC8. Don't know and refused responses removed. (n=46).

Benefits and Challenges

All participants receiving Typical Upgrades or Custom Analysis incentives reported one or more benefits that their companies experienced due to equipment installed. More than half the participants cited lower energy bills or reduced consumption as a benefit. As shown in Figure 17, participants also reported operational benefits such as better lighting, reduced maintenance costs, and increased productivity and comfort in their facilities.

Figure 17. Benefits of Equipment Installed



Source: Pacific Power **wattsmart** Business Program 2016–2017 **wattsmart** Business Participant Survey QC18. Don't know and refused responses removed. Multiple responses allowed. (n=53).

Eighty-seven percent of participants (n=52) did not report challenges in participating in the program. Of seven participants who reported challenges, three installed lighting projects, two installed irrigation projects, one installed HVAC, and one installed building shell improvements. Customer-reported challenges included completing the paperwork (two participants), the limited time frame to complete projects (two participants), the upfront costs (two participants), and difficulty predicting how much energy savings will occur due to the project (one participant).¹⁴

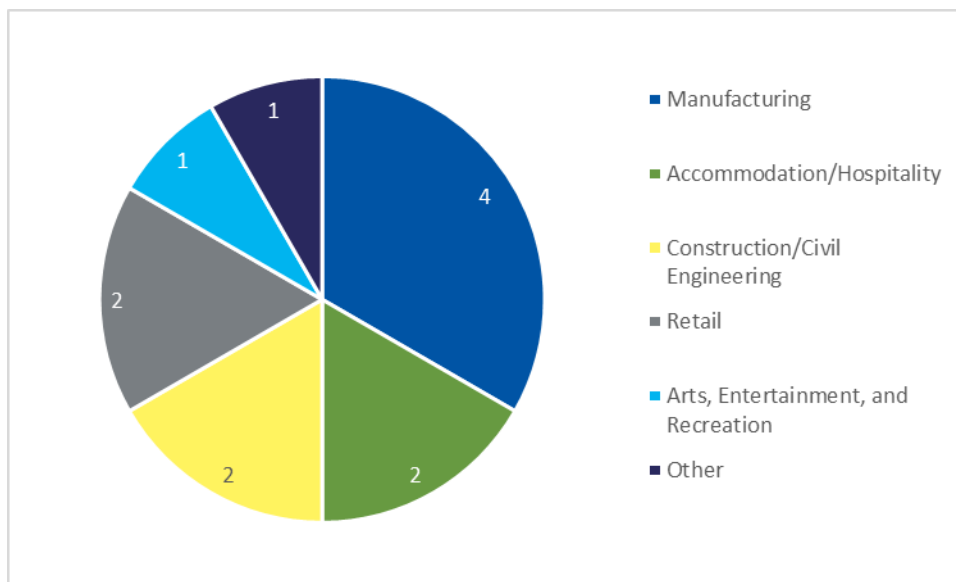
Among 33 participants in the Typical Upgrades and Custom Analysis incentives who interacted with Pacific Power during their projects, 85% reported they were *very satisfied* with their interactions. Three (9%) reported that they were *somewhat satisfied* with their interactions, and two (6%) were *not too satisfied*. Each of the three *somewhat satisfied* participants installed lighting, and the *not too satisfied* participants installed lighting or irrigation projects. When asked to explain their response, all five of these respondents said the process to participate took too long.

Small Business Enhanced Incentive Offer

The Cadmus team surveyed 12 participants about their experiences with the Small Business Enhanced Incentive Offer. Participants represented a variety of business sectors as shown in Figure 18, with manufacturing comprising the largest sector. The Other category included a public library and a social services business.

¹⁴ In 2017, Pacific Power teamed with HBC Energy Capital, who helps match customers to lending partners that can provide financing options for their energy efficiency projects.

Figure 18. Small Business Enhanced Incentive Offer Respondents by Business Sector



Source: Pacific Power **watt**smart Business Program 2016–2017 Small Business Lighting/Small Business Enhanced Incentive Participant Survey QF1. Don't know and refused responses removed. (n=12).

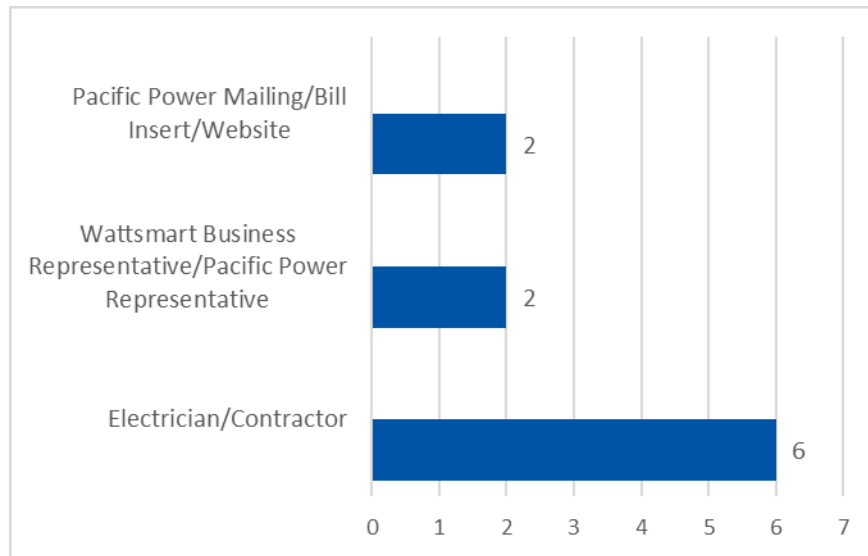
Most of the businesses (nine) own rather than lease their facility, and 11 of the businesses operate at just one location in the state. Eight participants employed 10 or fewer people, three businesses employed 11 to 25 people, and one employed 26 to 50 people.

Overall, Small Business Enhanced Incentive Offer participants reported high satisfaction levels with program elements and only a few challenges. As detailed below, some offered suggestions to improve their program experience.

Awareness and Communication

As shown in Figure 19, six participants learned about the program through their electrician/contractor, two through Pacific Power marketing materials, and two through a **watt**smart Business or Pacific Power representative.

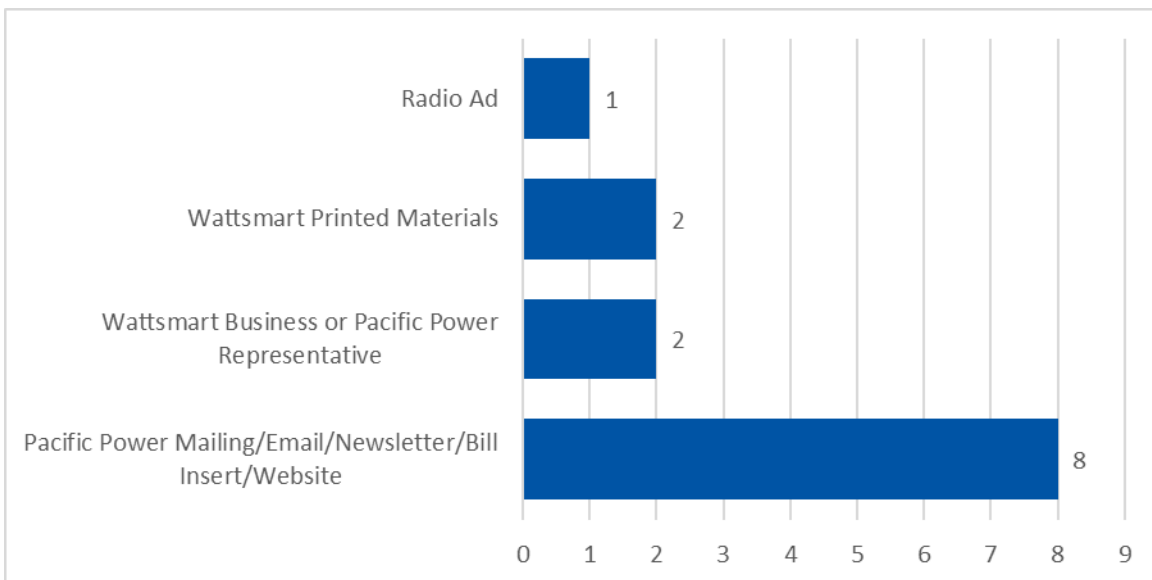
Figure 19. Small Business Enhanced Incentive Offer Participant Information Sources



Source: Pacific Power **wattsmart** Business Program 2016–2017 Small Business Lighting/Small Business Enhanced Incentive Participant Survey QB3. Don't know and refused responses removed. Multiple Responses allowed. (n=10).

Although just two participants learned about the program through Pacific Power marketing materials, eight out of 12 participants preferred that Pacific Power inform them about new opportunities available in the **wattsmart** Business program via a Pacific Power mailing, email, newsletter, bill insert, or website. Two participants reported that they would like to learn about new opportunities through a **wattsmart** Business or Pacific Power representative.

Figure 20. Participants Preferred Information Resources



Source: Pacific Power **wattsmart** Business Program 2016–2017 Small Business Lighting/Small Business Enhanced Incentive Participant Survey QG3. Don't know and refused responses removed. Multiple Responses allowed. (n=11).

Motivation and Participation

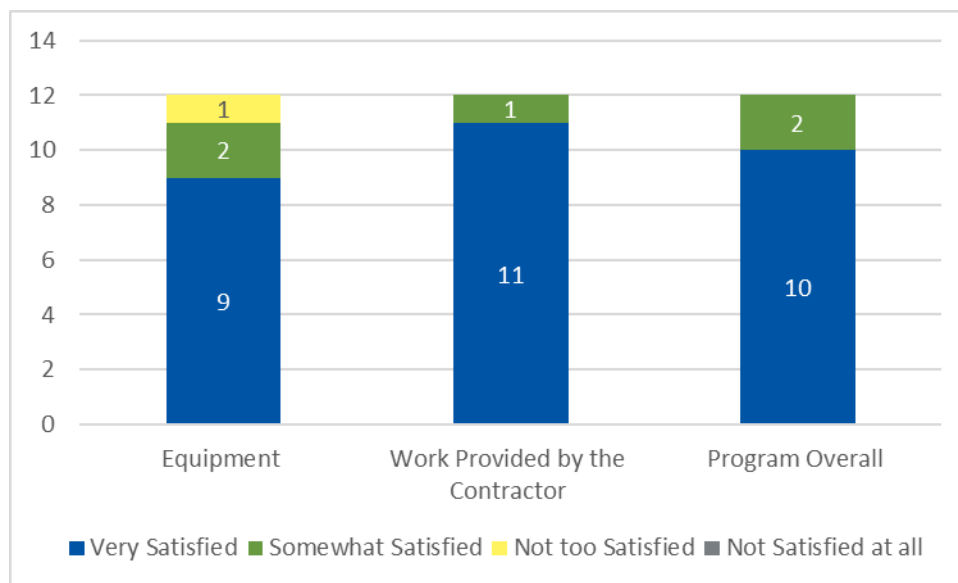
Small Business Enhanced Incentive Offer participants said saving money (seven) and improving lighting quality (four) were the most important reasons they decided to participate in the offering, followed by replacing old equipment (one).

Eleven participants found it *very easy* and one found it *somewhat easy* to schedule an approved contractor to conduct a free facility assessment. Nine participants reported that they received a project proposal with estimates of the incentive and cost savings (three did not respond to the question), and five of those participants said that the cost-savings projections on the project proposal was the most influential factor in their decision to proceed with the project. A sixth respondent said the “affordable” net cost was the most important information, while another said no information in the proposal was influential.

Satisfaction

All participants were *very satisfied* (10) or *somewhat satisfied* (two) with the program overall. As shown in Figure 21, most participants (nine) were *very satisfied* and two were *somewhat satisfied* with the equipment, while one was *not too satisfied*. The less-than-satisfied participant reported that the project reduced the amount of lighting in the facility to a degree that it impacted productivity. That same participant said that if his business had known about the reduced light levels, the business may not have completed the project. Most participants (11) were *very satisfied* with the work provided by the contractor, and one was *somewhat satisfied*.

Figure 21. Customer Satisfaction Levels with Small Business Enhanced Incentive Offer Elements

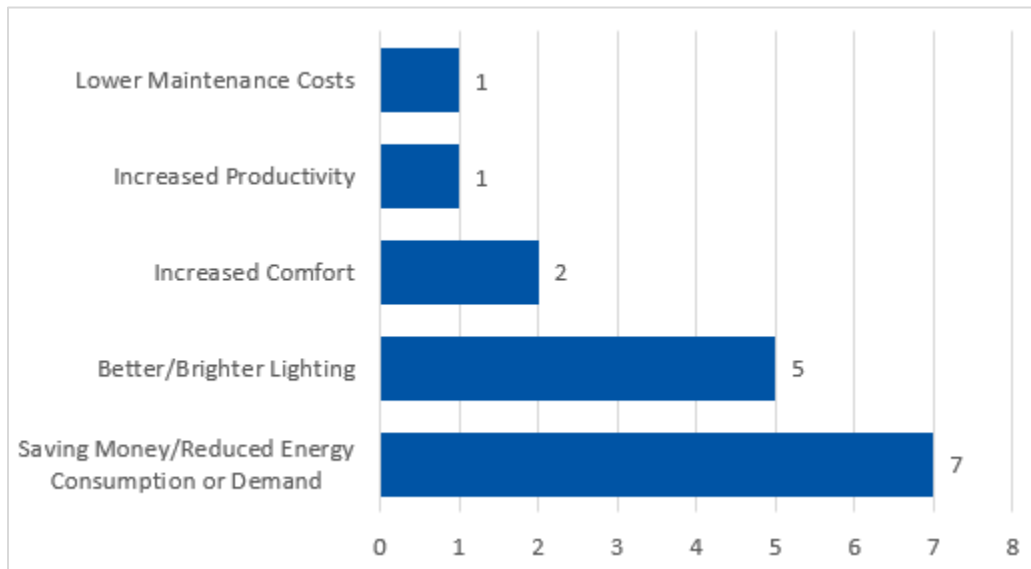


Source: Pacific Power **wattsmart** Business Program 2016–2017 Small Business Lighting/Small Business Enhanced Incentive Participant Survey QC6, QC8, QG1 Don’t know and refused responses removed. Multiple Responses allowed. (n=12).

Benefits and Challenges

Respondents most commonly cited reduced energy consumption or demand (seven) and better, brighter lighting (five) as benefits of the project, followed by increased comfort (two, Figure 22).

Figure 22. Benefits of Equipment Installed Through the Small Business Enhanced Incentive Offer



Source: Pacific Power **wattsmart** Business Program 2016–2017 Small Business Lighting/Small Business Enhanced Incentive Participant Survey QC16. Multiple responses allowed. (n=11)

Eight participants said they did not experience any challenges participating in the program, and four participants cited specific challenges: confusion on the limit for the incentive, difficulty coordinating between Pacific Power and the contractor, delays in project installation, and the upfront cost of the project. While eight participants suggested no improvements to the Small Business Enhanced Incentive Offer, two indicated they wanted a lower premium for more energy-efficient equipment or an increased incentive, and one recommended increased program marketing. When asked if Pacific Power could do anything to improve the respondents’ overall experience with the program, 10 said that nothing was needed. One participant said the incentive amount could be increased, and one wished his company had been told that the lighting amount would be reduced (as noted previously).

Midstream/Lighting Instant Incentives

The Cadmus team surveyed four participants about their experience with Lighting Instant Incentives. Of the two participants in the education sector, one owns a facility in Washington and employs 51 to 75 people. The other participant is from the education sector and employs 201 to 500 people. This participant leases one facility and owns four additional facilities. The one participant from the refrigerated warehouse sector owns and operates one facility and employs 1 to 10 people. The fourth respondent owns and operates one facility, identifying the business sector only as commercial, and employs more than 500 people.

Awareness and Communication

Three of the four participants learned about the incentives in variety of ways: contact with a **wattsmart** Business or utility representative (one participant), through an electrician or contractor (one participant), and through the vendor, distributor, or supplier where the lighting was purchased (one participant). The fourth participant does not know how his organization learned about the incentives.

Two of the participants would like to stay informed about opportunities available through the **wattsmart** Business program through contact from a **wattsmart** Business or utility representative, and the other two participants would like to stay informed through a utility mailing, email, newsletter, bill insert, or website.

Motivation and Satisfaction

Participants purchased lamps for the following reasons: for a larger lighting retrofit project (one participant), to relamp an area of the facility (two participants), and to replace inefficient light bulbs (one participant). All four participants were *very satisfied* with the incentive amount that they received.

All participants said it was very easy to find the product they wanted to purchase. Two participants purchased lamps through a contractor and said that they were *very satisfied* with the assistance that the contractor provided with the selection of lamps. The other two participants purchased lamps through a vendor (one participant) or a distributor (one participant), and neither participant reported receiving help with the selection of lamps purchased. The one participant who purchased lamps directly through a distributor said it was very easy to find a distributor offering the discount. Overall, all four participants reported they were *very satisfied* with the **wattsmart** Business program, saying nothing was needed to improve their experience.

Energy Management

The Cadmus team surveyed two Energy Management participants (out of a total of 12 projects in 2016-2017), both of whom implemented recommissioning projects. One participant was in the dairy/agricultural sector, and one was in the public sector. Each participant owned and operated just one facility in Washington. The public-sector participant employed 201 to 500 employees, and the dairy/agriculture sector participant employed 101 to 200 people.

The public-sector participant learned of the program through contact with a **wattsmart** Business representative or utility representative, and the dairy/agriculture participant learned of the program through word of mouth. Both prefer to learn of future Pacific Power offerings through utility mailing, email, bill insert, or utility website. Both participants reported that the program paperwork was very easy to complete.

Both participants said that the program incentive motivated them to participate in the program, and the dairy/agriculture participant also reported saving energy and money on utility bills as additional motivators.

The public-sector participant was *somewhat satisfied* with the incentive amount and would have been *very satisfied* if the incentive covered 50% of the total cost. The dairy/agriculture participant was *very satisfied* with the incentive amount. Both participants were *very satisfied* with the amount of time it took to receive the incentive. The public-sector participant looked for a three- or four-year payback on a project, while the dairy/agriculture participant looked for a one-year payback.

Overall, both participants were *very satisfied* with the Energy Management Provider funded by Pacific Power. Both participants were *very satisfied* with the detailed site assessment, the recommendations

presented in the Savings and Incentive Report, and the project verification completed by the Energy Management Provider. The public-sector participant was also *very satisfied* with the final Savings and Verification report. However, the dairy/agriculture participant was *somewhat satisfied*, explaining that energy use can vary depending on outside temperature, season, climate, and other factors.

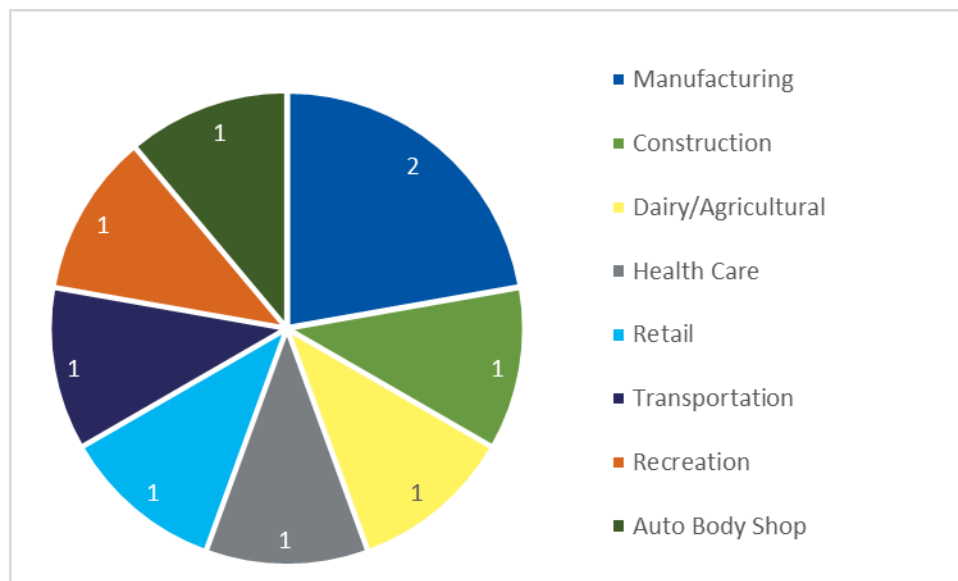
Both participants reported that using less energy was a primary benefit of the project they implemented. The public-sector participant also cited the incentive as a benefit, and the dairy/agriculture participant cited lower energy bills. Neither participant identified any challenges to participating in the program.

Partial Participants

The Cadmus team surveyed nine partial participants in the Typical Upgrades and Custom Analysis offerings. Eight respondents started lighting projects and one respondent started a custom irrigation project.

Figure 23 shows the distribution of business types among these respondents. Two respondents belonged to the manufacturing sector and the remaining respondents belonged to the following sectors (one respondent per sector): construction, dairy/agricultural, health care, retail, transportation, recreation, and an auto body shop.

Figure 23. Partial Participant Respondents by Business Sector



Source: Pacific Power **wattsmart** Business Program 2016–2017 **wattsmart** Business Partial Participant Survey QF1. (n=11).

The businesses varied in size, with the number of employees ranging from one to 10 (three respondents) to 101 to 200 (two respondents). Seven of these businesses operated in one Washington location, one operated in two locations, and one operated in five locations. Six of the nine respondents owned their facilities, and three leased their facilities.

Awareness

Partial participants learned about the program through a number of channels:

- Their electricians or contractors (two)
- Contact with a **wattsmart** Business or Pacific Power representative (two)
- Through a vendor, distributor, or supplier where they purchased lighting (two)
- Previous participation in the program (one)

The majority of partial participants (six) said the best way to inform them of future opportunities would be through Pacific Power mailings, bill inserts, or websites. One respondent recommended email, and two respondents indicated contact with a **wattsmart** Business representative.

Motivation and Barriers

When asked to choose the most important factor motivating them to make energy-efficient upgrades, most partial participants cited saving money on energy bills (six). One respondent was primarily motivated to replace old (but still functioning) equipment, and another respondent wanted to increase employee safety through better visibility.

Six participants reported that they completed their projects even though they did not receive a program incentive. Of these six, two participants reported that they applied for a **wattsmart** Business incentive, two reported that they did not, and two said that they *did not know*. Of the two who reported they *did not know* if their company applied for an incentive, both said that they were *very likely* to submit an incentive application within the next six months. Of the two who did not apply, one respondent explained that it “slipped through the cracks” and the company is *very likely* to apply for an incentive in six months. The other respondent said that the trade ally was supposed to submit the application and then did not, and that he is *not at all likely* to apply for an incentive in the next six months. Of the two who did apply, one did not receive an incentive because the project did not qualify, and the other did not know why they did not receive the incentive.

Two respondents reported that they did not complete their projects (one a custom refrigeration project and the other a commercial lighting project) and are *not at all likely* to apply for an incentive within the next six months. Both respondents indicated the project cost was a reason they did not complete their project, and one also said the project was too time intensive.

Satisfaction

Six of nine respondents were *somewhat* or *very satisfied* with the program, and three were *not too satisfied*. Two respondents, both of whom completed projects, explained that they were *not too satisfied* because they never received an incentive for the project.

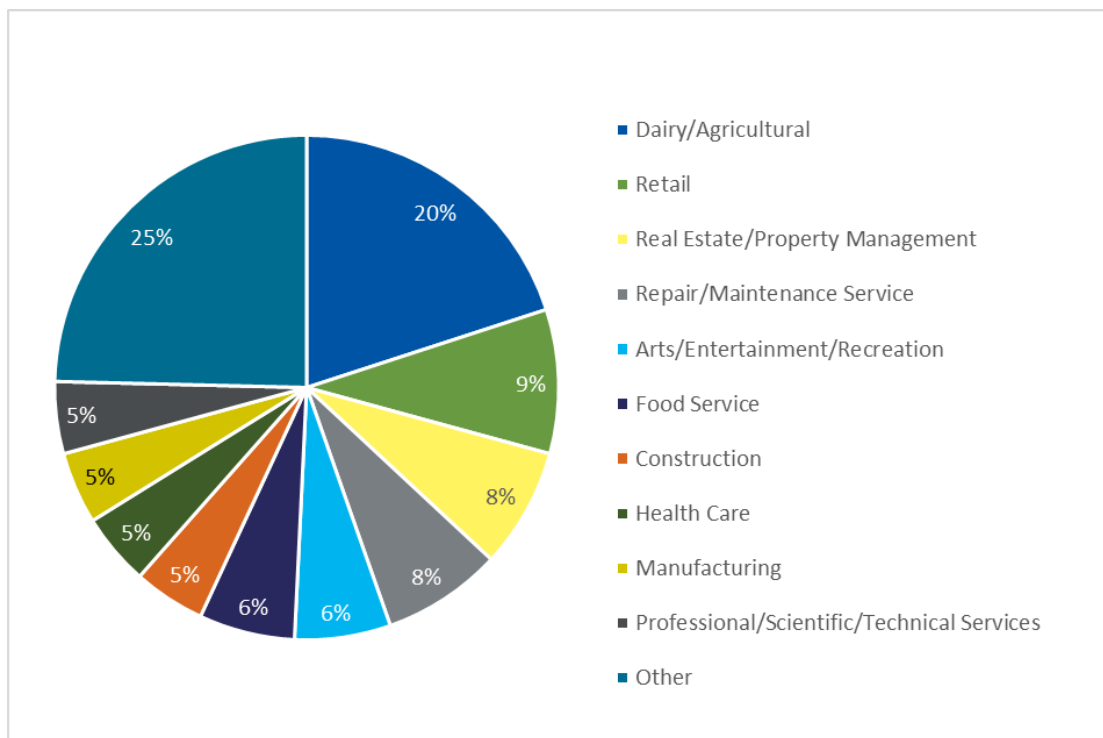
Five respondents had no suggestions for improvement. Two suggested better communication or more information could improve the program experience, one suggested sending the incentive check more quickly, and one suggested that the program “Follow through on the project and have equipment that works.” The respondent who suggested that the program follow through on the project does not know

why his incentive application was denied and saw a significant bill increase after the lighting project was completed.

Nonparticipants

The Cadmus team surveyed 68 nonparticipants who either never completed a project through the program or had not completed a project through the program in 2016 or 2017. As shown in Figure 24, respondents worked in a wide range of business sectors, with the largest single group of respondents (20%, n=65) operating in the dairy/agricultural sector.

Figure 24. Respondents by Business Sector



Source: Pacific Power **wattsmart** Business Program 2016–2017 Nonparticipant Survey: QF1. Don't know and refused responses removed. Total may not equal 100% due to rounding. (n=65)

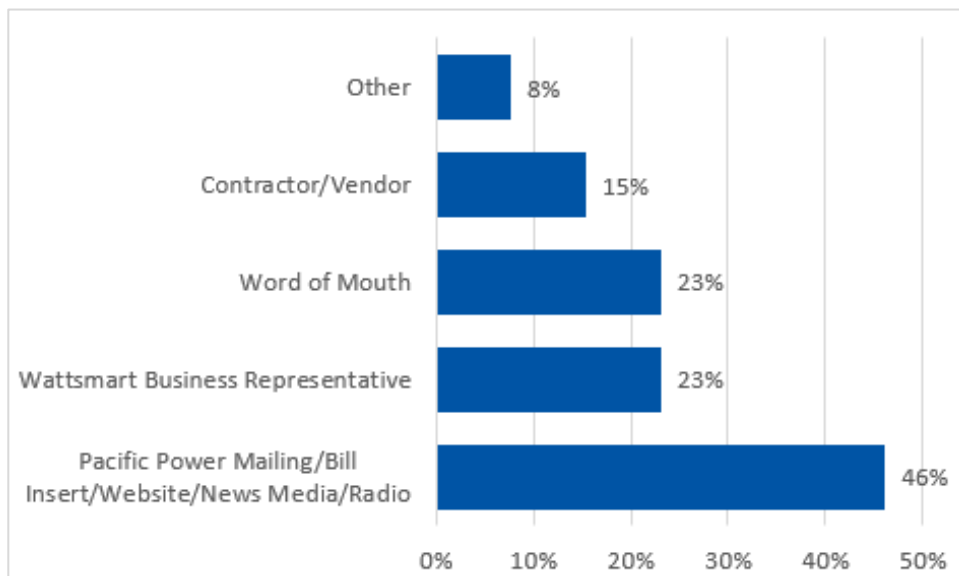
The majority of respondents (68%, n=59) employ between one and 10 people, but 10% of respondents employed over 100 people. Most nonparticipants (70%, n=64) operate a single facility in Washington, and 72% (n=64) own all or a portion of their facilities. Thirty-six percent of nonparticipants used electricity for space heating while the remaining 64% used other fuels such as natural gas, diesel, propane, waste oil, or did not heat their space (n=61). Participants relied more heavily on electricity for water heating (56%), with 32% using gas or other fuels, and 11% not heating water (n=55).

Awareness and Communication

Forty-three percent of nonparticipants reported that, prior to the survey call, they were aware Pacific Power offered technical expertise and cash incentives to help commercial and industrial customers improve their electric energy efficiency (n=68). Respondents familiar with the program most frequently reported they had learned about it through a Pacific Power mailing, bill insert, or the website (46%,

n=26) or through contact with a **wattsmart** Business representative (23%) or word of mouth (23%), as shown in Figure 25.

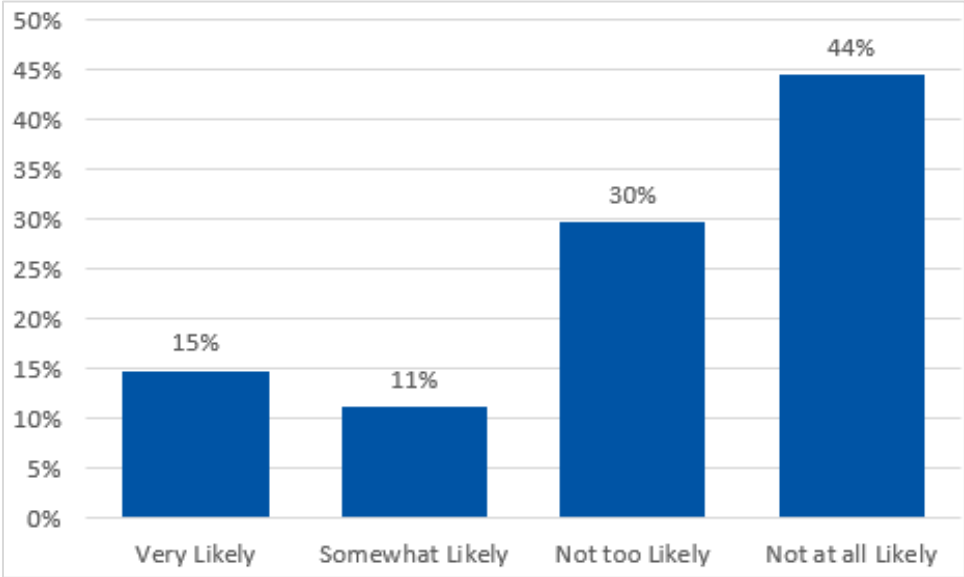
Figure 25. How Nonparticipants Learned About the *wattsmart* Business Program



Source: Pacific Power **wattsmart** Business Program 2016–2017 Nonparticipant Survey: QC3. Don't know and refused responses removed. Multiple responses allowed. (n=26)

The majority of nonparticipants (76%, n=66) said they wanted Pacific Power to inform them about incentives for energy efficiency improvements through a utility mailing/bill insert/website, by phone (17%), or by email (14%). Twenty-six percent (as shown in Figure 26), said they were *very likely* or *somewhat likely* to request an incentive from the program in the next six months (n=27).

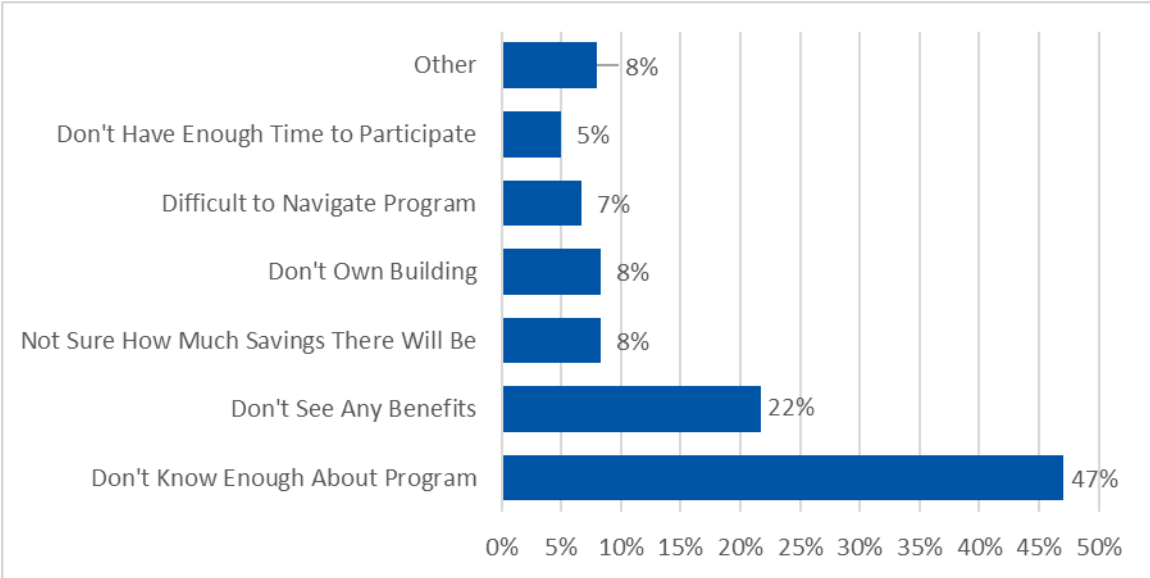
Figure 26. Likelihood of Requesting an Incentive in the Next Six Months



Source: Pacific Power **wattsmart** Business Program 2016–2017 Nonparticipant Survey: QC5. Don't know and refused responses removed. (n=27)

In assessing all nonparticipants' reasons for not yet using the **wattsmart** Business program, the Cadmus team found they did not do so primarily because they do not know enough about the program (47%, n=60) and they do not see any benefits to participating (22%), as shown in Figure 27. The Other category includes five customers who simply have not applied to the program thinking it did not apply, or whose buildings are empty.

Figure 27. Reasons for Not Yet Participating



Source: Pacific Power **wattsmart** Business Program 2016–2017 Nonparticipant Survey: QD13. Don't know and refused responses removed. Multiple responses allowed. (n=60)

Responses were similar among the subset of respondents (n=23) who were aware, prior to completing the survey, that Pacific Power provided expertise and incentives. Eight respondents did not see any benefits to participating, six did not know enough about the program or the available equipment, five did not have enough time or found the program difficult to navigate, and four provided other reasons. Of the four respondents who provided other reasons, two leased their space, one said that the existing equipment still worked, and one said that the building was empty.

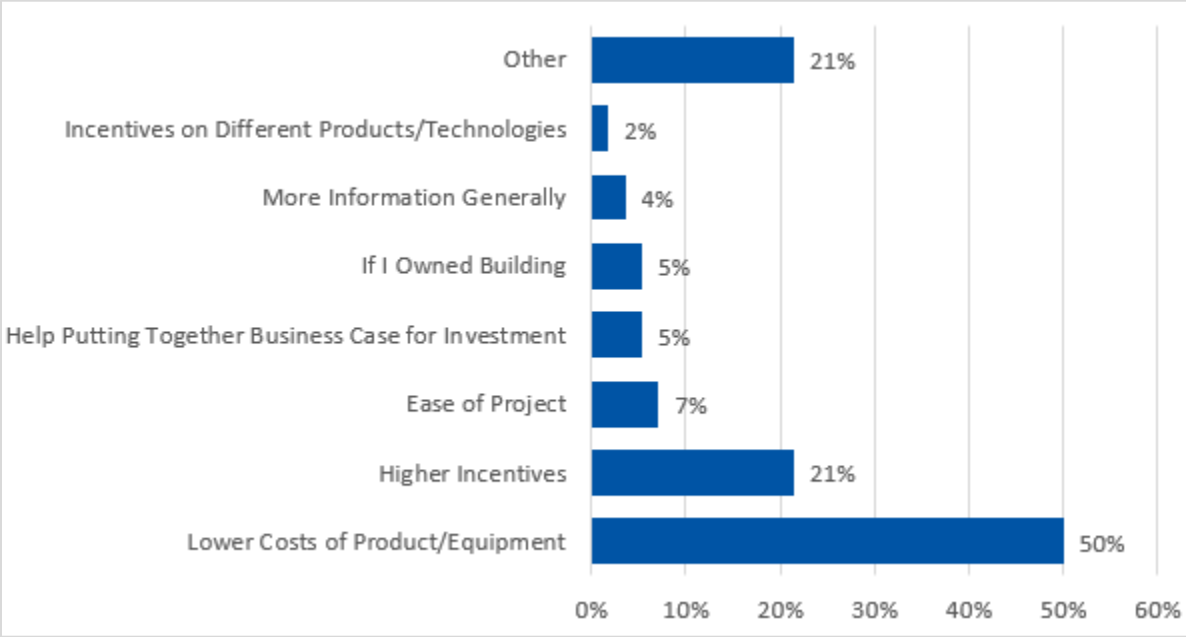
Nineteen of these aware respondents provided suggestions for what Pacific Power could do to help their businesses participate. Nine asked to receive more information about the program, such as qualifying equipment, to help them understand the potential for their buildings and the benefits or how to minimize their cash output, which suggests that many nonparticipants lack a solid understanding of the program. Three respondents said to make the program easier, three said to provide them with cash or credit for equipment or to help fix existing equipment, and one said to remove a service fee for an existing pump.

Motivation

More than any other reason given, nonparticipants said the most important factor that motivated their company to make energy efficiency upgrades was the opportunity to save money on energy bills (71%, n=59). While no other factor mentioned comprised more than 3% of all responses, some of those included replacing broken equipment, gaining access to solar power, energy conservation, cashflow, and ease of the program participation.

As shown below in Figure 28, nonparticipants said they would be more motivated to make energy-efficient upgrades to their existing equipment if equipment costs were lower (50%), incentives were higher (21%), if they could spend less time managing the projects and applications (7%), or if they had help putting together the business case for such investments (5%, n=56). Additional responses included being offered incentives on different equipment, having more information about the program, and assorted responses such as tax credit, waiting until equipment failure, access renewable sources, and increase in property value.

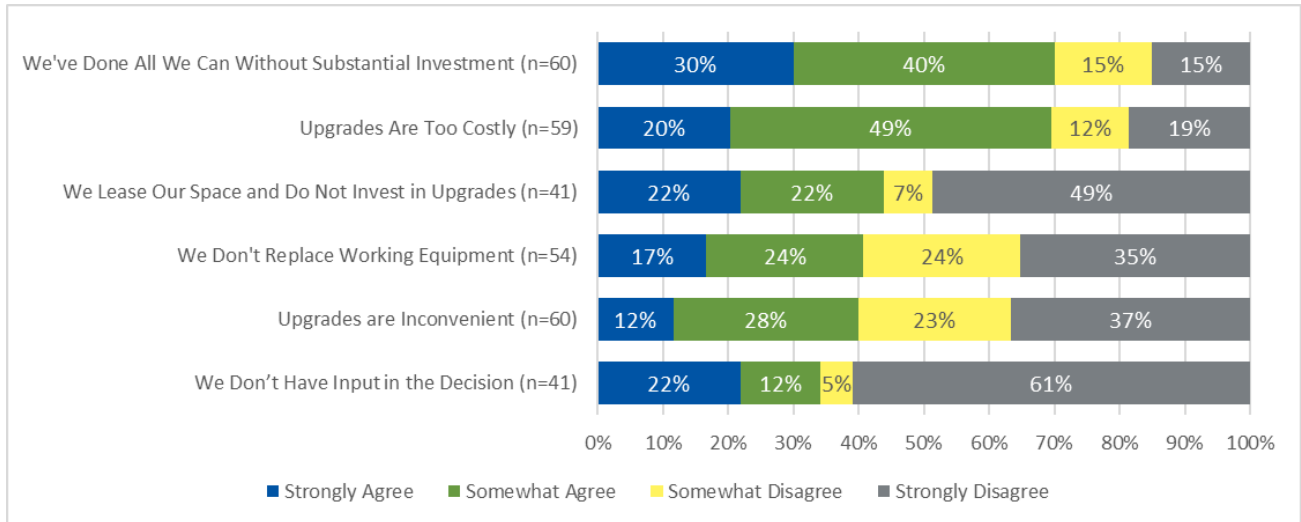
Figure 28. Nonparticipant Motivations for Making Energy-Efficient Purchases or Upgrades to Current Equipment



Source: Pacific Power **watt**smart Business Program 2016–2017 Nonparticipant Survey: QD9. Don't know and refused responses removed. Multiple responses allowed. (n=56)

The Cadmus team further explored nonparticipants' attitudes about making energy efficiency upgrades at their facilities. The team asked these customers to what extent they agreed with the barrier statements shown in Figure 29. Responses indicated that the most widely held attitudes about barriers to energy-efficient upgrades are beliefs that they have done all they can do without substantial investment or that upgrades are too costly. A minority of participants agreed with the statements that they do not invest in upgrades in a leased space (44%), they do not replace working equipment (41%), upgrades are inconvenient (40%), and they do not have input in the decision (34%).

Figure 29. Nonparticipants' Attitudes About Energy Efficiency Improvements



Source: Pacific Power **wattsmart** Business Program 2016–2017 Nonparticipant Survey: QD7a-QD7e. Not applicable, don't know, and refused responses removed.

When calculating the return on investment for a given project, 45% were as likely to include savings from energy efficiency, and 55% were not (n=60).

Customer Freeridership

Freeridership calculated for the **wattsmart** Business program 2016-2017 evaluation (9%) has declined from 15% for the 2014-2015 evaluation period. Although lighting freeridership has remained similar over the two periods (11% in 2015-2015, vs. 10% in 2016-2017), non-lighting declined substantially from 55% in 2014-2015, to 8% in 2016-2017. Refrigeration contributed 54% of the program savings in 2016-2017 compared to 42% in 2014-2015. Removing refrigeration savings from the 2016-2017 calculation increased freeridership to 17%.

Cost-Effectiveness

In assessing the **wattsmart** Business program's cost-effectiveness, the Cadmus team analyzed program benefits and costs from five different perspectives, using Cadmus' DSM Portfolio Pro model.¹⁵ The California Standard Practice Manual for assessing DSM program cost-effectiveness describes benefit/cost ratios for the following five tests:

- **PacifiCorp Total Resource Cost (PTRC) Test:** This test examines program benefits and costs from Pacific Power and Pacific Power's customers' perspectives (combined). On the benefit side, it includes avoided energy costs, capacity costs, and line losses, plus a 10% adder to reflect non-quantified benefits. On the cost side, it includes costs incurred by both the utility and participants.
- **Total Resource Cost (TRC) Test:** This test also examines program benefits and costs from Pacific Power and Pacific Power's customers' perspectives (combined). On the benefit side, it includes avoided energy costs, capacity costs, and line losses. On the cost side, it includes costs incurred by both the utility and participants.
- **Utility Cost Test (UCT):** This test examines program benefits and costs solely from Pacific Power's perspective. The benefits include avoided energy, capacity costs, and line losses. Costs include program administration, implementation, and incentive costs associated with program funding.
- **Ratepayer Impact Measure (RIM) Test:** All ratepayers (participants and nonparticipants) may experience rate increases designed to recover lost revenues. The benefits include avoided energy costs, capacity costs, and line losses. Costs include all Pacific Power program costs and lost revenues.
- **Participant Cost Test (PCT):** From this perspective, program benefits include bill reductions and incentives received. Costs include the measure incremental cost (compared to the baseline measures), plus installation costs incurred by the customer.

¹⁵ DSM Portfolio Pro has been independently reviewed by various utilities, their consultants, and a number of regulatory bodies, including the Iowa Utility Board, the Public Service Commission of New York, the Colorado Public Utilities Commission, and the Nevada Public Utilities Commission.

Table 19 summarizes the five tests’ components.

Table 19. Benefits and Costs Included in Various Cost-Effectiveness Tests

Test	Benefits	Costs
PTRC	Present value of avoided energy and capacity costs, ^a with a 10% adder for non-quantified benefits	Program administrative and marketing costs, and costs incurred by participants
TRC	Present value of avoided energy and capacity costs ^a	Program administrative and marketing costs, and costs incurred by participants
UCT	Present value of avoided energy and capacity costs ^a	Program administrative, marketing, and incentive costs
RIM	Present value of avoided energy and capacity costs ^a	Program administrative, marketing, and incentive costs, plus the present value of lost revenues
PCT	Present value of bill savings and incentives received	Incremental measure and installation costs

^a These tests include avoided line losses.

Table 20 provides selected cost analysis inputs for each year, including evaluated energy savings, discount rates, line losses, inflation rates, and total program costs. Pacific Power provided all of these values, except for energy savings and the discount rate, which the Cadmus team derived from the Pacific Power 2015 IRP.

Table 20. Selected Cost Analysis Inputs

Input Description	2016	2017	Total
Evaluated Energy Savings (kWh/year) ^a	27,449,264	24,949,206	52,398,470
Discount Rate	6.66%	6.66%	N/A
Commercial Line Loss	9.53%	9.53%	N/A
Industrial Line Loss	8.16%	8.16%	N/A
Irrigation Line Loss	9.67%	9.67%	N/A
Inflation Rate ^b	1.9%	1.9%	N/A
Total Program Costs	\$6,774,176	\$5,428,707	\$12,202,883

^a Savings are realized at the meter, while benefits account for line loss.

^b Based on PacifiCorp’s 2015 *Integrated Resource Plan, Volume I; Chapter 7—Modeling and Portfolio Evaluation*.

Available online:

http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2015/2015_Class_2_DSM_Decrement_Study.pdf

The Cadmus team determined future retail rates using a 1.9% annual escalator.

The **watt**smart Business program benefits included energy savings and their associated avoided costs. For the cost-effectiveness analysis, the Cadmus team used this study’s evaluated energy savings and

measure lives from sources such as the RTF.¹⁶ For all analyses, the team used avoided costs associated with the Pacific Power 2015 IRP Westside Class 2 DSM Decrement Values.¹⁷

Table 21 presents the 2016 and 2017 program years’ cost-effectiveness analysis results, not accounting for non-energy benefits (except those represented by the 10% conservation adder included in the PTRC test). For this scenario, the **wattsmart** Business program proved cost-effective from all perspectives, except the RIM test. The primary criterion for assessing cost-effectiveness in Washington is the PTRC, which achieved a 1.84 benefit/cost ratio for the combined years’ evaluated savings.

Table 21. wattsmart Business Program Cost-Effectiveness Summary of 2016 and 2017 Evaluated Savings^a

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC	\$0.042	\$21,871,544	\$40,186,420	\$18,314,876	1.84
TRC	\$0.042	\$21,871,544	\$36,533,109	\$14,661,565	1.67
UCT	\$0.023	\$11,863,910	\$36,533,109	\$24,669,199	3.08
RIM		\$56,661,951	\$36,533,109	(\$20,128,842)	0.64
PCT		\$16,282,696	\$51,073,102	\$34,790,406	3.14
Lifecycle Revenue Impacts (\$/kWh)				\$0.000415331	
Discounted Participant Payback (years)					2.90

^a The cost-effectiveness calculations assume a net to gross of 1.0.

The RIM test measures program impacts on customer rates. Most programs do not pass the RIM test because, while energy efficiency programs reduce costs, they also reduce energy sales. As a result, the average rate per unit of energy may increase. Passing a RIM test indicates that rates, as well as costs, decrease due to the program. Typically, this only happens for demand response programs or programs targeting the highest marginal cost hours (when marginal costs are greater than rates).

Table 22 presents the 2016 program cost-effectiveness analysis results, not accounting for non-energy benefits (except those represented by the 10% conservation adder included in the PTRC test). For this scenario, the **wattsmart** Business program proved cost-effective from all perspectives, except for the RIM test.

¹⁶ See Appendix F for detailed cost-effectiveness inputs and results at the measure category level.

¹⁷ PacifiCorp’s *Class 2 DSM Decrement Study* details the IRP decrements. April 20, 2015. Available online: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2015/2015_Class_2_DSM_Decrement_Study.pdf

Table 22. wattsmart Business Program Cost-Effectiveness Summary of 2016 Evaluated Savings

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC	\$0.046	\$12,295,359	\$20,014,233	\$7,718,874	1.63
TRC	\$0.046	\$12,295,359	\$18,194,757	\$5,899,398	1.48
UCT	\$0.025	\$6,774,177	\$18,194,757	\$11,420,580	2.69
RIM		\$29,560,709	\$18,194,757	(\$11,365,952)	0.62
PCT		\$9,463,817	\$26,729,167	\$17,265,350	2.82
Lifecycle Revenue Impacts (\$/kWh)				\$0.000262027	
Discounted Participant Payback (years)					2.52

Table 23 presents the 2017 program cost-effectiveness analysis results, not accounting for non-energy benefits (except those represented by the 10% conservation adder included in the PTRC test). For this scenario, the **wattsmart** Business program also proved cost-effective from all perspectives except the RIM test.

Table 23. wattsmart Business Program Cost-Effectiveness Summary of 2017 Evaluated Savings

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC	\$0.038	\$10,213,959	\$21,515,655	\$11,301,696	2.11
TRC	\$0.038	\$10,213,959	\$19,559,687	\$9,345,727	1.91
UCT	\$0.020	\$5,428,709	\$19,559,687	\$14,130,978	3.60
RIM		\$28,906,184	\$19,559,687	(\$9,346,498)	0.68
PCT		\$7,273,016	\$25,965,241	\$18,692,225	3.57
Lifecycle Revenue Impacts (\$/kWh)				\$0.000202030	
Discounted Participant Payback (years)					2.34

Conclusions and Recommendations

Pacific Power's customers recognized and reported benefits from participation in the **wattsmart** Business program. With some exceptions among participants in the Small Business Enhanced Incentive Offer, customers report high satisfaction with the program and few participation challenges inherent in the design of the program. Pacific Power has created a nuanced program to address many customer needs, however, the complexity can challenge customers to understand which equipment qualifies, how incentives and savings are calculated, and during transitions to lower incentive, how to complete projects in the designated timeframe. The Pacific Power and program administrator staff are experienced and work together to streamline delivery of the program and maintain program cost-effectiveness.

Pacific Power and program administrators have successfully transitioned to the new DSMC database and, for the most part, the data transfer is operating smoothly.

One challenge to the program appears to be getting trade allies to engage the small business customers due to these customers' limited funds and smaller savings potential. This spills over into engaging nonparticipants who are predominately small businesses. The Cadmus team found that most nonparticipants did not participate primarily because they did not know of the program, and they also lacked funds to make significant upgrades. While Pacific Power marketing and outreach are effectively supporting the program and administrators, additional inroads with the nonparticipant population could grow the program if Pacific Power so desires.

A second, and perhaps easier to resolve challenge, is retaining partial participants who described limited funds or inattentive communication as reasons they did not complete projects through the program.

Overall, Pacific Power successfully transitioned from the stand-alone programs of the 2014-2015 evaluation, to delivering the **wattsmart** Business program umbrella of services to a large variety of businesses, while maintaining customer satisfaction levels. While some opportunities exist to further refine program delivery, the Cadmus team recommends no major changes to the program design and delivery.

The 2016 and 2017 program evaluation yielded a 92.3% overall realization rate, with a precision of $\pm 6.5\%$ at 90% confidence. Within each of the eight measure categories, varying degrees of realization rates and precision emerged.

This section provides the team's conclusions and recommendations, based on this report's findings.

Savings Considerations

Prescriptive VFDs

Conclusion: Pacific Power's deemed savings value for prescriptive VFD projects does not account for motor service. All prescriptive VFD motor system projects in the evaluation sample used Pacific Power's deemed value to determine savings. To evaluate energy savings for these projects, the Cadmus team

used the deemed savings values from Cadmus’ 2016 *Variable Speed Drive Loadshape Project* report, created for the NEEP and which led to realization rates greater than 100% for all HVAC fan VFD projects. Deemed values from Cadmus’ study vary based on motor use (e.g., supply, return, or exhaust).

Recommendation Based on the report’s findings, the Cadmus team recommends increasing deemed savings for prescriptive VFDs serving HVAC fan projects, thus matching Cadmus’ 2016 *Variable Speed Drive Loadshape Project* report. Table 24 shows the savings.

Table 24. Deemed Energy Savings for HVAC Fan Projects

HVAC Fan Motor Type	Deemed Energy Savings (kWh/year/horsepower) ^a
Supply Fan Motor	2,033
Return Fan Motor	1,788
Exhaust Fan Motor	1,788

^a These deemed savings values are based on the Cadmus 2016 *Variable Speed Drive Loadshape Project* report created for NEEP. This report is available online: <http://www.neep.org/variable-speed-drive-loadshape-study-final-report>

For central equipment (e.g., hot/chilled water pumps, condenser water pumps, cooling tower fans), the quantity of evaluated projects were insufficiently high to draw conclusions on the current deemed savings value.

Marketing and Outreach

Conclusion: While Pacific Power’s marketing and outreach is well developed and provides multiple touchpoints to customers, low- or no-cost opportunities exist to enhance their effectiveness and provide customers with additional information.

Recommendation: Consider re-instituting the Energy Insights newsletter or identify a similar vehicle to distribute case studies. Other opportunities to provide additional information to customers include:

- Provide links in print ads, directing customers to case studies or other sources of more detailed information
- Use images within the text of the program brochure
- Format eblasts consistently to ensure customers identify them all with the program
- Issue eblasts throughout the year, concurrent with program changes.
- Update case studies from 2014 if new information is available or create additional studies

Project Data

Conclusion: Currently, measures containing the word “custom” in their name, appeared in the columns Measure Subtype, Measure Name and Measure Custom Name, however, these designations did not match across columns or with those in the Measure Type column. Project measure segmentation will be simplified and improved for future evaluations if measure types and naming conventions are standardized and coordinated. Specifically, standardize the use of the designation “custom.” Appending

the word “custom” to measure descriptions not otherwise designated as custom under the heading Measure Type, create ambiguity about what is to be counted as custom.

Recommendation: Establish one protocol for using the custom designation and apply it across Pacific Power’s, the program administrators’, and their subcontractors’ project data.

Conclusion: For the 2016-2017 program evaluation, contact information for Instant Incentive participants was missing from the program participant database provided by Pacific Power. This information was provided under separate request by the program administrator. While this did not provide a significant barrier, given the limited size of the Instant Incentive participant population, as the program grows this additional step of requesting and matching contact information to Instant Incentive participants, delays the development of survey samples and increases the opportunity for errors.

Recommendation: Include Instant Incentive participant contact information in the program participant database provided to the evaluation team.

Appendices

Appendix A. Self-Report NTG Results

Appendix B. Self-Report NTG Methodology

Appendix C. Nonparticipant Spillover

Appendix D. Participant Survey Guides

Appendix E. Nonparticipant Survey Guide

Appendix F. Measure Category Cost-Effectiveness

Appendix A. Self-Report Net-to-Gross Findings

The Cadmus team evaluated net savings by conducting a freeridership and participant spillover analysis using responses from the participant surveys. Appendix B. Self-Report NTG Methodology provides detailed information about the net savings methodology. This net savings approach aligns with industry best practices, as summarized in the Uniform Methods Project (UMP).¹

Further, in estimating NPSO, Cadmus included a series of questions from the 2016–2017 general population survey of Washington Pacific Power customers. This addressed savings generated by customers who, motivated by the program’s reputation and marketing, conducted energy efficiency installations without receiving incentives. Cadmus estimated NPSO as 7% of the 2016-2017 **wattsmart** Business program gross savings, applying the 7% NPSO equally across the program measure strata. Appendix C provides a detailed explanation of the estimated NPSO.

Table 1 provides the net savings evaluation results, shown as evaluated gross savings and NTG by program measure strata. Measure strata NTG estimates were weighted by their evaluated program energy savings to arrive at the overall 98% NTG estimate for the program.

Table 1. *wattsmart* Business Program NTG Results for 2016–2017

Measure Strata	n	Evaluated Gross Program Population Savings (kWh)	NTG
Lighting	44	28,540,483	97%
Refrigeration	9	15,521,820	103%
Agricultural	9	1,722,516	90%
Recommissioning	2	2,081,933	79%
Compressed Air	3	1,852,150	81%
Other	3	769,060	107%
HVAC	1	1,654,671	107%
Wastewater	0	255,838	98% ^b
Overall	71	52,398,470	98%^a

^a Freeridership weighted by evaluated program savings.

^b Applied overall savings weighted NTG of measures with survey respondents due to no survey respondents to inform a specific measure strata estimate. Overall NTG estimate is the savings weighted average of measure strata with survey respondents.

The following sections describe the NTG methodology the Cadmus team used and the results for the 2016–2017 **wattsmart** Business program.

¹ The Uniform Methods Project chapter covering estimation of net savings:
<http://www.nrel.gov/docs/fy14osti/62678.pdf>

Methodology

This section contains a brief overview of the NTG methodology (with a more detailed explanation provided in Appendix B. Self-Report NTG Methodology). To determine net savings, the Cadmus team used a self-report approach and analyzed collected data to estimate freeridership and participant spillover. Typically, this approach is considered the most cost-effective, transparent, and flexible method for estimating NTG. Consequently, it is the NTG methodology most frequently employed.

Freeridership and participant spillover constituted the NTG. The Cadmus team used the following formula to determine the final NTG ratio for all 2016 and 2017 participants:

$$\text{Net-to-gross ratio} = 100\% - \text{Freeridership Percentage} + \text{Participant Spillover Percentage} + \text{Nonparticipant Spillover Percentage}$$

The team then weighted each measure category's NTG ratio by the category's evaluated gross population energy savings to arrive at the program's overall NTG estimate.

Freeridership Estimation

The Cadmus team determined freeridership based on an approach previously developed for Pacific Power, which used responses to a series of survey questions. These questions asked whether participants would have installed the same equipment in the program's absence at the same time and in the same amount and efficiency. As the first step in freeridership scoring, the team reviewed the participant survey responses to determine whether the exact same project (in terms of scope and efficiency level) would have occurred at the same time in the program's absence. If so, the respondent was scored as a complete freerider. If not, the team reviewed the responses to determine whether the project would have occurred at all within the same 12-month period. Those not fitting these criteria were scored as a non-freerider. If the project would have occurred within the same 12-month period, but was altered regarding its size or efficiency level, the respondent was scored as a partial freerider. The team then weighted program-measure, strata-specific freeridership estimates by evaluated energy savings achieved by respondents within the sample to calculate the weighted freeridership estimate for each measure strata.

Spillover Estimation

The Cadmus team also estimated the indirect influence on the broader market due to program activities. This estimate of program "spillover" represented energy savings attributable to the program's intervention and influence, but not currently reported in program tracking data. Spillover savings can come from participants and nonparticipants, while participant spillover occurs when the program influences program participants to install additional energy-efficient equipment beyond that incentivized by a program; nonparticipant spillover savings occur when market allies influenced by the program install or influence nonparticipants to install energy-efficient equipment.

The team determined participant spillover by estimating savings derived from additional measures installed and whether respondents' credited Pacific Power with influencing their decisions to install additional measures. The team included measures eligible for program incentives, provided the respondent did not request or receive the incentive.

Freeridership Findings

After conducting 71 surveys, the Cadmus team converted responses to the freeridership questions into a freeridership estimate for each participant, using the approach described in Appendix B. Self-Report NTG Methodology.

To determine the extent that the program affected installation decisions, the Cadmus team asked respondents what would have differed about their installations had the program not been an option. Table 2 provides a summary of participant measure responses, along with an initial calculated freeridership estimate for each respondent.

Table 2. Measure Installations in Absence of wattsmart Business Program

Respondent Category	n	Percentage of Total Respondents ^a	Initial Freeridership Estimate
Would have been installed at the same efficiency and scope within the same year	15	21%	100%
Would not have been installed at all	35	49%	0%
Would have been installed more than 12 months later	13	18%	0%
Would have installed 90% of equipment at the same level of efficiency within the same year	1	1%	90%
Would have installed 75% of equipment at the same level of efficiency within the same year	2	3%	75%
Would have installed 50% of equipment at the same level of efficiency within the same year	1	1%	50%
Would have installed 25% of equipment at the same level of efficiency within the same year	1	1%	25%
Would have installed equipment at standard efficiency within the same year	3	4%	0%

^a Total may not sum to 100% due to rounding.

The Cadmus team credited the influence of past participation, due to the portfolio nature of the program delivery, by reducing freeridership if past program participation was important in the participant’s decision. Because of Pacific Power’s efforts to cross-promote its entire portfolio of energy efficiency programs, a respondent’s prior participation in a Pacific Power program may have influenced the decision to participate in the current program.

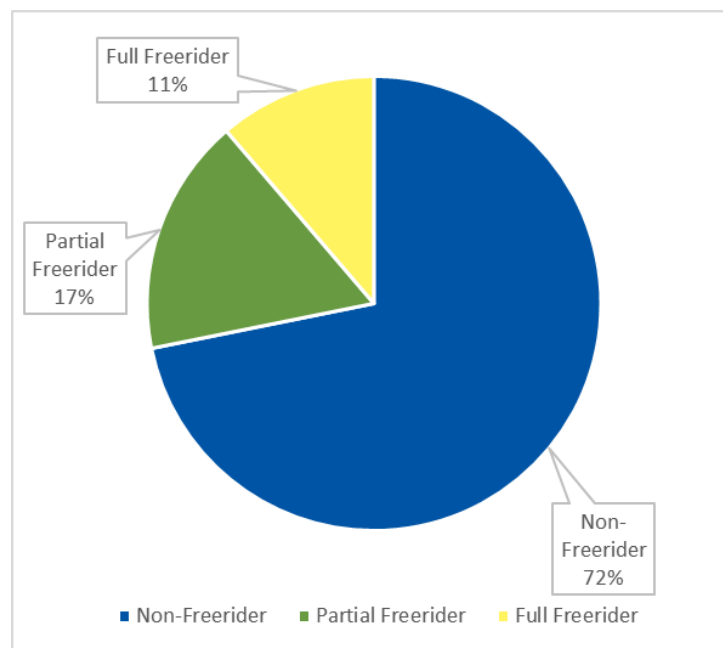
To calculate this credit, the Cadmus team reviewed respondents’ ratings of the influence of the prior program on a scale of 1 to 5, where 1 indicated “not important at all” and 5 indicated “extremely important.” For those who rated their previous participation as a 4 or 5, the team reduced their freeridership score by either 50% or 75%, respectively. This affected six projects that initially received a

100% freeridership estimate, reducing four of their freeridership estimates by 75% and reducing two by 50%.²

In addition, the Cadmus team compared participants’ statements about what they would have done in absence of the program to their statements about factors influencing their project. Some participants’ measure-specific responses indicated that they found the program incentive or program assistance important in their decision, but then said they would have installed a similar project at the same time. The team considered these responses inconsistent and requested that participants explain the program’s influence on their projects in their own words. Two respondents provided a description that warranted freeridership adjustments. For example, when asked about the program’s impact on their decisions to complete the energy efficiency improvements, one participant stated: “The program was saving a lot of money for me, and this program motivated me to get it done” Based on this response, the team adjusted this project’s freeridership from 100% to 50%. The team adjusted another respondent’s freeridership from 6% to 3% based on the response: “Program made it possible to get it done and without the program it would of took longer”.

Based on participant responses and after adjusting for prior program experience and inconsistencies, the team determined freeridership by respondent, as shown in Figure 1. Overall, the team determined that 11% of participants were full freeriders, 72% were non-freeriders, and 17% were partial freeriders.

Figure 1. Freeridership by Respondent



² The Cadmus team reduced a project’s freeridership, initially estimated at 25%, by 75% (i.e., a 5 rating), resulting in a 6% adjusted freeridership score for the project.

Participant Spillover Findings

After participating in the **wattsmart** Business program, some participants installed additional, energy-efficient measures. The Cadmus team only attributed program spillover to additional purchases significantly influenced by **wattsmart** Business program participation, but not reported through the program. Respondents indicated the influence level on a 1 to 5 point scale, where 1 indicated not important at all and 5 indicated extremely important in response to the following request: “Please rate how important your experience with the Pacific Power program was in your decision to install this energy efficient product.” If a respondent rated a measure as a 5, the team considered the spillover measure attributable to the Pacific Power program. Only two respondents responded with a 5 and the information provided was not detailed enough for the Cadmus Team to estimate savings with confidence. The resulting spillover percentage estimates for the measure categories are 0%.

Nonparticipant Spillover

The Cadmus team used a series of questions included in the nonparticipant surveys to estimate nonparticipant spillover. Nonparticipant spillover refers to savings generated by customers who were motivated by Pacific Power’s program’s reputation, past Pacific Power program participation, and/or Pacific Power program marketing to conduct energy efficiency installations for which they did not receive an incentive. The team estimated nonparticipant spillover to be 7% of total 2016-2017 **wattsmart** Business Program savings and applied the 7% NPSO estimate to each measure strata’s NTG. Appendix C. Nonparticipant Spillover provides detailed nonparticipant spillover analysis methods and results.

NTG Findings

As shown in Table 3, the Cadmus team calculated a program-weighted NTG of 98% by weighting each measure strata NTG percentage by the evaluated gross population’s energy savings for each measure strata.

Table 3. NTG Percentages by Measure Strata

Measure Strata	Measure Responses (n)	Freeridership Percentage	Spillover Percentage	NPSO	NTG ^a	Evaluated Gross Program Population Savings (kWh)
Lighting	44	10% ^a	0%	7%	97%	28,540,483
Refrigeration	9	4% ^a	0%	7%	103%	15,521,820
Agricultural	9	17% ^a	0%	7%	90%	1,722,516
Recommissioning	2	28% ^a	0%	7%	79%	2,081,933
Compressed Air	3	26% ^a	0%	7%	81%	1,852,150
Other	3	0% ^a	0%	7%	107%	769,060
HVAC	1	0%	0%	7%	107%	1,654,671
Wastewater	0	NA	NA	NA	98% ^c	255,838
Overall	71	9%^b	0%	7%	98%^b	52,398,470

^a Weighted by evaluated gross program savings.

^b Weighted by evaluated gross program population savings.

^c Applied the overall savings’ weighted NTG for measures with survey respondents due to survey respondents not informing a specific measure-strata estimate. The overall NTG estimate was the savings-weighted average of measure strata with survey respondents.

Benchmarking NTG

The Cadmus team benchmarked Pacific Power’s programs against similar nonresidential programs. Table 4 shows freeridership, spillover, and NTG estimates for nonresidential programs reported for prior Pacific Power program years as well as for other utilities with similar programs and measure offerings.

Table 4. NTG Comparisons^a

Utility/Region	Reported Year	Responses (n)	Freeridership %	Spillover %	NPSO	NTG
Pacific Power Washington 2016–2017 <i>wattsmart</i> Business Evaluation	2018	71	9%	0%	7%	98%
Pacific Washington 2014–2015 <i>wattsmart</i> Business Evaluation	2016	80	18%	0%	NA	82%
Pacific Washington 2012–2013 Energy FinAnswer Evaluation	2015	61	21%	0%	NA	79%
Pacific Washington 2012–2013 FinAnswer Express Evaluation	2015	84	22%	0%	NA	78%
Northeast Utility—C&I Prescriptive	2016	77	23%	0%	NA	77%
CY2016 Focus on Energy Non-Residential Evaluation Report—Wisconsin Statewide	2017	434	28%	1%	NA	73%
2014-2015 Massachusetts C&I Natural Gas Freeridership and Spillover Study—Statewide	2015	901	18%	4%	NA	86%
^a NTG values derive from self-response surveys, though differences in analysis and scoring methodologies may vary across evaluations.						

The 2016–2017 *wattsmart* Business program’s 9% freeridership estimate is lower than the 2014–2015 *wattsmart* Business program’s freeridership estimate (18%). The 2012–2013 Energy FinAnswer Evaluation and the 2012–2013 FinAnswer Express Evaluation freeridership values were 21% and 22%, respectively.³ These Pacific Power program evaluations used the same NTG methodology, modeled after the 2014–2015 Massachusetts C&I Natural Gas Freeridership and Spillover Study methodology framework.

³ Between 2013 and 2015, Pacific Power combined a number of programs under the *wattsmart* Business umbrella, rolling the Energy FinAnswer and the FinAnswer Express programs into the Custom Analysis and Typical Upgrades offerings, respectively, within the *wattsmart* Business program.

The Northeast Utility C&I Prescriptive and the CY2016 Focus on Energy Nonresidential evaluations used NTG methodologies comparable to that used for the 2016–2017 **wattsmart** Business program, but differed in design. The 2016–2017 **wattsmart** Business program freeridership estimate (9%) was the lowest among compared programs.

Appendix B. Self-Reported Net-to-Gross Methodology

Net-to-gross (NTG) estimates are a critical part of demand-side management program impact evaluations, because they allow utilities to determine portions of gross energy savings that were influenced by and are attributable to their DSM programs. Freeridership and participant spillover are the two NTG components calculated in this evaluation. True freeriders are customers who would have purchased an incented appliance or equipment without any support from the program (e.g. taking the incentive). Participant spillover is the amount of additional savings obtained by customers investing in additional energy-efficient measures or activities due to their program participation. Various methods can be used to estimate program freeridership and spillover; for this evaluation, the Cadmus team used self-reports from survey participants to estimate measure strata level NTG ratios. The Cadmus team used the same net savings methodology that has been used since the 2009-2011 Energy FinAnswer Program Evaluations and described in detail in Appendix B of the 2009-2011 evaluation report.¹ This net savings approach aligns with industry best practices summarized in the Uniform Methods Project (UMP) section discussing net savings.² This appendix provides a detailed description of how the evaluation team estimated NTG for the 2016-2017 *wattsmart* Business Program.

Survey Design

Using self-reported responses, the Cadmus team estimated net savings first by assessing the program's influence on the participant's decision to implement an energy efficiency project and what would have occurred absent the program's intervention. This estimation includes an examination of the program's influence on three key characteristics of the project: its timing, its level of efficiency, and its scope (i.e., size of the project). This estimate represents the amount of savings attributed to the program that would have occurred without its intervention and is often referred to as "freeridership." Cadmus then estimated program influence on the broader market as a result of the indirect effects of the program's activities. This estimate, often referred to as "spillover," represents the amounts of savings that occurred because of the program's intervention and influence but that is not currently claimed by the program. Spillover savings can be broken into two categories of savings: "participant" spillover and "non-participant" spillover. Participant spillover savings occur directly (i.e., program participants install additional energy efficient equipment), while non-participant spillover savings occur indirectly (i.e., trade allies install additional energy efficiency equipment for customers that choose not to participate as a results of the program).

¹ Final Evaluation Report For Washington's Energy FinAnswer Program (PY 2009-2011) – Appendix B: http://www.pacificcorp.com/content/dam/pacificcorp/doc/Energy_Sources/Demand_Side_Management/2013/WA_Energy_FinAnswer_Program_Evaluation_2009-2011.pdf

² The UMP chapter covering estimation of net savings is available online: http://www.nrel.gov/extranet/ump/pdfs/20131120_estimating_net_energy_savings.pdf. See also: <http://ump.pnnl.gov/showthread.php/5238-Estimating-Net-Energy-Savings-Methods-and-Practices>

Freeridership Calculation

To determine freeridership, the interview presented respondents with a series of questions regarding their decision to install the equipment promoted by the program. The Cadmus team then scored the responses to these questions to determine the level of freeridership. A score of 1.0 indicates the respondent is a complete free-rider; they would have installed the exact same equipment at the same time and in the same quantity without the program’s assistance. A score of 0.0 (zero) indicates the respondent is not a free-rider; that is, without the program they either would not have installed any equipment within 12 months of when they did or they would have installed baseline efficient equipment.

As the first step in scoring, the Cadmus team reviewed the interview responses to determine if the exact same project (in terms of scope and efficiency level) would have occurred at the same time without the program. If so, the respondent is scored as a complete free-rider. If not, the team reviewed the responses to determine whether the project would have occurred at all within the same 12 month period. If not, the respondent is scored as a non-free-rider. If the project would have occurred within the same 12 month period but altered in respect to its size or efficiency level, the respondent is scored as a partial free-rider. To assess the level of partial free-ridership, the Cadmus team used the respondents’ estimates of the percentage of the installed equipment that would have been high efficiency equipment (the efficiency score) and the percentage of high efficiency equipment that would have been installed within 12 months without the program (the quantity score). If the project would have occurred with some changes absent the program, the product of these two estimates is the initial free-ridership ratio or:

$$\text{Initial Freeridership Ratio} = \text{Efficiency Score} \times \text{Quantity Score}$$

The initial freeridership score was adjusted to account for prior program participation. Given Pacific Power’s efforts to cross-promote their entire portfolio of energy efficiency programs, a respondent’s prior participation in a Pacific Power program may have been influential in their decision to participate in the current program. Ideally, this influence would be attributed to the prior program as spillover savings since that program was responsible for the influence. However, given the portfolio-level marketing approach that Pacific Power implements, respondents are unlikely to be able to identify the prior program by name. Therefore, the Cadmus team attributed the savings credit to the current program. To calculate this credit, the team reviewed the respondents’ rating of the influence of the prior program. If the respondent rates their previous participation as a “4” or “5,” their adjusted freeridership was reduced by either 50 percent or 75 percent respectively.

After adjusting the initial freeridership ratio for past program participation, a series of consistency check questions were reviewed. These questions asked about the influence of the program’s interventions (e.g., financial incentives, technical assistance) and address the counter-factual (e.g., what would have happened without the program). For example, if the respondent stated that the financial incentive was extremely important to their decision (D9.2 = 5 – extremely important) but that they would have installed the exact same equipment at the same time without the program (D2 = Yes and D1= Yes), the interviewer asks them to describe in their own words what impact the program had on their decision

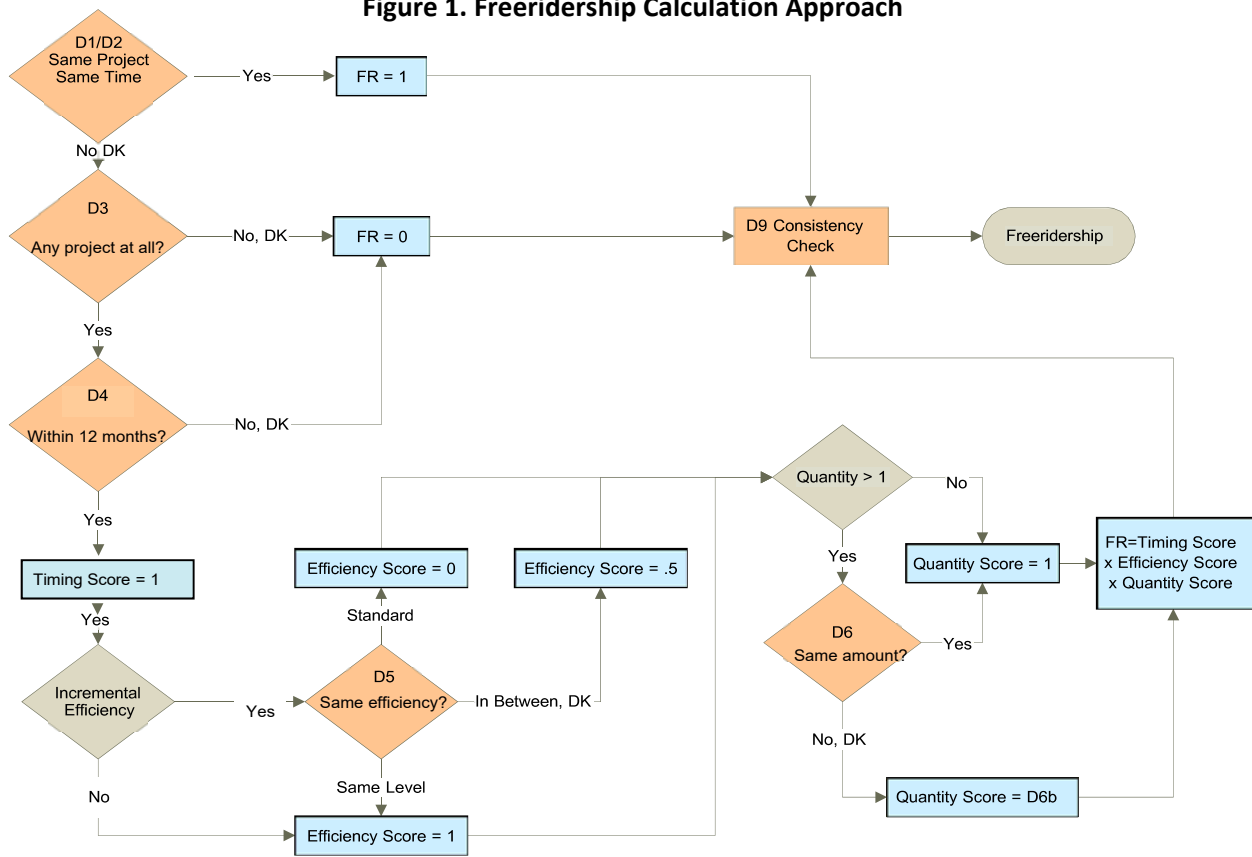
(D8). During the scoring process, these responses were reviewed by analysts to determine which scenario is correct and are scored accordingly to create an adjusted freeridership score.

Table 1 provides detailed scoring and descriptions of each question.

Table 1. Freeridership Calculation Approach

Question	Question Text	Scoring
D1	Without the program, meaning without either the technical assistance or the financial incentive, would you have still completed the exact same [MEASURE] project?	None; qualifying question
D2	Without the program, meaning without either the technical assistance or the financial incentive, would you have still installed the [MEASURE] at the same time?	If D2=yes and D1=yes then freeridership = 1
D3	Without the program, would you have installed any [MEASURE] equipment?	If D4=no, freeridership = 0
D4	Without the program, in terms of timing, when would you have installed the [MEASURE]?	If not within 12 months of original purchase date, freeridership = 0
D5	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?	If high efficiency, efficiency score = 1 If between high efficiency and baseline, efficiency score = 0.5 If baseline efficiency, efficiency score = 0
D6	Would you have installed more, less, or the same amount of [MEASURE] without the program?	If same or more, quantity score = 1 If less, quantity score = percentage of equipment not installed
D9.6	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: Previous participation with a Pacific Power program	If D9.6 = 5, reduce adjusted free-ridership by 75% If D9.6 = 4, reduce adjusted free-ridership by 50%
D9.2	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: information provided by Pacific Power on energy saving opportunities	Consistency Check
D9.4	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: The Pacific Power incentive or discount	Consistency Check
D8	In your own words, can you please describe what impact the program had on your decision to complete these energy efficiency improvements for [MEASURE]?	Considered if '4' or '5-extremely important' rating from D9.2 or D9.4 Initial freeridership score is reduced by 50% if D8 response merits an adjustment

Figure 1. Freeridership Calculation Approach



Participant Spillover Calculation

For the **wattsmart** Business Program, the Cadmus team measured participant spillover by asking a sample of participants about their purchases and whether they received an incentive for a particular measure (if they installed another efficient measure or undertook another energy-efficiency activity because of their program participation). We also asked these respondents to rate the **wattsmart** Business Program’s (and incentives) relative importance on their decisions to pursue additional energy-efficient activities.

The Cadmus team used a top-down approach to calculate spillover savings. We began our analysis with a subset of data containing only survey respondents who indicated they installed additional energy-savings measures after participating in the **wattsmart** Business Program. From this subset, we removed participants who said the program had little influence on their decisions to purchase additional measures, thus retaining only participants who rated the program as highly important. We also removed participants who applied for a **wattSmart** Business Program incentive for the additional measures they installed.

The Cadmus team used evaluated program savings as a proxy to estimate the savings associated with “like” spillover projects. “Like” spillover is associated with equipment that is not similar to the equipment that is incentivized by the program. Table 2 provides detailed scoring and descriptions of each “like” spillover question.

Table 2. Participant Spillover Calculation Approach

Question	Question Text	Scoring
E9	Since participating in this program, have you purchased and installed any other energy efficiency improvements on your own without any assistance from a utility or other organization?	If no, potential spillover savings = 0
E10	What type of equipment did you install?	If no, potential spillover savings = 0
E10.# Series	Measure specific efficiency, capacity, fuel type questions	If responses indicated non-program qualifying unit, potential spillover savings = 0
E11	How many did you purchase and install?	E11 x program-evaluated per-unit savings = potential spillover savings
E12	Did you receive an incentive from Pacific Power or another organization for this equipment?	If yes, potential spillover savings = 0.
E15	On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the [UTILITY] [CATEGORY] program was in your decision to install [this/these] energy efficient product(s).	“5” rating results in potential spillover savings attributed to program.

As it has no comparative program savings data, “unlike” spillover can often only be characterized qualitatively. The Cadmus team asked detailed follow up questions for “unlike” spillover responses that allowed the potential for them to be credited to the program as participant spillover if adequate information was provided to estimate savings by an engineer on the team.

The Cadmus team calculated the measure strata level spillover percentages by dividing the sum of additional spillover savings by the total incentivized gross savings achieved for all respondents in the measure strata:

$$Spillover \% = \frac{\sum Spillover Measure kWh Savings for All Measure Strata Respondents}{\sum Program Measure kWh Savings for All Measure Strata Respondents}$$

Appendix C. Nonparticipant Spillover

Effective program marketing and outreach generates program participation and increases general energy efficiency awareness among customers. The cumulative effect of sustained utility program marketing can affect customers' perceptions of their energy usage and, in some cases, motivate customers to take efficiency actions outside of the utility's program. This is generally called nonparticipant spillover (NPSO)—results in energy savings caused by, but not rebated through, utilities' demand-side management activities.

To understand whether Pacific Power's general and program marketing efforts generated energy efficiency improvements outside of the company's incentive programs, the Cadmus team collected spillover data through a nonparticipant survey, conducted with randomly selected nonresidential, nonparticipating customers.

Methodology

The Cadmus team randomly selected and surveyed 68 nonparticipating customers from a sample of 6,211 randomly generated nonresidential nonparticipant accounts provided by Pacific Power.

Using a 1 to 5 scale, with 1 meaning "not important at all" and 5 meaning "very important," the survey asked customers to rate the importance of several factors on their decisions to install energy efficient equipment without receiving an incentive from Pacific Power. This question determined whether Pacific Power's energy efficiency initiatives motivated energy-efficient purchases. The surveys asked respondents to address the following factors:

- General information about energy efficiency provided by Pacific Power
- Information from Pacific Power program staff or contractors
- Past participation experience participating in a Pacific Power energy efficiency program

The Cadmus team estimated NPSO savings from respondents who rated any of the above factors as "very important" for any energy-efficient actions or installations reported.

The Cadmus Team leveraged estimated gross savings for the reported measures using 2016-2017 **wattsmart** Business program evaluation activities.

Using the variables shown in Table 1, the Cadmus team determined total NPSO generated by Pacific Power's marketing and outreach efforts during the 2016 and 2017 program years.

Table 1. NPSO Analysis Method

Variable	Metric	Source
A	Total kWh Spillover Savings from Survey Respondents	Survey data / Engineering Analysis
B	Total Nonparticipant Customers Surveyed	Survey disposition
C	Sample Usage	Pacific Power Customer Database
D	Sample NPSO	$A \div C$
E	Total Population Usage kWh	Pacific Power Customer Database
F	NPSO kWh Savings Applied to Population	$D \times E$
G	Total Gross Program Evaluated kWh Savings	2016-2017 wattSmart Business Evaluation
H	NPSO as a Percentage of Total 2016-2017 wattSmart Business Evaluated kWh Savings	$F \div G$

Results

Of 68 Pacific Power nonparticipant customers surveyed, five nonparticipant respondents reported installing measures attributed to Pacific Power’s influence. Table 2 presents measures types and gross evaluated kWh savings the Cadmus team attributed to Pacific Power, generating total savings of 27,826 kWh.

Table 2. NPSO Response Summary

Reported Spillover Measure Type	Quantity	Unit Energy Savings (kWh) ¹	Total Savings (kWh)
Chiller	1	722 per unit	722
HVAC	3	463 per unit	1,389
Lighting	150	171 per unit	25,665
Total	154		27,826

¹ Unit energy savings (kWh) estimated for each measure were generated from the 2016-2017 **wattsmart** Business program evaluated gross savings analysis. Unit energy savings represents the average savings per unit for all attributable measures for a given measure type.

The NPSO represents energy savings from companies that did not participate in the 2016-2017 **wattsmart** business program who reduced their energy consumption and attributed their action to the energy efficiency program or information provided by Pacific Power or past participation in a Pacific Power energy efficiency program.

Cadmus found NPSO as a percentage of total 2016-2017 **wattsmart** Business Evaluated kWh Savings in Washington to be 7% (H). Table 3 below details the analysis steps. The first step is taking the total sample spillover savings from the 68 respondents (27,826 kWh (A)) and dividing it by the total sample usage (4,958,268 kWh (C)). This results in the Sample NPSO (.6% (D)).

The sample NPSO is then applied to the total population of consumption as calculated using average consumption by revenue class multiplied by the number of customers in each class (664,772,209 kWh (E)), as provided to Cadmus by Pacific Power¹.

The total population energy usage is then multiplied by the Sample NPSO to obtain the population NPSO savings (3,730,701 kWh (F)). This savings is then divided by the total gross program kWh savings (52,398,470 (G)) found in 2016-2017 **wattsmart** Business Evaluation to calculate the NPSO of 7%.

Table 3. Washington NPSO *wattsmart* Results

Variable	Metric	Value	Source
A	Total kWh Spillover Savings from Survey Respondents	27,826	Survey data / Engineering Analysis
B	Total Nonparticipant Customers Surveyed	68	Survey disposition
C	Sample Usage	4,958,268	Pacific Power Customer Database
D	Sample NPSO	0.6%	A ÷ C
E	Total Population Usage kWh	664,772,209	Pacific Power Customer Database
F	NPSO kWh Savings Applied to Population	3,730,701	D x E
G	Total Gross Program Evaluated kWh Savings	52,398,470	2016-2017 wattsmart Business Evaluation
H	NPSO as a Percentage of Total 2016-2017 wattsmart Business Evaluated kWh Savings	7%	F ÷ G

¹ NPSO savings were not extrapolated to industrial customers to provide a conservative estimate.

Appendix D. PacifiCorp *wattsmart* Business Program (2016–2017) *wattsmart* Business Participant Survey

Researchable Questions		
Key Research Topics	Areas of Investigation	Related Questions
Screening	Project initiation process	C1
Marketing and Outreach	Program Awareness	B3, C16-C17
	Future communication preferences	G3
Barriers	Obstacles to installing high-efficiency equipment	C2, C3, C14, C15, C19, C20
Satisfaction	Assess satisfaction with Program application process, various program components and reasons for dissatisfaction among participants	C4-C13, C18, C21, C22, G1,G2
Firmographics	Determine building and company characteristics of participants	Section F
Decision Making	Key factors influencing customers' decision to participate in program	C1, C18,
Freeridership and Spillover	Assess net savings	Sections D and E

Target Quota = See samples for each state

General Instructions

- Interviewer instructions are in green **[LIKE THIS]** (the style is “Survey: Interviewer Instructions”).
- CATI programming instructions are in red **[LIKE THIS]** (the style is “Survey: Programming”).
- Items that should not be read by the interviewer are in parentheses like this ().

Variables to be pulled into Survey

- **[UTILITY]**
- **[MEASURE.NAME.FINAL] MEASURE1**
- **[PROGRAM YEAR]**
- **[CONTACT NAME]**
- **[CUSTOMER NAME]**
- **[SITE ADDRESS 1]**
- **[SITE CITY]**
- **[PROJECT STATE]**
- **[CUSTOMER INCENTIVE]**
- **[BILL_CREDIT]**

A. Introduction

Hello, I'm [INSERT NAME] calling on behalf of [INSERT UTILITY]. May I speak with [INSERT CONTACT NAME]? OR [IF NO NAME OR NAMED RESPONDENT NO LONGER WORKS FOR COMPANY] May I speak with the FACILITY MANAGER, ENERGY MANAGER OR SOMEONE WHO IS FAMILIAR WITH THEIR PARTICIPATION IN THE [UTILITY] INCENTIVE FOR [CUSTOMER NAME]? [IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR THEIR NAME AND PHONE NUMBER AND START AGAIN]

1. **Respondent not available: ASK IF YOU CAN LEAVE A MESSAGE ON THEIR VM**
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]

A1. Hello, I'm [INSERT NAME] calling on behalf of [INSERT UTILITY]. Are you the person who handles energy decisions for [CUSTOMER NAME]? [IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR THEIR NAME AND PHONE NUMBER AND START AGAIN]

1. (Yes)
2. (No or not a convenient time) [ASK IF RESPONDENT WOULD LIKE TO ARRANGE A MORE CONVENIENT TIME OR IF YOU CAN LEAVE A MESSAGE FOR A MORE APPROPRIATE PERSON]
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]
99. (Refused) [THANK AND TERMINATE]

A2. Are you the person responsible for making energy-efficiency decisions for your company at the [SITE ADDRESS 1], [SITE CITY] location? [IF SITE ADDRESS 1 IS BLANK, JUST READ THE CITY]

1. (Yes)
2. (No, person is able to come to phone) [ASK FOR PERSON WHO IS AND START AGAIN]
3. (No, person is not able to come to phone) [GET NAME AND PHONE NUMBER, SCHEDULE CALL BACK]
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]
99. (Refused) [THANK AND TERMINATE]

A3. We are conducting an important survey today about [INSERT UTILITY]'s wattsmart business program. [INSERT UTILITY] is actively seeking your opinions to help improve their business efficiency programs and to better understand how to assist customers in saving money and energy. This call may be monitored or recorded for quality assurances purposes. Anything you share with us today will be confidential and not attributed to any one individual or business.

1. [IF RESPONDENT ASKS HOW LONG, SAY "Approximately 10-15 minutes."]
2. [IF NEEDED, STATE "this survey is for research purposes only and this is not a marketing call. This is the primary way for customers to provide input into the incentive programs [UTILITY] offers. Your perspectives help [UTILITY] design energy-efficiency programs to help their customers save money and energy."]
3. [ONLY IF ASKED FOR A [UTILITY] CONTACT TO VERIFY THE SURVEY AUTHENTICITY, offer NIKKI KARPAVICH, 801-220-4439.

B. Screeners

- B1. Our records show that you installed energy efficient equipment including **[MEASURE1]**, at **[SITE ADDRESS 1]** in **[INSERT PROGRAM YEAR]**? Is this correct? **[MULTIPLE RESPONSE]**
1. (Yes)
 2. (No, wrong year) **[RECORD CORRECT YEAR IF POSSIBLE]**
 3. (No, wrong address) **[RECORD CORRECT ADDRESS]**
 4. (No, wrong measure) **[CORRECT BELOW]**
(MEASURE 1 IS INCORRECT **[Correct: _____]**) **[CALL THIS VARIABLE C_MEASURE]**
 5. (No, I did not participate) **[THANK AND TERMINATE]**
 98. (Don't know) [ask to speak with someone who would know and start again **AT A2. IF NO ONE, THEN THANK AND TERMINATE**]
 99. (Refused) **[THANK AND TERMINATE]**
- B2. To ensure our records are correct, can you confirm that you received an incentive for this upgrade? The incentive may have been in the form of a check from the utility, a utility bill credit, or a discount applied to your project invoice.
1. (Yes)
 2. (No) **[THANK AND TERMINATE]**
 98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN AT A2. IF NO ONE, THEN THANK AND TERMINATE]**
 99. (Refused) **[THANK AND TERMINATE]**
- B3. How did your organization learn about the incentives or discounts available for this project? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]**
1. (Contact with *wattsmart* Business representative or utility representative)
 2. (*wattsmart* printed program materials)
 3. (*wattsmart* sponsored workshop or community event)
 4. (Utility mailing, bill insert, or utility Website)
 5. (Through my electrician or contractor)
 6. (Previously participated in program/received an incentive)
 7. (Through a civic organization, trade association or professional organization) **[SPECIFY: _____]**
 8. (Through the distributor or supplier where I purchase lighting)
 9. (Word of mouth (family, friend, or business colleague))
 10. (Other **[SPECIFY: _____]**)
 98. (Don't know)
 99. (Refused)

C. Wattsmart Business

Thank you. I'd like to ask you about your project where you installed **[INSERT MEASURE1 OR C_MEASURE1]**.

C1. I'm going to read you a short list. Please tell me who, if anyone, was involved in helping you initiate your project where you installed **[INSERT MEASURE1 OR C_MEASURE1]**. **[READ LIST AND MARK ALL THAT APPLY 98 = DON'T KNOW TO ALL 99= REFUSED ALL] [RANDOMIZE LIST]**

1. A wattsmart Business program participating vendor
2. Your independent contractor
3. A wattsmart Business representative or Energy Engineer
4. Your **[UTILITY]** account representative
5. A family member, friend, or coworker?
6. Other **[SPECIFY: Who else was involved? _____]**
98. (Don't know)
99. (Refused)

C2. Thinking about the general application and any supplemental equipment applications you submitted, how easy would you say this paperwork was to complete? Would you say...? **[READ LIST]**

1. Very easy,
2. Somewhat easy,
3. Not too easy, or
4. Not at all easy?
98. (Don't know)
99. (Refused)

[ASK IF C2=2, 3 OR 4]

C3. What would have made this paperwork easier to complete?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

C4. Thinking about the incentive you received for this project, were you satisfied with the amount of the incentive? Would you say...? **[READ LIST]**

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C4=2, 3 OR 4]

C5. What incentive amount would have been enough for you to say you were very satisfied?

- [RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

C6. How satisfied were you with the amount of time it took to receive the incentive? Would you say...?

[READ LIST]

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C6=2, 3 OR 4]

C7. What amount of time would have been appropriate? **[RECORD VERBATIM: _____]**

98. (Don't know)
99. (Refused)

C8. What payback period does your company typically look for on these kinds of projects? **[RECORD**

VERBATIM: _____]

98. (Don't know)

Thank you, now I'd like to ask you a few questions about the implementation of your project.

C9. I'm going to read you a short list. Please tell me who, if anyone, was involved in helping you install the **[INSERT MEASURE1 OR C_MEASURE1]**.

1. A wattsmart Business program participating vendor
2. Your independent contractor **[SKIP TO C12]**
3. Someone else **[SPECIFY: _____]** **[SKIP TO C12]**
98. (Don't know) **[SKIP TO C12]**
99. (Refused) **[SKIP TO C12]**

C10. How satisfied were you with the work provided by the participating vendor that installed the **[INSERT MEASURE1 OR C_MEASURE1]**? Would you say...? **[READ LIST]**

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C10=2, 3 OR 4]

C11. Why do you say that?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

C12. How satisfied were you with the **[MEASRURE1 OR C MEASURE1]** you installed? Would you say...?

[READ LIST]

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C12=2, 3 OR 4]

C13. Why do you say that?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

C14. Was there other energy-efficient equipment you wanted to install, which did not qualify for *wattsmart* Business incentives?

1. (Yes)
2. (No) **[SKIP TO C18]**
98. (Don't know) **[SKIP TO C18]**
99. (Refused) **[SKIP TO C18]**

[IF C14=1]

C15. What equipment?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

[IF C9=1]

C16. Did you ask the participating vendor installing your project about this other equipment?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[IF C16=1]

C17. Did the participating vendor direct you to the other *wattsmart* Business programs as a place where that equipment may be eligible for incentives?

1. (Yes)
2. (No)

- 98. (Don't know)
- 99. (Refused)

C18. What would you say are the main benefits your company has experienced as a result of the energy-efficient equipment installed? [DO NOT READ LIST; RECORD ALL THAT APPLY; PROBE FOR MULTIPLE RESPONSES]

- 1. (The incentive)
- 2. (Using less energy, reducing energy consumption or energy demand)
- 3. (Saving money on our utility bills; lower energy bills)
- 4. (Increased occupant comfort)
- 5. (Better aesthetics/better or brighter lighting)
- 6. (Increased productivity)
- 7. (Saving money on maintenance costs)
- 8. (Other [SPECIFY: _____])
- 9. (NO BENEFITS)
- 98. (Don't know)
- 99. (Refused)

C19. What challenges, if any, did you encounter participating in the *wattsmart* Business program incentives?

- 1. [SPECIFY: _____]
- 2. (No challenges)
- 98. (Don't know)
- 99. (Refused)

[IF C19=1]

C20. What could [UTILITY] do to help your company overcome these challenges? [DO NOT READ LIST, ALLOW MULTIPLE RESPONSES]

- 1. (Nothing)
- 2. (Higher incentives)
- 3. (Offer low-interest loans/financing)
- 4. (Simplify the paperwork)
- 5. (Provide better/more information about program)
- 6. (Other [RECORD VERBATIM ANSWER _____])
- 98. (Don't know)
- 99. (Refused)

[ASK IF C20=5]

C20.5 You mentioned you would like more information. What type of information do you need?
[RECORD VERBATIM: _____]

C21. Thinking about your project, how satisfied are you with your interaction with [UTILITY]? Are you ...

[READ LIST]

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
5. I did not interact with [UTILITY] during this project
98. (Don't know)
99. (Refused)

[IF C21=2, 3, OR 4]

C22. Why do you say you were [INSERT ANSWER FROM C21] with [UTILITY]?

1. [RECORD VERBATIM: _____]
98. (Don't know)
99. (Refused)

D. Freeridership

Thank you. Next, I'd like to ask you about your decision to purchase the [MEASURE1/C_MEASURE1].

D1. Without the program, meaning without either the technical assistance or the financial incentive, would you have still completed the exact same [MEASURE_1/C_MEASURE1] project?

1. (Yes)
2. (No) [SKIP TO D3]
98. (Don't know) [SKIP TO D3]
99. (Refused) [SKIP TO D3]

D2. Without the program, meaning without either the technical assistance or the financial incentive, would you have still installed the [MEASURE_1/C_MEASURE1] at the same time?

1. (Yes) [SKIP TO D7]
2. (No) [SKIP TO D4]
98. (Don't know) [SKIP TO D4]
99. (Refused) [SKIP TO D4]

D3. Without the program, would you have installed any [MEASURE_1/C_MEASURE1] equipment?

1. (Yes)
2. (No) [SKIP TO D8]
98. (Don't know) [SKIP TO D8]
99. (Refused) [SKIP TO D8]

- D4. Without the program, in terms of timing, when would you have installed the [MEASURE_1/C_MEASURE1]?
1. Within one year from original participation date
 2. In one to two years from original participation date
 3. More than two years from original participation date [SKIP TO D8]
 98. (Don't know)
 99. (Refused)
- D5. Relative to the energy efficiency of [MEASURE_1/C_MEASURE1] 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 standard efficiency
 3. Standard efficiency
 98. (Don't know)
 99. (Refused)
- D6. Would you have installed more, less, or the same amount of [MEASURE_1/C_MEASURE1] without the program?
1. (More)
 - D6a. Compared to the installed amount, how much more?
[RECORD PERCENTAGE: _____]
 2. (Less)
 - D6b. Compared to the installed amount, how much less?
[RECORD PERCENTAGE: _____]
 98. (Don't know)
 99. (Refused)
- D7. Prior to hearing about the program, was the cost of [MEASURE_1/C_MEASURE1] included in your organization's most recent capital budget?
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)
- D8. 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/C_MEASURE1]?
- D9. With the *wattsmart* Business program, your company received financial incentives of [CUSTOMER INCENTIVE OR BILL CREDIT] for installing [MEASURE_1/C_MEASURE1].

For the **[MEASURE_1/C_MEASURE1]** purchases, 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]**

1. Recommendation from contractor or vendor
2. Information provided by **[UTILITY]** on energy saving opportunities
3. Information on payback
4. The **[UTILITY]** incentive or discount
5. Familiarity with this equipment
6. Previous participation with a **[UTILITY]** program

E. Spillover

E1. 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 and installed any additional energy efficiency improvements on your own without any assistance from a utility or other organization?

1. (Yes)
2. (No) **[SKIP TO SECTION F]**
98. (Don't know) **[SKIP TO SECTION F]**
99. (Refused) **[SKIP TO SECTION F]**

E2. Did you purchase and install any energy efficient improvements that are the same as the **[MEASURE_1/C_MEASURE1]** you installed through the program?

1. (Yes)
2. (No) **[SKIP TO E9]**
98. (Don't know) **[SKIP TO E9]**
99. (Refused) **[SKIP TO E9]**

E3. How many did you purchase and install?

1. **[RECORD RESPONSE]**
98. (Don't know)
99. (Refused)

E4. 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 through the program
2. Lower than installed through the program, but better than the standard efficiency
3. Standard efficiency
98. (Don't know)
99. (Refused)

- E5. Did you receive an incentive from **[UTILITY]** or another organization for this equipment?
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)

[ASK IF E5=1]

- E6. What program or sponsor provided the incentive?
1. **[ENTER PROGRAM OR UTILITIY]**
 98. (Don't know)
 99. (Refused)
- E7. On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the **[UTILITY]** *wattsmart* Business program was in your decision to install these energy efficient product(s).
1. RECORD RATING: _____]
 98. (Don't know)
 99. (Refused)

[ASK IF E5=2]

- E8. Why did you not apply for an incentive from **[UTILITY]** for this equipment?
1. [RECORD RESPONSE]
 98. (Don't know)
 99. (Refused)
- E9. In **[PROGRAM YEAR]** did you purchase and install any *other* energy efficiency improvements on your own without any assistance (financial or technical) from a utility, vendor or other organization?
1. (Yes)
 2. (No) **[SKIP TO SECTION F]**
 98. (Don't know) **[SKIP TO SECTION F]**
 99. (Refused) **[SKIP TO SECTION F]**
- E10. What type of equipment did you install? **[DO NOT READ LIST. RECORD ALL THAT APPLY]**
1. (Lighting equipment)
 2. (HVAC equipment (heating and cooling))
 3. (Water heating equipment)
 4. (Variable drive)
 5. (Efficient motor)
 6. (Refrigeration equipment, freezers)
 7. (Building envelope measure)
 8. (Compressed air equipment)

- 9. (Chiller)
- 10. (Pump)
- 11. (Irrigation equipment (gaskets, drains, sprinklers))
- 12. (Other) **[SPECIFY]:** _____
- 13. (None of the above) **[SKIP TO SECTION F]**
- 98. (Don't know) **[SKIP TO SECTION F]**
- 99. (Refused) **[SKIP TO SECTION F]**

[ASK E10.11-E10.14 AND E11-E15 if E10=1]

- E10.11** What type of lighting was purchased and installed? **[SPECIFY TYPE EXAMPLE: CFL, LED, FLUORESCENT]:** _____
- E10.12** What is the wattage of the lighting? **[SPECIFY]:** _____
- E10.13** In what location was it installed (Wall/Ceiling/Outdoors)? **[SPECIFY]:** _____
- E10.14** What type of equipment was removed or replaced? **[SPECIFY]:** _____

[ASK E10.21-E10.24 AND E11-E15 if E10=2]

- E10.21** What type of HVAC equipment was purchased and installed? **[SPECIFY TYPE]:** _____
- E10.22** What Fuel type is used? **[SPECIFY]:** _____
- E10.23** What is the efficiency rating of the equipment? **[SPECIFY]:** _____
- E10.24** What is the capacity of the equipment? **[SPECIFY]:** _____

[ASK E10.31-E10.34 AND E11-E15 if E10=3]

- E10.31** What type of water heating equipment was purchased and installed? **[SPECIFY TYPE]:** _____
- E10.32** What Fuel type is used? **[SPECIFY]:** _____
- E10.33** What is the efficiency rating of the equipment? **[SPECIFY]:** _____
- E10.34** (If water heater with storage) What is the capacity of the equipment? **[SPECIFY]:** _____

[ASK E10.41-E10.42 AND E11-E15 if E10=4]

- E10.41** What type of motor was it installed on? **[SPECIFY TYPE]:** _____
- E10.42** What is the horsepower of the motor? **[SPECIFY]:** _____

[ASK E10.51-E10.52 AND E11-E15 if E10=5]

- E10.51** What equipment was the motor installed on? **[SPECIFY TYPE]:** _____
- E10.52** What is the horsepower of the motor? **[SPECIFY]:** _____

[ASK E10.61 AND E11-E15 if E10=6]

- E10.61** What type of refrigeration or freezer equipment was purchased and installed? **[SPECIFY TYPE]:** _____

[ASK E10.71-E10.73 AND E11-E15 if E10=7]

E10.71 What building envelope measure was purchased and installed? [SPECIFY TYPE]:

E10.72 What is the efficiency (R-value) of the measure? [SPECIFY]: _____

E10.73 In what location was it installed (Wall/Roof/Floor)? [SPECIFY]: _____

[ASK E10.81-E10.82 AND E11-E15 if E10=8]

E10.81 FOR What type of application was the compressed air equipment purchased and installed? [SPECIFY APPLICATION]: _____

E10.82 What is the horsepower of the compressor motor? [SPECIFY]: _____

[ASK E10.91-E10.92 AND E11-E15 if E10=9]

E10.91 FOR What type of application was the chiller purchased and installed? [SPECIFY APPLICATION]: _____

E10.92 What size chiller did you install? [SPECIFY]: _____

[ASK E10.101-E10.103 AND E11-E15 if E10=10]

E10.101 FOR What type of application was the pump purchased and installed? [SPECIFY APPLICATION]: _____

E10.102 What is the horsepower of the motor for the pump? [SPECIFY] _____

E10.103 What is the efficiency rating of the pump? [SPECIFY]: _____

[ASK E10.111 AND E11-E15 if E10=11]

E10.111 WHAT IRRIGATION EQUIPMENT DID YOU purchase and install? [SPECIFY GASKETS, DRAINS, SPRINKLERS, ETC.]: _____

[ASK IF E10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN E10]

E11. How many did you purchase and install? [ASK FOR EACH MEASURE MENTIONED IN E10] [IF E10 MEASURE = 'BUILDING ENVELOPE' THEN ASK HOW MANY 'SQUARE FEET']

1. [RECORD RESPONSE]

98. (Don't know)

99. (Refused)

[ASK IF E10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN E10]

E12. Just to confirm, did you receive an incentive from [UTILITY] or another organization for this equipment? [ASK FOR EACH MEASURE MENTIONED IN E10]

1. (Yes)

2. (No)

- 98. (Don't know)
- 99. (Refused)

[ASK FOR EACH YES IN E12]

- E13. What utility or organization provided the incentive? **[ASK FOR EACH MEASURE MENTIONED IN E10]**
- 1. **[RECORD UTILITY OR ORGANIZATION]**
 - 98. (Don't know)
 - 99. (Refused)

[ASK IF E10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN E10]

- E14. What information did you rely upon to determine that the equipment installed was energy efficient? **[ASK FOR EACH MEASURE MENTIONED IN E10]**
- 1. **[RECORD RESPONSE]**
 - 98. (Don't know)
 - 99. (Refused)

[ASK IF E10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN E10]

- E15. On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the **[UTILITY]** wattsmart Business program was in your decision to install [this/these] energy efficient product(s). **[ASK FOR EACH MEASURE MENTIONED IN E10]**
- 1. **[RECORD RATING: _____]**
 - 98. (Don't know)
 - 99. (Refused)

[ASK SECTION F TO ALL SURVEY RESPONDENTS]

F. Firmographics

Finally, I have a few general questions about your business.

- F1. What industry is your company in? **[DON'T READ RESPONSES UNLESS NECESSARY]**
- 1. (Accommodation)
 - 2. (Arts, Entertainment and Recreation)
 - 3. (Construction)
 - 4. (Dairy, Agricultural)
 - 5. (Educational Services)
 - 6. (Finance, Insurance)
 - 7. (Food Service)
 - 8. (Food Processing)
 - 9. (Health Care)

- 10. (Manufacturing)
- 11. (Mining)
- 12. (Nonprofit and Religious Organizations)
- 13. (Oil and Gas)
- 14. (Professional, Scientific and Technical Services)
- 15. (Public Administration/Government Services)
- 16. (Retail)
- 17. (Refrigerated Warehouse)
- 18. (Real Estate/Property Management)
- 19. (Repair and Maintenance Service)
- 20. (Transportation)
- 21. (Warehouses or Wholesaler)
- 22. (Other [SPECIFY: _____])
- 98. (Don't know)
- 99. (Refused)

F2. How many locations does your company operate in [PROJECT STATE]?

- 1. [RECORD NUMBER: _____]
- 98. (Don't know)
- 99. (Refused)

F3. Does your organization lease or own the facility or facilities?

- 1. (Lease)
- 2. (Own)
- 3. (Other) [RECORD VERBATIM: _____]
- 98. (Don't know)
- 99. (Refused)

F4. How many people are employed by your company at all locations?

- 1. (1-10)
- 2. (11-25)
- 3. (26-50)
- 4. (51-75)
- 5. (76-100)
- 6. (101-200)
- 7. (201-500)
- 8. More than 500
- 98. (Don't know)
- 99. (Refused)

G. Closing

G1. Overall, how satisfied would you say you are with the *wattsmart* Business program? Would you say:

[READ LIST]

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

G2. Is there anything that **[UTILITY]** could have done to improve your overall experience with the *wattsmart* Business program? **[DO NOT READ THE LIST, RECORD ALL THAT APPLY]**

1. (Better/more communication)
2. (Quicker response time)
3. (Larger selection of eligible equipment)
4. (Increasing the incentive amount)
5. (Simplify the application process)
6. (Simplify the website)
7. (Provide quicker approval on applications)
8. (Send incentive check out faster)
9. (Other **[SPECIFY: _____]**)
10. (No, nothing)
98. (Don't know)
99. (Refused)

G2.1 **[ASK IF G2 = 1]** You mentioned you would like better communication. Who would you like more communication from? **[RECORD RESPONSE_____]**

G2.2 **[ASK IF G2 = 2]** You mentioned a quicker response time. Who would you like a quicker response time from? **[RECORD RESPONSE_____]**

G2.3 **[ASK IF G2 = 3]** What other energy-efficient equipment should *wattsmart* business offer incentives for? **[RECORD RESPONSE_____]**

G2.5 **[ASK IF G2=5]** In what way would you like them to simply the application process? **[RECORD RESPONSE_____]**

G2.6 **[ASK IF G2 = 6]** In what way would you like them to simplify the website? **[RECORD RESPONSE_____]**

G3. In the future, how would you like to stay informed about opportunities available through the *wattsmart* Business Program? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]**

1. (Contact with *wattsmart* Business representative or utility representative)
2. (*wattsmart* printed program materials)
3. (*wattsmart* sponsored workshop or event)
4. (Utility mailing, email, newsletter with bill, bill insert, or utility Website)

5. (Contact with a vendor/contractor)
6. (Through a trade association, trade publication or professional organization) [SPECIFY: _____])
7. (Newspaper ad)
8. (Radio ad)
9. (TV ad)
10. (Social Media (e.g., Facebook, Twitter, YouTube))
11. (Online ads)
12. (Other [SPECIFY: _____])
98. (Don't know)
99. (Refused)

This completes the survey. Your responses are very important to [UTILITY]. We appreciate your participation and thank you for your time. Have a good day.

PacifiCorp *wattsmart* Business Program (2016 - 2017) Small Business Lighting/ Small Business Direct Install Participant Survey

Researchable Questions		
Key Research Topics	Areas of Investigation	Related Questions
Screening	Project initiation process	C1, C4, C5
Marketing and Outreach	Program Awareness	B3, C14
	Future communication preferences	G3
Barriers	Obstacles to installing high-efficiency lighting	C17-C19
Satisfaction	Assess satisfaction with Program application process, various program components and reasons for dissatisfaction among participants	C1-C3, C6-C9, C15, C16
Firmographics	Determine building and company characteristics of participants	Section F
Decision Making	Key factors influencing customers' decision to participate in program	C1, C5
Freeridership and Spillover	Assess net savings	Sections D and E

Target Quota = See samples for individual states

General Instructions

- Interviewer instructions are in green **[LIKE THIS]** (the style is "Survey: Interviewer Instructions").
- CATI programming instructions are in red **[LIKE THIS]** (the style is "Survey: Programming").
- Items that should not be read by the interviewer are in parentheses like this ().

Variables to be pulled into Survey

- **[UTILITY]**
- **[PROGRAM NAME]**
- **[MEASURE.NAME.FINAL] MEASURE1**
- **[PROGRAM YEAR]**
- **[CONTACT NAME]**
- **[CUSTOMER NAME]**
- **[SITE ADDRESS 1]**
- **[SITE CITY]**
- **[PROJECT STATE]**
- **[CUSTOMER INCENTIVE]**

A. Introduction

Hello, I'm [INSERT NAME] calling on behalf of [UTILITY]. May I speak with [CONTACT NAME]? OR [IF NO NAME OR NAMED RESPONDENT NO LONGER WORKS FOR COMPANY] May I speak with the facility manager, energy manager or someone who is familiar with your participation in the [UTILITY] [PROGRAM NAME] incentive program? [IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR THEIR NAME AND PHONE NUMBER AND START AGAIN]

1. **Respondent not available: ASK IF YOU CAN LEAVE A MESSAGE ON THEIR VM**
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]

A1. Hello, I'm [INSERT NAME] calling on behalf of [UTILITY]. Are you the person who handles energy decisions for [CUSTOMER NAME]? [IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR THEIR NAME AND PHONE NUMBER AND START AGAIN]

1. (Yes)
2. (No or not a convenient time) [ASK IF RESPONDENT WOULD LIKE TO ARRANGE A MORE CONVENIENT TIME OR IF YOU CAN LEAVE A MESSAGE FOR A MORE APPROPRIATE PERSON]
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]
99. (Refused) [THANK AND TERMINATE]

A2. Are you the person responsible for making energy-efficiency decisions for your company at the [SITE ADDRESS 1], [SITE CITY] location?

1. (Yes)
2. (No, person is able to come to phone) [ASK FOR PERSON WHO IS AND START AGAIN]
3. (No, person is not able to come to phone) [GET NAME AND PHONE NUMBER, SCHEDULE CALL BACK]
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]
99. (Refused) [THANK AND TERMINATE]

A3. We are conducting an important survey today about [UTILITY]'S [PROGRAM NAME] program. [UTILITY] is actively seeking your opinions to help improve their business efficiency programs and to better understand how to assist customers in saving money and energy. This call may be monitored or recorded for quality assurances purposes. Anything you share with us today will be confidential and not attributed to any one individual or business.

1. [IF RESPONDENT ASKS HOW LONG, SAY "Approximately 10 minutes."]
2. [IF NEEDED, STATE "this survey is for research purposes only and this is not a marketing call. This is the primary way for customers to provide input into the incentive programs [UTILITY] offers. Your perspectives help [UTILITY] design energy-efficiency programs to help their customers save money and energy."]
3. [ONLY IF ASKED FOR A [UTILITY] CONTACT TO VERIFY THE SURVEY AUTHENTICITY, offer NIKKI KARPAVICH, 801-220-4439.

B. Screeners

- B1. Our records show that you **[FOR SBL READ: installed energy efficient lighting including [MEASURE1]] [FOR SBDI READ: participated in the [MEASURE1] program]**, at **[SITE ADDRESS 1]** in **[PROGRAM YEAR]**? Is this correct? **[MULTIPLE RESPONSE]**
1. (Yes)
 2. (No, wrong year) **[RECORD CORRECT YEAR IF POSSIBLE]**
 3. (No, wrong address) **[RECORD CORRECT ADDRESS]**
 4. (No, wrong measure) **[CORRECT BELOW]**
(MEASURE 1 IS INCORRECT **[Correct: _____]**) **[CALL THIS VARIABLE C_MEASURE]**
 5. (No, I did not participate) **[THANK AND TERMINATE]**
 98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN AT A2. IF NO ONE, THEN THANK AND TERMINATE]**
 99. (Refused) **[THANK AND TERMINATE]**
- B2. To ensure our records are correct, can you confirm that you received an incentive for this upgrade? The incentive may have been in the form of a check from the utility, or a discount applied to your project invoice.
1. (Yes)
 2. (No) **[THANK AND TERMINATE]**
 98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN AT A2. IF NO ONE, THEN THANK AND TERMINATE]**
 99. (Refused) **[THANK AND TERMINATE]**
- B3. How did your organization learn about the incentives or discounts available for this project? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]**
1. (Contact with *wattsmart* Business representative or utility representative)
 2. (*wattsmart* printed program materials)
 3. (*wattsmart* sponsored workshop or community event)
 4. (Utility mailing, bill insert, or utility Website)
 5. (Through my electrician or contractor)
 6. (Previously participated in program/received an incentive)
 7. (Through a trade association or professional organization) **[SPECIFY: _____]**
 8. (Through the vendor, distributor or supplier where I purchase lighting)
 9. (Word of mouth (family, friend, or business colleague))
 10. (Other **[SPECIFY: _____]**)
 98. (Don't know)
 99. (Refused)

C. *Small Business Direct Install/Small Business Lighting/wattsmart Small Business Lighting Incentives*

Thank you. I'd like to ask you about your participation in the [PROGRAM NAME] incentives.

- C1. What factor was most important to your company's decision to participate in the [PROGRAM NAME] incentives? [DO NOT READ LIST; RECORD ONE RESPONSE]
1. (To save money on energy bills)
 2. (To obtain a program incentive)
 3. (To obtain a tax credit)
 4. (To replace old (but still functioning) equipment)
 5. (To replace broken equipment)
 6. (To improve productivity)
 7. (To improve lighting quality)
 8. (Other [SPECIFY _____])
 98. (Don't know)
 99. (Refused)

[IF PROGRAM NAME= SMALL BUSINESS LIGHTING OR WATTSMART SMALL BUSINESS LIGHTING ASK
C2. IF PROGRAM NAME =SMALL BUSINESS DIRECT INTALL SKIP TO C4]

- C2. How easy was it to schedule a *wattsmart* Small Business Lighting approved contractor to conduct your free facility assessment? Would you say...? [READ LIST]
1. Very easy
 2. Somewhat easy
 3. Not too easy
 4. Not at all easy
 98. (Don't know)
 99. (Refused)

[IF C2=2, 3 OR 4]

- C3. What would have made it easier to schedule a *wattsmart* Small Business approved contractor?
1. [RECORD VERBATIM: _____]
 98. (Don't know)
 99. (Refused)
- C4. After the free energy assessment, did you receive a project proposal with estimates of your incentive or discount and cost savings?
1. (Yes)
 2. (No) [SKIP TO C6]
 98. (Don't know) [SKIP TO C6]
 99. (Refused) [SKIP TO C6]

[IF C4=1]

- C5. What information in the project proposal was most influential in your decision to proceed with your project....? **[PROBE FOR SPECIFICS OF WHAT WAS INFLUENTIAL]**
1. (Cost savings)
 2. (Energy savings)
 3. (Other) **[RECORD VERBATIM: _____]**
 4. (Nothing)
 98. (Don't know)
 99. (Refused)

- C6. How satisfied were you with the work provided by the contractor? Would you say...? **[READ LIST]**
1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
 98. (Don't know)
 99. (Refused)

[IF C6=2, 3 OR 4]

- C7. Why do you say you were **[INSERT ANSWER FROM C6]** with the work provided by the contractor?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)

- C8. How satisfied were you with the equipment provided by the contractor? Would you say...? **[READ LIST]**
1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
 98. (Don't know)
 99. (Refused)

[IF C8=2, 3 OR 4]

- C9. Why do you say you were **[INSERT ANSWER FROM C8]** with the equipment provided by the contractor?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)

C10. Was there other lighting equipment you wanted to install, which was not offered in your **[PROGRAM NAME]** project proposal?

1. (Yes)
2. (No) **[SKIP TO C14]**
98. (Don't know) **[SKIP TO C14]**
99. (Refused) **[SKIP TO C14]**

[IF C10=1]

C11. What equipment?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

C12. Did you ask the contractor installing your project, about this other equipment?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[IF C12=1]

C13. Did the contractor direct you to the other *wattsmart* Business programs as a place where that equipment may be eligible for incentives?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[IF PROGRAM NAME = SMALL BUSINESS DIRECT INSTALL ASK C14]

C14. **[UTILITY]** offered the Small Business Direct incentives in your community, during a specified window of time. Were you aware you had a limited time to enroll in the Small Business Direct incentives?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

C15. **[IF C14=1]** Thinking about the timeframe of your project, how satisfied were you with the window of time in which you could enroll in the Small Business Direct incentives? Would you say...? **[READ LIST]**

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

C16. What would you say are the main benefits your company has experienced as a result of the lighting installed? **[DO NOT READ LIST; RECORD ALL THAT APPLY; PROBE FOR MULTIPLE RESPONSES]**

1. (The incentive)
2. (Savings money, reducing energy consumption or energy demand)
3. (Increased occupant comfort)
4. (Better aesthetics/better or brighter lighting)
5. (Increased productivity)
6. (Saving money on maintenance costs)
7. (Other **[SPECIFY: _____]**)
8. (NO BENEFITS)
98. (Don't know)
99. (Refused)

C17. What challenges, if any, did you encounter participating in the **[PROGRAM NAME]** incentives?

1. **[SPECIFY: _____]**
2. (No challenges)
98. (Don't know)
99. (Refused)

[ASK IF C17=1]

C18. What could **[UTILITY]** do to help your company overcome these challenges? **[DO NOT READ LIST, ALLOW MULTIPLE RESPONSES]**

1. (Nothing)
2. (Higher incentives)
3. (Offer low-interest loans/financing)
4. (Simplify the paperwork)
5. (Provide better/more information about program)
6. (Other **[RECORD VERBATIM ANSWER _____]**)
98. (Don't know)
99. (Refused)

[ASK IF C18=5]

C18.5 You mentioned providing better information about the program. What type of information do you need? **[SPECIFY: _____]**

- C19. Do you have any suggestions for improving the **[PROGRAM NAME]** offering?
1. (Yes) **[SPECIFY: _____]**
 2. (No)
 98. (Don't know)
 99. (Refused)

D. Freeridership

Thank you. Next, I'd like to ask you about your decision to **[FOR SBL READ: purchase] [FOR SBDI READ: install]** the **MEASURE1/C_MEASURE1** equipment.

- D1. Without the program, meaning without either the technical assistance or the financial incentive, would you have still completed the exact same **MEASURE_1/C_MEASURE1** project?
1. (Yes)
 2. (No) **[SKIP TO D3]**
 98. (Don't know) **[SKIP TO D3]**
 99. (Refused) **[SKIP TO D3]**
- D2. Without the program, meaning without either the technical assistance or the financial incentive, would you have still installed the **MEASURE_1/C_MEASURE1** equipment at the same time?
1. (Yes) **[SKIP TO D6]**
 2. (No) **[SKIP TO D4]**
 98. (Don't know) **[SKIP TO D4]**
 99. (Refused) **[SKIP TO D4]**
- D3. Without the program, would you have installed any **MEASURE_1/C_MEASURE1** equipment?
1. (Yes)
 2. (No) **[SKIP TO D7]**
 98. (Don't know) **[SKIP TO D7]**
 99. (Refused) **[SKIP TO D7]**
- D4. Without the program, in terms of timing, when would you have installed the **MEASURE_1/C_MEASURE1** equipment?
1. Within one year from original participation date
 2. In one to two years from original participation date
 3. More than two years from original participation date **[SKIP TO D7]**
 98. (Don't know)
 99. (Refused)

D5. Would you have installed more, less, or the same amount of **[MEASURE_1/C_MEASURE1]** equipment without the program?

1. (More)
 - D5a. Compared to the installed amount, how much more?
[RECORD PERCENTAGE: _____]
2. (Less)
 - D5b. Compared to the installed amount, how much less?
[RECORD PERCENTAGE: _____]
98. (Don't know)
99. (Refused)

D6. Prior to hearing about the program, was the cost of **[MEASURE_1/C_MEASURE1]** equipment included in your organization's most recent capital budget?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

D7. In your own words, can you please describe what impact the program had on your decision to complete **[FOR SBL READ: these energy efficiency improvements for] [FOR SBDI READ: this installation of] [MEASURE_1/C_MEASURE1]** equipment?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

D8. With the **[PROGRAM NAME]** program, your company received financial incentives of **[CUSTOMER INCENTIVE]** for installing **[MEASURE_1/C_MEASURE1]** equipment.

For the **[MEASURE_1/C_MEASURE1]** purchases, 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]**

1. Recommendation from contractor or vendor
2. Information provided by **[UTILITY]** on energy saving opportunities
3. Information on payback
4. The **[UTILITY]** incentive or discount
5. Familiarity with this type of lighting
6. Previous participation with a **[UTILITY]** program

E. Spillover

E1. Now I'd like to ask about energy efficient lighting improvements **other than those** you installed through the program. Since participating in this program, have you purchased and installed any additional energy-efficient lighting on your own without any assistance from a utility or other organization?

1. (Yes)
2. (No) **[SKIP TO SECTION F]**
98. (Don't know) **[SKIP TO SECTION F]**
99. (Refused) **[SKIP TO SECTION F]**

E2. Did you purchase and install any energy-efficient lighting that is the same as the **[MEASURE1/C_MEASURE1]** you installed through the program?

1. (Yes)
2. (No) **[SKIP TO SECTION F]**
98. (Don't know) **[SKIP TO SECTION F]**
99. (Refused) **[SKIP TO SECTION F]**

E3. How many did you purchase and install?

1. **[RECORD RESPONSE]**
98. (Don't know)
99. (Refused)

E4. Did you receive an incentive from **[UTILITY]** or another organization for this lighting?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[ASK IF E4=1]

E5. What program or sponsor provided the incentive?

1. **[ENTER PROGRAM OR UTILTY]**
98. (Don't know)
99. (Refused)

E6. On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the **[UTILITY] [PROGRAM NAME]** program was in your decision to install this lighting.

1. **[RECORD RATING: _____]**
98. (Don't know)
99. (Refused)

[ASK IF E4=2 OTHERWISE SKIP TO SECTION F]

- E7. Why did you not apply for an incentive from **[UTILITY]** for this equipment?
1. **[RECORD RESPONSE] [SKIP TO SECTION F]**
 98. (Don't know) **[SKIP TO SECTION F]**
 99. (Refused) **[SKIP TO SECTION F]**
- E8. What type of efficient lighting did you purchase and install? **[SPECIFY TYPE EXAMPLE: CFL, LED, FLUORESCENT]:** _____
- E8.11 What is the wattage of the lighting? **[SPECIFY]:** _____
- E8.12 In what location was it installed (Wall/Ceiling/Outdoors)? **[SPECIFY]:** _____
- E8.13 What type of equipment was removed or replaced? **[SPECIFY]:** _____
- E9. How many did you purchase and install?
1. **[RECORD RESPONSE]**
 98. (Don't know)
 99. (Refused)
- E10. Just to confirm, did you receive an incentive from **[UTILITY]** or another organization for this energy-efficient lighting?
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)
- [ASK IF E10=1]**
- E11. What utility or organization provided the incentive?
1. **[RECORD UTILITY OR ORGANIZATION]**
 98. (Don't know)
 99. (Refused)
- E12. What information did you rely upon to determine that the lighting installed was energy efficient?
1. **[RECORD RESPONSE]**
 98. (Don't know)
 99. (Refused)
- E13. On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the **[UTILITY]** LED Instant Incentive Program was in your decision to install this lighting.
1. **[RECORD RATING: _____]**
 98. (Don't know)
 99. (Refused)

F. Firmographics

Finally, I have a few general questions about your business.

F1. What industry is your company in? **[DON'T READ RESPONSES UNLESS NECESSARY]**

1. (Accommodation)
2. (Arts, Entertainment and Recreation)
3. (Construction)
4. (Dairy, Agricultural)
5. (Educational Services)
6. (Finance, Insurance)
7. (Food Service)
8. (Food Processing)
9. (Health Care)
10. (Manufacturing)
11. (Mining)
12. (Nonprofit and Religious Organizations)
13. (Oil and Gas)
14. (Professional, Scientific and Technical Services)
15. (Public Administration/Government Services)
16. (Retail)
17. (Refrigerated Warehouse)
18. (Real Estate/Property Management)
19. (Repair and Maintenance Service)
20. (Transportation)
21. (Warehouses or Wholesaler)
22. (Other **[SPECIFY: _____]**)
98. (Don't know)
99. (Refused)

F2. How many locations does your company operate in **[PROJECT STATE]**?

1. **[RECORD NUMBER: _____]**
98. (Don't know)
99. (Refused)

F3. Does your organization lease or own the facility or facilities?

1. (Lease)
2. (Own)
3. (Other **[RECORD VERBATIM: _____]**)
98. (Don't know)
99. (Refused)

F4. How many people are employed by your company at all locations?

1. (1-10)
2. (11-25)
3. (26-50)
4. (51-75)
5. (76-100)
6. (101-200)
7. (201-500)
8. More than 500
98. (Don't know)
99. (Refused)

G. Closing

G1. Overall, how satisfied would you say you are with the **[PROGRAM NAME]** program? Would you say:
[READ LIST]

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

G2. Is there anything that **[UTILITY]** could have done to improve your overall experience with the **[PROGRAM NAME]** program? **[DO NOT READ THE LIST, RECORD ALL THAT APPLY]**

1. (Better/more communication)
2. (Quicker response time)
3. (Larger selection of eligible equipment)
4. (Increasing the incentive amount)
5. (Simplify the application process)
6. (Simplify the website)
7. (Provide quicker approval on applications)
8. (Send incentive check out faster)
9. (Other **[SPECIFY: _____]**)
10. (No, nothing)
98. (Don't know)
99. (Refused)

G2.1 **[ASK IF G2 = 1]** You mentioned you would like better communication. Who would you like more communication from? **[RECORD RESPONSE_____]**

G2.2 **[ASK IF G2 = 2]** You mentioned a quicker response time. Who would you like a quicker response time from? **[RECORD RESPONSE_____]**

G2.3 **[ASK IF G2 = 3]** What other energy-efficient equipment should wattsmart business offer incentives for? **[RECORD RESPONSE_____]**

G2.5 **[ASK IF G2=5]** In what way would you like them to simplify the application process? **[RECORD RESPONSE_____]**

G2.6 **[ASK IF G2 = 6]** In what way would you like them to simplify the website? **[RECORD RESPONSE_____]**

G3. In the future, how would you like to stay informed about opportunities available through the wattsmart Business Program? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]**

1. (Contact with wattsmart Business representative or utility representative)
2. (wattsmart printed program materials)
3. (wattsmart sponsored workshop or event)
4. (Utility mailing, email, newsletter with bill, bill insert, or utility Website)
5. (Contact with a vendor/contractor)
6. (Through a trade association, trade publication or professional organization) **[SPECIFY: _____]**)
7. (Newspaper ad)
8. (Radio ad)
9. (TV ad)
10. (Social Media (e.g., Facebook, Twitter, YouTube))
11. (Online ads)
12. (Other **[SPECIFY: _____]**)
98. (Don't know)
99. (Refused)

This completes the survey. Your responses are very important to [UTILITY]. We appreciate your participation and thank you for your time. Have a good day.

PacifiCorp *wattsmart* Business Program (2016 - 2017) Instant Incentives-Lighting (Midstream) Participant Survey

Researchable Questions		
Key Research Topics	Areas of Investigation	Related Questions
Screening	Project initiation process	C1, C8
Marketing and Outreach	Program awareness	B1-B3
	Future communication preferences	G3
Barriers	Obstacles to installing high-efficiency lighting	C2-C5
Satisfaction	Assess satisfaction with distributor/contractor and instant discount	C6-C7, C9-C10, G1, G2
Freeridership and Spillover	Assess net savings	Sections D and E
Firmographics	Determine building and company characteristics of participants	Section F

Target Quota = See samples for each state

General Instructions

- Interviewer instructions are in green **[LIKE THIS]** (the style is “Survey: Interviewer Instructions”).
- CATI programming instructions are in red **[LIKE THIS]** (the style is “Survey: Programming”).
- Items that should not be read by the interviewer are in parentheses like this ().

Variables to be pulled into Survey

- **[CONTACT.NAME]**
- **[CUSTOMER.NAME]**
- **[SITE.ADDRESS 1]**
- **[SITE.CITY]**
- **[PROJECT. STATE]**
- **[UTILITY]**
- **[PROGRAM.YEAR]**
- **[MEASURE.NAME.FINAL] MEASURE1**
- **[CUSTOMER.INCENTIVE]**

A. Introduction

Hello, I'm [INSERT NAME] calling on behalf of [INSERT UTILITY]. May I speak with [INSERT CONTACT NAME]? OR [IF NO NAME OR NAMED RESPONDENT NO LONGER WORKS FOR COMPANY] May I speak with the facility manager or energy manager or the person who is familiar with your participation in the [INSERT UTILITY] Instant Incentive program? [IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR THEIR NAME AND PHONE NUMBER AND START AGAIN]

1. (Respondent not available) [ASK IF YOU CAN LEAVE A MESSAGE ON THEIR VOICE MAIL]
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]

A1. Hello, I'm [INSERT NAME] calling on behalf of [INSERT UTILITY]. Are you the person who handles energy decisions for [INSERT CUSTOMER NAME]? [IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR THEIR NAME AND PHONE NUMBER AND START AGAIN]

1. (Yes)
2. (No or not a convenient time) [ASK IF RESPONDENT WOULD LIKE TO ARRANGE A MORE CONVENIENT TIME OR IF YOU CAN LEAVE A MESSAGE FOR A MORE APPROPRIATE PERSON]
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]
99. (Refused) [THANK AND TERMINATE]

A2. Are you the person responsible for making energy efficiency decisions for your company at the [SITE ADDRESS 1] [SITE CITY] location?

1. (Yes)
2. (No, person is able to come to phone) [ASK FOR PERSON WHO IS AND START AGAIN]
3. (No, person is not able to come to phone) [GET NAME AND PHONE NUMBER, SCHEDULE CALL BACK]
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]
99. (Refused) [THANK AND TERMINATE]

A3. We are conducting an important survey today about [INSERT UTILITY]'s wattsmart Business Instant Incentive Lighting Program. [INSERT UTILITY] is actively seeking your opinions to help improve energy efficiency programs and to better understand how to assist customers in saving money and energy. This call may be monitored or recorded for quality assurance purposes. Anything you share with us today will be confidential and not attributed to any one individual or business.

1. [IF RESPONDENT ASKS HOW LONG, SAY "Approximately 5-7 minutes."]
2. [IF NEEDED, STATE "this survey is for research purposes only and this is not a marketing call. This is the primary way for customers to provide input into the incentive programs [UTILITY] offers. Your perspectives help [UTILITY] design energy efficiency programs to help its customers save money and energy."]
3. [ONLY IF ASKED FOR A [UTILITY] CONTACT TO VERIFY THE SURVEY AUTHENTICITY, offer NIKKI KARPAVICH, 801-220-4439.

B. Screeners

- B1. Our records show that you installed energy efficient lighting including **[MEASURE1]**, for **[INSERT SITE ADDRESS 1]** in **[INSERT PROGRAM YEAR]**? Is this correct? [Multiple Response]
1. (Yes)
 2. (No, wrong year) **[RECORD CORRECT YEAR IF POSSIBLE]**
 3. (No, wrong address) **[RECORD CORRECT ADDRESS]**
 4. (No, wrong measure) **[CORRECT BELOW]**
(MEASURE1 IS INCORRECT **[Correct: _____]**) **[CALL THIS VARIABLE C_MEASURE1]**
 5. (No, I did not participate) **[THANK AND TERMINATE]**
 98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN AT A1. IF NO ONE, THEN [THANK AND TERMINATE]**
 99. (Refused) **[THANK AND TERMINATE]**
- B2. To ensure our records are correct, can you confirm that you received an incentive for this new **[MEASURE1/C_MEASURE1]**? The incentive was in the form of check from the utility or an instant discount on your invoice.
1. (Yes)
 2. (No) **[THANK AND TERMINATE]**
 98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN AT A2. IF NO ONE, THEN [THANK AND TERMINATE]**
 99. (Refused) **[THANK AND TERMINATE]**
- B3. How did your organization learn about the incentives available for this project? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]**
1. (Contact with *wattsmart* Business representative or utility representative)
 2. (*wattsmart* printed program materials)
 3. (*wattsmart* sponsored workshop or community event)
 4. (Utility mailing, bill insert, or utility website)
 5. (Through my electrician or contractor)
 6. (Previously participated in program/received an incentive)
 7. (Through a trade association or professional organization) **[SPECIFY: _____]**)
 8. (Through the vendor, distributor or supplier where I purchase lighting)
 9. (Word of mouth (family, friend, or business colleague)
 10. (Other **[SPECIFY: _____]**)
 98. (Don't know)
 99. (Refused)

C. Midstream (Instant Incentives)

Thank you. I'd like to ask you about the lamps you purchased through the Instant Incentive program.

C1. Did your company purchase your lamps direct from a distributor or through your contractor? **[DO NOT READ LIST; RECORD ONE ANSWER]?**

1. (Contractor)
2. (Distributor)
3. (Other) **[SPECIFY: _____]**
98. (Don't know)
99. (Refused)

[IF C1= 2]

C2. How easy was it to find a distributor offering the instant discount? Would you say...? **[READ LIST]**

1. Very easy
2. Somewhat easy
3. Not too easy
4. Not at all easy
98. (Don't know)
99. (Refused)

[IF C2=3 OR 4]

C3. What would have made it easier?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

C4. How easy was it to find the **[MEASURE1/C_MEASURE1]** product you wanted to purchase? Would you say...? **[READ LIST]**

1. Very easy
2. Somewhat easy
3. Not too easy
4. Not at all easy
98. (Don't know)
99. (Refused)

[IF C4=3 OR 4]

C5. What would have made it easier?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

[ASK C6 IF C1=1 OR 2 [IF C1 = 3, 98, 99 SKIP TO C8]

- C6. Did the **[INSERT RESPONSE FROM C1]** provide assistance with the selection of the lamps you purchased?
1. (Yes)
 2. (No)
 98. (Don't Know)
 99. (Refused)

[IF C6 = 1]

- C7. How satisfied were you with their help? Would you say you were...? **[READ LIST]**
1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
 98. (Don't know)
 99. (Refused)
- C8. When you made this purchase of the **[MEASURE1/C_MEASURE1]**, were you...? **[RECORD ONE RESPONSE]**
1. Replacing burned out lamps
 2. Relamping an area of your facility as part of ongoing maintenance
 3. Purchasing lamps for a larger lighting retrofit project
 4. Or some other reason **[SPECIFY _____]**
- C9. Thinking about the incentive you received, how satisfied were you with the amount of the incentive? Would you say you were...? **[READ LIST]**
1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
 98. (Don't know)
 99. (Refused)

[IF C9=3 OR 4]

- C10. What incentive amount would have been enough for you to say you were very satisfied?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)

D. Freeridership

Thank you. Next, I'd like to ask you about your decision to purchase the **MEASURE1/C_MEASURE1**.

- D1. Without the **[UTILITY]** incentive **[IF C6 = 1 OR 2 READ "AND ASSISTANCE FROM THE DISTRIBUTOR OR CONTRACTOR"]**, would you have still purchased **[MEASURE1/C_MEASURE1]**?
1. (Yes)
 2. (No) **[SKIP TO D3]**
 98. (Don't know) **[SKIP TO D3]**
 99. (Refused) **[SKIP TO D3]**
- D2. Without the **[UTILITY]** incentive **[IF C6 = 1 OR 2 READ "AND ASSISTANCE FROM THE DISTRIBUTOR OR CONTRACTOR"]**, would you have still purchased the **[MEASURE1/C_MEASURE1]** at the same time?
1. (Yes) **[SKIP TO D6]**
 2. (No) **[SKIP TO D4]**
 98. (Don't know) **[SKIP TO D4]**
 99. (Refused) **[SKIP TO D4]**
- D3. Without the **[UTILITY]** incentive **[IF C6 = 1 OR 2 READ "AND ASSISTANCE FROM THE DISTRIBUTOR OR CONTRACTOR"]**, would you have purchased any **[MEASURE1/C_MEASURE1]**?
1. (Yes)
 2. (No) **[SKIP TO D7]**
 98. (Don't know) **[SKIP TO D7]**
 99. (Refused) **[SKIP TO D7]**
- D4. Without the **[UTILITY]** incentive **[IF C6 = 1 OR 2 READ "AND ASSISTANCE FROM THE DISTRIBUTOR OR CONTRACTOR"]**, In terms of timing, when would you have purchased the **[MEASURE1/C_MEASURE1]**? **[READ LIST]**
1. Within one year from original participation date
 2. In one to two years from original participation date
 3. More than two years from original participation date **[SKIP TO D7]**
 98. (Don't know)
 99. (Refused)

- D5. Would you have purchased more, less, or the same amount of **[MEASURE1/C_MEASURE1]** without the incentive **[IF C6 = 1 OR 2 READ “AND ASSISTANCE FROM THE DISTRIBUTOR OR CONTRACTOR”]**?
1. (More)
D5. a. Compared to the installed amount, how much more? **[RECORD PERCENTAGE: _____]**
 2. (Less)
D5. b. Compared to the installed amount, how much less? **[RECORD PERCENTAGE: _____]**
 3. (Same)
 98. (Don't know)
 99. (Refused)
- D6. Prior to hearing about the program, was the cost of **[MEASURE1/C_MEASURE1]** included in your organization's most recent capital or maintenance budget?
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)
- D7. In your own words, can you please describe what impact the **[UTILITY]** instant incentive offer **[IF C6 = 1 OR 2 READ “AND ASSISTANCE FROM THE DISTRIBUTOR OR CONTRACTOR”]** had on your decision to purchase **[MEASURE1/C_MEASURE1]**?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)
- D8. With the instant incentive, your company received a discount of, **[CUSTOMER INCENTIVE]** for purchasing **[MEASURE_1/C_MEASURE1]**.

For this **[MEASURE_1/C_MEASURE1]** purchase, 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 lamps to purchase. 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]**

1. Recommendation from distributor or contractor
2. Information provided by **[UTILITY]** on energy saving opportunities
3. The **[UTILITY]** discount or incentive
4. Familiarity with this type of lighting
5. Previous participation with a **[UTILITY]** program

E. Spillover

E1. Now I'd like to ask about energy-efficient lighting improvements **other than those** you installed through the program. Since participating in this program, have you purchased and installed any additional energy-efficient lighting on your own **without** any assistance from a utility or other organization?

1. (Yes)
2. (No) **[SKIP TO SECTION F]**
98. (Don't know) **[SKIP TO SECTION F]**
99. (Refused) **[SKIP TO SECTION F]**

E2. Did you purchase and install any energy-efficient lighting that is the same as the **[MEASURE1/C_MEASURE1]** you installed through the program?

1. (Yes)
2. (No) **[SKIP TO E8]**
98. (Don't know) **[SKIP TO E8]**
99. (Refused) **[SKIP TO E8]**

E3. How many did you purchase and install?

1. **[RECORD RESPONSE]**
98. (Don't know)
99. (Refused)

E4. Did you receive an incentive from **[UTILITY]** or another organization for this lighting?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[ASK IF E4=1]

E5. What program or sponsor provided the incentive?

1. **[ENTER PROGRAM OR UTILTIY]**
98. (Don't know)
99. (Refused)

E6. On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the **[UTILITY]** Instant Incentive program was in your decision to install this lighting.

1. **[RECORD RATING: _____]**
98. (Don't know)
99. (Refused)

[ASK IF E4=2 OTHERWISE SKIP TO SECTION F]

- E7. Why did you not apply for an incentive from **[UTILITY]** for this equipment?
1. **[RECORD RESPONSE] [SKIP TO SECTION F]**
 98. (Don't know) **[SKIP TO SECTION F]**
 99. (Refused) **[SKIP TO SECTION F]**
- E8. What other type of efficient lighting did you purchase and install? **[SPECIFY TYPE EXAMPLE: CFL, LED, FLUORESCENT: _____]**
- E8.11 What is the wattage of the lighting? **[SPECIFY: _____]**
 - E8.12 In what location was it installed (Wall/Ceiling/Outdoors)? **[SPECIFY: _____]**
 - E8.13 What type of equipment was removed or replaced? **[SPECIFY: _____]**
- E9. How many did you purchase and install?
1. **[RECORD RESPONSE]**
 98. (Don't know)
 99. (Refused)
- E10. Just to confirm, did you receive an incentive from **[UTILITY]** or another organization for this energy-efficient lighting?
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)

[ASK IF E10=1]

- E11. What utility or organization provided the incentive?
1. **[RECORD UTILITY OR ORGANIZATION]**
 98. (Don't know)
 99. (Refused)
- E12. What information did you rely upon to determine that the lighting installed was energy efficient?
1. **[RECORD RESPONSE]**
 98. (Don't know)
 99. (Refused)
- E13. On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the **[UTILITY]** LED Instant Incentive Program was in your decision to install this lighting.
1. **[RECORD RATING: _____]**
 98. (Don't know)
 99. (Refused)

F. Firmographics

Finally, I have a few general questions about your business.

F1. What industry is your company in? **[DON'T READ RESPONSES UNLESS NECESSARY]**

1. (Accommodation)
2. (Arts, Entertainment and Recreation)
3. (Construction)
4. (Dairy, Agricultural)
5. (Educational Services)
6. (Finance, Insurance)
7. (Food Service)
8. (Food Processing)
9. (Health Care)
10. (Manufacturing)
11. (Mining)
12. (Nonprofit and Religious Organizations)
13. (Oil and Gas)
14. (Professional, Scientific and Technical Services)
15. (Public Administration/Government Services)
16. (Retail)
17. (Refrigerated Warehouse)
18. (Real Estate/Property Management)
19. (Repair and Maintenance Service)
20. (Transportation)
21. (Warehouses or Wholesaler)
22. (Other **[SPECIFY: _____]**)
98. (Don't know)
99. (Refused)

F2. How many locations does your company operate in **[PROJECT STATE]**?

1. **[RECORD NUMBER: _____]**
98. (Don't know)
99. (Refused)

F3. Does your organization lease or own the facility or facilities?

1. (Lease)
2. (Own)
3. (Other **[RECORD VERBATIM: _____]**)
98. (Don't know)
99. (Refused)

F4. How many people are employed by your company at all locations?

1. (1-10)
2. (11-25)
3. (26-50)
4. (51-75)
5. (76-100)
6. (101-200)
7. (201-500)
8. More than 500
98. (Don't know)
99. (Refused)

G. Closing

G1. Overall, how satisfied would you say you are with the Instant Incentive program? Would you say:

[READ LIST]

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

G2. Is there anything that **[UTILITY]** could have done to improve your overall experience with the Instant Incentive program? **[DO NOT READ THE LIST, RECORD ALL THAT APPLY]**

1. (Better/more communication)
2. (Quicker response time)
3. (Larger selection of eligible equipment)
4. (Increasing the incentive amount)
5. (Simplify the application process)
6. (Simplify the website)
7. (Provide quicker approval on applications)
8. (Send incentive check out faster)
9. (Other **[SPECIFY: _____]**)
10. (No, nothing)
98. (Don't know)
99. (Refused)

G2.1 **[ASK IF G2 = 1]** You mentioned you would like better communication. Who would you like more communication from? **[RECORD RESPONSE_____]**

G2.2 **[ASK IF G2 = 2]** You mentioned a quicker response time. Who would you like a quicker response time from? **[RECORD RESPONSE_____]**

G2.3 **[ASK IF G2 = 3]** What other energy-efficient equipment should *wattsmart* business offer incentives for? **[RECORD RESPONSE_____]**

G2.5 **[ASK IF G2=5]** In what way would you like them to simplify the application process? **[RECORD RESPONSE_____]**

G2.6 **[ASK IF G2 = 6]** In what way would you like them to simplify the website? **[RECORD RESPONSE_____]**

G3. In the future, how would you like to stay informed about opportunities available through the *wattsmart* Business Program? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]**

1. (Contact with *wattsmart* Business representative or utility representative)
2. (*wattsmart* printed program materials)
3. (*wattsmart* sponsored workshop or community event)
4. (Utility mailing, emailing, newsletter w/bill, bill insert, or utility Website)
5. (Through my electrician or contractor)
6. (Through a trade association, trade publication or professional organization) **[SPECIFY: _____]**
7. (Through the vendor, distributor or supplier where I purchase lighting)
8. (Newspaper ad)
9. (Radio ad)
10. (TV ad)
11. (Social Media (e.g., Facebook, Twitter, YouTube))
12. (Online ads)
13. (Other **[SPECIFY: _____]**)
98. (Don't know)
99. (Refused)

This completes the survey. Your responses are very important to [UTILITY]. We appreciate your participation and thank you for your time. Have a good day.

PacifiCorp wattsmart Business Program (2016–2017) Energy Management Participant Survey

Researchable Questions		
Key Research Topics	Areas of Investigation	Related Questions
Screening	Project initiation process	C1
Marketing and Outreach	Program Awareness	B3
	Future communication preferences	G3
Barriers	Obstacles to installing high-efficiency equipment	C3-C4, C34-C35
Satisfaction	Assess satisfaction with Program application process, various program components and reasons for dissatisfaction among participants	C5-C32, G1, G2
Firmographics	Determine building and company characteristics of participants	Section F
Decision Making	Key factors influencing customers’ decision to participate in program. Benefits received.	C1, C2, C9, C33
Freeridership and Spillover	Assess net savings	Sections D and E

Target Quota = See samples for individual states

General Instructions

- Interviewer instructions are in green **[LIKE THIS]** (the style is “Survey: Interviewer Instructions”).
- CATI programming instructions are in red **[LIKE THIS]** (the style is “Survey: Programming”).
- Items that should not be read by the interviewer are in parentheses like this ().

Variables to be pulled into Survey

- **[UTILITY]**
- **[PROGRAM YEAR]**
- **[CONTACT NAME]**
- **[PROJECT NAME]**
- **[SITE ADDRESS 1]**
- **[SITE CITY]**
- **[PROJECT STATE]**
- **[MEASURE SUB TYPE]**
- **[MEASURE CUSTOM NAME]**
- **[CUSTOMER INCENTIVE]**
- **[BILL_CREDIT]**

A. Introduction

Hello, I'm [INSERT NAME] calling on behalf of [INSERT UTILITY]. May I speak with [INSERT CONTACT NAME]? OR [IF NO NAME OR NAMED RESPONDENT NO LONGER WORKS FOR COMPANY] May I speak with the facility manager, energy manager or someone who is familiar with your participation in the [UTILITY] incentives for the [PROJECT NAME] project? [IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR THEIR NAME AND PHONE NUMBER AND START AGAIN]

1. **Respondent not available: ASK IF YOU CAN LEAVE A MESSAGE ON THEIR VM**
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]

A1. Hello, I'm [INSERT NAME] calling on behalf of [INSERT UTILITY]. Are you the person who handles energy decisions for the [PROJECT NAME] project? [IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR THEIR NAME AND PHONE NUMBER AND START AGAIN]

1. (Yes)
2. (No or not a convenient time) [ASK IF RESPONDENT WOULD LIKE TO ARRANGE A MORE CONVENIENT TIME OR IF YOU CAN LEAVE A MESSAGE FOR A MORE APPROPRIATE PERSON]
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND READ A1 AGAIN]
99. (Refused) [THANK AND TERMINATE]

A2. Are you the person responsible for making energy-efficiency decisions for your company at the [SITE ADDRESS 1], [SITE CITY] location?

1. (Yes)
2. (No, person is able to come to phone) [ASK FOR PERSON WHO IS AND RE-READ A2]
3. (No, person is not able to come to phone) [GET NAME AND PHONE NUMBER, SCHEDULE CALL BACK – START CALLBACK AT A1]
98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND RE-READ A2]
99. (Refused) [THANK AND TERMINATE]

A3. We are conducting an important survey today about [INSERT UTILITY]'s Energy Management program. [INSERT UTILITY] is actively seeking your opinions to help improve their business efficiency programs and to better understand how to assist customers in saving money and energy. This call may be monitored or recorded for quality assurances purposes. Anything you share with us today will be confidential and not attributed to any one individual or business.

1. [IF RESPONDENT ASKS HOW LONG, SAY "Approximately 10-15 minutes."]
2. [IF NEEDED, STATE "this survey is for research purposes only and this is not a marketing call. This is the primary way for customers to provide input into the incentive programs [UTILITY] offers. Your perspectives help [UTILITY] design energy-efficiency programs to help their customers save money and energy."]
3. [ONLY IF ASKED FOR A [UTILITY] CONTACT TO VERIFY THE SURVEY AUTHENTICITY, offer NIKKI KARPAVICH, 801-220-4439.

B. Screeners

- B1. Our records show that you completed a **[MEASURE SUB TYPE]** project at **[SITE ADDRESS 1]** in **[INSERT PROGRAM YEAR]**? Is this correct? **[IF MEASURE CUSTOM NAME IN SAMPLE READ: This included [MEASURE CUSTOM NAME]. [MULTIPLE RESPONSE]**
1. (Yes)
 2. (No, wrong year) **[RECORD CORRECT YEAR IF POSSIBLE]**
 3. (No, wrong address) **[RECORD CORRECT ADDRESS]**
 4. (No, wrong measure) **[CORRECT BELOW]**
 - B1.4A (ASKED IF MEASURE SUB TYPE IS INCORRECT **[Which of the following did you complete?**)
 - 1 Industrial Recommissioning
 - 2 Persistent Recommissioning
 - 3 Recommissioning
 - 4 Strategic Energy Management
98. (Don't know) ask to speak with someone who would know and start again **AT A2. IF NO ONE, THEN THANK AND TERMINATE]**
99. (Refused) **[THANK AND TERMINATE]**
- [ASSIGN VARIABLE C_MEASURE SUB TYPE based on response to B1.4A]**
5. (No, I did not participate) **[THANK AND TERMINATE]**
98. (Don't know) ask to speak with someone who would know and start again **AT A2. IF NO ONE, THEN THANK AND TERMINATE]**
99. (Refused) **[THANK AND TERMINATE]**
- B2. To ensure our records are correct, can you confirm that you received an incentive for this project?
1. (Yes)
 2. (No) **[THANK AND TERMINATE]**
 98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN AT A2. IF NO ONE, THEN THANK AND TERMINATE]**
 99. (Refused) **[THANK AND TERMINATE]**
- B3. How did your organization learn about the incentives for this **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** project? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]**
1. (Contact with *wattsmart* Business representative or utility representative)
 2. (*wattsmart* printed program materials)
 3. (*wattsmart* sponsored workshop or community event)
 4. (Utility mailing, bill insert, or utility Website)
 5. (Previously participated in program/received an incentive)
 6. (Through a civic organization, trade association or professional organization)
[SPECIFY: _____]
 7. (Through the vendor or supplier where I purchase equipment)
 8. (Word of mouth (family, friend, or business colleague)

- 9. (Other [SPECIFY: _____])
- 98. (Don't know)
- 99. (Refused)

C. Energy Management

- C1. What factors were important to your company's decision to participate in the **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** incentives? **[DO NOT READ LIST; RECORD ALL THAT APPLY]**
- 1. (To save money on energy bills)
 - 2. (To save energy)
 - 3. (To obtain professional services of the Energy Management Provider/identify operational issues in the building systems or processes)
 - 4. (To obtain a program incentive)
 - 5. (To improve productivity)
 - 6. (Other [SPECIFY _____])
 - 98. (Don't know)
 - 99. (Refused)
- C2. Thinking about the factor(s) you just mentioned, what was the most important to your company's decision to participate? **[DO NOT READ LIST; RECORD ONE RESPONSE]**
- 1. (To save money on energy bills)
 - 2. (To save energy)
 - 3. (To obtain professional services/ services of the Energy Management Provider/identify operational issues in the building systems or processes)
 - 4. (To obtain a program incentive)
 - 5. (To improve productivity)
 - 6. (Other [SPECIFY _____])
 - 98. (Don't know)
 - 99. (Refused)
- C3. Thinking about the general application and any supplemental applications you submitted, how easy would you say this paperwork was to complete? Would you say...? **[READ LIST]**
- 1. Very easy,
 - 2. Somewhat easy,
 - 3. Not too easy, or
 - 4. Not at all easy?
 - 98. (Don't know)
 - 99. (Refused)

[ASK IF C3=2, 3 OR 4]

- C4. What would have made this paperwork easier to complete?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)
- C5. Thinking about the incentive you received for this project, were you satisfied with the amount of the incentive? Would you say...? **[READ LIST]**
1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
 98. (Don't know)
 99. (Refused)

[IF C5=2, 3 OR 4]

- C6. What incentive amount would have been enough for you to say you were very satisfied?
- [RECORD VERBATIM: _____]**
98. (Don't know)
 99. (Refused)
- C7. How satisfied were you with the amount of time it took to receive the incentive? Would you say...? **[READ LIST]**
1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
 98. (Don't know)
 99. (Refused)

[IF C7=2, 3 OR 4]

- C8. What amount of time would have been appropriate? [Record answer in days, weeks, months]
- [RECORD VERBATIM: _____]**
98. (Don't know)
 99. (Refused)

C9. What payback period does your company typically look for on these kinds of projects?

[RECORD SPECIFIC PERIOD OF TIME, EX 1-2 MONTHS, 1 YEAR, 2-3 YEARS]

[RECORD VERBATIM: _____]

98. (Don't know)

Thank you, now I'd like to ask you a few questions about the information and services provided for your project, by the [UTILITY] funded, Energy Management Provider.

[ASK C10-C17 IF MEASURE SUB TYPE OR C MEASURE SUB TYPE ≠ STRATEGIC ENERGY MANAGEMENT]

C10. Overall, how satisfied were you with the detailed site assessment that was conducted by the engineering services Provider for this project? Would you say...? [READ LIST]

1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C10=2, 3 OR 4]

C11. Why do you say that?

1. [RECORD VERBATIM: _____]
98. (Don't know)
99. (Refused)

C12. How satisfied were you with the recommendations presented in the Savings and Incentive Report for this project? Would you say...? [READ LIST]

1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C12=2, 3 OR 4]

C13. Why do you say that?

1. [RECORD VERBATIM: _____]
98. (Don't know)
99. (Refused)

C14. After you implemented the project, how satisfied were you with the project verification completed by the Energy Management Provider? Would you say...? **[READ LIST]**

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C14=2, 3 OR 4]

C15. Why do you say that?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

C16. How satisfied were you with the final Savings and Verification Report? Would you say...? **[READ LIST]**

1. Very satisfied **[SKIP TO C30]**
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know) **[SKIP TO C30]**
99. (Refused) **[SKIP TO C30]**

[IF C16=2, 3 OR 4]

C17. Why do you say that?

1. **[RECORD VERBATIM: _____] [SKIP TO C30]**
98. (Don't know) **[SKIP TO C30]**
99. (Refused) **[SKIP TO C30]**

[ASK C18-C29 IF MEASURE SUB TYPE OR C MEASURE SUB TYPE =STRATEGIC ENERGY MANAGEMENT]

C18. Overall, how satisfied were you with the energy management assessment conducted for this project? Would you say...? **[READ LIST]**

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C18=2, 3 OR 4]

C19. Why do you say that?

- 1. **[RECORD VERBATIM: _____]**
- 98. (Don't know)
- 99. (Refused)

C20. How satisfied were you with the coaching your organization received from the Energy Management Provider for this project? Would you say...? **[READ LIST]**

- 1. Very satisfied
- 2. Somewhat satisfied
- 3. Not too satisfied
- 4. Not satisfied at all
- 98. (Don't know)
- 99. (Refused)

[IF C20=2, 3 OR 4]

C21. What would have increased your satisfaction with the coaching your organization received?

- 1. **[RECORD VERBATIM: _____]**
- 98. (Don't know)
- 99. (Refused)

C22. During the phase in which you and your Energy Management Provider determined the energy savings for your facility, an Energy Map was created, energy data was collected and analyzed, and an energy savings model and dashboard were built. Following this, the Energy Management Provider would have discussed each of these with your organization. Thinking about this phase, how satisfied were you with the Energy Map? Would you say...? **[READ LIST]**

- 1. Very satisfied
- 2. Somewhat satisfied
- 3. Not too satisfied
- 4. Not satisfied at all
- 98. (Don't know)
- 99. (Refused)

[IF C22=2, 3 OR 4]

C23. Why do you say that?

- 1. **[RECORD VERBATIM: _____]**
- 98. (Don't know)
- 99. (Refused)

C24. Thinking about this same phase, how satisfied were you with the information you received about the energy data analysis? Would you say...? **[READ LIST]**

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C24=2, 3 OR 4]

C25. Why do you say that?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

C26. Again, thinking about this same phase, how satisfied were you with the savings model? Would you say...? **[READ LIST]**

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C26=2, 3 OR 4]

C27. Why do you say that?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

C28. As a final step in this phase, the Energy Management Provider estimated the energy savings for your facility and created an SEM Savings Memorandum. How satisfied were you with the information you received in this memorandum? Would you say...? **[READ LIST]**

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF C28=2, 3 OR 4]

- C29. Why do you say that?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)

[ASK ALL C30-C34]

- C30. Overall how satisfied were you with the engineering services provider funded by **[UTILITY]**? Would you say...? **[READ LIST]**
1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
 98. (Don't know)
 99. (Refused)

[IF C30=2, 3 OR 4]

- C31. Why do you say that?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)

- C32. Overall, how satisfied were you with the **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** program? Would you say...? **[READ LIST]**
1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
 98. (Don't know)
 99. (Refused)

- C33. What would you say are the main benefits your company has experienced as a result of your participation in the **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** program]? **[DO NOT READ LIST; RECORD ALL THAT APPLY; PROBE FOR MULTIPLE RESPONSES]**
1. (Saving money on our utility bills; lower energy bills)
 2. (Using less energy, reducing energy consumption or energy demand)
 3. (Obtained professional services of the Energy Management Provider/identified operational issue in the building systems or processes)
 4. (The incentive)
 5. (Improved productivity)
 6. (Saving money on maintenance costs)

- 7. (Other [SPECIFY: _____])
- 8. (NO BENEFITS)
- 98. (Don't know)
- 99. (Refused)

C34. Other than what you've already told me, did you encounter any challenges participating in the [MEASURE SUB TYPE OR C MEASURE SUB TYPE] program?

- 1. [SPECIFY: _____]
- 2. (No challenges)
- 98. (Don't know)
- 99. (Refused)

[IF C34=1]

C35. What could [UTILITY] do to help your company overcome these challenges? [DO NOT READ LIST, ALLOW MULTIPLE RESPONSES]

- 1. (Nothing)
- 2. (Higher incentives)
- 3. (Offer low-interest loans/financing)
- 4. (Simplify the paperwork)
- 5. (Provide better/more information about program)
- 6. (Other [RECORD VERBATIM ANSWER _____])
- 98. (Don't know)
- 99. (Refused)

[ASK IF C35=5]

C35.5 You mentioned you would like more information. What type of information do you need?
[RECORD VERBATIM: _____]

D. Freeridership

[IF MEASURE SUB TYPE OR C_MEASURE SUB TYPE=STRATEGIC ENERGY MANAGEMENT SKIP TO E16]

Thank you. Next, we have a few questions about other energy-efficiency improvements you might have made.

[ASK D1-D9 IF MEASURE SUB TYPE OR C MEASURE SUB TYPE ≠STRATEGIC ENERGY MANAGEMENT]

D1. Without the [MEASURE SUB TYPE OR C MEASURE SUB TYPE] program, meaning without either the technical assistance or the financial incentive, would you have still completed the exact same [MEASURE SUB TYPE OR C MEASURE SUB TYPE] project?

- 1. (Yes)
- 2. (No) [SKIP TO D3]

98. (Don't know) [SKIP TO D3]
99. (Refused) [SKIP TO D3]
- D2. Without the program, meaning without either the technical assistance or the financial incentive, would you have still completed the [MEASURE SUB TYPE OR C MEASURE SUB TYPE] project at the same time?
1. (Yes) [SKIP TO D7]
 2. (No) [SKIP TO D4]
98. (Don't know) [SKIP TO D4]
99. (Refused) [SKIP TO D4]
- D3. Without the program, would you have completed any [MEASURE SUB TYPE OR C MEASURE SUB TYPE] project?
1. (Yes)
 2. (No) [SKIP TO D8]
98. (Don't know) [SKIP TO D8]
99. (Refused) [SKIP TO D8]
- D4. Without the program, in terms of timing, when would you have completed the [MEASURE SUB TYPE OR C MEASURE SUB TYPE] project?
1. Within one year from original participation date
 2. In one to two years from original participation date
 3. More than two years from original participation date [SKIP TO D8]
98. (Don't know)
99. (Refused)
- D5. Relative to the energy efficiency of [MEASURE SUB TYPE OR C MEASURE SUB TYPE] project completed through the program, how would you characterize the efficiency of the recommissioning project you would have completed without the program?
1. Just as efficient as completed with the program
 2. Lower than completed through the program, but better than standard efficiency
 3. Standard efficiency
98. (Don't know)
99. (Refused)
- D6. Would you have recommissioned more, less, or the same amount of equipment without the program?
1. (More)
 - D6a. Compared to the amount recommissioned through the program, how much more? [RECORD PERCENTAGE: _____] [NUMERIC 0-100,998(DON'T KNOW),999 (REFUSED)]
 2. (Less)

D6b. Compared to the amount recommissioned through the program, how much less? **[RECORD PERCENTAGE: _____]** **[NUMERIC 0-100, 998 (DON'T KNOW), 999 (REFUSED)]**

- 98. (Don't know)
- 99. (Refused)

D7. Prior to hearing about the program, was the cost of your recommissioning project included in your organization's most recent capital budget?

- 1. (Yes)
- 2. (No)
- 98. (Don't know)
- 99. (Refused)

D8. In your own words, can you please describe what impact the program had on your decision to complete this **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** project?

D9. With the **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** program, your company received financial incentives of **[CUSTOMER INCENTIVE]** for your project.

For the project, 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 recommission. 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]**

- 1. Recommendations provided by **[UTILITY]**'s engineering services Provider on energy saving opportunities
- 2. Information on payback
- 3. The **[UTILITY]** incentive
- 4. Verification of proper installation, repairs, and/or control strategies
- 5. Previous participation with a **[UTILITY]** program **[RECORD RATINGS AND SPECIFY PROGRAM_____]**

E. Spillover

E1. Now I'd like to ask about recommissioning projects **other than** those you completed through the program. Since participating in this program, have you completed any additional recommissioning projects on your own without any assistance from a utility or other organization?

- 1. (Yes)
- 2. (No) **[SKIP TO SECTION F]**
- 98. (Don't know) **[SKIP TO SECTION F]**
- 99. (Refused) **[SKIP TO SECTION F]**

E2. Did you complete a recommissioning project that is the same as the **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** project you completed through the program?

- 1. (Yes)
- 2. (No) **[SKIP TO E9]**
- 98. (Don't know) **[SKIP TO E9]**
- 99. (Refused) **[SKIP TO E9]**

E3. How many projects did you complete?

- 1. **[RECORD RESPONSE]** [Numeric 0-97]
- 98. (Don't know)
- 99. (Refused)

E4. Relative to the energy efficiency of the project completed through the program, how would you characterize the efficiency of this project?

- 1. Just as efficient as installed through the program
- 2. Lower than installed through the program, but better than the standard efficiency
- 3. Standard efficiency
- 98. (Don't know)
- 99. (Refused)

E5. Did you receive an incentive from **[UTILITY]** or another organization for this recommissioning?

- 1. (Yes)
- 2. (No)
- 98. (Don't know)
- 99. (Refused)

[ASK IF E5=1]

E6. What program or sponsor provided the incentive?

- 1. **[ENTER PROGRAM OR UTILITY]**
- 98. (Don't know)
- 99. (Refused)

E7. On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the **[UTILITY] [MEASURE SUB TYPE OR C MEASURE SUB TYPE]** program was in your decision to recommission this equipment(s).

- 1. RECORD RATING: _____]
- 98. (Don't know)
- 99. (Refused)

[ASK IF E5=2]

E8. Why did you not apply for an incentive from **[UTILITY]** for this recommissioning project?

- 1. **[RECORD RESPONSE]**
- 98. (Don't know)
- 99. (Refused)

- E9. In **[PROGRAM YEAR]** did you purchase and install **other** energy efficiency improvements, on your own without any assistance (financial or technical) from a utility, vendor or other organization?
1. (Yes)
 2. (No) **[SKIP TO SECTION F]**
 98. (Don't know) **[SKIP TO SECTION F]**
 99. (Refused) **[SKIP TO SECTION F]**

- E10. What type of equipment did you install? **[DO NOT READ LIST. RECORD ALL THAT APPLY]**
1. (Lighting equipment)
 2. (HVAC equipment (heating and cooling)/HVAC controls/Ventilation/Fans)
 3. (Water heating equipment)
 4. (Variable frequency drive)
 5. (Efficient motor)
 6. (Refrigeration equipment)
 7. (Building envelope measures)
 8. (Compressed air equipment)
 9. (Chiller)
 10. (Pump)
 11. (Irrigation equipment (gaskets, drains, sprinklers))
 12. (Other) **[SPECIFY]:** _____
 13. (None of the above) **[SKIP TO SECTION F]**
 98. (Don't know) **[SKIP TO SECTION F]**
 99. (Refused) **[SKIP TO SECTION F]**

[ASK E10.11-E10.14 AND E11-E15 if E10=1]

- E10.11** What type of lighting was purchased and installed? **[SPECIFY TYPE EXAMPLE: CFL, LED, FLUORESCENT]:** _____
- E10.12** What is the wattage of the lighting? **[SPECIFY]:** _____
- E10.13** In what location was it installed (Wall/Ceiling/Outdoors)? **[SPECIFY]:** _____
- E10.14** What type of equipment was removed or replaced? **[SPECIFY]:** _____

[ASK E10.21-E10.24 AND E11-E15 if E10=2]

- E10.21** What type of HVAC equipment was purchased and installed? **[SPECIFY TYPE]:** _
- E10.22** What Fuel type is used? **[SPECIFY]:** _____
- E10.23** What is the efficiency rating of the equipment? Is that HSFP, EER or SEER? [Record as HSFP or EER or SEER (ex 13 SEER)] **[SPECIFY]:** _____
- E10.24** What is the capacity, in tons, of the equipment? [Record in tons (5 tons, 10 tons etc.)] **[SPECIFY]:** _____

[ASK E10.31-E10.34 AND E11-E15 if E10=3]

E10.31 What type of water heating equipment was purchased and installed? **[SPECIFY TYPE]:** _____

E10.32 What Fuel type is used? **[SPECIFY]:** _____

E10.33 What is the energy factor of the equipment? [Record energy factor (ex .54 EF or 2 EF)] **[SPECIFY]:** _____

E10.34 (If water heater with storage) What is the capacity, in gallons, of the equipment? [Record in gallons] **[SPECIFY]:** _____

[ASK E10.41-E10.42 AND E11-E15 if E10=4]

E10.41 What type of motor was it installed on? **[SPECIFY TYPE]:** _____

E10.42 What is the horsepower of the motor? **[SPECIFY]:** _____

[ASK E10.51-E10.52 AND E11-E15 if E10=5]

E10.51 What equipment was the motor installed on? **[SPECIFY TYPE]:** _____

E10.52 What is the horsepower of the motor? **[SPECIFY]:** _____

[ASK E10.61 AND E11-E15 if E10=6]

E10.61 What type of refrigeration or freezer equipment was purchased and installed? **[SPECIFY TYPE]:** _____

[ASK E10.71-E10.73 AND E11-E15 if E10=7]

E10.71 What building envelope measure was purchased and installed? **[SPECIFY TYPE]:** _____

E10.72 What is the efficiency (R-value) of the measure? **[SPECIFY]:** _____

E10.73 In what location was it installed (Wall/Roof/Floor)? **[SPECIFY]:** _____

[ASK E10.81-E10.82 AND E11-E15 if E10=8]

E10.81 FOR What type of application was the compressed air equipment purchased and installed? **[SPECIFY APPLICATION]:** _____

E10.82 What is the horsepower of the compressor motor? **[SPECIFY]:** _____

[ASK E10.91-E10.92 AND E11-E15 if E10=9]

E10.91 FOR What type of application was the chiller purchased and installed? **[SPECIFY APPLICATION]:** _____

E10.92 What size chiller, in tons, did you install? [Record in tons (5-ton, 10 ton etc.)] **[SPECIFY]:** _____

[ASK E10.101-E10.103 AND E11-E15 if E10=10]

E10.101 FOR What type of application was the pump purchased and installed? **[SPECIFY APPLICATION]:** _____

E10.102 What is the horsepower of the motor for the pump? **[SPECIFY]** _____

E10.103 What is the efficiency rating of the pump? [Record percentage (ex 94%)] **[SPECIFY]:** _____

[ASK E10.111 AND E11-E15 if E10=11]

E10.111 WHAT IRRIGATION EQUIPMENT DID YOU purchased and install? **[SPECIFY GASKETS, DRAINS, SPRINKLERS, ETC.]:** _____

[ASK IF E10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN E10 = 1- 12]

E11. How many did you purchase and install? [ASK FOR EACH MEASURE MENTIONED IN E10 = 1-12] [IF E10 MEASURE = 7 'BUILDING ENVELOPE' THEN ASK HOW MANY 'SQUARE FEET']

1. [RECORD RESPONSE]
98. (Don't know)
99. (Refused)

[ASK IF E10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN E10]

E12. Just to confirm, did you receive an incentive from **[UTILITY]** or another organization for this equipment? [ASK FOR EACH MEASURE MENTIONED IN E10]

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[ASK FOR EACH YES IN E12]

E13. What utility or organization provided the incentive? [ASK FOR EACH MEASURE MENTIONED IN E10]

1. [RECORD UTILITY OR ORGANIZATION]
98. (Don't know)
99. (Refused)

[ASK IF E10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN E10]

E14. What information did you rely upon to determine that the equipment installed was energy efficient? [ASK FOR EACH MEASURE MENTIONED IN E10]

1. [RECORD RESPONSE]
98. (Don't know)
99. (Refused)

[ASK IF E10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN E10]

- E15. On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the **[UTILITY] [MEASURE SUB TYPE OR C MEASURE SUB TYPE]** program was in your decision to install [this/these/ energy-efficient product(s)]? **[ASK FOR EACH MEASURE MENTIONED IN E10]**
1. **[RECORD RATING: _____]**
 98. (Don't know)
 99. (Refused)

**[IF MEASURE SUB TYPE OR C MEASURE SUB TYPE≠STRATEGIC ENERGY MANAGEMENT SKIP TO F1]
[ASK E16 IF MEASURE SUB TYPE OR C MEASURE SUB TYPE =STRATEGIC ENERGY MANAGEMENT]**

- E16. Does your organization have other facilities within the **[UTILITY]** service territory?
1. (Yes)
 2. (No) **[SKIP TO SECTION F]**
 98. (Don't know) **[SKIP TO SECTION F]**
 99. (Refused) **[SKIP TO SECTION F]**
- E17. Please describe any **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** activities at your other locations within **[UTILITY]**'s territory, that you implemented **since** participating in the program, without an incentive from **[UTILITY]**.
1. **[RECORD RESPONSE]**
 2. (None) **[SKIP TO SECTION F]**
 98. (Don't know) **[SKIP TO SECTION F]**
 99. (Refused) **[SKIP TO SECTION F]**
- E18. On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the **[UTILITY] [MEASURE SUB TYPE OR C MEASURE SUB TYPE]** program was in your decision to implement [this/these/ activity(s)]?
1. **[RECORD RATING: _____]**
 98. (Don't know)
 99. (Refused)

[ASK SECTION F TO ALL SURVEY RESPONDENTS]

F. Firmographics

Finally, I have a few general questions about your business.

F1. What industry is your company in? **[DON'T READ RESPONSES UNLESS NECESSARY]**

1. (Accommodation)
2. (Arts, Entertainment and Recreation)
3. (Construction)
4. (Dairy, Agricultural)
5. (Educational Services)
6. (Finance, Insurance)
7. (Food Service)
8. (Food Processing)
9. (Health Care)
10. (Manufacturing)
11. (Mining)
12. (Nonprofit and Religious Organizations)
13. (Oil and Gas)
14. (Professional, Scientific and Technical Services)
15. (Public Administration/Government Services)
16. (Retail)
17. (Refrigerated Warehouse)
18. (Real Estate/Property Management)
19. (Repair and Maintenance Service)
20. (Transportation)
21. (Warehouses or Wholesaler)
22. (Other **[SPECIFY: _____]**)
98. (Don't know)
99. (Refused)

F2. How many locations does your company operate in **[PROJECT STATE]**?

1. **[RECORD NUMBER: _____] [NUMERIC 1-500]**
2. More than 500
- 998 (Don't know)
- 999 (Refused)

F3 Does your organization lease or own the facility or facilities?

1. (Lease)
2. (Own)
3. (Other) **[Record VERBATIM: _____]**
98. (Don't know)
99. (Refused)

F4 How many people are employed by your company at all locations?

1. (1-10)
2. (11-25)
3. (26-50)
4. (51-75)
5. (76-100)
6. (101-200)
7. (201-500)
8. More than 500
98. (Don't know)
99. (Refused)

G. Closing

G1. Overall, how satisfied would you say you are with the **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** program? Would you say: **[READ LIST]**

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

G2. Is there anything that **[UTILITY]** could have done to improve your overall experience with the **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** program? **[DO NOT READ THE LIST, RECORD ALL THAT APPLY]**

1. (Better/more communication)
2. (Quicker response time)
3. (Larger selection of eligible equipment)
4. (Increasing the incentive amount)
5. (Simplify the application process)
6. (Simplify the website)
7. (Provide quicker approval on applications)
8. (Send incentive check out faster)
9. (Other **[SPECIFY: _____]**)
10. (No, nothing)
98. (Don't know)
99. (Refused)

G2.1 **[ASK IF G2 = 1]** You mentioned you would like better communication. Who would you like more communication from? **[RECORD RESPONSE _____]**

G2.2 **[ASK IF G2 = 2]** You mentioned a quicker response time. Who would you like a quicker response time from? **[RECORD RESPONSE _____]**

G2.3 **[ASK IF G2 = 3]** What other energy-efficient equipment should *wattsmart* business offer incentives for? **[RECORD RESPONSE_____]**

G2.5 **[ASK IF G2=5]** In what way would you like them to simplify the application process? **[RECORD RESPONSE_____]**

G2.6 **[ASK IF G2 = 6]** In what way would you like them to simplify the website? **[RECORD RESPONSE_____]**

G3. In the future, how would you like to stay informed about opportunities available through the **[MEASURE SUB TYPE OR C MEASURE SUB TYPE]** program? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]**

1. (Contact with *wattsmart* Business representative or utility representative)
2. (*wattsmart* printed program materials)
3. (*wattsmart* sponsored workshop or event)
4. (Utility mailing, email, newsletter with bill, bill insert, or utility Website)
5. (Contact with a vendor/contractor)
6. (Through a trade association, trade publication or professional organization) **[SPECIFY: _____]**)
7. (Newspaper ad)
8. (Radio ad)
9. (TV ad)
10. (Social Media (e.g., Facebook, Twitter, YouTube))
11. (Online ads)
12. (Other **[SPECIFY: _____]**)
98. (Don't know)
99. (Refused)

This completes the survey. Your responses are very important to [UTILITY]. We appreciate your participation and thank you for your time. Have a good day.

Appendix E. PacifiCorp *wattsmart* Business Program (2016/2017) Nonparticipant/Partial Participant Survey

Researchable Questions		
Key Research Topics	Areas of Investigation	Related Questions
Marketing and Outreach	Program awareness	C1-C4, D10-D11
	Future communication preferences	C5
Motivation and Barriers	Reasons to make energy-efficient improvements; Obstacles to installing high-efficiency equipment	D1-D9, D12-D14, G1-G3
Spillover	Assess savings spillover	Section E
Firmographics	Determine building and company characteristics of participants	Section F

Target Quota:

Nonparticipants:

California=68

Washington=68

Utah=68

Idaho=68

Wyoming=68

Partial participants: See quota tab in Partial Participants 2016-2017 Sample for VuPoint

General Instructions

- Interviewer instructions are in green **[LIKE THIS]** (the style is “Survey: Interviewer Instructions”).
- CATI programming instructions are in red **[LIKE THIS]** (the style is “Survey: Programming”).
- Items that should not be read by the interviewer are in parentheses like this ().

Variables to Be Pulled into Survey

- **[CONTACT NAME]**
- **[CUSTOMER NAME]**
- **[SITE.ADDRESS 1]**
- **[SITE CITY]**
- **[SITE STATE]**
- **[UTILITY]**
- **[MEASURE.NAME.FINAL] MEASURE**
- **[YEAR] PROGRAM YEAR**

A. Introduction

- A1. Hello, I'm [INSERT NAME] calling on behalf of [UTILITY]. May I speak with [CONTACT NAME]? OR [IF NO NAME OR NAMED RESPONDENT NO LONGER WORKS FOR COMPANY] May I speak with the person who handles energy decisions for [CUSTOMER NAME]? [IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR THEIR NAME AND PHONE NUMBER AND START AGAIN]
1. (Yes) [IF CORRECT PERSON, SKIP TO A3. IF TRANSFERRED TO SOMEONE ELSE, READ A2]
 2. (No or not a convenient time) [ASK IF RESPONDENT WOULD LIKE TO ARRANGE A MORE CONVENIENT TIME OR IF YOU CAN LEAVE A MESSAGE FOR A MORE APPROPRIATE PERSON]
 98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]
 99. (Refused) [THANK AND TERMINATE]
- A2. Hello, I'm [INSERT NAME] calling on behalf of [UTILITY]. Are you the person responsible for making energy-efficiency decisions for your company at the [SITE.ADDRESS 1] location?
1. (Yes)
 2. (No, person is able to come to phone) [ASK FOR PERSON WHO IS AND START AGAIN]
 3. (No, person is not able to come to phone) [GET NAME AND PHONE NUMBER, SCHEDULE CALL BACK]
 98. (Don't know) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]
 99. (Refused) [THANK AND TERMINATE]
- A3. We are conducting an important survey today about [UTILITY]'s wattsmart Business Program. [UTILITY] is actively seeking your opinions to help improve their business efficiency programs and to better understand how to assist customers in saving money and energy. [IF SITE STATE=CA AND IF PARTICIPANT=PARTIAL PARTICIPANT, READ: For completing this survey, we will enter your name into a drawing for the chance to win a \$100-dollar gift card.] This call may be monitored or recorded for quality assurances purposes. Anything you share with us today will be confidential and not attributed to any one individual or business.
1. [IF RESPONDENT ASKS HOW LONG, SAY "Approximately 5 to 7 minutes."]
 2. [IF NEEDED, STATE "This survey is for research purposes only and this is not a marketing call. This is the primary way for customers to provide input into the incentive programs [UTILITY] offers. Your perspectives help [UTILITY] design energy-efficiency programs to help their customers save money and energy."]
 3. [ONLY IF ASKED FOR A [UTILITY] CONTACT TO VERIFY THE SURVEY AUTHENTICITY, OFFER [Nikki Karpavich, 801-220-4439]

B. Screeners

[ASK PARTIAL PARTICIPANTS]

- B1. Our records show that you initiated **[DEPENDING ON MEASURE NAME READ “a” or “an”]** **[MEASURE]** project at **[SITE.ADDRESS 1]** with **[UTILITY]** in **[YEAR]**, but did not complete this project through the wattsmart Business Program. You may have first discussed this project with **[UTILITY]**, or submitted an application as early as 2013, but the project was officially created in **[YEAR]** **IS** this correct?
1. (Yes)
 2. (No, wrong year) **[RECORD CORRECT YEAR, IF POSSIBLE]**
 3. (No, wrong address) **[RECORD CORRECT ADDRESS]**
 4. (No, I did not participate) **[THANK AND TERMINATE]**
 98. (Don’t know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN AT A2. IF NO ONE, THEN THANK AND TERMINATE]**
 99. (Refused) **[THANK AND TERMINATE]**

[THANK AND TERMINATE TEXT] Those are all the questions we have for you today. Thank you for your help. Have a nice day!

[ASK EVERYONE]

- B2. Did your company receive an incentive from **[UTILITY]**’s wattsmart Business Program for installing **[FOR PARTIAL PARTICIPANTS READ: this equipment?]** **[FOR NONPARTICIPANTS READ: energy efficient equipment in 2016 or 2017? By energy-efficient equipment, I mean high-efficiency lighting, HVAC equipment, irrigation or dairy equipment, variable speed drives, building envelope, or other energy-efficient equipment.]**
1. (Yes) **[READ: For this survey, we are seeking those companies who did not receive an incentive. We will not take any more of your time today. Thank you.]** **[TERMINATE]**
 2. (No)
 98. (Don’t know) **[ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN AT A2. IF NO ONE, THEN THANK AND TERMINATE]**
 99. (Refused) **[THANK AND TERMINATE]**

[THANK AND TERMINATE TEXT] Those are all the questions we have for you today. Thank you for your help. Have a nice day!

C. Awareness

[ASK PARTIAL PARTICIPANTS C1 THEN SKIP TO C4]

- C1. Even though you did not receive an incentive; how did your organization learn about the incentives available for this project? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]**
1. (Contact with *wattsmart* Business representative or utility representative)
 2. (*wattsmart* printed program materials)
 3. (*wattsmart* sponsored workshop or community event)
 4. (Utility mailing, bill insert, or utility website)
 5. (Through my electrician or contractor)
 6. (Previously participated in program/received an incentive)
 7. (Through a trade association or professional organization) **[SPECIFY: _____]**
 8. (Through a vendor, distributor or supplier where I purchase lighting)
 9. (Word of mouth (family, friend, or business colleague))
 10. (Other **[SPECIFY: _____]**)
 98. (Don't know)
 99. (Refused)

[ASK NONPARTICIPANTS C2]

- C2. Prior to this call today, were you aware that **[UTILITY]** offers technical expertise and cash incentives to help their commercial and industrial customers like you, improve your business' electric energy efficiency?
1. (Yes)
 2. (No) **[SKIP TO C5]**
 98. (Don't know) **[SKIP TO C5]**
 99. (Refused) **[SKIP TO C5]**

[ASK IF C2=1]

- C3. How did your organization learn about the *wattsmart* Business Program? **[DO NOT READ LIST; MULTIPLE RESPONSES POSSIBLE]**
1. (Contact with *wattsmart* Business representative through phone, email, or in person)
 2. (*wattsmart* printed program materials)
 3. (*wattsmart* sponsored workshop or event)
 4. (Contact with utility representative)
 5. (Utility mailing, bill insert, or utility website)
 6. (I contacted my contractor/vendor to ask)
 7. (My contractor/vendor let me know about them)
 8. (Previously participated in program/received an incentive)
 9. (Through a trade association or professional organization) **[SPECIFY: _____]**
 10. (Word of mouth (family, friend, or business colleague))

- 11. (Other **[SPECIFY: _____]**)
- 98. (Don't know)
- 99. (Refused)

[ASK IF C1=1-12 OR 98 OR 99, OR IF C3=1-12 OR 98 OR 99]

- C4. How likely is it that your business will request an incentive from the *wattsmart* Business program for an energy efficiency project in the next 6 months? Would you say ... **[READ LIST]**
- 1. Very likely
 - 2. Somewhat likely
 - 3. Not too likely
 - 4. Not at all likely
 - 98. (Don't know)
 - 99. (Refused)

- C5. What's the best way for **[UTILITY]** to inform you about their incentives for energy-efficient improvements? **[DO NOT READ. MULTIPLE RESPONSES POSSIBLE]**
- 1. (Contact with *wattsmart* Business representative, or utility representative)
 - 2. (*wattsmart* printed program materials)
 - 3. (*wattsmart* sponsored workshop or community event)
 - 4. (Utility mailing, mail, newsletter with bill, bill insert, or utility website)
 - 5. (Through my electrician or contractor)
 - 6. (Through a trade association, trade publication or professional organization) **[SPECIFY: _____]**
 - 7. (Through the vendor, distributor or supplier where I purchase lighting)
 - 8. (Newspaper ad)
 - 9. (Radio ad)
 - 10. (TV ad)
 - 11. (Social Media (e.g., Facebook, Twitter, YouTube))
 - 12. (Online ads)
 - 13. (Other **[SPECIFY: _____]**)
 - 14. (Not interested in being informed about incentives for energy-efficient improvements)
 - 98. (Don't know)
 - 99. (Refused)

D. Motivation and Barriers

[ASK EVERYONE D1]

Thank you. The next few questions are about making energy-efficient improvements for your business.

D1. What factor is the most important to motivate your company to make energy-efficient upgrades?

[DO NOT READ LIST; RECORD ONE RESPONSE]

1. (To save money on energy bills)
2. (To obtain a program incentive)
3. (To obtain a tax credit)
4. (To replace old (but still functioning) equipment)
5. (To replace broken equipment)
6. (To improve productivity)
7. (To improve lighting quality)
8. (Other [SPECIFY _____])
98. (Don't know)
99. (Refused)

[NONPARTICIPANTS SKIP TO D7]

[PARTIAL PARTICIPANTS ASK D2-D6]

D2. Did your company complete the [MEASURE] project you initiated with [UTILITY] even though you did not receive a *wattsmart* Business incentive?

1. (Yes) [SKIP TO D4]
2. (No)
98. (Don't know) [SKIP TO D4]
99. (Refused) [SKIP TO D4]

D3. Why did you not complete the project?

1. [RECORD RESPONSE] [SKIP TO E1]
98. (Don't know) [SKIP TO E1]
99. (Refused) [SKIP TO E1]

D4. Did your company apply for a *wattsmart* Business incentive?

1. (Yes)
2. (No) [SKIP TO D6]
98. (Don't know) [SKIP TO E1]
99. (Refused) [SKIP TO E1]

- D5. Why did your project not receive an incentive?
1. [RECORD RESPONSE] [SKIP TO E1]
 98. (Don't know) [SKIP TO E1]
 99. (Refused) [SKIP TO E1]
- D6. Why did you not apply for an incentive?
1. (Project did not qualify) [SKIP TO E1]
 2. (Other) [RECORD RESPONSE] [SKIP TO E1]
 98. (Don't know) [SKIP TO E1]
 99. (Refused) [SKIP TO E1]

[NONPARTICIPANT ASK D7-D14]

- D7. I'm going to read you six statements describing situations companies experience when considering energy-efficient improvements. Please tell me to what extent you agree with each statement. If it doesn't apply to you, please let me know that. The first statement is: **[RANDOMIZE, READ STATEMENT; THEN JUST FOR THE FIRST STATEMENT, READ THE FOLLOWING: Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?]** **[READ LIST AND RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, AND 4=STRONGLY DISAGREE; 97= NOT APPLICABLE, 98=DON'T KNOW, AND 99=REFUSED]**
- D2a. Making upgrades at our facility is an inconvenience.
 - D2b. Making energy efficiency upgrades to this facility is too costly.
 - D2c. We don't replace working equipment even if it is not energy efficient.
 - D2d. My company has made all the energy efficiency improvements we can without a substantial investment.
 - D2e. My company leases space, we do not want to invest in energy efficiency upgrades.
 - D2f. Decisions about equipment upgrades are made at a corporate office, and we don't have much input at this facility.
- D8. When calculating the return on investment for proposed capital upgrades, does your company include savings gained from energy efficiency?
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)
- D9. What would motivate your business to make more energy-efficient purchases or upgrades to your current equipment? **[DO NOT READ LIST; RECORD UP TO 3 RESPONSES]**
1. (Lower costs of product/equipment)
 2. (Information on return on investment/help with the business case for investment)
 3. (More information generally)
 4. (Higher incentives)
 5. (Incentives on different products/technologies)
 6. (Other) **[SPECIFY]**

- 98. (Don't know)
- 99. (Refused)

[ASK IF D9=3]

- D10. When you say you would like more information, what kind of information is most useful?
- 1. **[RECORD RESPONSE]**
 - 98. (Don't know) **[SKIP TO D13]**
 - 99. (Refused) **[SKIP TO D13]**

[ASK IF D10=1]

- D11. Who could best to provide you with this information? For example, a *wattsmart* Business representative, someone like your contractor, or a product manufacturer?
- 1. (*wattsmart* Business)
 - 2. (Contractor/Distributor/Vendor)
 - 3. (Store staff)
 - 4. (Product Manufacturer)
 - 5. (Something else) **[SPECIFY: _____]**
 - 98. (Don't know)
 - 99. (Refused)

[ASK IF D9=5]

- D12. When you say incentives on different products or technologies, what kind of products or technologies?
- 1. **[RECORD RESPONSE]**
 - 98. (Don't know)
 - 99. (Refused)
- D13. What are the reasons you have not yet participated in a *wattsmart* Business program? **[DO NOT READ LIST; MULTIPLE CHOICES POSSIBLE]**
- 1. (Don't know enough about program)
 - 2. (Don't understand what equipment/measures are available)
 - 3. (Don't have resources for initial investment)
 - 4. (Don't have enough time to participate)
 - 5. (Not sure how much savings there will be)
 - 6. (Don't see any benefits)
 - 7. (Have participated in past and do not see a need)
 - 8. (Other) **[SPECIFY]**
 - 98. (Don't know) **[SKIP TO E1]**
 - 99. (Refused) **[SKIP TO E1]**
- D14. What could **[UTILITY]** do to help your business participate in the *wattsmart* Business program?
- 1. **[RECORD ANSWER]**
 - 98. (Don't know)
 - 99. (Refused)

[ASK EVERYONE]

E. Spillover

- E1. In 2016 or 2017, did you purchase and install any energy efficiency improvements on your own without any assistance (financial or technical) from a utility, vendor or other organization?
1. (Yes)
 2. (No) **[SKIP TO SECTION F]**
 98. (Don't know) **[SKIP TO SECTION F]**
 99. (Refused) **[SKIP TO SECTION F]**
- E2. What type of equipment did you purchase and install?
1. (Lighting) **[SPECIFY TYPE EXAMPLE: CFL, LED, FLUORESCENT]:** _____
 - a. How many did you purchase and install **[SPECIFY]:** _____
 - b. What is the wattage of the installed equipment **[SPECIFY]:** _____
 - c. Where is the equipment installed? (Wall/Ceiling/Outdoors) **[SPECIFY]:** _____
 - d. What type of equipment was removed or replaced **[SPECIFY]:** _____
 2. (HVAC (heating and cooling)) **[SPECIFY EQUIPMENT]:** _____
 - a. How many did you purchase and install **[SPECIFY]:** _____
 - b. What fuel type does this equipment use **[SPECIFY]:** _____
 - c. What is the efficiency rating of the equipment **[SPECIFY]?** _____
 - d. What is the equipment's rated capacity **[SPECIFY]:** _____
 3. (Water heating) **[SPECIFY EQUIPMENT]:** _____
 - a. How may did you purchase and install **[SPECIFY]:** _____
 - b. What fuel type does this equipment use **[SPECIFY]:** _____
 - c. What is the efficiency rating of the equipment **[SPECIFY]?** _____
 - d. What is the capacity of the water heater (if water heater with storage) **[SPECIFY]:** _____
 4. (Variable drives)
 - a. How may did you purchase and install **[SPECIFY]:** _____
 - b. What type of motor was it installed on **[SPECIFY]:** _____
 - c. What is the horsepower of the motor **[SPECIFY]:** _____
 5. (Efficient motors)
 - a. How many did you purchase and install **[SPECIFY]:** _____
 - b. What type of equipment is the motor installed on **[SPECIFY]:** _____
 - c. What is the horsepower of the motor **[SPECIFY]:** _____
 6. (Refrigeration) **[SPECIFY EQUIPMENT]:** _____
 - a. How much did you purchase and install **[SPECIFY]:** _____
 7. (Building envelope) **[SPECIFY TYPE]:** _____
 - a. How may square feet did you purchase and install **[SPECIFY]:** _____
 - b. What is the efficiency (R-value, thickness) **[SPECIFY]?** _____
 - c. Where was it installed (Wall/Roof/Floor) **[SPECIFY]:** _____

8. (Compressed air) **[SPECIFY TYPE OF PROJECT]:** _____
 - a. How many did you purchase and install **[SPECIFY]:** _____
 - b. What is the horsepower of the compressor motor **[SPECIFY]:** _____
9. (Chillers) **[SPECIFY TYPE OF EQUIPMENT]:** _____
 - a. How many did you purchase and install **[SPECIFY]:** _____
 - b. What size unit did you install **[SPECIFY]:** _____
10. (Pumps) **[SPECIFY WHAT IS IT INSTALLED ON]:** _____
 - a. How many did you purchase and install **[SPECIFY]:** _____
 - b. What is the horsepower of the pump motor **[SPECIFY]:** _____
 - c. What is the efficiency rating of the pump **[SPECIFY]:** _____
11. (Irrigation (gaskets, drains, sprinklers) **[SPECIFY]:** _____
 - a. How many did you purchase and install **[SPECIFY]:** _____
12. (Other) **[SPECIFY]:** _____
 - a. How many did you purchase and install **[SPECIFY]:** _____
98. (Don't know) **[SKIP TO F1]**
99. (Refused) **[SKIP TO F1]**

[ASK IF E2=1-12]

- E3. Just to confirm, did you receive an incentive from **[UTILITY]** or another organization for any of these measures? **[RECORD FOR EACH MEASURE MENTIONED IN E2]**
1. (Yes)
 2. (No) **[SKIP TO E5]**
 98. (Don't know) **[SKIP TO E5]**
 99. (Refused) **[SKIP TO E5]**
- E4. What program or sponsor provided the incentive(s)? **[RECORD FOR EACH MEASURE MENTIONED IN E2]**
1. **[SPECIFY]**
 98. (Don't know)
 99. (Refused)

[ASK IF E2=1-12]

- E5. For these purchases, on a scale from 1 to 5, with 1 being not important at all and 5 being very important, please rate how important were each of the following on your decision to purchase and install [this/these] energy efficient improvement(s). 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]**

E5.1 General information about energy efficiency provided by **[UTILITY]** _____
[IF NEEDED: ON A SCALE FROM 1 TO 5, WITH 1 BEING NOT IMPORTANT AT ALL AND 5 BEING VERY IMPORTANT. IF A FACTOR IS NOT APPLICABLE TO YOU, PLEASE SAY SO.]

E5.1a **[ASK IF E5.1 = 1-5 AND MORE THAN 1 SELECTED IN E2]** Does this rating differ for any of the improvements you mentioned?

1. (Yes)
2. (No)
98. (Don't know)

E5.1b **[ASK IF E5.1A=1]** Which of the following equipment would you rate differently on the General information about energy efficiency provided by **[UTILITY]**? **[DISPLAY EQUIPMENT MENTIONED IN E2. MULTIPLE RESPONSE ALLOWED]**

ASK RATING FOR EACH EQUIPMENT SELECTED. [IF NEEDED READ: ON A SCALE FROM 1 TO 5, WITH 1 BEING NOT IMPORTANT AT ALL AND 5 BEING VERY IMPORTANT].

- Lighting
- HVAC (heating and cooling)
- Water heating
- Variable drives
- Efficient motors
- Refrigeration
- Building envelope
- Compressed air
- Chillers
- Pumps
- Irrigation
- [OTHER SPECIFY]**
- None of the above

E5.2 Information from **[UTILITY]** program staff or contractors. ____

[IF NEEDED: ON A SCALE FROM 1 TO 5, WITH 1 BEING NOT IMPORTANT AT ALL AND 5 BEING VERY IMPORTANT. IF A FACTOR IS NOT APPLICABLE TO YOU, PLEASE SAY SO.]

E5.2a **[ASK IF E5.2 = 1-5 AND MORE THAN 1 SELECTED IN E2]** Does this rating differ for any of the other improvements you mentioned?

1. (Yes)
2. (No)
98. (Don't know)

E5.2b **[ASK IF E5.2A = 1]** Which of the following equipment would you rate differently on the Information from **[UTILITY]** program staff or contractors? **[DISPLAY EQUIPMENT MENTIONED IN E2. MULTIPLE RESPONSE ALLOWED]**

ASK RATING FOR EACH EQUIPMENT SELECTED. [IF NEEDED READ: ON A SCALE FROM 1 TO 5, WITH 1 BEING NOT IMPORTANT AT ALL AND 5 BEING VERY IMPORTANT.]

- Lighting
- HVAC (heating and cooling)
- Water heating
- Variable drives
- Efficient motors
- Refrigeration
- Building envelope
- Compressed air
- Chillers
- Pumps
- Irrigation
- [OTHER SPECIFY]**
- None of the above

E5.3 Your experience with a past **[UTILITY]** energy efficiency program. ____
[IF NEEDED: ON A SCALE FROM 1 TO 5, WITH 1 BEING NOT IMPORTANT AT ALL AND 5 BEING VERY IMPORTANT. IF A FACTOR IS NOT APPLICABLE TO YOU, PLEASE SAY SO.]

E5.3a **[ASK IF E5.3=1-5 AND MORE THAN 1 SELECTED IN E2]** Does this rating differ for any of the other improvements you mentioned?

1. (Yes)
2. (No)
98. (Don't know)

E5.3b **[ASK IF E5.3A = 1]** Which of the following equipment would you rate differently on your experience with a past **[UTILITY]** energy efficiency program? **[DISPLAY EQUIPMENT MENTIONED IN E2. MULTIPLE RESPONSE ALLOWED]**

ASK RATING FOR EACH EQUIPMENT SELECTED. [IF NEEDED READ: ON A SCALE FROM 1 TO 5, WITH 1 BEING NOT IMPORTANT AT ALL AND 5 BEING VERY IMPORTANT.]

- Lighting
- HVAC (heating and cooling)
- Water heating
- Variable drives
- Efficient motors
- Refrigeration
- Building envelope
- Compressed air
- Chillers
- Pumps
- Irrigation

[OTHER SPECIFY]

None of the above

[ASK SECTION F TO ALL SURVEY RESPONDENTS]

F. Firmographics

Finally, I have a few general questions about your business.

F1. What industry is your company in? [DON'T READ RESPONSES UNLESS NECESSARY]

1. (Accommodation)
2. (Arts, Entertainment and Recreation)
3. (Construction)
4. (Dairy, Agricultural)
5. (Educational Services)
6. (Finance, Insurance)
7. (Food Service)
8. (Food Processing)
9. (Health Care)
10. (Manufacturing)
11. (Mining)
12. (Nonprofit and Religious Organizations)
13. (Oil and Gas)
14. (Professional, Scientific and Technical Services)
15. (Public Administration/Government Services)
16. (Retail)
17. (Refrigerated Warehouse)
18. (Real Estate/Property Management)
19. (Repair and Maintenance Service)
20. (Transportation)
21. (Warehouses or Wholesaler)
22. (Other [SPECIFY: _____])
98. (Don't know)
99. (Refused)

F2. How many locations does your company operate in [PROJECT STATE]?

1. [RECORD VERBATIM: _____]
98. (Don't know)
99. (Refused)

F3. Does your organization lease or own the facilities or facilities?

1. Lease
2. Own
3. Other [RECORD VERBATIM: _____]
98. (Don't know)
99. (Refused)

F4. How many people are employed by your company at all locations?

1. (1-10)
2. (11-25)
3. (26-50)
4. (51-75)
5. (76-100)
6. (101-200)
7. (201-500)
8. More than 500
9. (Other) [RECORD VERBATIM: _____]
98. (Don't know)
99. (Refused)

F5. What type of fuel is used for space heating at your facility?

1. Electric
2. Gas
3. (Other) [RECORD VERBATIM: _____]
98. (Don't know)
99. (Refused)

F6. What type of fuel is used for water heating at your facility?

1. Electric
2. Gas
3. (Other) [RECORD VERBATIM: _____]
98. (Don't know)
99. (Refused)

G. Closing

[ASK PARTIAL PARTICIPANTS G1-G4] [NONPARTICIPANTS GO TO CLOSING STATEMENT]

G1. Overall, how satisfied would you say you are with the wattsmart Business program? Would you say:

[READ LIST]

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. (Don't know)
99. (Refused)

[IF G1=3 OR 4]

G2. Why do you say you were **[INSERT ANSWER FROM G1]** with the program?

1. **[RECORD VERBATIM: _____]**
98. (Don't know)
99. (Refused)

G3. Is there anything that **[UTILITY]** could have done to improve your overall experience with the wattsmart Business Program? **[DO NOT READ THE LIST, RECORD ALL THAT APPLY]**

1. (Better/more communication **[SPECIFY: WHO WOULD YOU LIKE MORE COMMUNICATION FROM? _____]**)
2. (Quicker response time **[SPECIFY: WHO WOULD YOU LIKE A QUICKER RESPONSE TIME FROM? ____]**)
3. (Larger selection of eligible equipment **[ASK: WHAT ENERGY-EFFICIENT EQUIPMENT SHOULD WATSMART BUSINESS OFFER INCENTIVES FOR? _____]**)
4. (Increasing the incentive amount)
5. (Simplify the application process) **[ASK: IN WHAT WAY? _____]**)
6. (Simplify the website) **[ASK: IN WHAT WAY? _____]**)
7. (Provide quicker approval on applications)
8. (Send incentive check out faster)
9. (Other **[SPECIFY: _____]**)
10. (No, nothing)
98. (Don't know)
99. (Refused)

G4. May I please get the spelling of your name, and your mailing address to enter you into the drawing for the \$100-dollar gift card? The winner will be notified within the next month.

1. **[RECORD NAME]**
2. **[RECORD MAILING ADDRESS]**

This completes the survey. Your responses are very important to [UTILITY]. We appreciate your participation and thank you for your time. Have a good day.

Appendix F. Measure Category Cost-Effectiveness

Completed at the end-use category level, cost-effectiveness was reported for evaluated savings. Table F1 shows cost-effectiveness inputs for Washington’s *wattsmart* program.

Table F1. Washington *wattsmart* Business End-Use Category Cost-Effectiveness Inputs

Input Description	2016	2017	Total
Average Measure Life*			
Agricultural	11.5	9.1	10.5
Compressed Air	15.0	15.3	15.1
HVAC	16.0	10.9	14.9
Lighting	13.2	16.0	14.5
Other	10.5	14.6	13.0
Recommissioning	11.2	3.0	9.1
Refrigeration	12.0	15.3	14.1
Wastewater	15.9	N/A	15.9
Evaluated Energy Savings (kWh/year)**			
Agricultural	882,530	578,561	1,461,091
Compressed Air	1,457,871	473,237	1,931,108
HVAC	962,554	280,547	1,243,101
Lighting	17,829,274	14,040,890	31,870,165
Other	312,727	506,893	819,620
Recommissioning	1,571,461	510,472	2,081,933
Refrigeration	5,603,090	9,811,528	15,414,618
Wastewater	1,924,052	N/A	1,924,052
Total Utility Cost (including incentives)***			
Agricultural	\$882,530	\$578,561	\$1,461,091
Compressed Air	\$1,457,871	\$473,237	\$1,931,108
HVAC	\$962,554	\$280,547	\$1,243,101
Lighting	\$17,829,274	\$14,040,890	\$31,870,165
Other	\$312,727	\$506,893	\$819,620
Recommissioning	\$1,571,461	\$510,472	\$2,081,933
Refrigeration	\$5,603,090	\$9,811,528	\$15,414,618
Wastewater	\$1,924,052	N/A	\$1,924,052
Incentives			
Agricultural	\$99,405	\$57,662	\$157,067
Compressed Air	\$169,460	\$58,710	\$228,170
HVAC	\$125,527	\$33,506	\$159,033
Lighting	\$2,380,026	\$1,415,063	\$3,795,089
Other	\$58,508	\$80,227	\$138,735
Recommissioning	\$31,429	\$10,209	\$41,638



Refrigeration	\$798,659	\$832,389	\$1,631,048
Wastewater	\$279,621	N/A	\$279,621
Commercial Retail Rate	\$0.08	\$0.08	N/A
Industrial Retail Rate	\$0.07	\$0.07	N/A
Irrigation Retail Rate	\$0.09	\$0.08	N/A

*Weighted average measure category lives are based on individual measure lifetimes and weighted by savings and the frequency of installations.

**Evaluated savings reflect impacts at the customer meter.

***Pacific Power provided program costs and incentives in annual report data, allocating program costs by weighted savings.

Agricultural

Table F2, Table F3, and Table F4 show the agriculture end-use category cost-effectiveness results for evaluated savings. The agricultural end-use category proved cost-effective all test perspectives except for the RIM perspective (Table F2).

**Table F2. Washington Agricultural 2016-2017
(2015 Decrement West System 7f% – Load Shape Irrigation and Industrial Machinery General)
(2015 Decrement West Commercial Cooling 13% – Load Shape Irrigation)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.052	\$689,003	\$1,505,192	\$816,189	2.18
TRC	\$0.052	\$689,003	\$1,368,357	\$679,354	1.99
UCT	\$0.026	\$338,361	\$1,368,357	\$1,029,996	4.04
RIM		\$1,584,997	\$1,368,357	(\$216,641)	0.86
PCT		\$504,109	\$1,400,103	\$895,994	2.78
Lifecycle Revenue Impacts (\$/kWh)					\$0.000005373
Discounted Participant Payback (years)					2.87

**Table F3. Washington Agricultural 2016
(2015 Decrement West System 7f% – Load Shape Irrigation and Industrial Machinery General)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.049	\$425,912	\$962,874	\$536,961	2.26
TRC	\$0.049	\$425,912	\$875,340	\$449,427	2.06
UCT	\$0.023	\$202,279	\$875,340	\$673,061	4.33
RIM		\$1,038,704	\$875,340	(\$163,365)	0.84
PCT		\$323,038	\$935,830	\$612,792	2.90
Lifecycle Revenue Impacts (\$/kWh)					\$0.000004051
Discounted Participant Payback (years)					2.53

**Table F4. Washington Agricultural 2017
(2015 Decrement West Commercial Cooling 13% – Load Shape Irrigation)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.058	\$280,612	\$578,437	\$297,825	2.06
TRC	\$0.058	\$280,612	\$525,852	\$245,240	1.87
UCT	\$0.030	\$145,145	\$525,852	\$380,707	3.62
RIM		\$582,676	\$525,852	(\$56,824)	0.90
PCT		\$193,129	\$495,193	\$302,064	2.56
Lifecycle Revenue Impacts (\$/kWh)	\$0.000001838				
Discounted Participant Payback (years)	2.44				

Compressed Air

Table F5, Table F6, and Table F7 show the compressed air end-use category cost-effectiveness results for evaluated savings. The compressed air end-use category proved cost-effective from all perspectives except for the RIM (Table F5).

**Table F5. Washington Compressed Air 2016-2017
(2015 Decrement West System 7f% – Load Shape Load Shape Industrial Machinery General)
(2015 Decrement West Industrial 44% – Load Shape Industrial Machinery General)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.036	\$702,201	\$1,497,258	\$795,057	2.13
TRC	\$0.036	\$702,201	\$1,361,143	\$658,942	1.94
UCT	\$0.019	\$369,062	\$1,361,143	\$992,081	3.69
RIM		\$1,755,549	\$1,361,143	(\$394,405)	0.78
PCT		\$557,643	\$1,610,990	\$1,053,348	2.89
Lifecycle Revenue Impacts (\$/kWh)	\$0.000008809				
Discounted Participant Payback (years)	2.87				

**Table F6. Washington Compressed Air 2016
(2015 Decrement West System 7f% – Load Shape Industrial Machinery General)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.031	\$458,643	\$1,133,820	\$675,177	2.47
TRC	\$0.031	\$458,643	\$1,030,745	\$572,102	2.25
UCT	\$0.018	\$273,735	\$1,030,745	\$757,010	3.77
RIM		\$1,328,003	\$1,030,745	(\$297,257)	0.78
PCT		\$354,368	\$1,223,728	\$869,360	3.45
Lifecycle Revenue Impacts (\$/kWh)	\$0.000007095				
Discounted Participant Payback (years)	1.99				



**Table F7. Washington Compressed Air 2017
(2015 Decrement West Industrial 44% – Load Shape Industrial Machinery General)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.053	\$259,779	\$387,643	\$127,864	1.49
TRC	\$0.053	\$259,779	\$352,402	\$92,624	1.36
UCT	\$0.021	\$101,676	\$352,402	\$250,726	3.47
RIM		\$456,020	\$352,402	(\$103,618)	0.77
PCT		\$216,813	\$413,054	\$196,242	1.91
Lifecycle Revenue Impacts (\$/kWh)					\$0.000002464
Discounted Participant Payback (years)					5.56

HVAC

Table F8, Table F9, and Table F10 show the HVAC end-use category cost-effectiveness results for evaluated savings. The HVAC end-use category proved cost-effective from UCT and PCT test perspectives (Table F8). In 2017 the HVAC end-use category was cost-effective from all test perspectives (Table F10).

**Table F8. Washington HVAC 2016-2017
(2015 Decrement West System 7f% – Load Shape Heat Pump)
(2015 Decrement West Commercial Cooling 13% – Load Shape Heat Pump)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.089	\$1,525,982	\$1,484,333	(\$41,649)	0.97
TRC	\$0.089	\$1,525,982	\$1,349,394	(\$176,588)	0.88
UCT	\$0.059	\$1,013,899	\$1,349,394	\$335,494	1.33
RIM		\$2,517,014	\$1,349,394	(\$1,167,620)	0.54
PCT		\$669,023	\$1,660,056	\$991,032	2.48
Lifecycle Revenue Impacts (\$/kWh)					\$0.000026918
Discounted Participant Payback (years)					4.23

**Table F9. Washington HVAC 2016
(2015 Decrement West System 7f% – Load Shape Heat Pump)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.098	\$1,403,858	\$1,126,434	(\$277,424)	0.80
TRC	\$0.098	\$1,403,858	\$1,024,031	(\$379,827)	0.73
UCT	\$0.067	\$950,897	\$1,024,031	\$73,134	1.08
RIM		\$2,193,211	\$1,024,031	(\$1,169,180)	0.47
PCT		\$578,488	\$1,367,841	\$789,353	2.36
Lifecycle Revenue Impacts (\$/kWh)					\$0.000026954
Discounted Participant Payback (years)					4.59

**Table F10. Washington HVAC 2017
(2015 Decrement West Commercial Cooling 13% – Load Shape Heat Pump)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.043	\$130,257	\$381,734	\$251,478	2.93
TRC	\$0.043	\$130,257	\$347,031	\$216,775	2.66
UCT	\$0.022	\$67,198	\$347,031	\$279,833	5.16
RIM		\$345,368	\$347,031	\$1,663	1.00
PCT		\$96,565	\$311,676	\$215,112	3.23
Lifecycle Revenue Impacts (\$/kWh)					(\$0.00000050)
Discounted Participant Payback (years)					2.04

Lighting

Table F11, Table F12, and

Table F13 show the lighting end-use category cost-effectiveness results for evaluated savings. The lighting end-use category proved cost-effective from all perspectives except for the RIM (Table F11).

**Table F11. Washington Lighting 2016-2017
(2015 Decrement West System 7f% – Load Shape Lighting)
(2015 Decrement Commercial Lighting 46% – Load Shape Lighting)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.043	\$12,666,172	\$22,051,930	\$9,385,759	1.74
TRC	\$0.043	\$12,666,172	\$20,047,209	\$7,381,038	1.58
UCT	\$0.022	\$6,417,890	\$20,047,209	\$13,629,319	3.12
RIM		\$31,608,036	\$20,047,209	(\$11,560,826)	0.63
PCT		\$9,955,012	\$28,896,876	\$18,941,864	2.90
Lifecycle Revenue Impacts (\$/kWh)					\$0.000258221
Discounted Participant Payback (years)					3.22

**Table F12. Washington Lighting 2016
(2015 Decrement West System 7f% – Load Shape Lighting)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.040	\$6,490,278	\$11,638,449	\$5,148,171	1.79
TRC	\$0.040	\$6,490,278	\$10,580,408	\$4,090,130	1.63
UCT	\$0.020	\$3,285,025	\$10,580,408	\$7,295,383	3.22
RIM		\$16,851,462	\$10,580,408	(\$6,271,054)	0.63
PCT		\$5,585,279	\$15,946,463	\$10,361,184	2.86
Lifecycle Revenue Impacts (\$/kWh)					\$0.000155520
Discounted Participant Payback (years)					2.49



**Table F13. Washington Lighting 2017
(2015 Decrement Commercial Lighting 46% – Load Shape Lighting)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.046	\$6,587,209	\$11,107,020	\$4,519,811	1.69
TRC	\$0.046	\$6,587,209	\$10,097,290	\$3,510,082	1.53
UCT	\$0.024	\$3,341,514	\$10,097,290	\$6,755,776	3.02
RIM		\$15,739,362	\$10,097,290	(\$5,642,071)	0.64
PCT		\$4,660,758	\$13,812,911	\$9,152,153	2.96
Lifecycle Revenue Impacts (\$/kWh)					\$0.000134140
Discounted Participant Payback (years)					3.20

Other

Error! Reference source not found., **Error! Reference source not found.**, and **Error! Reference source not found.** show the other end-use category cost-effectiveness results for evaluated savings. The other end-use category proved cost-effective from the UCT and PCT perspectives (**Error! Reference source not found.**). In 2016, the other end-use category proved cost-effective from the PCT perspective (**Error! Reference source not found.**). In 2017, the other end-use category proved cost-effective from all test perspectives except the RIM perspective (**Error! Reference source not found.**).

Table F14. Washington Other 2016-2017 (2015 Decrement West System 7f% – Load Shape Industrial Machinery, Cooking, Heat Pump) (2015 Decrement West Plug Load 61% – Load Shape Industrial Machinery, Cooking, Heat Pump)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.112	\$797,934	\$594,792	(\$203,141)	0.75
TRC	\$0.112	\$797,934	\$540,720	(\$257,213)	0.68
UCT	\$0.072	\$512,899	\$540,720	\$27,821	1.05
RIM		\$1,120,899	\$540,720	(\$580,179)	0.48
PCT		\$418,760	\$741,725	\$322,965	1.77
Lifecycle Revenue Impacts (\$/kWh)					\$0.000011971
Discounted Participant Payback (years)					5.76

Table F15. Washington Other 2016 (2015 Decrement West System 7f% – Load Shape Industrial Machinery, Cooking, Heat Pump)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.224	\$546,337	\$207,809	(\$338,528)	0.38
TRC	\$0.224	\$546,337	\$188,918	(\$357,420)	0.35
UCT	\$0.162	\$396,315	\$188,918	(\$207,397)	0.48
RIM		\$592,780	\$188,918	(\$403,862)	0.32
PCT		\$208,530	\$254,973	\$46,443	1.22
Lifecycle Revenue Impacts (\$/kWh)					\$0.000009311
Discounted Participant Payback (years)					7.51

Table F16. Washington Other 2017 (2015 Decrement West Plug Load 61% – Load Shape Industrial Machinery, Cooking, Heat Pump)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.054	\$268,353	\$412,756	\$144,403	1.54
TRC	\$0.054	\$268,353	\$375,233	\$106,880	1.40
UCT	\$0.025	\$124,349	\$375,233	\$250,884	3.02
RIM		\$563,292	\$375,233	(\$188,059)	0.67
PCT		\$224,231	\$519,170	\$294,939	2.32
Lifecycle Revenue Impacts (\$/kWh)					\$0.000004065
Discounted Participant Payback (years)					3.80

Recommissioning

Table F17, Table F18, and Table F19 show the recommissioning end-use category cost-effectiveness results for evaluated savings. The recommissioning end-use category proved cost-effective from all



perspectives except for the RIM (Table F17). In 2017, the recommissioning end-use category was only cost-effective from the PCT perspective.

**Table F17. Washington Recommissioning Large 2016-2017
(2015 Decrement West System 7f% – Load Shape Plug Load)
(2015 Decrement West Industrial 44% – Load Shape Plug Load)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.022	\$315,496	\$953,214	\$637,717	3.02
TRC	\$0.022	\$315,496	\$866,558	\$551,061	2.75
UCT	\$0.019	\$272,230	\$866,558	\$594,328	3.18
RIM		\$1,566,062	\$866,558	(\$699,504)	0.55
PCT		\$84,267	\$1,334,833	\$1,250,566	15.84
Lifecycle Revenue Impacts (\$/kWh)	\$0.000018976				
Discounted Participant Payback (years)	0.55				

**Table F18. Washington Recommissioning 2016
(2015 Decrement West System 7f% – Load Shape Plug Load)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.015	\$193,669	\$859,429	\$665,761	4.44
TRC	\$0.015	\$193,669	\$781,300	\$587,631	4.03
UCT	\$0.014	\$180,173	\$781,300	\$601,127	4.34
RIM		\$1,357,466	\$781,300	(\$576,166)	0.58
PCT		\$44,925	\$1,208,722	\$1,163,797	26.91
Lifecycle Revenue Impacts (\$/kWh)	\$0.000015630				
Discounted Participant Payback (years)	0.28				

**Table F19. Washington Recommissioning 2017
(2015 Decrement West Industrial 44% – Load Shape Plug Load)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.084	\$129,941	\$100,030	(\$29,911)	0.77
TRC	\$0.084	\$129,941	\$90,937	(\$39,005)	0.70
UCT	\$0.063	\$98,188	\$90,937	(\$7,251)	0.93
RIM		\$222,489	\$90,937	(\$131,553)	0.41
PCT		\$41,962	\$134,510	\$92,548	3.21
Lifecycle Revenue Impacts (\$/kWh)	\$0.000011563				
Discounted Participant Payback (years)	0.78				

Refrigeration

Table F17, Table F18, and Table F19 show the refrigeration end-use category cost-effectiveness results for evaluated savings. The refrigeration end-use category proved cost-effective from all perspectives except for the RIM (Table F17).

**Table F20. Washington Refrigeration Small 2016-2017
(2015 Decrement West System 7f% – Load Shape Plug Load)
(2015 Decrement West Industrial 44% – Load Shape Plug Load)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.029	\$4,434,686	\$11,880,473	\$7,445,787	2.68
TRC	\$0.029	\$4,434,686	\$10,800,430	\$6,365,744	2.44
UCT	\$0.017	\$2,593,174	\$10,800,430	\$8,207,256	4.16
RIM		\$15,916,065	\$10,800,430	(\$5,115,635)	0.68
PCT		\$3,420,584	\$14,901,963	\$11,481,379	4.36
Lifecycle Revenue Impacts (\$/kWh)	\$0.000114262				
Discounted Participant Payback (years)	2.11				

**Table F21. Washington Refrigeration Small 2016
(2015 Decrement West System 7f% – Load Shape Plug Load)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.039	\$2,036,590	\$3,866,189	\$1,829,599	1.90
TRC	\$0.039	\$2,036,590	\$3,514,717	\$1,478,127	1.73
UCT	\$0.022	\$1,139,359	\$3,514,717	\$2,375,358	3.08
RIM		\$5,605,754	\$3,514,717	(\$2,091,037)	0.63
PCT		\$1,695,890	\$5,265,054	\$3,569,164	3.10
Lifecycle Revenue Impacts (\$/kWh)	\$0.000054104				
Discounted Participant Payback (years)	1.94				

**Table F22. Washington Refrigeration Small 2017
(2015 Decrement West Industrial 44% – Load Shape Plug Load)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.024	\$2,557,809	\$8,548,035	\$5,990,226	3.34
TRC	\$0.024	\$2,557,809	\$7,770,941	\$5,213,132	3.04
UCT	\$0.014	\$1,550,639	\$7,770,941	\$6,220,302	5.01
RIM		\$10,996,978	\$7,770,941	(\$3,226,036)	0.71
PCT		\$1,839,559	\$10,278,728	\$8,439,169	5.59
Lifecycle Revenue Impacts (\$/kWh)	\$0.000076699				
Discounted Participant Payback (years)	1.21				

Wastewater

Table F23 shows the wastewater end-use category cost-effectiveness results for evaluated savings. The wastewater end-use category did not prove cost-effective from any test perspective (Table F23).

**Table F23. Washington Wastewater 2016
(2015 Decrement West System 7f% – Load Shape Plug Load)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.261	\$740,071	\$219,228	(\$520,843)	0.30
TRC	\$0.261	\$740,071	\$199,298	(\$540,773)	0.27
UCT	\$0.122	\$346,394	\$199,298	(\$147,096)	0.58
RIM		\$593,329	\$199,298	(\$394,031)	0.34
PCT		\$673,298	\$526,556	(\$146,742)	0.78
Lifecycle Revenue Impacts (\$/kWh)					\$0.000009084
Discounted Participant Payback (years)					N/A