



2014–2015 Utah *wattsmart* Business Program Evaluation

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Glossary of Terms

Demand Side Management Central

Demand Side Management Central (DSMC) is Rocky Mountain 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 Gross Savings

Evaluated gross savings represent the total program savings, based on the validated savings and installations, before adjusting for behavioral effects such as freeridership or spillover. They are most often calculated for a given measure 'i' as:

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

Evaluated Net Savings

Evaluated net savings are the program savings net of what would have occurred in the program's absence. These savings are the observed impacts attributable to the program. Net savings are calculated as the product of evaluated gross savings and the net-to-gross (NTG) ratio:

$$\text{Net Savings} = \text{Evaluated Gross Savings} * \text{NTG}$$

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 gross savings that can be classified as freeridership.

Gross Realization Rate

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

In-Service Rate

The in-service rate (also known as the installation rate) is the proportion of incited measures actually installed.

Net-to-Gross

NTG is the ratio of net savings to evaluated gross savings:

$$\text{NTG} = (1 - \text{Freeridership Rate}) + \text{Spillover Rate}$$

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 gross 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 definitions, which is linked to the DSMC.

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 incented through the program.

Verification Engineer

Verification engineers are third parties hired to verify project savings.

Executive Summary

Through its **wattsmart**® Business Program, Rocky Mountain Power (RMP) offers incentives to commercial, industrial, and agricultural customers to facilitate their purchases of energy-efficient products and services through midstream (distributors/suppliers) and downstream (customer) incentive mechanisms. During the 2014 and 2015 program years, the **wattsmart** Business Program reported gross electricity savings of 231,481,825 kWh in Utah.

RMP contracted with the Cadmus team (comprised of The Cadmus Group, ADM Associates, and VuPoint Research) to conduct impact and process evaluations of the Utah **wattsmart** Business Program for program years 2014 and 2015. Cadmus subcontracted a portion of the impact evaluation to ADM Associates, and VuPoint Research performed the telephone surveys. For the impact evaluation, we assessed gross and net energy impacts and program cost-effectiveness. For the process evaluation, we assessed program delivery and efficacy, bottlenecks, barriers, and opportunities for improvements. The Cadmus team evaluated midstream and downstream delivery channels, encompassing energy efficiency measures and services in four delivery channels:

- **Small Business Lighting (SBL):** RMP provided a free facility assessment and incentives for small business customers who made upgrades such as T5 and T8 fluorescent lamps and ballasts, lighting controls and LED exit signs, or existing interior lighting systems. SBL is delivered through a network of program-approved trade allies. RMP suspended this delivery channel in 2015, and reintroduced it on September 5, 2016, as the Small Business Direct Install channel, which RMP offered to small business customers on specific rate schedules who are in geo-targeted locations.
- **Typical Upgrades (also known as Prescriptive Measures):** RMP provided customers with prescriptive incentives for lighting, HVAC, compressed air, motors and variable frequency drives (VFDs), green motor rewinds, building envelope, food service, appliances, office, farm and dairy, wastewater, and other refrigeration, and irrigation equipment and measures, as well as refrigerator and freezer recycling.
- **Custom Analysis:** RMP provided customer incentives for first-year energy savings resulting from specialized, preapproved, capital equipment upgrades that were not covered by the Typical Upgrades incentives.
- **LED Instant Incentives (also known as Midstream):** RMP offered instant incentives for screw-in LED lighting purchased from a participating lighting distributor. This program was added in May 2015.

Key Findings

Key Impact Evaluation Findings

For the impact evaluation, the Cadmus team analyzed 154 projects that contributed 18% of the 2014 and 2015 program savings. Table 1 provides a summary of the evaluation findings, including evaluated



units, gross savings, and net savings. Overall, the gross realization rate was 99.7% for the two program years, though there was variability between measure categories. The Cadmus team calculated net-to-gross (NTG) as 77%, yielding evaluated net savings of 177,020,603 kWh. Overall, the impact evaluation achieved $\pm 8.5\%$ precision with 90% confidence. Specific details and findings per strata are described in the Evaluated Gross Savings Results by Strata report section.

Table 1. 2014 and 2015 wattsmart Business Program Savings

Strata	Unique Projects	Reported Gross Savings (kWh)	Evaluated Gross Savings (kWh)	Gross Realization Rate	Precision*	NTG	Evaluated Net Savings (kWh)
Lighting – Large	266	70,678,974	65,618,358	93%	7.7%	76%	49,869,952
Lighting – Small	5,143	65,111,079	80,228,898	123%	18.3%		60,973,962
HVAC	419	19,100,687	17,784,036	93%	11.2%		13,515,867
Refrigeration	104	8,566,676	8,270,573	97%	1.1%		6,285,636
Motor Systems	232	13,700,185	15,497,782	113%	16.5%		11,778,314
Compressed Air	49	9,263,192	6,819,039	74%	26.2%		5,182,470
Agricultural	207	4,032,901	3,284,011	81%	47.9%		2,495,849
Recommissioning	31	8,498,605	7,131,674	84%	14.9%		5,420,072
Other	1,832	26,353,861	19,589,329	74%	9.9%		14,887,890
SEM**	2	6,175,665	6,610,591	107%	15.4%		100%
Total	8,285	231,481,825	230,834,291	99.7%	8.5%	77%	177,020,603

* Measure category precision is based on 80% confidence. Portfolio precision is based on 90% confidence. Poor precision values are the result of large variability within sampled projects.

** The team evaluated strategic energy management (SEM) projects separately and presented results in the 2014-2015 wattsmart Business Utah Strategic Energy Management Impact and Process Evaluation report dated September 9, 2016.

Table 2 and Table 3 show impact evaluation findings by program year, for 2014 and 2015, respectively. The Cadmus team combined the 2014 and 2015 program years to perform the analysis, and applied the overall realization rates to each year.

Table 2. 2014 wattsmart Business Program Savings

Strata	Unique Projects	Reported Gross Savings (kWh)	Evaluated Gross Savings (kWh)	Gross Realization Rate	NTG	Evaluated Net Savings (kWh)
Lighting - Large	135	37,532,216	34,844,908	93%	76%	26,482,130
Lighting - Small	1,885	28,633,818	35,282,162	123%		26,814,443
HVAC	213	10,254,268	9,547,419	93%		7,256,039
Refrigeration	40	1,200,535	1,159,039	97%		880,870
Motor Systems	108	7,247,163	8,198,061	113%		6,230,526
Compressed Air	23	2,988,034	2,199,622	74%		1,671,713
Agricultural	99	1,506,994	1,227,153	81%		932,636
Recommissioning	2	309,466	259,691	84%		197,365
Other	898	21,441,019	15,937,520	74%		12,112,515
SEM*	0	-	0	-		N/A
Total	3,403	111,113,513	108,655,576	98%	76%	82,578,237

* The SEM results were reported in the Cadmus team's September 9, 2016 report, "2014-2015 wattsmart Business Utah Strategic Energy Management Impact and Process Evaluation."

Table 3. 2015 wattsmart Business Program Savings

Strata	Unique Projects	Reported Gross Savings (kWh)	Evaluated Gross Savings (kWh)	Gross Realization Rate	NTG	Evaluated Net Savings (kWh)
Lighting - Large	131	33,146,758	30,773,449	93%	76%	23,387,821
Lighting - Small	3,258	36,477,261	44,946,736	123%		34,159,519
HVAC	206	8,846,419	8,236,616	93%		6,259,828
Refrigeration	64	7,366,141	7,111,534	97%		5,404,766
Motor Systems	124	6,453,022	7,299,721	113%		5,547,788
Compressed Air	26	6,275,158	4,619,417	74%		3,510,757
Agricultural	108	2,525,907	2,056,859	81%		1,563,212
Recommissioning	29	8,189,139	6,871,983	84%		5,222,707
Other	934	4,912,842	3,651,810	74%		2,775,375
SEM*	2	6,175,665	6,610,591	107%		100%
Total	4,882	120,368,312	122,178,716	102%	77%	94,442,366

* The SEM results were reported in the Cadmus team's September 9, 2016 report, "2014-2015 wattsmart Business Utah Strategic Energy Management Impact and Process Evaluation."



Key Process Evaluation Findings

The key process evaluation findings are listed below. More nuanced descriptions of these key findings can be found in the Process Evaluation section of this report.

- A high percentage of participants (from 85% up to 100%) in all four program delivery channels (SBL, Typical Upgrades, Custom Analysis, and LED Instant Incentives) reported being very satisfied with the work provided by their contractor or the assistance they received from program staff or their distributor. Participants in the Typical Upgrades channel (83%) and the SBL channel (90%) also reported being very satisfied with the equipment they installed. Participants in all delivery channels (from 58% up to 79%) reported being very satisfied with the incentives they received. (Details for each rating are provided in the Satisfaction section of each program delivery channel.)
- Ninety-one percent (n=96) of participants in the SBL, Typical Updates, and Custom Analysis delivery channels said they received one or more benefits from the program. Two of the three most frequently reported benefits from each group were better lighting quality and reduced energy consumption and demand as. Participants in both SBL and Typical Upgrades reported lower bills as their third most frequent benefit. Custom Analysis participants reported increased productivity as their third most common benefit. (The team did not ask this question of participants in the LED Instant Incentives delivery channel.)
- SBL and Typical Upgrades customers prefer to receive program updates from **wattsmart** Business Program representatives. These customer-stated preferences do not align with the most cost-effective program design for these channels, which is interaction with contractors/vendors.
- Participants in each program delivery channel reported some challenges, but none that had a significant impact on their program participation. However, across all four program delivery channels, participants asked for better communication or more clarity about the eligible equipment and participation processes. Some also asked for more accurate savings projections and indicated a need for better performance and communication from their contractors/vendors. (Detailed information can be found in the Benefits and Challenges section of each program delivery channel.)
- Non-managed nonparticipants (those who typically have lower energy usage and do not have a dedicated RMP account manager) reported the lowest awareness of the **wattsmart** Business Program name (30%). Awareness increased among the managed nonparticipants (50%) and, as expected, was even higher among the partial participants (67%). In assessing nonparticipants' reasons for not using the **wattsmart** Business Program, the Cadmus team found that those with managed accounts were more influenced by what they lacked, such as financial resources, opportunity, time, or motivation, while those with non-managed accounts reported not using the program primarily because they did not know enough about it.
- The two program implementers maintain separate databases from which they review, upload projects to DSMC, and process applications on a weekly basis. Inputs of measure names, project

savings, and incentive amounts must be error free to be accepted by DSMC. Both RMP and program administrators reported that the data exchange between them is not yet error free and needs further streamlining.

Cost-Effectiveness Results

As shown in Table 4, the program was cost-effective in the 2014 and 2015 evaluation years from all test perspectives, except for the Ratepayer Impact Measure (RIM) test. The program was cost-effective from the Utility Cost Test (UCT) perspective, with a benefit/cost ratio of 1.99.

Table 4. 2014–2015 Evaluated Net wattsmart Business Program Cost-Effectiveness Summary

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PacifiCorp Total Resource Cost Test (PTRC) (TRC + 10% Conservation Adder)	\$0.055	\$79,402,248	\$110,847,433	\$31,445,185	1.40
Total Resource Cost Test (TRC) No Adder	\$0.055	\$79,402,248	\$100,770,394	\$21,368,146	1.27
Utility Cost Test (UCT)	\$0.035	\$50,553,314	\$100,770,394	\$50,217,080	1.99
Ratepayer Impact Measure (RIM) Test		\$166,788,671	\$100,770,394	(\$66,018,276)	0.60
Participant Cost Test (PCT)		\$82,104,050	\$186,049,418	\$103,945,368	2.27
Lifecycle Revenue Impacts (\$/kWh)				\$0.000219894	
Discounted Participant Payback (years)					3.52

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 as a result of the program. Typically, this only happens for demand response programs or programs that are 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, 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).

Savings Considerations

Recommendation: Reduce the cool roof measure deemed savings amount from the current assumption of 0.33 kWh per year per square foot from the California Database for Energy Efficiency Resources (DEER). The Cadmus team recommends using the Oak Ridge National Laboratory (ORNL) Commercial Roof Savings Calculator (RSC)¹ to calculate an average deemed energy savings factor for cool roof projects in Utah. The ORNL Commercial RSC calculates energy savings on a case-by-case basis using the unique attributes of each project such as facility type, climate data, space temperature setpoints, HVAC

¹ The ORNL Commercial RSC is available online: http://rsc.ornl.gov/rsc_main.htm?calc=com



systems, and roof construction characteristics. According to the ORNL Commercial RSC, the energy savings factor for an office building in Salt Lake City with baseline and installed cool roof default envelope characteristics is 0.11 kWh per year per square foot (66% less than the DEER value). The Cadmus team derived this finding based on cool roof projects sampled in Utah as well as other PacifiCorp territories. RMP could use the RSC on a case-by-case basis or sample past projects to derive a new deemed value.

Recommendation: Consider increasing the deemed savings amount for irrigation hardware. Of the 10 irrigation hardware projects included in the evaluation sample, nine referred to Rocky Mountain Power’s deemed savings values. The Cadmus team used the Regional Technical Forum’s (RTF’s) Irrigation Hardware calculator² to evaluate the energy savings. We recommend using the RTF’s calculator because it was updated as recently as June 2016 and all of the RTF’s tools undergo cyclical technical reviews and are vetted by regional industry experts. Six of the nine projects had realization rates greater than 100% when using the RTF Irrigation Hardware calculator. Table 36 in the Savings Considerations section outlines the RTF’s Irrigation Hardware calculator deemed energy savings factors for irrigation hardware measures.

Recommendation: Consider adding an HVAC interactive effect factor to indoor lighting savings based on a weighted average of the heating and cooling systems within Rocky Mountain Power’s commercial and industrial customers in Utah. HVAC interactive effect factors are included in many national technical reference manuals (TRMs), ranging from approximately 0.90 to 1.10 and account for energy saving interactions that occur when energy efficient lighting is installed. Depending on the location of the facility and the heating and cooling systems used, there could be an energy penalty for including HVAC interactive effects. For example, if the site installs LEDs and has electric heat, the electric heating load will be higher since LEDs emit less heat than fluorescents or CFLs.

Recommendation: Increase the deemed savings amount for prescriptive HVAC VFD fan and pump motor projects. To evaluate the energy savings for the six prescriptive VFD motor systems projects, the Cadmus team used the deemed savings values from Cadmus’ 2014 *Variable Speed Drive Loadshape Project* report created for the Northeast Energy Efficiency Partnership³ (NEEP; shown in Table 37 of the Savings Considerations section), which resulted in realization rates greater than 100% for five of the six deemed VFD projects. The Cadmus team recommends using these deemed values for HVAC fan motor projects. (Cadmus derived 135% realization rate based on RMP’s savings value.)

For prescriptive VFD projects installed on central HVAC equipment, including hot water pumps, chilled water pumps, condenser water pumps, and cooling tower fans, the Cadmus team recommends using an

² This calculator is available online: <https://rtf.nwcouncil.org/measure/irrigation-hardware>

³ These deemed savings values are based on the Cadmus 2014 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>

average deemed energy savings value calculated from the 2016 Pennsylvania Technical Reference Manual (PA TRM).⁴ The Cadmus team calculated a deemed savings factor of 1,191 kWh per year per horsepower for central equipment from the 2016 PA TRM. There were no prescriptive VFD projects for central equipment in the evaluation sample, but the Cadmus team still recommends that this deemed savings value be updated to reflect typical central equipment motor sizes and efficiencies.

Recommendation: The Cadmus team recommends Rocky Mountain Power consider additional training to participating motor service centers regarding the need to provide a more accurate estimate for when the motor will be installed, as opposed to always entering six months from time of service. After the training or new instructions have been delivered, the Cadmus team recommends the program begin reviewing applications and tracking estimated reinstall dates to make sure the motor service centers are providing a more reliable estimate and to better understand when the savings may be realized. If the motor replacements are being estimated to occur beyond a year, the Cadmus team recommends considering prorating energy savings by project or based on an average of applications submitted. Green motor rewinds represent a small percentage of total program savings (green motor rewind projects account for 0.034% of the total claimed savings in the evaluation sample), but first-year savings are not being realized.

Overall Program Management

Recommendation: To further increase customer satisfaction with their participation in the various program delivery channels, by enhancing trade ally, contractor, vendor and distributor knowledge of the program tools and program delivery, the Cadmus team recommends that the implementers reinforce to the trade allies, contractors, and vendors the need to provide detailed and accurate cost, savings, and benefit information to participants. The implementers can review with each of these groups, the steps necessary to accurately calculate the costs, projected energy savings, and incentives, and should also review with lighting distributors how to input program data to calculate incentives for the LED Instant Incentives delivery channel.

Program Data Interface

Recommendation: Assess the size of any data exchange inconsistencies and associated impacts, and identify the most appropriate solution, which could include the following:

- Continue the same process
- Revise the implementers' databases to use drop-down menus with precise measure names and formulas, or provide look-up tables of saving/incentive amounts, and update this as needed
- Have RMP revise the DSMC batch process to allow some room for variations in DSMC uploads

⁴ Pennsylvania Public Utility Commission. *2016 Technical Reference Manual*. Available online: http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/technical_reference_manual.aspx



- Have RMP provide implementers with a direct interface to the DSMC rather than using their own databases
- Have RMP provide trade allies with direct access to the DSMC

Small Business Lighting

Recommendation: While an account management approach may not prove cost effective, if RMP chooses to grow participation in the SBL delivery channel, consider methods for increasing direct contact from RMP or the implementer staff. These could include expanding the “Targeted town” luncheon event format to other small business associations, or adding a chat or instant messaging feature to the website, thus more seamlessly assisting customers who prefer this method for asking questions over a phone call or email.

Typical Upgrades and Custom Analysis

Recommendation: Provide clear and specific instructions about the application process and specifically what is required of the participant. Review the number of people involved in the application approval and installation process to determine steps that could be streamlined, reduced, or eliminated. Review and simplify the application where possible by allowing it to be filled and submitted online, and to auto-populate fields where possible. Also, consider ways to reduce or streamline the data or supplemental invoices and documentation required for each field on the application.

Nonparticipants and Partial Participants

Recommendation: If additional program growth is desired in any of the program delivery channels, encourage and/or incent contractors, vendors, and distributors to increase outreach to their nonparticipant customers. Talk to contractors, vendors and distributors to gain insight into how much they have penetrated their target market and to determine what resources RMP could provide to help them increase outreach to those customers without an active ongoing project.

Recommendation: If additional program growth is desired in any of the program delivery channels, consider performing a comprehensive marketing effectiveness assessment to both evaluate the impact of existing marketing and outreach activities, and to investigate how to better reach and motivate these customers.

Introduction

Program Description

Through the **wattsmart** Business Program, RMP offered incentives for measures and services through four delivery channels: Small Business Lighting (SBL), Typical Upgrades (also known as Prescriptive Measures), Custom Analysis, and LED Instant Incentives (also known as Midstream) for program years 2014 and 2015. RMP also offered custom incentives for capital measures installed by customers participating in its Energy Management Recommissioning or Industrial Recommissioning offerings.

The RMP program managers who oversee nonresidential energy efficiency programs in Utah were responsible for contracting and managing the program administrators, managing in-house delivery and cost-effectiveness, achieving and monitoring program performance and compliance, conducting program marketing, and recommending changes to the program terms and conditions.

The program is administered through multiple delivery channels that are differentiated based on customer need. The SBL delivery channel is an enhanced incentive offering for small business customers. Nexant managed the SBL program-approved trade allies and SBL projects for all participants. As noted above, this delivery channel was suspended in May 2015 and reinstated in September 2016 as the Small Business Direct Install channel, which RMP offered to SBL customers on specific rate schedules, who are in targeted locations. This report addresses the SBL delivery channel as it existed until it was suspended in May 2015.

The second delivery channel, Typical Upgrades, is delivered through trade allies and targeted for prescriptive opportunities primarily for small and mid-size customers; however, large customers may also receive these incentives. RMP contracted with Nexant, Inc. and Cascade Energy to coordinate the trade allies who deliver these upgrades, and to administer the Typical Upgrades delivery channel. These companies manage trade ally coordination, provide training and support, and conduct application processing services for commercial and industrial/agricultural measures, respectively.

Both of these administrators also implemented custom projects for non-managed accounts. They conducted direct customer outreach, project facilitation, and measurement and verification.

RMP targeted the Custom Analysis delivery channel to large energy users who generally have multiple opportunities for energy efficiency upgrades, and who have projects that require custom analysis. The largest of these customers are managed in-house by RMP internal project managers (large accounts are typically ≥ 100 kW). RMP provided energy efficiency analysis and verification of savings through a pre-contracted group of engineering firms.

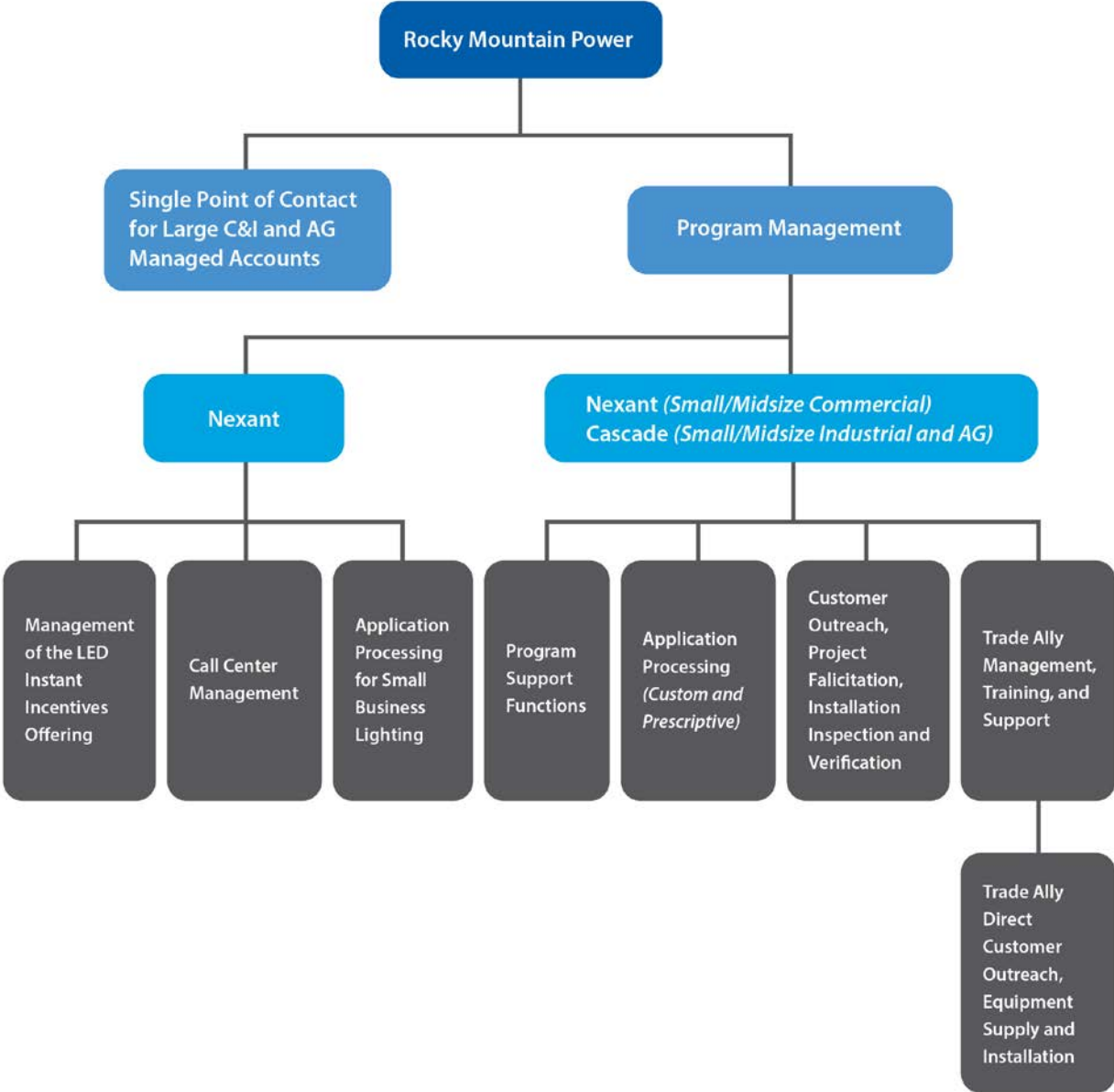
In the fourth delivery channel, LED Instant Incentives, RMP targets the lighting maintenance market by offering customers instant incentives on LED screw-in lighting purchased through a participating lighting distributor. Customers who purchase through a nonparticipating distributor do not receive an instant



discount, but may apply to RMP for incentives post-purchase. Nexant also managed the participating distributors who deliver this offering.

Figure 1 provides an overview of the program management responsibilities.

Figure 1. *watt*smart Business Program Delivery Roles



Evaluation Objectives

The Cadmus team assessed *watt*smart Business Program incentives in Utah to determine gross and net savings achievement, assess cost-effectiveness, and where applicable, identify areas to improve

program delivery and customer involvement and satisfaction. Table 5 lists the evaluation goals, along with the corresponding evaluation activities to achieve those goals.

Table 5. Evaluation Objectives and Activities

Rocky Mountain 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	X	X		X	X	X	X	X
Verify installation and savings		X		X	X	X	X	
Evaluate the program process and the effectiveness of delivery and efficiency	X	X	X					
Understand motivations of participants, nonparticipants, and partial participants		X	X					
Provide data support for program cost-effectiveness assessments		X		X	X	X	X	
Identify areas for potential improvements	X	X	X	X	X	X	X	
Document compliance with regulatory requirements								X

Data Collection and Evaluation Activities

The Cadmus team performed on-site visits and engineering analysis for 154⁵ projects to achieve 90% confidence and ±10% precision at the portfolio level. Our process evaluation included a thorough review of program operation and marketing materials and data tracking. The team interviewed program managers and implementers to thoroughly understand and document the program history, objectives, and operations. We also surveyed program participants, partial participants, and nonparticipants regarding program delivery channels and operations.⁶

Impact Sampling and Extrapolation Methodology

Through the Utah **wattsmart** Business Program, RMP provides incentives for the 37 measure types shown in Table 6. The Cadmus team stratified these 37 measure types into ten strata shown in the table.

⁵ This includes two SEM projects evaluated and documented in a separate report.

⁶ Participants are customers who completed a project through the program during the evaluation period of 2014 and/or 2015. Partial participants are customers who initiated a project through the program in 2014 or 2015, but did not complete that project. Nonparticipants are customers who have never initiated or completed a project through the program or who had not done so in the past two years.



We designed the sampling plan for 2014 and 2015 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, we created a plan to divide each end-use strata into a selected group from which we hand selected a few very large sites, and then randomly sampled the remaining projects.

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

Table 6. Utah 2014-2015 wattsmart Business Program Impact Sampling

Strata	Measure Type	Number of Incentivized Projects	Energy Savings (kWh)	Unique Sampled Projects
Agricultural	Irrigation	5	4,032,901	18
	Irrigation Pumps	88		
	Water Distribution Equipment	423		
	Milkers	2		
Compressed Air	Compressed Air	73	9,263,192	15
HVAC	HVAC	84	19,100,687	27
	Cooling	535		
	Fans	5		
	Heat Pumps	32		
	Controls and Thermostats	50		
	Water Heaters	1		
Lighting – Large and Small*	Non-General Illuminance	265	135,790,053	32
	Lighting	3,750		
	General Illuminance	13,904		
	Exterior Lighting	154		
Recommissioning	Energy Management	31	8,498,605	8
Motor Systems	Motors	180	13,700,185	21
	Pumps	3		
	Electronically Commutated Motors	83		
	Green Motor Rewinds	60		
Other	Insulation	758	26,353,861	21
	Roof	82		
	Controls	2,909		
	Dishwashers	5		
	Windows	14		
	Office Equipment	113		
	Building Shell	42		
	Holding Cabinets	4		

Strata	Measure Type	Number of Incentivized Projects	Energy Savings (kWh)	Unique Sampled Projects
	Additional Measures	27		
Refrigeration	Refrigeration	106	8,566,676	10
	Refrigerators	20		
	Freezers	27		
	Ice Machines	20		
	Fast Acting Doors	8		
	Cooking Equipment	9		
	Grocery Refrigeration	12		
SEM	Energy Management	2	6,175,665	2
Total		23,886	231,481,825	154

* Lighting was divided into two strata: Large and Small. Large lighting sites were categorized as having annual energy savings greater than or equal to 100,000 kWh.

Sampled projects were divided 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 strata. Selected projects were hand-picked from the projects with the highest claimed energy savings per strata. These projects were evaluated individually and the results were included within each strata, but the associated realization rates were not extrapolated to the population. Figure 2 provides an example of how the Cadmus team applied the realization rates for the selected and random sites within the agricultural strata to the population, per strata.



Figure 2. Realization Rate Extrapolation

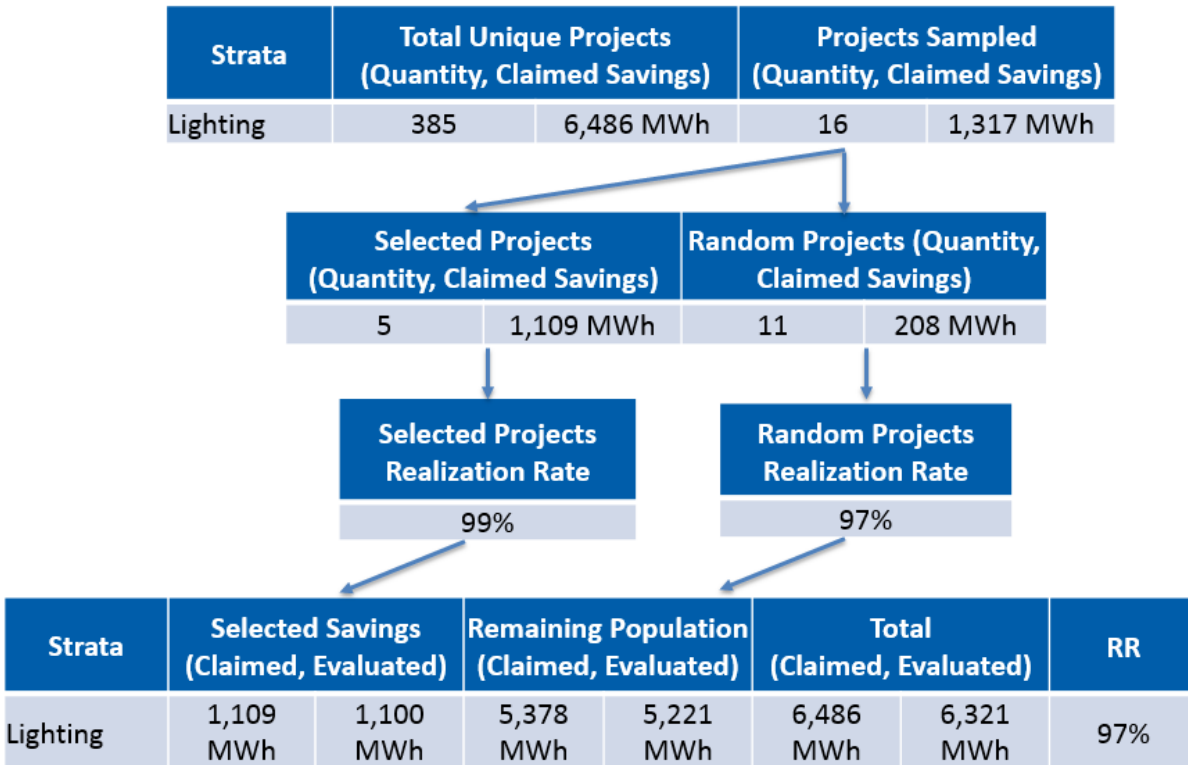


Table 7 shows the total quantity of projects sampled, the associated reported energy savings, and the percentage this sample represents out of the population.

Table 7. Utah 2014-2015 *wattsmart* Business Program Impact Sampling Summary

Strata	Sample Type	Unique Projects Sampled	Reported Energy Savings (kWh)		Percentage kWh Sampled
			Sampled Projects	All Projects	
Lighting – Large	Selected	5	5,708,840	70,678,974	11%
	Random	11	2,369,540		
Lighting – Small	Selected	4	397,481	65,111,079	1%
	Random	12	221,749		
Recommissioning	Selected	5	4,560,732	8,498,605	60%
	Random	3	535,788		
HVAC	Selected	4	4,391,340	19,100,687	36%
	Random	23	2,532,947		
Refrigeration	Selected	2	1,823,709	8,566,676	43%
	Random	8	1,830,921		
Motor Systems	Selected	6	2,755,641	13,700,185	29%
	Random	15	1,242,849		
Compressed Air	Selected	4	3,967,632	9,263,192	55%
	Random	11	1,168,886		
Agricultural	Selected	4	901,544	4,032,901	27%
	Random	14	195,870		
Other	Selected	10	1,566,978	26,353,861	7%
	Random	11	186,299		
SEM	Selected	2	6,175,665	6,175,665	100%
Total		154	42,534,411	231,481,825	18%

Process Sample Design and Data Collection Methods

The Cadmus team conducted the process evaluation by assessing each program delivery channel. There were four program delivery channels, each corresponding to one of the incentive types: SBL, Typical Upgrades, Custom Analysis, and LED Instant Incentives.

The team developed samples for three customer populations—participants, partial participants, and nonparticipants—using simple random sampling within each *wattsmart* Business Program delivery channel. We defined participants as customers who completed a SBL, Typical Upgrades, Custom Analysis, or LED Instant Incentives project through the program during the evaluation period of program years 2014 and 2015. The team defined partial participants as customers who initiated a Typical Upgrades or Custom Analysis project through the program in 2014 or 2015, but did not complete that project. We did not stratify these customers, but selected projects for review using simple random sampling. Finally, the Cadmus team defined nonparticipants as customers who have never initiated or completed a project through the program or who had not done so in 2014 and 2015. The team sorted nonparticipants into managed and non-managed accounts. Managed accounts represent those customers who have an assigned RMP account manager.



Table 8 shows the final sample disposition for various data collection activities. The Cadmus team exceeded the precision/confidence targets shown in the table for both participants and nonparticipants. The team achieved $\pm 8.5\%$ precision at 90% confidence for participants in the SBL, Typical Upgrades, and Custom Analysis delivery channels, and $\pm 12.5\%$ precision at 90% confidence for participants in the LED Instant Incentives delivery channel. We also achieved $\pm 8.8\%$ precision at 90% confidence for nonparticipants. We achieved $\pm 27\%$ precision at 90% confidence for partial participants after dialing each person in the sample five times.

A detailed methodology for each surveyed population is provided in the Surveys section of the Process Evaluation chapter.

Table 8. Utah 2014-2015 wattsmart Business Program Data Collection and Sampling

Data Collection Activity	Precision and Confidence Target*	Precision and Confidence Achieved	Population**	Sampling Frame**	Target Completes	Achieved Completes
RMP Program Staff Interviews	N/A	N/A	N/A	N/A	N/A	2
Program Administrator Interviews	N/A	N/A	N/A	N/A	N/A	6
Participant Surveys (SBL)	±10% at 90% (combined)	±8.5% at 90% (combined)	4,353	1,216	30	30
Participant Surveys (Typical Upgrades)				1,903	30	30
Participant Surveys (Custom Analysis)				354	28	28
Recommissioning/Industrial Recommissioning				22	21	4
Participant Surveys (LED Instant Incentives)	±10% at 90%	±12.5% at 90%	282	276	55	38
Partial Participant Surveys	±15% at 90%	±27% at 90%	204	98	26	9
Nonparticipant Surveys (Managed)	±10% at 90% (combined)	±8.8% at 90% (combined)	23,363	372	20	16
Nonparticipant Surveys (Non-Managed)				22,623	50	71
Total Interviews and Surveys			28,202	26,864	260	234

* Sample sizes based on a 0.5 coefficient of variation (CV). The CV is the ratio of standard deviation (a measure of the dispersion of data points in a data series) to the series mean.

** Population based on unique pairings of customer names and measure names. Sample frame based on unique customer names with contact information (and site addresses for partial participants). Sources: Rocky Mountain Power. *UT WSB 2015 Participants*. March 2, 2016; Rocky Mountain Power. *UT 2014 WSB Eval_Rpt*. April 12, 2016; Nexant Inc. *Copy of Nexant WSB FX Partial Participant Data*. July 12, 2016; Cascade Engineering Services. *Cascade UT WA WY PTAC Partial Participants*. August 16, 2016; Rocky Mountain Power. *ID UT WA WY NonRes Cust 201609*. August 23, 2016; Rocky Mountain Power. *2014-2015 WSB Near Participants*. August 15, 2016; PacifiCorp. *PP RMP Managed Accounts December 2015*. December 3, 2009, last modified October 21, 2016.



Impact Evaluation

This chapter provides the impact evaluation findings for the **wattsmart** Business Program resulting from the Cadmus team’s data analysis, for which we used these methods:

- Participant surveys
- Partial participant surveys
- Nonparticipant surveys
- Net-to-gross analysis
- Site visits
- Engineering measurements
- Site-level billing analysis

This section presents two evaluated saving values: gross savings and net savings. Reported gross savings are electricity savings (kWh) that RMP reported in the 2014 and 2015 *Rocky Mountain Power Energy Efficiency and Peak Reduction Annual Reports* (annual reports).⁷ Net savings are the program savings net of what would have occurred in the program’s absence. These savings are the observed impacts attributable to the program.

To determine gross savings, the Cadmus team applied step 1 through step 4 shown in Table 9. To determine evaluated net savings, we applied the fifth step.

Table 9. Impact Steps to Determine Evaluated Gross and Net Savings

Savings Estimate	Step	Action
Evaluated Gross Savings	1	Tracking Database Review: Validate the accuracy of data in the participant database and verify that savings match annual reports
	2	Verification: Adjust gross 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 population
Evaluated Net Savings	5	Attribution: Apply NTG adjustments

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: The Cadmus team selected a sample of sites from the RMP program database. We stratified the distribution of measures among sampled sites, primarily by end-use type: lighting, recommissioning,

⁷ These reports are available online:
http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2016/UT_Energy_Efficiency_and_Peak_Reduction_Report.pdf; and
http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2015/UT_2014-Annual-Report_FINAL042915.pdf

HVAC, refrigeration, motor systems, compressed air, agricultural, and other measures. The team completed 154 site visits and desk reviews as part of the 2014 and 2015 program evaluation. Site visits were performed to verify measure installation.

Step 3: Next, we reviewed all project documentation; developed an evaluation, measurement, and verification plan; and performed site visits to verify the installation, specifications, and operation of incented measures. The Cadmus team installed light loggers at 20 sites and power metering equipment at 14 sites within the sample.

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

Step 5: Lastly, the Cadmus team used participant surveys to calculate freeridership using industry standard self-report methodology. We also surveyed partial participants and nonparticipants to determine if any nonparticipant spillover could be credited to the program, which was not otherwise incented; however, we did not apply this value to the overall NTG used to calculate net savings but instead provide the information for future planning consideration.

Site Visits and Engineering Measurements

The Cadmus team reviewed all project documentation available from RMP. 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, confirming that installed equipment meets program eligibility requirements, and verifying that the quantity of installed measures matches 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 Cadmus team interviewed facility personnel involved with the project, gathering information (such as the type of equipment replaced and hours of operation) that could not be verified on the site, or through documentation reviews or metering.



Overall Evaluated Gross Savings Results

Table 10 presents reported and evaluated gross savings for the 2014 and 2015 program years, with an overall realization rate of 99.7%.

Table 10. Reported and Evaluated Gross Savings by Program Year

Program Year	Program Savings (kWh)		Gross Program Realization Rate
	Reported	Evaluated Gross	
2014	111,113,513	108,655,576	98%
2015	120,368,312	122,178,716	102%
Total	231,481,825	230,834,291	99.7%

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

Table 11. Reported and Evaluated Gross wattsmart Business Program Savings by Measure Category (2014-2015)

Strata	Program Savings (kWh)		Realization Rate	Precision*
	Reported	Evaluated Gross		
Lighting - Large	70,678,974	65,618,358	93%	7.7%
Lighting - Small	65,111,079	80,228,898	123%	18.3%
HVAC	19,100,687	17,784,036	93%	11.2%
Refrigeration	8,566,676	8,270,573	97%	1.1%
Motor Systems	13,700,185	15,497,782	113%	16.5%
Compressed Air	9,263,192	6,819,039	74%	±26.2%
Agricultural	4,032,901	3,284,011	81%	±47.9%
Recommissioning	8,498,605	7,131,674	84%	±14.9%
Other	26,353,861	19,589,329	74%	±9.9%
SEM	6,175,665	6,610,591	107%	±15.4%
Total	231,481,825	230,834,291	99.7%	±8.5%

* Precision calculated at 80% confidence by strata and 90% confidence overall.

Evaluated Gross Savings Results by Strata

Lighting

RMP provides incentives for four types of lighting projects: exterior lighting, general illuminance, lighting, and non-general illuminance. These projects are either for renovations or new construction, and involve high-efficient lighting technologies such as CFLs, LEDs, and induction fixtures. The Cadmus team divided lighting projects into large lighting and small lighting strata, where large lighting projects are those claiming 100,000 kWh or more in reported electric energy savings, and small lighting projects are those claiming less than 100,000 kWh in electric energy savings.

RMP incented 2,206 large lighting measures within 268 unique projects, and reported 70,678,974 kWh in energy savings for the 2014 and 2015 years. The incented large lighting projects account for 31% of all reported energy savings in Utah. RMP incented 16,471 small lighting projects within 5,108 unique project IDs, and reported 65,111,079 kWh in energy savings for the 2014 and 2015 years. Incented small lighting projects account for 28% of all reported energy savings in Utah.

Methodology

The Cadmus team evaluated 16 large lighting projects and 16 small lighting projects. Together, these projects account for 12% of all reported energy savings within the two lighting strata. RMP used prescriptive calculations for 30 of the evaluated projects and custom calculations for two of the projects. RMP used the FinAnswer Express prescriptive lighting calculator to determine incentive amounts for most of the lighting projects in Utah,⁸ and used custom calculations for other projects. The FinAnswer Express calculator documents the customer information, project location, light fixture specifications, energy saving calculations, and financial information. Critical inputs used to calculate energy savings include the following:

- Lighting operation schedule
- Space name, type, area, and condition
- Baseline lighting fixture location, type, quantity, controls, and wattage
- Proposed lighting fixture location, type, quantity, controls, and wattage

The Cadmus team reviewed the FinAnswer Express calculator methodology and assumptions to determine the applicability for each sampled project. We also performed site visits at each of the sampled projects to inspect and document the installed lighting equipment. For 20 of the 32 projects visited, the Cadmus team installed light loggers to document the hours of use where incentivized lighting fixtures were installed. Of the 20 sites where the team installed light loggers, 12 were small lighting sites and eight were large lighting sites. The Cadmus team installed two to six light loggers per facility in representative spaces. We determined these representative spaces as the areas with fixtures where the highest energy savings were claimed. We left the loggers in place for a minimum of three weeks, then retrieved and analyzed the data. The Cadmus team extrapolated measured hours of use to annual hours of use, and updated the prescriptive Express calculators with the revised values.

For the one large lighting project in which the implementer had used custom calculations to determine energy savings, the Cadmus team reviewed the implementer's custom calculation workbook for energy savings methodology, inputs, assumptions, and accuracy. If site-level findings deviated from the claimed

⁸ Between 2013 and 2015, RMP combined a number of programs under the **wattsmart** Business Program umbrella. The Energy FinAnswer program was rolled into the Custom Analysis delivery channel, and the FinAnswer Express Program was rolled into the Typical Upgrades delivery channel within the **wattsmart** Business Program.

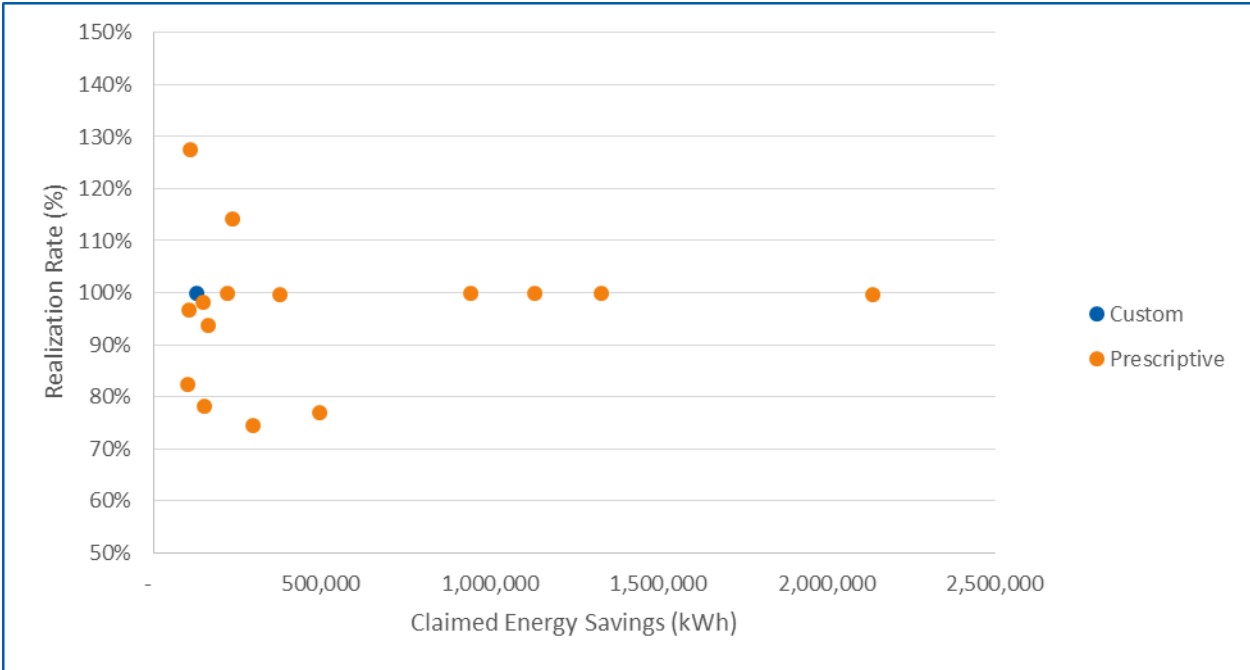


equipment quantities, performance specifications, or hours of use, the Cadmus team recreated the custom calculations with the updated information.

Findings

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

Figure 3. Lighting - Large Sample Results



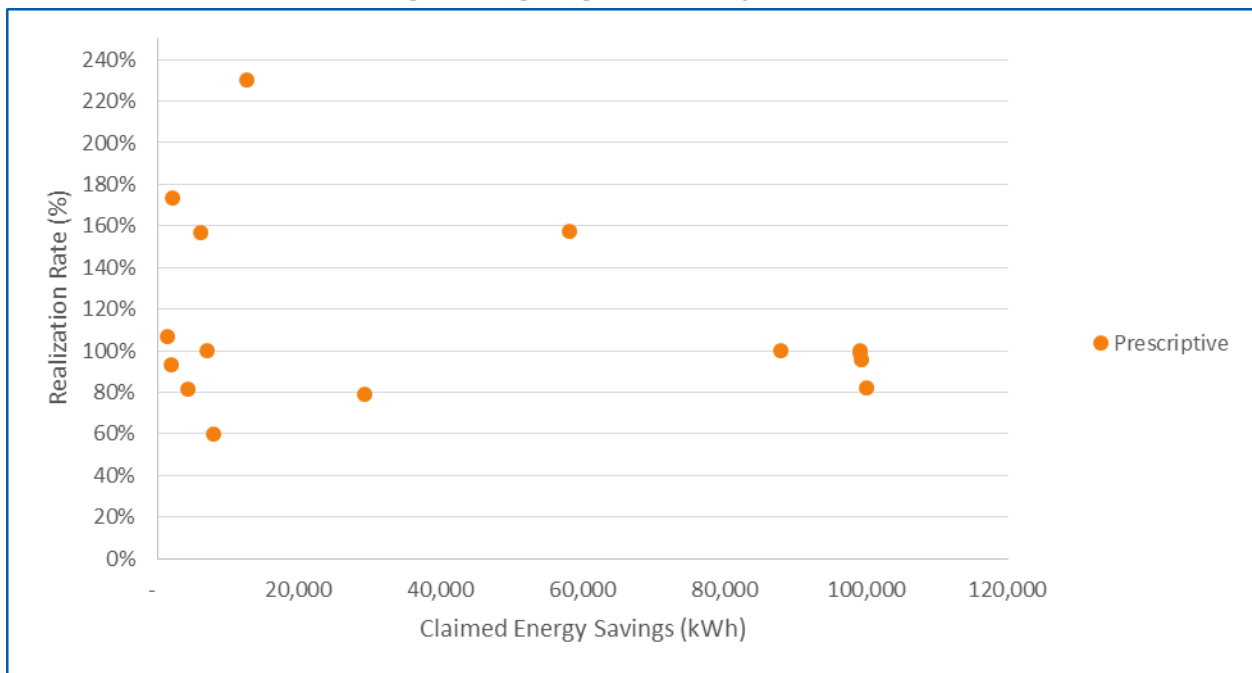
There were three sites exhibiting less than 80% realization rates and one site with a greater than 120% realization rate. For the remaining sites, the Cadmus team found no (or a nominal) difference between our calculated savings and the reported savings. For the sites with evaluated energy savings less than 80% or greater than 120%, the differences in savings were due to discrepancies in the claimed hours of use. Table 12 provides specific details.

Table 12. Lighting – Large Sample Detailed Findings

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
UTFX1_004645	LEDs	294,895	219,943	75%	Lights operate at reduced hours of operation per lighting schedule
WBUT_9099	LED wallpacks	493,284	379,400	77%	Exterior row of LED wallpacks operate based on photocell instead of 24/7
UTFX1_004594	T5HOs	153,418	119,898	78%	Light loggers indicate lower hours of use
WBUT_8240	Reduced wattage T8s	111,797	142,521	127%	Light loggers indicate higher hours of use

Figure 4 indicates the realization rates and associated energy savings for each of the sampled small lighting projects.

Figure 4. Lighting - Small Sample Results



There were two sites exhibiting less than 80% realization rate and five sites with greater than 120% realization rate. For the remaining sites, the Cadmus team found no (or a nominal) difference between our calculated savings and the reported savings. For the sites with evaluated energy savings less than 80% or greater than 120%, the differences in savings were due to discrepancies in the quantity of fixtures or the claimed hours of use. Table 13 provides specific details.



Table 13. Lighting – Small Sample Detailed Findings

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
UTFX1_002334	T8s and LEDs	7,982	4,794	60%	Light loggers indicate lower hours of use. Two of three LED wallpacks were not installed
SBUT_29042	T8s	29,336	23,197	79%	Light loggers indicate lower hours of use
SBLS000252	T8s	6,075	9,533	157%	Three of 21 fixtures are left on 24/7, and light loggers indicate higher hours of use
UTFX1_006112	T5HOs	58,110	91,415	157%	Light loggers indicate higher hours of use
UTFX1_002213	T8s	2,137	3,706	173%	Light loggers indicate higher hours of use
SBUT_29391	T8s	12,559	28,915	230%	Light loggers indicate higher hours of use
WLEDUT_62247	Midstream LEDs	2,871	10,164	354%	No calculations provided for Midstream projects

HVAC

RMP incented 713 HVAC measures within 424 unique projects. These projects consist of pump and fan motor VFDs, air-handling units, air-source and ground-source heat pumps, packaged terminal heat pumps, chillers, cooling towers, indirect/direct evaporative cooling systems, demand control ventilation, heat pumps, and scheduling controls. RMP reported energy savings of 19,100,687 kWh, which accounts for 8% of all reported energy savings for the 2014 and 2015 program years.

Methodology

The Cadmus team evaluated 27 HVAC projects, accounting for 36% of all reported energy savings within the HVAC strata. Of the evaluated projects, RMP used deemed savings for five projects, prescriptive calculations for 11 projects, and custom calculations for 11 projects. Deemed savings refer to a single energy savings value per unit per measure (e.g., kWh per horsepower or kWh per CFM). Prescriptive calculations require more than one input to determine energy savings (e.g., HVAC equipment performance, operating hours, and capacity). RMP used one of three prescriptive calculators to determine the incentive amount for prescriptive HVAC projects:

- Rocky Mountain Power HVAC Calculator
- Rocky Mountain Power FinAnswer Express Chiller Calculator
- Rocky Mountain Power Indirect/Direct Evaporative Cooling Calculator

These prescriptive calculators document the customer information, project location, equipment specifications, and energy savings calculations. The critical inputs used to calculate energy savings are listed in Table 14.

Table 14. Critical Inputs to Calculating Energy Savings

Rocky Mountain Power HVAC Calculator	Rocky Mountain Power FinAnswer Express Chiller Calculator	Rocky Mountain Power Indirect/Direct Evaporative Cooling Calculator
Manufacturer make/model	Manufacturer make/model	Design air flow
Quantity	Quantity	Supply air temperature
Cooling capacity	Chiller service type	Supply fan size (hp)
EER, SEER, and/or HSPF	Heat rejection specifications	Static pressure
Business type	AHRI capacity	Evaporative stage types
Interior/exterior space type	AHRI integrated part load value and full-load efficiency	Chilled water stage type
	Facility type	Building square footage

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 or farmers, and review the expected performance characteristics. We then used the collected data to update the prescriptive calculators and determine evaluated savings.

For projects in which the implementer used custom calculations, the Cadmus team reviewed the custom calculation workbooks for energy savings methodology, inputs, assumptions, and accuracy. If site findings deviated from the claimed equipment quantities, performance specifications, or hours of use, the team recreated the custom calculations with the updated information. The Cadmus team installed power metering equipment for three projects and analyzed the meter data to develop a load profile and determine hours of use.

Findings

Figure 5 indicates the realization rates and associated energy savings for each of the sampled projects.

incented measures had been altered or disabled since the time the measure was implemented. For one custom project (WBUT_17409), RMP's implementation contractor used custom spreadsheet calculations to determine energy savings associated with a chiller plant upgrade and flat plate heat exchanger. Based on the Cadmus team's on-site activities and investigation into the original calculations, we determined that energy consumption was overestimated in the baseline case and the claimed energy savings were exaggerated.

For one custom project that involved the implementation of multiple HVAC upgrades and control changes (WBUT_8217), the Cadmus team evaluated total energy consumption via a site-level billing analysis. The utility bill analysis involved analyzing four years of utility data, normalizing for weather and occupancy and calculating energy savings by subtracting the post-implementation energy consumption from the pre-implementation energy consumption. The analysis results indicate the total energy consumption was lower than expected, resulting in increased energy savings.

Refrigeration

RMP incented 203 refrigeration measures within 106 unique projects, consisting of food service refrigeration equipment, fast acting doors, case lighting, high performance chillers, compressor and condenser fan VFDs, optimized refrigeration controls, and process cooling system upgrades. RMP reported energy savings of 8,566,676 kWh, which accounts for 4% of all reported energy savings for the 2014 and 2015 program years.

Methodology

The Cadmus team evaluated 10 refrigeration projects, accounting for 43% of all reported energy savings within the refrigeration strata. Of the evaluated projects, RMP used deemed savings for four projects and custom calculations for six projects. RMP's implementation contractor performed custom project calculations of energy efficiency savings. For some complicated and large energy saving projects, the implementer installed power meters to measure performance before and after the measure was implemented. For deemed calculations, RMP used the energy savings established by ENERGY STAR or the RTF.

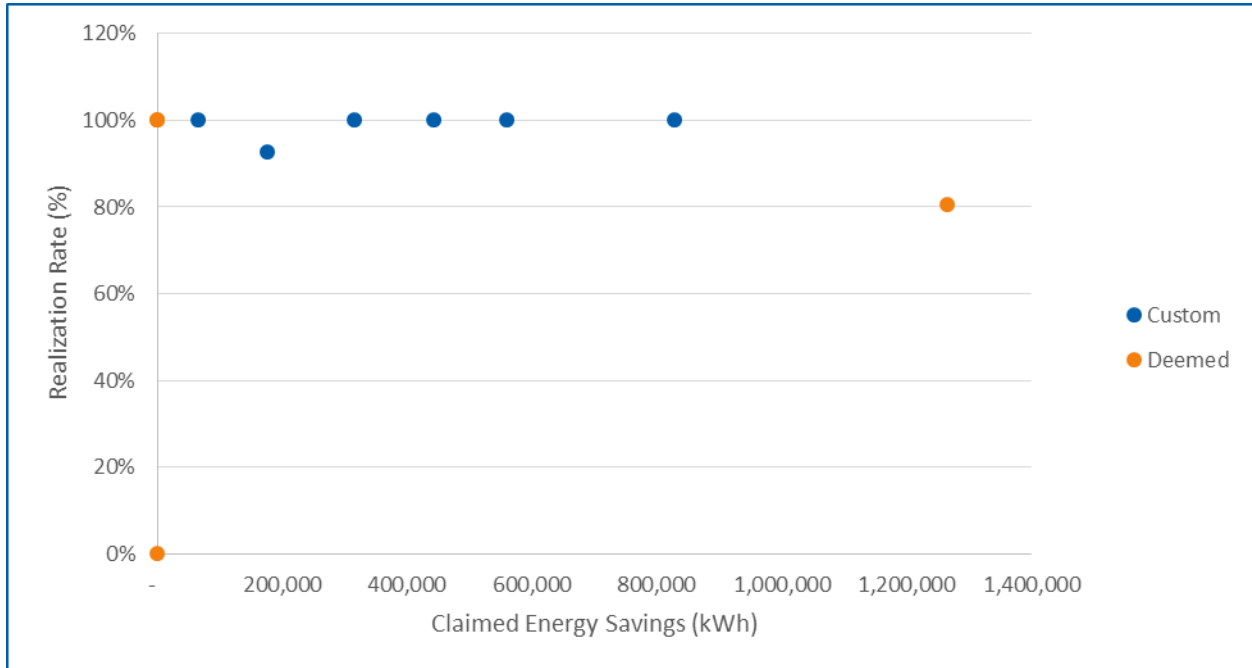
For projects that required custom calculations, the Cadmus team reviewed the contractor's custom calculation workbooks for energy savings methodology, inputs, assumptions, and accuracy. For projects where claimed savings were determined using deemed values, the team reviewed the unit energy savings calculations provided by ENERGY STAR or the RTF, and adjusted savings inputs based on site findings and interviews.

Findings

Figure 6 indicates the realization rates and associated energy savings for each of the sampled projects.



Figure 6. Refrigeration Sample Results



There was one site exhibiting less than 80% realization rate. For the remaining sites, the Cadmus team found no (or a nominal) differences between our calculated savings and the reported savings. Table 16 provides specific details for the one project with a low realization rate.

Table 16. Refrigeration Sample Detailed Findings

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
UTFX1_002377	ENERGY STAR Freezer	978	0	0%	Restaurant closed shortly after receiving incentive and building was converted to a retail space

Motor Systems

RMP provides incentives for several types of motor systems projects—green motor rewinds, motor upgrades, and VFDs—serving commercial HVAC and industrial processes. RMP incented 326 measures within 234 projects, and reported 13,700,185 kWh in energy savings for the 2014 and 2015 program years. Incentivized motor systems projects account for 6% of all reported energy savings in Utah.

Methodology

The Cadmus team evaluated 21 motor systems projects, accounting for 29% of all reported energy savings within the motor systems strata. Of the 21 evaluated projects, RMP determined claimed savings using deemed savings for 12 projects, prescriptive calculations for one project, and custom calculations for eight projects.

For projects in which the implementer used deemed savings to determine claimed energy savings, the Cadmus team evaluated savings using the most appropriate savings calculation methodology based on the RTF measure database. For prescriptive VFD projects installed on HVAC ventilation equipment (supply fans, return fans, and exhaust fans), we reference the deemed savings amounts identified within the variable speed drive load shape study⁹. For prescriptive VFD projects installed on central plant equipment (chilled water pumps, condenser water pumps, hot water pumps, cooling tower fans), we referenced the calculation methodology and energy savings factors identified within the PA TRM.

Where prescriptive calculations were used to determine claimed energy consumption savings, the Cadmus team reviewed the prescriptive calculator methodology and assumptions to determine the applicability for each project sampled. We collected critical savings inputs—such as equipment quantity, capacity, efficiency, load profile, and hours of use—during site visits and evaluated savings by updating the prescriptive calculators based on site findings.

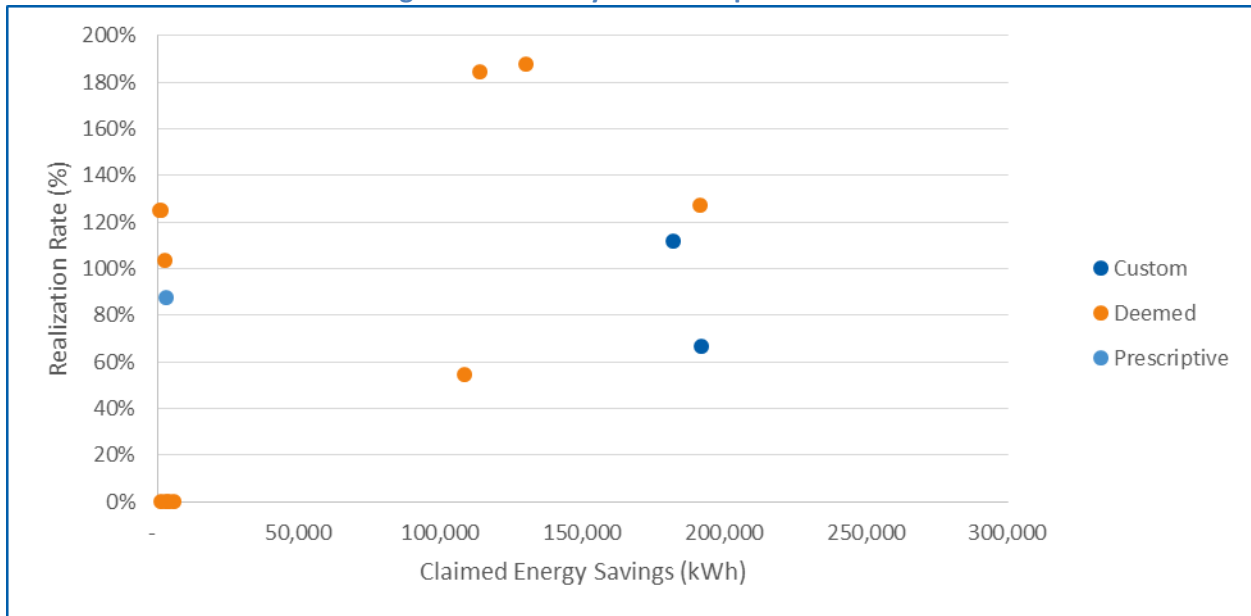
For projects in which RMP's implementation contractor used custom calculations to determine energy savings, the Cadmus team reviewed the custom calculation workbooks for energy savings methodology, inputs, assumptions, and accuracy. If site findings deviated from the claimed equipment quantities, performance specifications, or hours of use, the team recreated the custom calculations with the updated information. We installed power metering equipment for four of the custom projects and analyzed the meter data to develop load profiles and determine hours of use.

Figure 7 indicates the realization rates and associated energy savings for each of the sampled projects.

⁹ These deemed savings values are based on the Cadmus 2014 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>



Figure 7. Motor Systems Sample Results*



* Not all project results are shown on plot. Outliers are removed for clarity.

There were seven sites with realization rates below 80% and six sites with a realization rate above 120%. The Cadmus team found no or only nominal differences in reported savings for the remaining sites. Table 17 provides specific details for the 13 sites with realization rates greater than 120% or less than 80%.

Table 17. Motor System Sample Results

Project	Project Measure	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
UTFX1_002430	Green motor rewind	5,935	0	0%	Motor found in storage
UTFX1_004149	Green motor rewind	4,088	0	0%	Motor found in storage
UTFX1_004629	Green motor rewind	3,089	0	0%	Motor was not found on-site
UTFX1_007288	Green motor rewind	1,319	0	0%	Motor was not found on-site
UTFX1_003084	VFDs on eight supply fans	108,200	58,989	55%	Power meters installed and indicated lower hours of use than expected
WBUT_9098	Custom rock crusher upgrade	526,000	302,800	58%	Power meters installed and indicated lower hours of use than expected
WBUT_10506	VFDs on compressor fans	192,076	128,257	67%	Reduced oil production resulted in only two of three fans being used

Project	Project Measure	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
UTFX1_004295	ECM motor	707	884	125%	RTF calculation methodology used to evaluate ECM deemed savings projects
UTFX1_004296	ECM motor	1,414	1,767	125%	RTF calculation methodology used to evaluate ECM deemed savings projects
UTFX1_003930	VFDs on supply fans	191,514	243,620	127%	VFD savings calculated based on Cadmus VFD study and PA TRM
UTFX1_002300	VFDs on supply fans	302,960	388,351	128%	VFD savings calculated based on Cadmus VFD study and PA TRM
UTFX1_003083	VFDs on supply fans	113,610	209,790	185%	VFD savings calculated based on Cadmus VFD study and PA TRM
UTFX1_005862	VFDs on supply fans	129,840	243,960	188%	VFD savings calculated based on Cadmus VFD study and PA TRM

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

- All motors incentivized for green motor rewind projects were either found in storage or unable to be located during site visits. Energy savings from these projects are achieved by performing green motor rewinds, which result in a higher motor efficiency than a normal rewind process. However, savings are only realized when the motor is placed back into service. Because no motors were found in service, no savings are currently being realized.
- Two projects (UTFX1_004295 and UTFX1_004296) involved upgrades to electronically commuted motors (ECMs) for refrigeration projects. RMP used a deemed value of 9.3 kWh/year/motor-watt based on the DEER and RTF databases. Cadmus evaluated these projects using the RTF calculation methodology and project-specific site findings. Both projects realized higher energy savings as a result of using the RTF calculations.
- For projects where VFDs are applied to HVAC fans, RMP uses deemed savings of 1,082 kWh/hp. The Cadmus team evaluated these projects by referencing the 2014 VFD study and applying the deemed savings specific to HVAC supply fans, return fans, and exhaust fans. The revised deemed savings amounts are higher than RMP's deemed savings value.

Compressed Air

RMP provides incentives for several types of compressed air projects: VFDs serving air compressors, air dryers, compressed air system setpoint and sequence optimizations, air leak reduction, and zero-loss condensate drains. RMP reported 9,263,192 kWh in energy savings for the 2014 and 2015 program years, which accounts for 4% of all reported energy savings in Utah.



Methodology

The Cadmus team evaluated 15 compressed air projects, accounting for 56% of all reported energy savings within the strata. From the evaluated projects, RMP used prescriptive calculations for seven projects and custom calculations for eight projects.

For the seven projects claiming savings from prescriptive calculations, the Cadmus team reviewed the prescriptive calculator (NW Regional Compressed Air Tool v3.0) methodology and assumptions to determine the applicability. The prescriptive calculator documents the customer information, compressed air system specifications, and expected performance. Critical inputs used to calculate energy savings include:

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

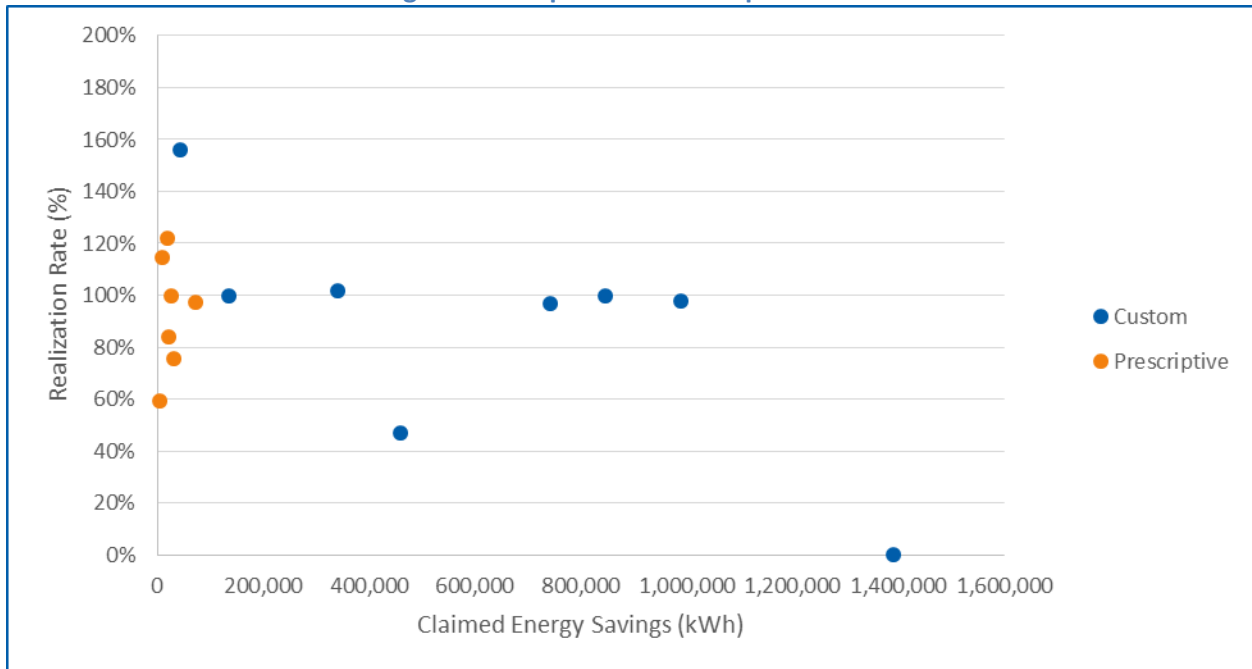
The Cadmus team performed site visits to inspect and document the installed system specifications and operational setpoints. When variations existed between the project data and site findings, the team updated the NW Regional Compressed Air Tool v3.0 with the revised inputs to calculate evaluated savings.

The Cadmus team evaluated projects in which claimed savings were determined using custom workbooks and spreadsheets by installing power metering equipment where possible and recreating custom calculations based on trend data and site findings. We installed power metering equipment on five of the eight sampled projects using custom calculations. The team installed motor on/off loggers at one of the eight sampled projects. For the two custom calculated sites where power metering equipment was not installed or trend data was not available, the Cadmus team reviewed the custom calculations for methodology and accuracy, and used site findings to revise calculation inputs where we found variations.

Findings

Figure 8 indicates the realization rates and associated energy savings for each of the sampled projects.

Figure 8. Compressed Air Sample Results



There were four sites with realization rates below 80% and two sites with a realization rate above 120%. The Cadmus team found no or nominal differences in reported savings for the remaining sites. Table 18 provides specific details for the six sites with realization rates greater than 120% or less than 80%.

Table 18. Compressed Air System Sample Results

Project	Project Measure	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
WBUT_17477	Two new air compressors	1,390,800	0	0%	New air compressors were installed, but are not operating. The inefficient existing air compressor is still in use as base-loaded compressor
WBUT_84423	Two new air compressors	459,782	215,949	47%	Meter data indicates higher energy consumption from new air compressors than expected
UTC00557	New air compressor	5,092	3,022	59%	Load profile and hours of use revised based on facility compressor log
UTC00618	New air compressor	31,824	24,001	75%	Load profile and hours of use revised based on facility compressor log



Project	Project Measure	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
UTC00294	New air compressor	20,081	24,447	122%	Load profile and hours of use revised based on facility compressor log
UTC00272	New air compressor	44,385	69,161	156%	Meter data indicates lower energy consumption than expected with no other changes to facility production

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

- Five custom projects involved the use of power metering to determine energy savings. One of these projects had a realization rate less than 80% (WBUT_84423), and one had a realization rate greater than 120% (UTC00272).
 - The low realization rate was because the average metered demand during the Cadmus team’s metering period was higher than the average demand in the verification report. The team identified that the installed air compressors did not unload as often as anticipated.
 - The high realization rate was because the average metered demand for the installed air compressor was 9% less than expected in the verification report. Airflow data for the site was not available, but the site contact stated that there had been no changes in compressed air load.
- Three prescriptive projects (UTC00577, UTC00618, and UTC00294) exhibited realization rates greater than 120% or less than 80%. The Cadmus team evaluated these projects by reviewing the load profile and hours of use trend logs during site visits and updating the NW Regional Compressed Air Tool v3.0 with the revised information. In two cases, the hours of use were lower than expected, with higher load levels when operating. VFD air compressors are most efficient and achieve the greatest energy savings when operated at part-load conditions. Because these units were operating at nearly full-load capacity, reduced savings were realized.
- One custom project exhibited a realization rate of 0% (WBUT_17477) due to many compressed air system variations from the verification report. While on the site, the Cadmus team found that the existing, inefficient 400-hp Ingersoll Rand air compressor was still operating and the new Cameron air compressors were not operating. The site contact explained that the annual operating hours of the facility had been decreased (the facility is down approximately two weeks per month from September through December) and that the current compressed air system was not meeting the load. The team collected motor loggers, which indicated that the new Cameron air compressors and auxiliary air compressor did not run during the monitoring period. The Cadmus team requested airflow and compressor trend data from the site, but this data was not provided.

Agricultural

RMP provides incentives for seven types of agricultural projects: milker take offs, pivots and linear irrigation systems, pump upgrades, system redesigns, VFDs, irrigation hardware upgrades, and wheel line/hand line equipment. RMP provided incentives for 521 measures in 209 unique projects, and reported 4,032,901 kWh in energy savings for the 2014 and 2015 program years. Incented agricultural projects account for 2% of all reported energy savings in Utah.

Methodology

To determine savings for incented agricultural projects in Utah, RMP used prescriptive or custom calculations or deemed savings values. The Cadmus team evaluated 18 agricultural projects, accounting for 27% of the reported energy savings within the agricultural strata. From the evaluated projects, RMP used deemed savings for 11 projects, prescriptive calculations for five projects, and custom calculations for two projects.

The majority of the projects the Cadmus team evaluated involved upgrading or replacing irrigation hardware equipment including gaskets, sprinklers, nozzles, hoses, and regulators. These projects claim 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 include quantity of equipment, hours of operation per season, and pump pressure.

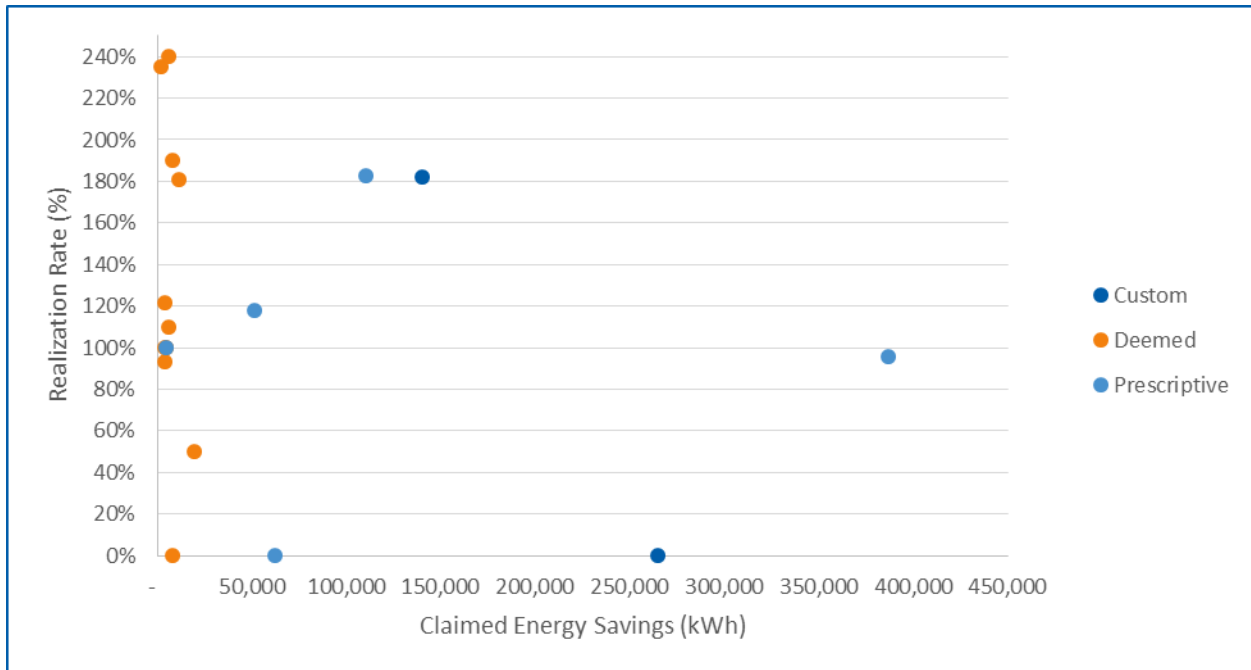
For the five projects that involved prescriptive calculations for installing VFDs on irrigation pump, the implementer determined claimed savings using the Irrigation Pump VFD Savings Estimator v1.4 calculator. The Cadmus team evaluated savings for these projects by updating the prescriptive calculators based on site findings and/or by comparing utility bill consumption from the period before and after the incented project was implemented. For systems where the incented equipment was 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 site data collection activities. We also conducted utility billing analysis for the two projects in which deemed savings were determined using custom calculations.

Findings

Figure 9 indicates the realization rates and associated energy savings for each of the sampled projects.



Figure 9. Agricultural Sample Results



There were seven sites with realization rates greater than 120% and four sites with realization rates below 80%. Table 19 provides specific details related to these projects.

Table 19. Agricultural Sample Detailed Findings

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
WBUT_10327	Custom pump relocation	264,900	0	0%	Two pumps installed instead of rebuilding existing pump
UTC00325	Irrigation hardware	7,819	0	0%	Water provided through gravity well; no pump energy used
UTC00589	New well pump with VFD	62,249	0	0%	Pump failed shortly after installation; no crops or irrigation found on the site
UTC00666	Irrigation hardware	19,806	9,905	50%	Only 29% of irrigation hardware purchased installed, with the remaining in storage
UTC00604	Irrigation hardware	4,032	4,898	121%	RTF measure calculated higher savings than deemed values
UTC00510	Irrigation hardware	11,424	20,688	181%	RTF measure calculated higher savings than deemed values
UTC00282	Custom irrigation system	140,153	255,600	182%	Utility bill analysis indicated lower post-installation energy consumption than expected

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
UTC00346	New well pump with VFD	110,046	200,960	183%	Utility bill analysis indicated lower post-installation energy consumption than expected
UTC00301	Irrigation hardware	8,160	15,533	190%	RTF led to higher calculated savings than deemed values
UTC00509	Irrigation hardware	2,015	4,733	235%	RTF led to higher calculated savings than deemed values
UTC00267	Irrigation hardware	5,907	14,174	240%	RTF led to higher calculated savings than deemed values

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

- Seven projects (UTC00325, UTC00666, UTC00604, UTC00510, UTC00301, UTC00509, and UTC00267) involved replacing irrigation hardware such as gaskets, sprinklers, nozzles, hoses, and/or regulators. For these projects, the implementer determined savings using deemed values based on estimated lift, operation hours, and assumed pump efficiency from Nexant and Fazio Engineering. The Cadmus team evaluated these projects using the RTF irrigation hardware measure calculation methodology and associated calculation tools. The RTF calculator allows for site-specific project data collected during site visits to be used to update savings calculations. The site-specific information includes hours of use, flow rate, and pump pressure. In general, we determined higher energy savings for irrigation hardware projects; however, two projects realized lower savings due to irrigation equipment being placed in storage or the site using a gravity well instead of pumping energy to provide irrigation.
- For projects where the implementer determined deemed savings using a utility billing analysis, the Cadmus team compared the unfiltered, raw metered energy consumption from the baseline period to the consumption from the post-implementation period. For sites where large deviations from expected performance were observed, the Cadmus team interviewed farmers to identify other potential factors affecting the performance (such as crop shifts, irrigation schedules, or market factors). We could not determine any consistent factor within these projects that resulted in consistently high or low energy consumption.

Recommissioning

RMP provided incentives for 31 recommissioning projects, which involve the investigation and implementation of multiple energy efficiency measures within each facility. RMP reported 8,498,605 kWh in energy savings from these projects for the 2014 and 2015 program years. Incented recommissioning projects account for 4% of all reported energy savings in Utah.

Methodology

RMP used custom calculations to determine savings for all incented recommissioning projects in Utah. The Cadmus team evaluated eight recommissioning projects, accounting for 60% of the reported energy



savings within the recommissioning strata. The evaluated projects involved the implementation of between two and ten individual measures within each project. Customers provided spreadsheet calculations and workbooks, as well as energy simulation models. All project documentation included an Energy Analysis Report that identified the potential energy efficiency measures and associated savings, as well as a Savings Verification Report that documented the success of implemented measures and the associated changes to claimed energy savings.

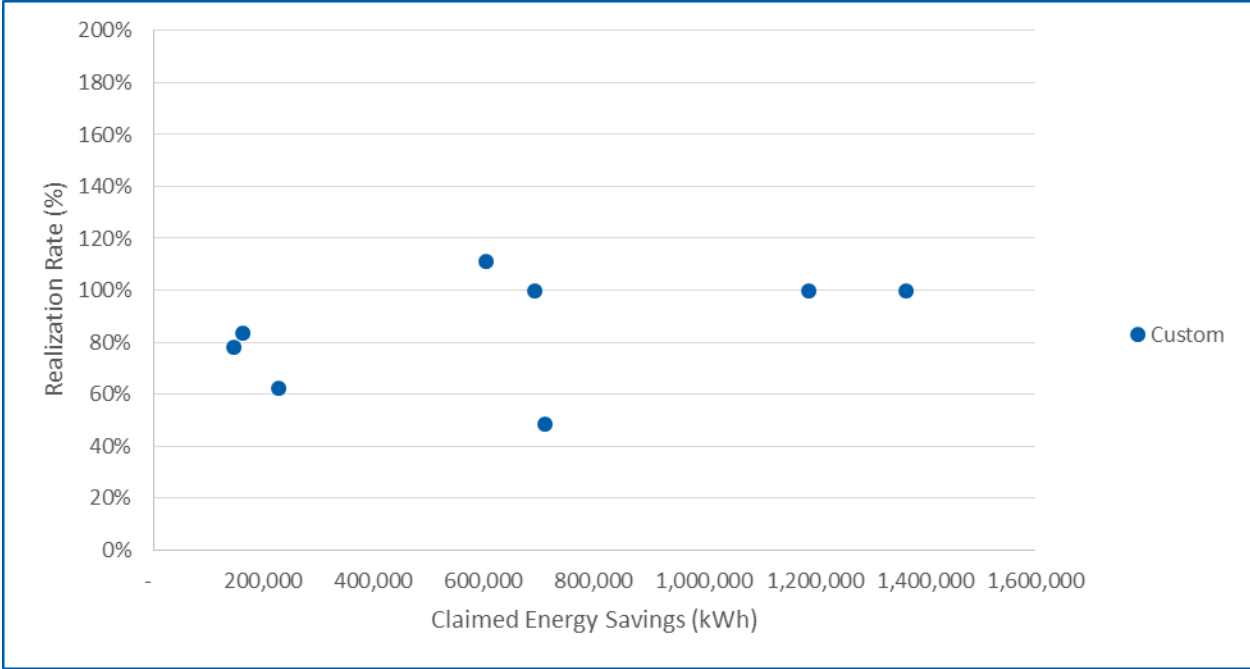
The Cadmus team evaluated recommissioning measures by reviewing the Energy Analysis and Savings Verification reports and identifying the equipment quantity, capacity, efficiency, performance characteristics, control strategy, and proposed changes for each energy efficiency measure. We performed site visits for each sampled project and physically verified all critical information on the site and/or reviewed this 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 of time.

For two projects, the Cadmus team conducted a utility billing analysis using billing data from 2012 to September 2016, in addition to the site data collection activities. We normalized this utility data for weather and occupancy.

Findings

Figure 10 indicates the realization rates and associated energy savings for each of the sampled projects.

Figure 10. Recommissioning Sample Results



There were three sites with realization rates below 80%. Table 20 provides specific details related to these projects with low realization rates.

Table 20. Recommissioning Sample Detailed Findings

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
WBUT_42914	Recommissioning	711,399	345,320	49%	Largest energy saving measure was not implemented
WBUT_11544	Recommissioning	227,817	141,685	62%	Controls sequences and setpoints were modified
WBUT_8307	Recommissioning	146,065	113,910	78%	Lighting control measures were disabled and instead lights are operated 24/7

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

- One project (WBUT_42914) involved recommissioning of a compressed air system. Compressor staging controls, air leakage reduction, and regulators were all installed or implemented. The largest energy saving measure, compressor staging controls, was not implemented. The equipment and systems are in place, but the facility has delayed implementation until a period when the equipment can be placed into full shut down mode.
- One project (WBUT_11544) involved the recommissioning process by implementing refrigeration and facility operation systems, which include anti-sweat heater controls, suction pressure controls, head pressure controls, and store lighting optimization. After the project was implemented, facility staff and company management changed. The corresponding changes in facility operation priorities resulted in setpoints that were modified such that only 25% of the savings from the largest measure (anti-sweat heater controls) are being realized. The other control measures and strategies maintained the efficient conditions.
- One project (WBUT_8307) involved recommissioning of a grocery store, implementing rescheduled case lighting, a lower minimum condensing setpoint, and rescheduled store lighting. The facility staff and controls contractors have changed multiple times since the project was implemented. The condenser measure setpoints were higher than originally implemented, and a portion of the store lighting changes were disabled and the associated hardware was removed, resulting in facility lights operating 24 hours a day. These changes result in lower energy savings than originally anticipated.

Other

RMP provides incentives for projects within the “other” category; these include building shell measures, controls, dishwashers, holding cabinets, insulation, office equipment, roofs, and windows. RMP incented 4,221 measures within 1,870 unique projects, and reported 26,353,861 kWh in energy savings for the 2014 and 2015 program years. Incented other projects accounted for 11% of all reported energy savings in Utah.



Methodology

To determine deemed savings for other projects incented in Utah, RMP used prescriptive and custom calculators and deemed savings values to determine reported energy savings. The Cadmus team evaluated 21 projects, accounting for 7% of the reported energy savings within the other strata. From the evaluated projects, RMP used deemed savings for 13 projects, prescriptive calculations for five projects, and custom calculations for three projects. Table 21 lists the deemed savings source and evaluation methodology for projects within the other category.

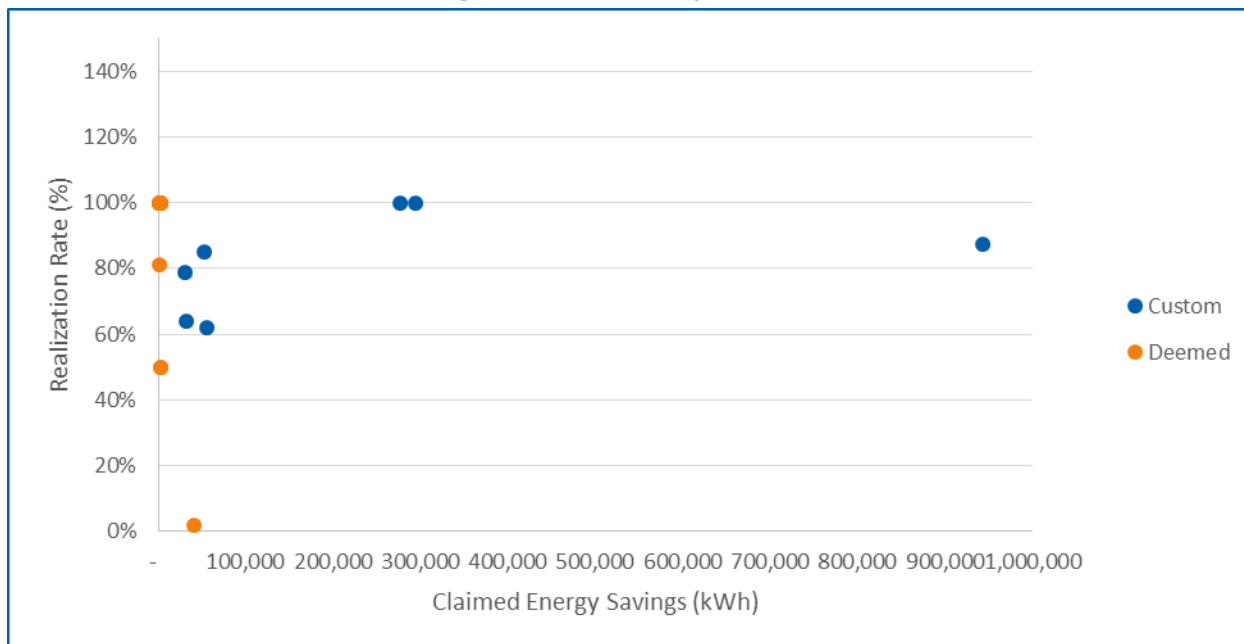
Table 21. Other Sample Energy Savings Methodology

Project Type	Reported Saving Methodology	Evaluation Methodology
Cool roofs	Deemed savings (0.33 kWh/yr/sq. ft.) based on California DEER	ORNL Commercial RSC
Insulation	Deemed savings (0.33 kWh/yr/sq. ft.) based on California DEER	Used reported deemed savings and updated quantities based on site observations
High-efficiency windows	Deemed savings (kWh/yr/sq. ft.) based on PacifiCorp and Xcel Energy demand-side management studies	Used reported deemed savings and updated quantities based on site observations
Network computer power management	Deemed savings (162 kWh/yr/PC) based on RTF	RTF Network Computer Power Management calculator
Smart plug strips	Deemed savings (100 kWh/yr/sq. ft.) based on RTF	Used reported deemed savings and updated quantities based on site observations

Findings

Figure 11 indicates the realization rates and associated energy savings for each of the sampled projects.

Figure 11. Other Sample Results



There were six projects with realization rates below 80%. Table 22 provides specific details related to those projects with low realization rates.

Table 22. Other Sample Detailed Findings

Project	Project Measures	Reported kWh	Evaluated kWh	Site Realization Rate	Notes
UTFX1_005810	Cool roof	40,953	707	2%	Only 40% of cool roof was installed above mechanically cooled warehouse*
UTFX1_003804	Roof insulation	3,112	1,556	50%	Only 50% of insulation installed
UTFX1_004201	Attic insulation	2,440	1,220	50%	Only 50% of attic insulation installed
UTFX1_001094	Network computer management	55,242	34,333	62%	Fewer computers were controlled by system than reported
WBUT_30915	Network computer management	31,536	20,218	64%	Fewer computers were controlled by system than reported
UTFX1_001071	Network computer management	30,780	24,289	79%	Fewer computers were controlled by system than reported

* Cool roofs only save energy above mechanically cooled spaces.



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

- One cool roof project (UTFX1_005810) involved installing a cool roof on a 120,000 square foot warehouse divided into five bays, where only two of the five bays are mechanically cooled. Additionally, warehouse facilities are assumed to have higher cooling setpoints than office spaces due to their space use type and characteristics. RMP uses deemed savings of 0.33 kWh for all cool roof projects based on the California DEER, which is determined from California’s varied climate. The Cadmus team evaluated this project using the ORNL Commercial RSC with project specific inputs observed from the site visit. Due to the warehouse project and reduced roof area above mechanically cooled spaces, the savings are significantly reduced.
- Two projects (UTFX1_003804 and UTFX1_004201) involved the implementation of roof and attic insulation. For both projects, the Cadmus team visibly inspected the insulation and observed that only half of the total roof area received additional insulation.
- Three projects (UTFX1_001094, WBUT_30915, and UTFX1_001071) involved the implementation of a control system that can disable networked computers at school districts. The Cadmus team evaluated these projects using the RTF Network Computer Management calculation methodology and calculator. For all three projects, the team counted the quantity of laptops and personal computers controlled by the incented system. In all cases, the total quantity of laptops and computers were less than indicated in the original project data. Additionally, the ratio of laptops to personal computers were higher than originally anticipated, resulting in lower energy savings due to the reduced energy consumption from laptops as compared to personal computers.

Evaluated Net Savings

The Cadmus team evaluated net savings by conducting a freeridership and participant spillover analysis using responses from the participant surveys. The team used the same net savings methodology used for the 2009–2011 and 2012–2013 Energy FinAnswer Program evaluations and described in detail in Appendix B of the 2009–2011 evaluation report.¹⁰ Detailed information about the net savings methodology is provided in Appendix A. Self-Report NTG Methodology of this report. This net savings approach aligns with industry best practices summarized in the Uniform Methods Project.¹¹

Table 23 provides the net savings evaluation results, shown as evaluated gross savings and NTG by program delivery channel. The Cadmus team weighted program delivery channel NTG estimates by their evaluated program energy savings to arrive at the overall 76% NTG estimate for the program. The table shows delivery channel NTG values for informational purposes.

¹⁰ This appendix is available online: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2013/ID_Energy_FinAnswer_Program_Evaluation_2009-2011.pdf

¹¹ The Uniform Methods Project chapter covering estimation of net savings is available online: <http://www.nrel.gov/docs/fy14osti/62678.pdf>

Table 23. *wattsmart* Business Program NTG Results for 2014–2015

Program Delivery Channel	n	Gross Evaluated Program Savings (kWh)	NTG
Small Business Lighting	35	9,562,158	98%
Typical Upgrades	37	169,027,129	75%
Custom Analysis	29	50,097,107	76%
LED Instant Incentives	39	2,147,897	66%
Overall	140	230,834,291	76%*

* Weighted by evaluated program savings.

The following sections describe the NTG methodology we used and the results for the 2014-2015 *wattsmart* Business Program.

Methodology

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

Freeridership and participant spillover constitute the NTG. The Cadmus team used the following formula to determine the final NTG ratio for all four program channels (SBL, Typical Upgrades, Custom Analysis, and LED Instant Incentives) for 2014 and 2015 participants:

$$\text{Net-to-gross ratio} = (1 - \text{Freeridership Percentage}) + \text{Participant Spillover Percentage}$$

The team then weighted each delivery channel NTG ratio by the delivery channel’s evaluated gross population energy savings to arrive at the overall NTG estimate for the program.

Estimation of Freeridership

The Cadmus team determined the freeridership for the SBL, Typical Upgrades, Custom Analysis, and LED Instant Incentive delivery channels based on an approach previously developed for RMP, in which we ascertained freeridership using 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 Cadmus team reviewed the participant survey 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 the same project would have occurred, the team scored the respondent as a complete freerider; otherwise, we reviewed the responses to determine whether the project would have occurred at all within the same 12 month period. If the project would not have occurred, we scored the respondent as a non-freerider. If the project would have occurred within the same 12 month period, but would have been altered in respect to its size or efficiency level, we scored



the respondent as a partial freerider. We then weighted the delivery channel-specific freeridership estimates by the evaluated energy savings achieved by respondents within the sample to calculate the weighted freeridership estimate for each delivery channel.

Estimation of Spillover

The Cadmus team estimated the indirect program influence on the broader market as a result of the program activities. This program spillover represents the energy savings attributable to the program's intervention and influence but that is not currently reported in program tracking data. Spillover savings can come from participants and nonparticipants. Participant spillover occurs when the program influences program participants to install additional energy-efficient equipment-beyond what was incentivized by the program, while nonparticipant spillover savings occur when market allies who were influenced by the program install or influence nonparticipants to install energy-efficient equipment.

The Cadmus team determined participant spillover by estimating the savings derived from additional measures installed and assessing whether respondents' credited RMP 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 126 surveys covering 140 measures with SBL, Typical Upgrades, Custom Analysis, and LED Instance Incentive delivery channel participants, the Cadmus team converted the responses to the freeridership questions into a freeridership estimate for each participant, using the approach described in Appendix A.

In order to determine the extent to which the program affected installation decisions, the Cadmus team asked respondents what would have been different about their installations if the program were not an option. We asked about details for up to two measures for those who installed more than one through the program. Participants stated that they would have installed 42 project measures (30%) at the same efficiency and scope within the same year; while 64 project measures (46%) would not have been installed at all. Another 26 project measures (19%) would have occurred absence of the program, but they would have been installed more than 12 months later, the measures chosen would have been of standard efficiency, or the project would have been reduced in scope. For two project measures (1%), the participants would have installed the same quantity within one year of the original participation date, but would have installed less efficient equipment than installed through the program (but better than standard efficiency). For six project measures (4%), participants would have installed equipment to the same level of efficiency within the same year, but with less quantity. A summary of participant measure responses is shown in Table 24, along with the initial calculated freeridership estimate for each group of respondents.

Table 24. Measure Installations in Absence of wattsmart Business Program

Respondent Category	n*	Percentage of Total**	Initial Freeridership Estimate
Would have been installed at the same efficiency and scope within the same year	42	30%	100%
Would not have been installed at all	64	46%	0%
Would have installed more than 12 months later, the measures chosen would have been less efficient, or the project would have been reduced in scope	26	19%	0%
Would have installed the same quantity of the measure within one year of the original participation date, but would have installed less efficient equipment than installed through the program (but better than standard efficiency)	2	1%	50%
Would have installed 96% of equipment at the same efficiency within the same year	1	1%	96%
Would have installed 80% of equipment at the same efficiency within the same year	1	1%	80%
Would have installed 75% of equipment at the same efficiency within the same year	2	1%	75%
Would have installed 60% of equipment at the same efficiency within the same year	1	1%	60%
Would have installed 50% of equipment at the same efficiency within the same year	1	1%	50%

* The team asked 126 respondents about 140 measures.

** Total may not sum to 100% due to rounding.

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. Several participants’ measure specific responses (n=27) indicated that they found the program incentive or program assistance important in their decision, but then said they would have installed the same project at the same time without the program. The Cadmus team considered these responses inconsistent, and requested that participants explain the program’s influence on their project in their own words. Seven respondents provided a description that warranted freeridership adjustments. For example, when asked about the impact of the program on their decision to complete the energy efficiency improvement, one participant stated “100% we wouldn’t have done it without the incentive at that time.” Based on this response, we adjusted this project freeridership to 0%. The Cadmus team adjusted other respondents freeridership from 100% to 50% based on responses such as:

- “It [the program] made it so I was able to purchase more lights then I thought I was going to. Took the savings and bought more bulbs.”
- “It [the program] was 50% of why I purchased the lamps.”



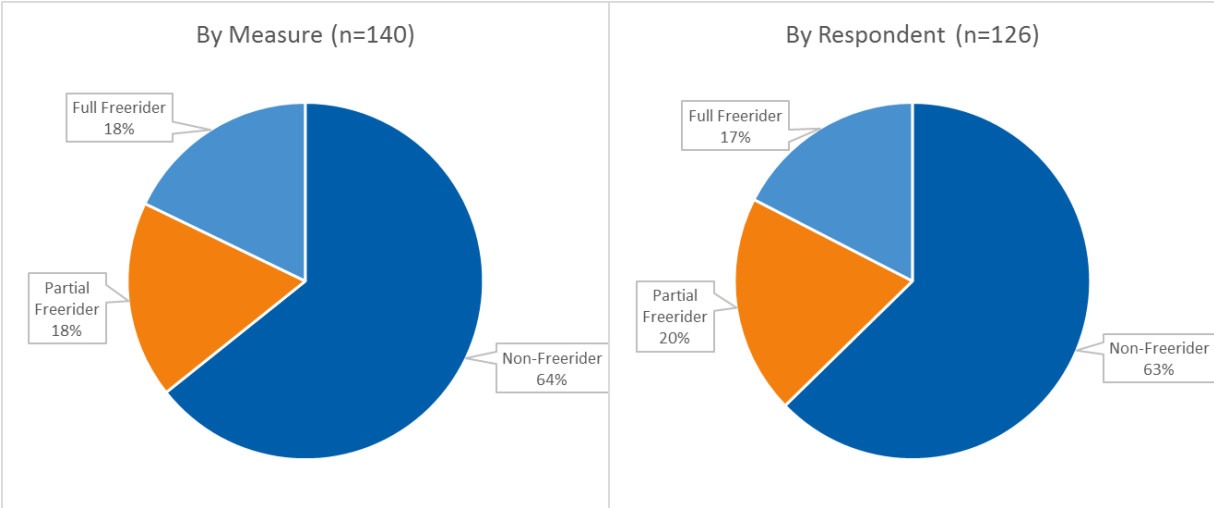
- “The company had started to replace the lights only if they burned out, now we could replace all of them.”
- “Been able to purchase the lights in that manner was able to increase the purchase quantity.”

In addition, 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 somewhat or very important in the participant’s decision to install efficient equipment. Because of RMP’s efforts to cross-promote their entire portfolio of energy efficiency programs, a respondent’s prior participation in a RMP program may have influenced their decision to participate in the current program.

To calculate this credit, the Cadmus team reviewed respondents’ rating 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, we reduced their freeridership score by either 50% or 75%, respectively. This affected 17 projects that received an initial freeridership estimate of 100%: we reduced 13 of these project’s measures’ freeridership estimates by 75% and reduced four by 50%. Additionally, we reduced a project that received an initial freeridership estimate of 60% by 50%.

Based on participant responses and after adjusting for inconsistencies and prior program experience, the Cadmus team determined freeridership by measure and by respondent, as shown in Figure 12. We asked approximately 22% of the respondents about two measures associated with their project. Overall, responses were consistent regarding the program influence on decisions, so the overall representations are similar by measure and by respondent. However, three participants were more influenced by one measure than the other. Overall, the team determined that 17% of participants are full freeriders, 63% are non-freeriders, and 20% are partial freeriders.

Figure 12. Freeridership, by Measure and by Respondent



Participant Spillover Findings

Some participants installed additional, energy-efficient measures after participating in the **wattsmart** Business Program. The Cadmus team attributed program spillover only to additional purchases that were significantly influenced by **wattsmart** Business Program participation and not reported through the program. Respondents indicated the level of influence on a 1 to 5 point scale, where 1 indicated being “not important” at all and 5 indicated being “extremely important,” when asked “please rate how important your experience with the RMP program was in your decision to install this energy-efficient product.” If a respondent gave a rating of 5, the team considered the spillover measure as attributable to the RMP program. Three participants provided a response of 5, and all three had purchased and installed additional lighting equipment without getting an incentive that was the same as the program equipment they were surveyed about in the freeridership questions.

The Cadmus team attempted to use evaluated savings values from the engineering gross savings analysis to estimate spillover energy savings for the lighting equipment, but information in the tracking data was not detailed enough to allow the team to estimate savings with confidence. The resulting spillover percentage estimates for the program categories are 0%. Table 25 shows the qualitative spillover data gathered.

Table 25. wattsmart Business Program Participant Spillover

Program Delivery Channel	Spillover Measures Installed	Quantity	Relative to the energy efficiency of the equipment installed through the program, how would you characterize the efficiency of this equipment?	Why did you not apply for an incentive from RMP for this equipment?
Typical Upgrades	Interior Lighting	25	Just as efficient as installed through the program	It was a timing issue
	LED Lighting	4	Lower than installed through the program, but better than the standard efficiency	I didn't know if you could do it again
Custom Analysis	Lighting Retrofit - Fixtures	12	Just as efficient as installed through the program	It was or had to be done quickly, we did not have the time to go through the process

NTG Findings

The Cadmus team conducted 30 surveys covering 35 project measures with SBL delivery channel participants, 30 surveys covering 37 project measures with Typical Upgrades delivery channel participants, 28 surveys covering 29 project measures with Custom Analysis delivery channel participants, and 38 surveys covering 39 project measures with LED Instant Incentives delivery channel participants. The team used these participant responses to generate NTG of 98% for SBL, 75% for Typical Upgrades, 74% for Custom Analysis, and 66% for LED Instant Incentives. Table 26 lists these findings.



The Cadmus team calculated a program-weighted NTG of 76% by weighting each delivery channel NTG percentage from Table 26 by the evaluated gross population energy savings for each delivery channel.

Table 26. *wattsmart* Business Program NTG Results for 2014–2015

Program Delivery Channel	Measure Responses (n)	Freeridership Percentage	Spillover Percentage	NTG*	Evaluated Gross Population Savings (kWh)
Small Business Lighting	35	2%*	0%	98%	9,562,158
Typical Upgrades	37	25%*	0%	75%	169,027,129
Custom Analysis	29	26%*	0%	74%	50,097,107
LED Instant Incentives	39	34%*	0%	66%	2,147,897
Overall	140	24%**	0%**	76%**	230,834,291

* The Cadmus team weighted NTG by evaluated program savings.

** The team weighted overall results by the evaluated gross program population savings.

Benchmarking NTG

The Cadmus team benchmarked RMP’s program against similar nonresidential programs. Table 27 shows freeridership, spillover, and NTG estimates reported for prior RMP program years, as well as for other utilities with similar nonresidential programs and measure offerings.

Table 27. NTG Benchmarking Comparisons*

Utility/Region	Reported Year	Responses (n)	FR**	Spillover	NTG
Rocky Mountain Power Utah 2014–2015 <i>wattsmart</i> Business Program	2016	140	24%	0%	76%
Rocky Mountain Power Utah 2012–2013 Energy FinAnswer Evaluation	2015	61	9%	0%	91%
Rocky Mountain Power Utah 2012–2013 FinAnswer Express Evaluation	2015	271	21%	0%	79%
Northeast Utility – C&I Prescriptive	2016	77	23%	0%	77%
CY2015 Wisconsin Focus On Energy Nonresidential Evaluation Report - Wisconsin Statewide	2016	450	21%	0%	79%
2014-2015 Massachusetts C&I Natural Gas Freeridership and Spillover Study - Statewide	2015	901	18%	4%	86%

* NTG values were derived from self-response surveys, though differences in analysis and scoring methodologies may vary across evaluations.

** FR = freeridership.

The 2014–2015 *wattsmart* Business Program freeridership estimate of 24% is the highest freeridership estimate in Table 27 but is similar to the benchmarked programs. The *wattsmart* Business Program freeridership estimate of 24% is higher than the 2012–2013 Energy FinAnswer Evaluation and 2012–

2013 FinAnswer Express Evaluation freeridership values of 21% and 9%, respectively.¹² These RMP program evaluations were completed using the same NTG methodology as in this evaluation.

The methodology used for the Northeast utility C&I Prescriptive and CY2015 Wisconsin Focus On Energy Nonresidential evaluations are comparable to that used for the 2014–2015 **wattsmart** Business Program, but are different in design.

Nonparticipant Spillover

The Cadmus team included a series of questions in the nonparticipant surveys to estimate nonparticipant spillover. Nonparticipant spillover refers to the savings generated by customers who were motivated by the RMP program's reputation, past RMP program participation, and/or the RMP program marketing to conduct energy efficiency installations for which they did not receive an incentive. The team did not apply nonparticipant spillover to program savings for this period, but instead calculated this for informational purposes as 0.2% of total **wattsmart** Business Program savings. Appendix B. Nonparticipant Spillover provides detailed nonparticipant spillover analysis methods and results.

¹² Between 2013 and 2015, RMP combined a number of programs under the **wattsmart** Business Program umbrella. The Energy FinAnswer program was rolled into the Custom Analysis delivery channel, and the FinAnswer Express program was rolled into the Typical Upgrades delivery channel within the **wattsmart** Business Program.



Process Evaluation

This section outlines the detailed findings of the Cadmus team’s process evaluation of the SBL, Typical Upgrades, Custom Analysis, and LED Instant Incentives delivery channels of the Utah **wattsmart** Business Program. These findings are based on our analysis of data collected through program staff interviews and participant, partial participant, and nonparticipant surveys. In conducting the evaluation, the Cadmus team focused on assessing the following:

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

The Cadmus team focused the research activities on the key research topics identified during the evaluation kick-off meeting, as well as on topics of interest identified by program stakeholders. Our primary research questions are listed in Table 28.

Table 28. Research Areas and Questions

Research Areas	Researchable Questions and Topics
Program Status	How did the program perform in 2014 and 2015, and what opportunities and challenges do program staff foresee for future program years?
Satisfaction	How satisfied are participants and partial participants with the program and with the program measures, incentives, and services?
Awareness	Are customers aware of the RMP wattsmart Business Program? If so, how did they learn about the program?
Motivations and Barriers	What are the key factors influencing participants’ and partial participants’ decisions to participate in the program? What are the key factors in any customers’ decision to install energy efficiency improvements? What are the barriers to participation for participants, partial participants, and nonparticipants?
Freeridership and Spillover	How influential was the program on participants’ and partial participants’ decisions to participate? How influential was the program on any customers’ decision to install energy efficiency equipment without program incentives or services?
Firmographics	What are the business characteristics of participants in each program delivery channel? How do participant awareness and business size compare by program delivery channel?

Methodology

Between program years 2013 and 2015, RMP consolidated the Energy FinAnswer, and FinAnswer Express programs under the **wattsmart** Business Program name. The following sections provide an overview of the methodology the Cadmus team used for process evaluation research of program years 2014 and 2015, which occurred during this transition period.

Materials and Database Review

The Cadmus team conducted a program materials review of past evaluation reports for Utah's Energy FinAnswer and FinAnswer Express programs (in program years 2012 and 2013), marketing materials, the **wattsmart** Business Program website, program logic models, the contractor manual, participant and partial participant databases, and the RMP nonresidential customer database.

Utility and Administrator Staff Interviews

The Cadmus team developed stakeholder interview guides and collected information about key topics from program management staff. We conducted one interview with the program staff at RMP and two interviews with program staff at Cascade and Nexant (the program administrators), covering the following topics:

- Changes in stakeholder roles and responsibilities
- Program design and implementation changes
- Marketing and outreach
- Trade ally roles
- Data management and quality control processes
- Barriers and areas for improvement

Surveys

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



Participant Telephone Surveys

The Cadmus team conducted telephone surveys with 130 participants who installed measures through the SBL, Typical Upgrades, Custom Analysis, and LED Instant Incentives delivery channels. We designed the survey instrument to collect 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 materials and delivery channels
 - Customer interaction with trade allies and program staff
 - Customer satisfaction
- **Customer information:** firmographic information

Participant Sample Detail

The participant databases provided by RMP contained both projects under the older program names (Energy FinAnswer, and FinAnswer Express) and **wattsmart** Business Program projects. In order to sort all projects into one of four delivery channels for evaluation, the Cadmus team first assigned Energy FinAnswer and projects to the Custom Analysis delivery channel, and FinAnswer Express to the Typical Upgrades delivery channel. We then further sorted **wattsmart** Business Program projects into those with custom measures and those with measures other than custom, based on the measure name. The team assigned any project with both custom measures and measures other than custom as Custom Analysis to ensure that there was enough sample in that delivery channel.

After assigning all projects to a delivery channel, the Cadmus team reviewed projects for any participants who completed more than one project within that delivery channel, and kept the single project with the highest kWh savings. For projects with more than one installed measure type, we kept the two non-identical measures with the highest energy savings. Then the team randomly selected participants for surveys within each delivery channel. Table 29 shows the mapping of each project’s program or measure designation to its respective delivery channel.

Table 29. Programs and Measures Reported by Delivery Channel

Delivery Channel	Program(s)/Measures
Small Business Lighting	Small Business Lighting
Typical Upgrades	wattsmart Business (measures other than custom)
	FinAnswer Express
Custom Analysis	wattsmart Business (custom measures)
	Energy FinAnswer
LED Instant Incentives	wattsmart Business (midstream lighting measures)

Nonparticipant and Partial Participant Telephone Surveys

The Cadmus team conducted telephone surveys with 87 nonparticipants and with nine partial participants regarding their projects that had been started but not completed. The surveys covered the following process evaluation topics:

- ***Customer perceptions and motivations***
 - Program awareness
 - Reasons for and barriers to make energy-efficient improvements
- ***Customer experience***
 - Reasons partial participants did not complete specific projects
- ***Customer information***: firmographic information

Nonparticipant Sample Detail

The Cadmus team removed participants and partial participants from the master list of nonresidential customers provided by RMP. We then segmented the nonparticipant population into managed accounts (those with a dedicated RMP account manager and higher energy usage) and non-managed accounts. The team randomly called nonparticipants for surveys from each of these two subpopulations.

Partial Participant Sample Detail

RMP, Nexant, and Cascade provided the Cadmus team with lists of 2014 and 2015 partial participants from each of their respective program areas of responsibility. The team checked this list against the list of program participants and removed any customers who appeared on the participant list for another project during that same timeframe to eliminate any possibility of double sampling these individuals. For partial participants who began but did not complete multiple projects during the evaluation period, the Cadmus team included the project with the greatest estimated kWh savings in the sample. We then randomly selected partial participants from the sampling frame for surveys.

Program Implementation and Delivery

Drawing on stakeholder interviews and participant survey data, this section outlines the **wattsmart** Business Program implementation and delivery.

Program Overview

RMP consolidated the previous energy efficiency programs under the **wattsmart** Business Program umbrella in order to offer a portfolio of incentives to its customers with a reduced and simplified application processes and improved customer experience. Program staff reported that the consolidation has worked well, and said it was the “right thing to do.” During this time, RMP also increased its focus on the maintenance market in Utah, adding the LED Instant Incentives delivery channel in May 2015. Also in July 2015, RMP suspended the SBL program delivery channel until September 2016, when they reintroduced it as the Small Business Direct Install delivery channel. RMP offered this channel to SBL customers on specific rate schedules who are in geo-targeted locations.



In 2013, Nexant took over **wattsmart** Business Program customer service call management from RMP. Previously, RMP had maintained a single person to respond to calls on their business energy efficiency hotline. Nexant said that person was not dedicated to the task, so most calls were managed by voicemail. Nexant took on these calls, either answering them live or routing them to the appropriate person. This position is staffed by a knowledgeable subject matter expert who answers calls from customers and vendors, as well as misdirected calls about residential programs and customers asking about their bills.

The customer service phone number is on the RMP business website and was developed for commercial energy efficiency calls. The phone line is staffed during normal business hours (8:00 a.m. to 5:00 p.m., Monday through Friday) by people who also process projects and handle online and email inquiries, making them very familiar with the questions and answers.

Design and Implementation

RMP reassigned utility staff who had previously managed the individual demand-side management programs across the parent company's, PacifiCorp's, multistate territory, to manage the **wattsmart** portfolio of programs within the RMP division. RMP program management staff said the program delivery worked well with the in-house managed accounts, and that outreach to the trade allies also worked well, but said that program delivery is not yet as efficient for the smaller commercial and industrial customers with non-managed accounts.

Cascade staff noted that approximately 10% of customers who installed irrigation equipment through the Typical Upgrades delivery channel have issues with the incentive cap, anticipating higher incentives than they qualify for. RMP caps incentives at 70% of cost or a one-year payback (whichever is less). This one-year cap means that the incentives are not available to shorten the simple payback of the project to less than one year. Although the general application states these incentive limits, staff said that customers do not know they have exceeded the incentive limits until after they submit the application and the implementer has completed the energy savings and incentive calculations. RMP recommends that customers prequalify for these incentives prior to purchasing equipment, but prequalification is not mandatory.

Review of Contractor Manual

The Cadmus team reviewed the **wattsmart** Business Program Guidelines for Contractors manual and found it comprehensive in scope, well organized and easy to search, and it provided detailed information necessary to understand the program's organization and offerings, the incentive calculator and analysis tools required by each delivery channel, contractor engagement and communication processes, program evaluation requirements, and the savings verification and reporting frameworks.¹³

¹³ Rocky Mountain Power. **wattsmart** Business Program Guidelines for Contractors-Version 1.1. November 1, 2016.

Marketing and Outreach

Program management staff said there has been no change in the outreach strategy following the program consolidation: it primarily remains a function of in-house RMP staff and customer-facing trade allies. RMP develops marketing collateral and manages any co-branding to maintain quality control. RMP extended the **wattsmart** Business Program vendor logo, previously limited for use to advertise residential offerings, across the portfolio.

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 found each state and delivery channel quickly. The team also found information provided within each delivery channel useful in achieving a high-level understanding of the steps necessary to initiate a project.

When reviewing measure level information, the team found the Typical Upgrades channel more difficult to follow when trying to understand which measures qualified and how incentives were calculated—particularly lighting measures. (This was a function of the many incentive categories into which lighting was segmented and unfamiliar terms such as “general illuminance” and “non-general illuminance.”) The team also found that, for all delivery channels, questions had to be directed to customer service staff through a phone call or email, which did not allow the customer to access information quickly and seamlessly while directly engaged with the site.

Trade Allies

RMP developed the Energy Efficiency Alliance to provide customers with a trained pool of local trade allies (designers, contractors, distributors, manufacturers, and vendors) to assist them in identifying and implementing energy efficiency projects. **wattsmart** Business Program vendors can promote the program to their customers, assist customers with their projects, provide recommended upgrades, create proposals and bids, assist with the paperwork, and supply and/or install the upgrades.

This alliance is managed by Cascade and Nexant, each in their respective markets. Trade allies who join RMP’s Energy Efficiency Alliance sign an agreement, then receive incentive program training and calculation tools, introductions to local business prospects through organized meet-and-greet events, marketing support, and are notified about program updates. The program implementers post business information for Energy Efficiency Alliance members on the program website in a searchable database.

Nexant, who works with commercial trade allies, said they are considering grouping these trade allies into tiers so they can highlight them for good program performance (based on a high number of projects completed, good accuracy, and high customer satisfaction scores) and based on their qualifications (training, certifications, and experience with specific measures). This would allow customers to better differentiate between contractors when selecting help for a specific project.

With the exception of SBL projects, RMP did not require customers to use an Energy Efficiency Alliance member. For SBL projects, Nexant trained and managed a select group of approved contractors who



promoted the SBL services and measures, and had customers use one of these contractors to receive the SBL incentives.

Cascade, who works with agricultural and industrial customers, recruits trade allies but does not require them to join the Energy Efficiency Alliance. Cascade finds it more effective to work in support of the trade allies in Utah rather than conduct a lot of direct outreach. When a trade ally provides a program lead, rather than Cascade engineers taking the lead role with the customer, Cascade provides engineering support to assist the trade ally in reaching out to the customer, prepares the necessary calculations to show customers potential savings, and advises the trade ally on how to achieve higher savings from a project.

Database Interface and Data Management

RMP uses two software projects —DSMC and the Technical Resource Library (TRL)—for project management, data warehousing, and reporting. The TRL, as described in the *wattsmart* Business Program Guidelines for Contractors,¹⁴ houses the program database of measure definitions, which the DSMC draws on for RMP to perform validation checks to ensure incentives and savings submitted by engineer and trade allies correspond with the value and caps defined by tariff.

TRL measures are built into the Incentive Calculator Tool, which RMP provides to engineers or trade allies to ensure consistency in incentive calculations. When preparing offers for customers or calculating savings and incentives, engineers and trade allies use pull-down menus within the tool to select only measures that are included in *wattsmart* Business Program. Implementation staff who oversee the trade allies said this is a big benefit in keeping trade allies from selecting ineligible equipment. When a new measure appears, RMP must update the TRL and the calculator. Implementation staff said this works pretty well, but noted that custom measure descriptions needed to be reviewed and revised and some custom measures needed to be added.

The two program implementers maintain project databases from which they review, upload to DSMC, and process projects on a weekly basis (weekly batch). The implementers expressed different experiences with this interface process, with one calling it efficient “now,” indicating there had been improvement over time, and another saying it was somewhat laborious. Although the process is automated, RMP and Nexant said they still have challenges with data exchange, indicating that inputs of measure names, project savings, and incentive amounts must be error free to be accepted by DSMC. This indicates that the exchange of data still needs some improvement.

Additionally, Nexant said the data reconciliation process could be streamlined by allowing trade allies to enter project data directly into RMP’s system. This was successfully tested during the SBL pilot;

¹⁴ Rocky Mountain Power. *Wattsmart Business Program Guidelines for Contractors*. Version 1.1. November 1, 2016.

http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/WSB_Contractor_Tools/wattsmart_Program_Guidelines_for_Contractors_v1-1_2016-11-1_Final.pdf

however, expanding this to all **watt**smart Business Program delivery channels may require system modifications to limit the data trade allies could access. These modifications may be limited by budget and RMP restrictions.

Through the weekly batch, both implementers submit invoices to RMP for payment of the approved incentives. The intention is for RMP to provide funding within 10 days; this is currently reported as taking 10 to 15 days, which challenges the implementers to deliver checks within the trade allies' expectations.

Data Quality Assurance

RMP's DSMC is considered the database of record; however, as noted above, both implementers also maintain their own database. Nexant noted that they spend significant time transferring data between the two systems on a weekly basis. They said variances found during the weekly batch uploads are very small, sometimes as little as \$0.15, and that 99% of the time they match exactly. If any variance is found, they will identify and correct it until the two systems match exactly. Nexant suggested that in the future, the benefit of this level of effort should be evaluated relative to the amount of potential savings.

RMP also performs quarterly and annual reconciliations between the DSMC and implementer databases, which are also time consuming and require significant effort. Given the checks and balances that occur weekly between the two systems, Nexant suggested that these quarterly or annual reconciliations might not be necessary.

Before full launch of the SBL delivery channel, which Nexant administers, RMP and Nexant ran a pilot to build Nexant's data into RMP's system. This gave RMP immediate and total visibility to everything Nexant was doing and Nexant said this worked well.

Project Quality Control

The program quality control function is located in an online database, accessible to the Nexant implementation team. This function has a checklist of steps for reviewing and submitting projects for approval. First, the trade ally submits information to Nexant's processing group, who do final reviews and check the project for program compliance, then submit the project for payment to RMP, who funds the incentives while Nexant writes the checks. Every project contains these checklists.

Evaluation of the Program Database

While evaluating the program, the Cadmus team identified a number of inconsistencies in the participant databases. These included:

- Inconsistent measure name entries between the RMP, Nexant, and Cascade databases
- Inconsistent data reporting categories between 2014 and 2015
- Incomplete customer contact, project site data, and equipment measure information



The Cadmus team considers the inconsistencies in data reporting categories between 2014 and 2015 to be a result of the ongoing consolidation of programs. There will likely be evidence of this being resolved in data extracts from 2016 onward.

Program Challenges and Successes

RMP program management staff and the program implementers reported that, for the most part, they had the resources needed to deliver the program in 2014 and 2015. Staff from both RMP and the implementers cited the following program strengths:

- A well-functioning, well supported **watt**smart Business Program network of trade allies who are ingrained in the local communities. Trade allies have their own contact for questions, and relationships are fostered over time. Nexant and Cascade provide proactive local outsourced delivery staff who are available for site visits or trade ally visits.
- Strong relationships with large customers, whose projects deliver large savings.
- Project-level incentives for lighting retrofits and custom projects that encourage comprehensive projects and simplify delivery.
- RMP, through third-party contractors, provides robust energy engineering services for custom projects, giving customers high-quality site evaluations and savings and incentive reports prior to any investment. These services facilitate informed decision-making. Additionally, RMP hires a second engineer to develop the Savings Verification Report after a project is installed.
- The personal attention provided to customers by the implementation staff has contributed to year-over-year participation growth, in spite of boom and bust economic cycles.
- There has been continuous refinement and improvement in targeting and recruiting customers.

However, program management and implementation staff also noted the following challenges that they anticipate will impact the program going forward.

- Reaching the small business sector cost-effectively.
- Staying ahead of the rapid pace of change for lighting and lighting controls, especially for the SBL delivery channel, and keeping lighting equipment and incentives coordinated between the different delivery channels.
- Continuing to improve outreach and increase awareness of the program.
- Needing to generate more projects to achieving escalating savings goals without matching increases in the incentive and delivery budgets.
- Declining project savings amounts (the average kWh savings per project has been decreasing for several years).
- Staying ahead of energy codes and standards that are advancing and, in some cases, going beyond the program requirements.
- Providing customers and trade allies with online projects and project tracking.
- Providing trade allies with online access to program calculator tools.

Implementation staff said that many of the prior issues with the various express programs were addressed with the integration to the **wattsmart** Business Program. For example, RMP wrote a new program manual (including **wattsmart** Business Program guidelines), simplified the process and reporting templates, and provided measurement and verification guidance. RMP scaled the measurement and verification, which is labor and data intensive on all projects, to be commensurate with the project size. RMP also simplified customer projects and streamlined customer reports.

Customer Response

The Cadmus team surveyed 130 participants of the **wattsmart** Business Program. We interviewed 30 customers about a SBL project, 30 customers about a Typical Upgrades project, 32 customers about a Custom Analysis project (including four customers with a recommissioning project), and 38 customers about an LED Instant Incentives purchase. This section first presents combined findings of awareness and communication, then provides separate findings for each of the four program delivery channels. The findings of capital projects installed as part of a custom recommissioning project are reported as part of the Custom Analysis delivery channel. In some cases, when it provides a better perspective of the recommissioning participants, we report their responses separately within the Custom Analysis delivery channel section of this report. Additionally, occasionally (as with the awareness and communication section below) we report findings for the separate delivery channels and for the program overall.

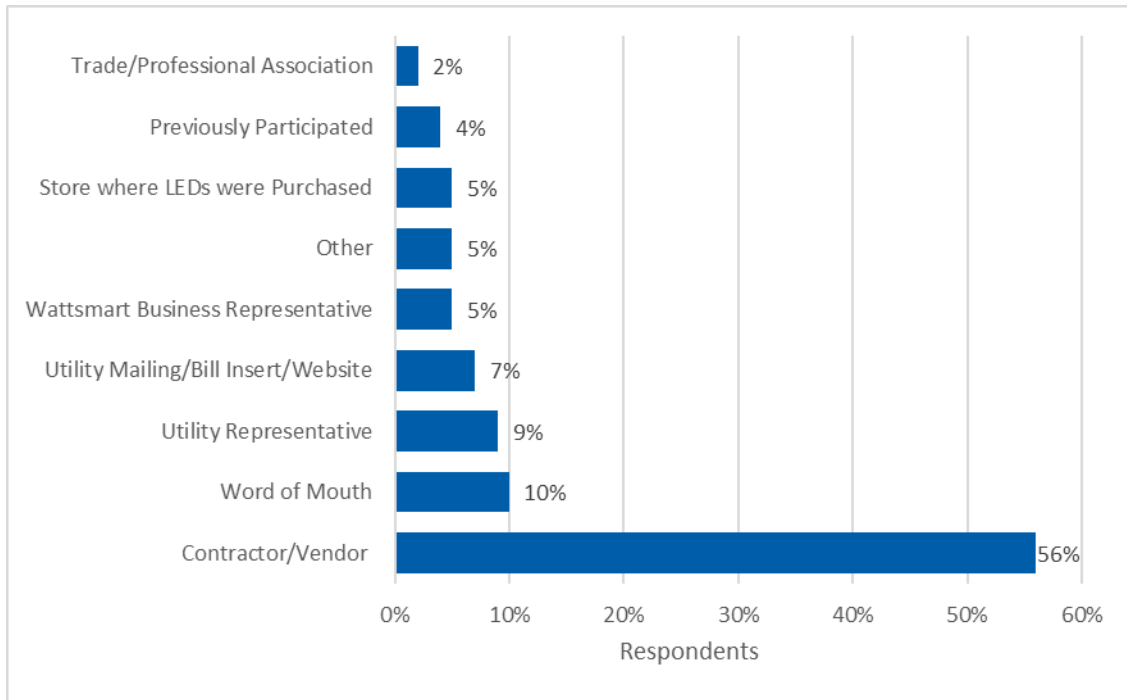
Awareness and Communication

Participants in all delivery channels, excluding the four recommissioning participants, most frequently learned about the available incentives through their contractor or vendor (mean combined 56%, n=130).¹⁵ Recommissioning participants (n=4) most frequently learned about the program through their RMP account representative. Figure 13 shows the frequency of all source of information for all delivery channels combined.

¹⁵ This “n” represents the number of respondents or responses to the question. For example, if the reference is 20% (n=100), this indicates that there were 100 responses or respondents included after removing any non-relevant answers (such as “don’t know” or “refused”).



Figure 13. Source of Information – All Delivery Channels Combined



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey QB3, and Midstream Participant Survey QB3. Don't know and refused responses removed. Multiple responses allowed (n=130).

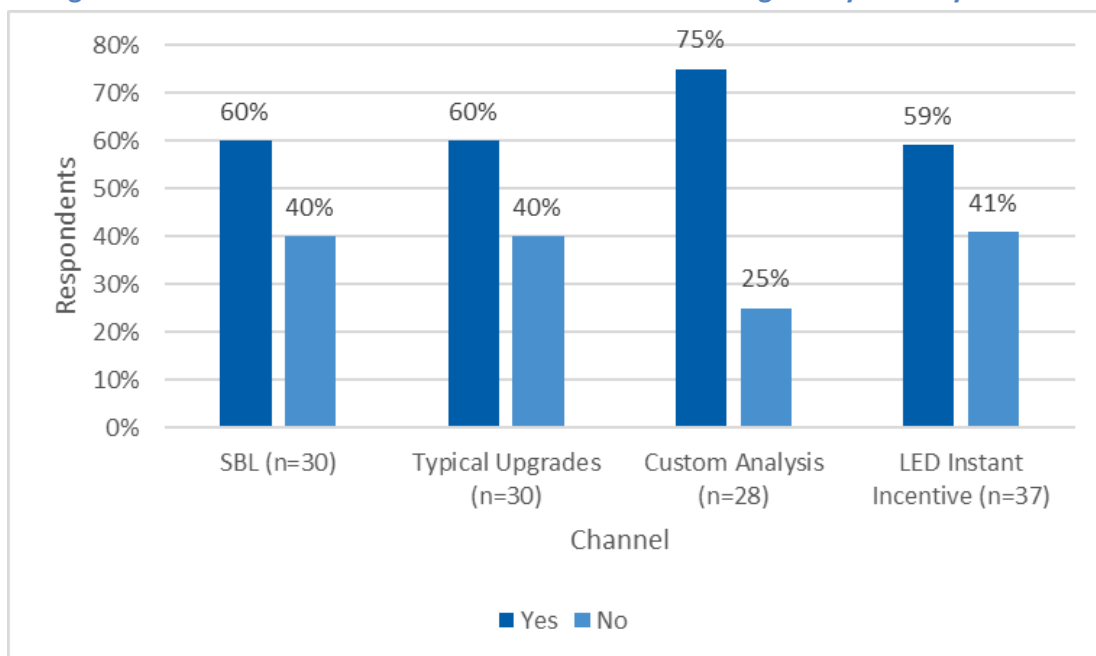
As noted earlier, the program consolidation under **wattsmart** Business was ongoing during this evaluation period, and customers were still learning about this consolidation. At the time of the participant surveys, in September and October 2016, 64% of participant survey respondents (mean combined n=129) had heard of the **wattsmart** Business Program name before the survey call. As shown in Figure 14, participants in the Custom Analysis delivery channel (including all participants who completed custom recommissioning projects) had the highest program name awareness.

At 90% confidence, the Cadmus team did not find a statistically significant difference in the awareness of the **wattsmart** Business Program name between delivery channels.¹⁶

Additionally, whereas 59% of LED Instant Incentives delivery channel participants said they were aware of the **wattsmart** Business Program name prior to the survey call, 70% said they had heard of the LED Instant Incentives delivery channel before they purchased their lighting (n=37).

¹⁶ Lack of statistically significant difference is based on a two-sample t-test for proportions using a Bonferroni correction for multiple comparisons.

Figure 14. Customer Awareness of *wattsmart* Business Program by Delivery Channel



Source: Rocky Mountain Power Utah *wattsmart* Business Program 2014–2015 Participant Survey QB4. Don't know and refused responses removed.

Although participants most frequently learned about the program incentives from a contractor or vendor, the majority of customers in the SBL, Typical Upgrades, and Custom Analysis delivery channels said they prefer to be kept informed about the program through a *wattsmart* representative, and a smaller proportion of participants in these same three channels said they prefer to be kept informed through an RMP mailing, bill insert, or the website. As shown in Figure 15, a small percentage of SBL delivery channel participants (14%, n=29) preferred that vendors or contractors provide ongoing information about the *wattsmart* Business Program. Social media or online ads were seldom mentioned. While participant interaction with a vendor or contractor is RMP's most cost-effective way to market the SBL and Typical Upgrades delivery channels, and the way the program is designed, the participants' stated preferences are not aligned with the program design.

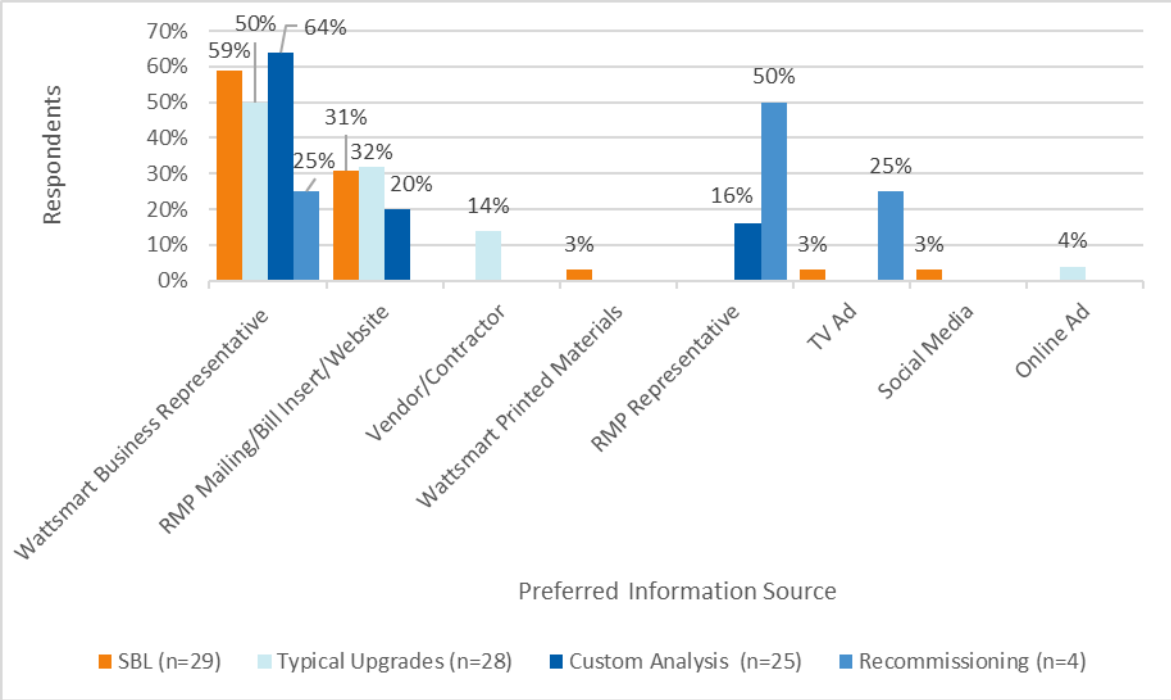
As noted earlier in the report, RMP offers incentives through the Custom Analysis delivery channel, for capital measures installed by participants in the Energy Management delivery channel, who complete recommissioning or industrial recommissioning projects. These surveyed participants preferred to receive ongoing program information from *wattsmart* representatives. This is aligned with the current design and delivery of the Energy Management channel.

In an effort to collect the necessary information without overburdening LED Instant Incentives participants, and due to the straightforward nature of an instant incentive offering in which participants purchase LED lighting and receive a discount on-the-spot, we abbreviated the number of questions compared to the participant surveys for other program delivery channels. The Cadmus team did not ask



participants in the LED Instant Incentives delivery channel this question about preferred method of communication.

Figure 15. Preferred Method of Communication to Stay Informed



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey QJ4. Don't know and refused responses removed.

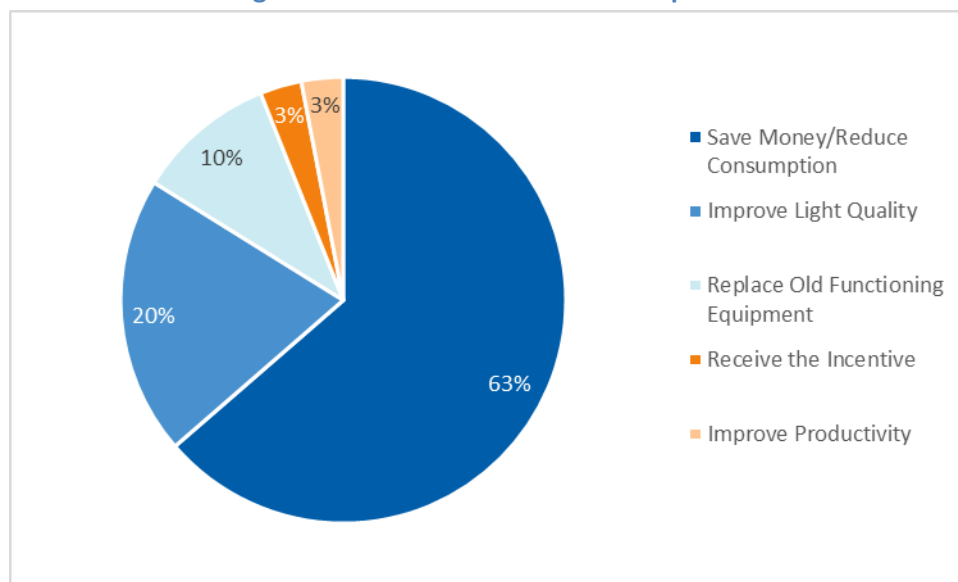
Small Business Lighting Delivery Channel

SBL participants, overall, reported high satisfaction with the program elements, and only a few challenges. Some offered suggestions to improve their program experience, as detailed below.

Motivation

SBL participants said that saving money and reducing their energy consumption were the most important reasons they decided to participate in the offering, followed by improving light quality (63% and 20% respectively, n=30). As shown in Figure 16, few participants said they were motivated by the incentives or improving productivity (one response each).

Figure 16. Motivation for SBL Participation



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey QD1. Don't know and refused responses removed. May not total 100% due to rounding. (n=30)

Satisfaction

Ninety-seven percent of SBL participants said it was very or somewhat easy to find an approved contractor to conduct their free site assessment (n=30), although two said it would have been easier to find an approved contractor had they been provided a list.

All 28 participants who met with a contractor said they received a lighting proposal following their facility assessment, and 26 of the 28 said they were very satisfied or somewhat satisfied with that proposal. Sixteen respondents who received the proposal said they were influenced by the projections for reduced cost when deciding whether to proceed with their projects, while seven respondents were most influenced by the energy savings. Of the remaining five participants, four cited the ease of the installation timeframe or their need for better lighting as their reason for proceeding, and one participant could not say what influenced them. Only two participants voiced some dissatisfaction with the report, one who said they needed a more detailed explanation of the proposal, and one who said the cost estimates they received were inaccurate.

SBL participants also had high satisfaction levels with work by the contractor, and equipment installed—and were slightly less satisfied with the incentives.

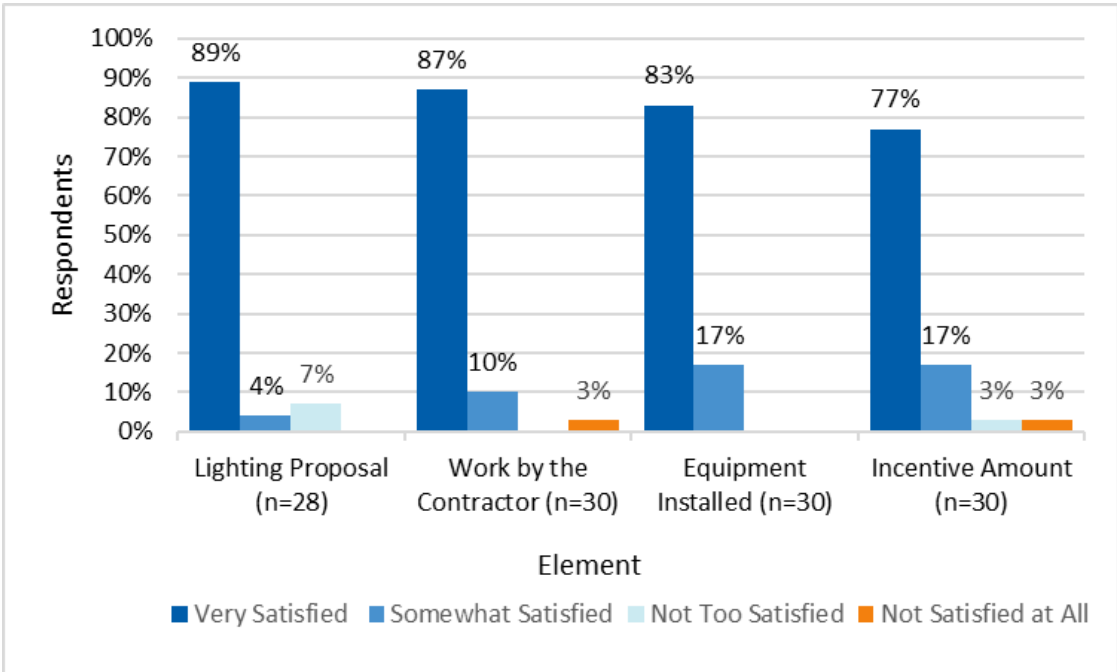
Those customers who were less than very satisfied with the work or the equipment said their contractor could have done a better job of setting expectations at the project start. These customers were left to clean up after their contractors, or received ballasts and lamps but not new fixtures as expected, or the lamps they did receive were outdated or not as bright as they expected.



Three respondents said they would like the RMP to offer additional equipment, including bathroom lighting (n=1) and outdoor lighting (n=2). With the change of the SBL delivery channel to the Small Business Direct Install delivery channel, small business customers may receive incentives for qualifying outdoor or bathroom lighting products, but through a different delivery channel.

Customers were the least satisfied with the amount of the incentive they received for their project, but still had fairly high satisfaction with this program element. Five of the seven customers who rated their satisfaction as somewhat satisfied, not too satisfied, or not satisfied at all (17%, 3%, and 3%, respectively, n=30) asked for higher incentives (enough to cover the entire cost of the project or their up-front costs). One customer said they had not seen the promised reduction in energy consumption, nor a savings on their bill, and one customer did not provide additional information about their rating of the incentives. Participant satisfaction levels with SBL are shown in Figure 17.

Figure 17. Customer Satisfaction Levels with SBL Elements

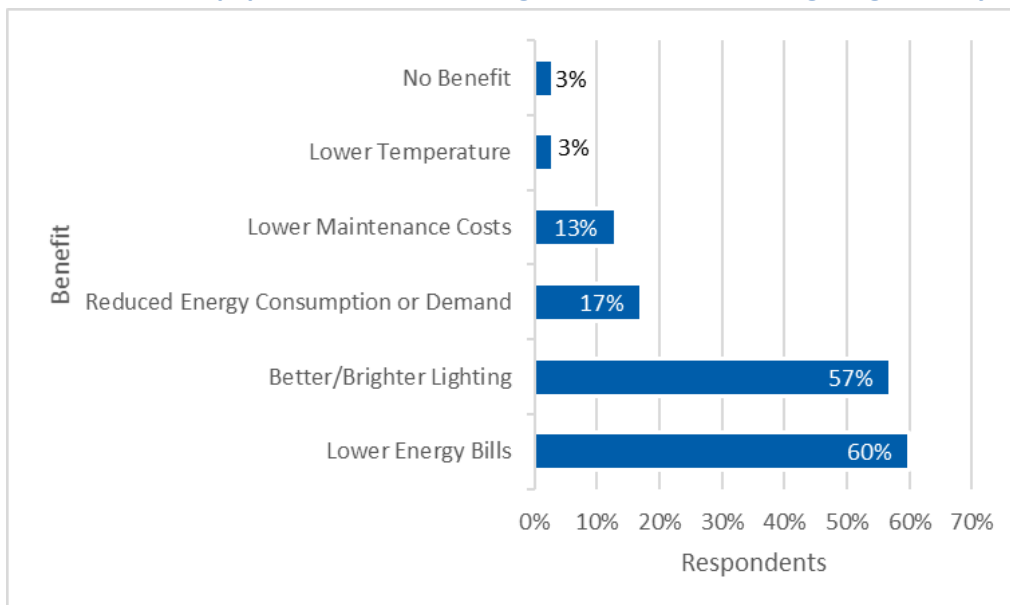


Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey QD2, QD7, QD10, and QD12. Refused responses removed.

Benefits and Challenges

Overall, all but one SBL participant (29 of 30) said they received one or more benefits as a result of installing the lighting equipment. As shown in Figure 18, respondents most frequently cited lower energy bills, followed closely by better or brighter lighting quality. The one participant who said they had not received any benefit said they had not seen any savings on their utility bill as a result of the project.

Figure 18. Benefits of Equipment Installed Through the Small Business Lighting Delivery Channel



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey QD16. Don't know and refused responses removed. Multiple responses allowed. (n=30)

While 90% of SBL delivery channel participants reported no challenges with their participation, 10% (three of 30) did note the following challenges (one each):

- The time required to receive the incentive
- Miscommunication between the customer and contractor about what was going to happen and what actually happened
- High up-front project costs

One respondent who encountered challenges said that RMP could help them by providing more and better information about the program.

Finally, when asked if they had recommendations to improve the SBL delivery channel, three participants (one each) offered the following suggestions:

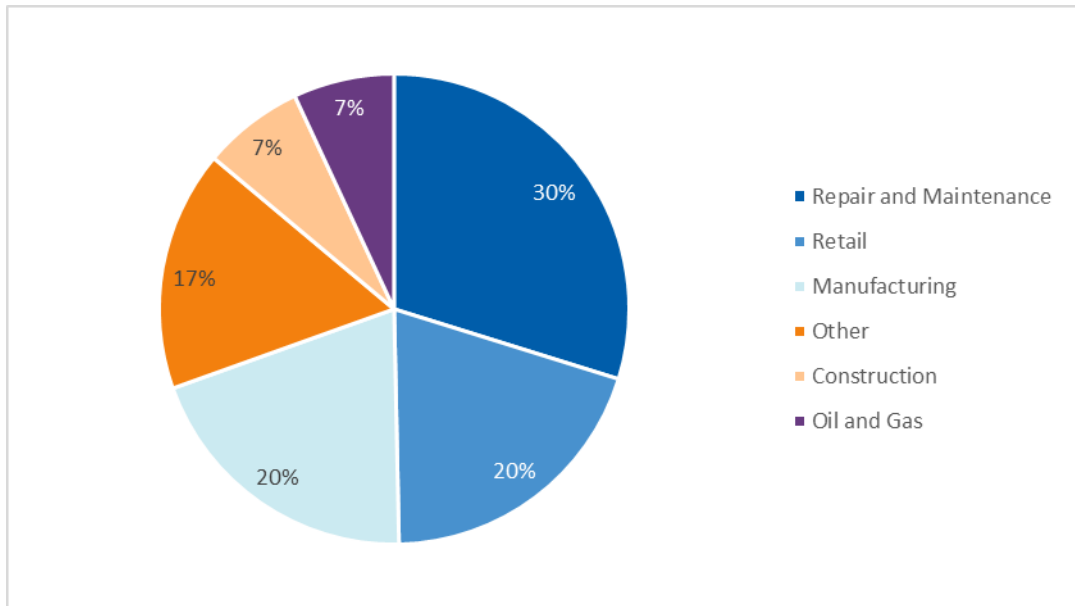
- Provide quicker follow up
- Provide more information about the program
- Improve the accuracy of the projected incentives and project costs

In closing, when asked if RMP could do anything to improve their overall experience with the **wattsmart** Business Program, two participants asked for better or more communication, one specifically asked for that communication to be provided by RMP rather than the vendor, and one participant asked for increased incentive amounts.

Firmographics

Seventy percent of the surveyed SBL delivery channel participants are in three business sectors: Repair and Maintenance,¹⁷ the largest group at 30%, followed by Retail (20%) and Manufacturing (20%). The remaining survey participants were in Construction (7%), Oil and Gas (7%), and “other” business categories (17%), which includes Public Administration/Government, Real Estate/Property Management, Transportation, Arts/Entertainment/Recreation, and Professional/Scientific/Technical Services (Figure 19).

Figure 19. SBL Delivery Channel Survey Participants by Business Sector



Source: Rocky Mountain Power Utah **watt**smart Business Program 2014–2015 Participant Survey Q11. Don't know and refused responses removed. May not total 100% due to rounding. (n=30)

Of the overall sample (n=30), half of the SBL delivery channel participants share three characteristics: they operate a business with 10 or less employees, they occupy a single location, and they own that location. Details of these similarities for the overall population of SBL delivery channel participants include:

- Eighty-three percent (n=30) operate a single facility in Utah.
- Sixty-nine percent (n=29) employ between one and 10 people, while 17% employ 11 to 25 people and another 14% employ 26 to 50 people.
- Sixty-seven percent (n=30) own their facilities and 33% lease.

¹⁷ The Repair and Maintenance category includes respondent-designated businesses, and included repair, aircraft maintenance, automotive, and a truck shop.

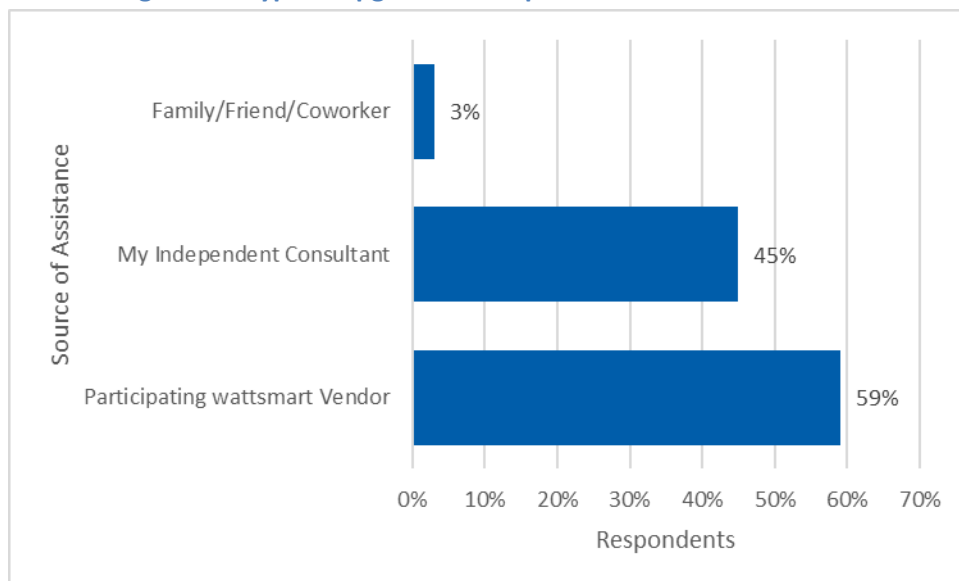
Typical Upgrades Delivery Channel

The Cadmus team surveyed 30 participants who received program incentives through the Typical Upgrades delivery channel. Overall, they represent a wide array of business sectors (with the highest percentage in Manufacturing, followed closely by Retail and Public Administration/Government), ranging in size from less than 10 employees to more than 500, with 53% employing 25 or fewer people. Participant satisfaction with the program is generally high, particularly with the work performed by their vendors, and with the equipment they installed. More details are provided below.

Motivation

The Cadmus team asked participants in the Typical Upgrades delivery channel about who had helped them initiate their project. Twenty-nine of the 30 participants said they were helped by one or more people, most frequently a participating **wattsmart** vendor or an independent consultant (Figure 20). These consultants included contractors, lighting engineers, electricians, and maintenance people.

Figure 20. Typical Upgrade Participants' Source of Assistance



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey QE1. Don't know and refused responses removed. Multiple responses allowed. (n=29)

Participation and Satisfaction

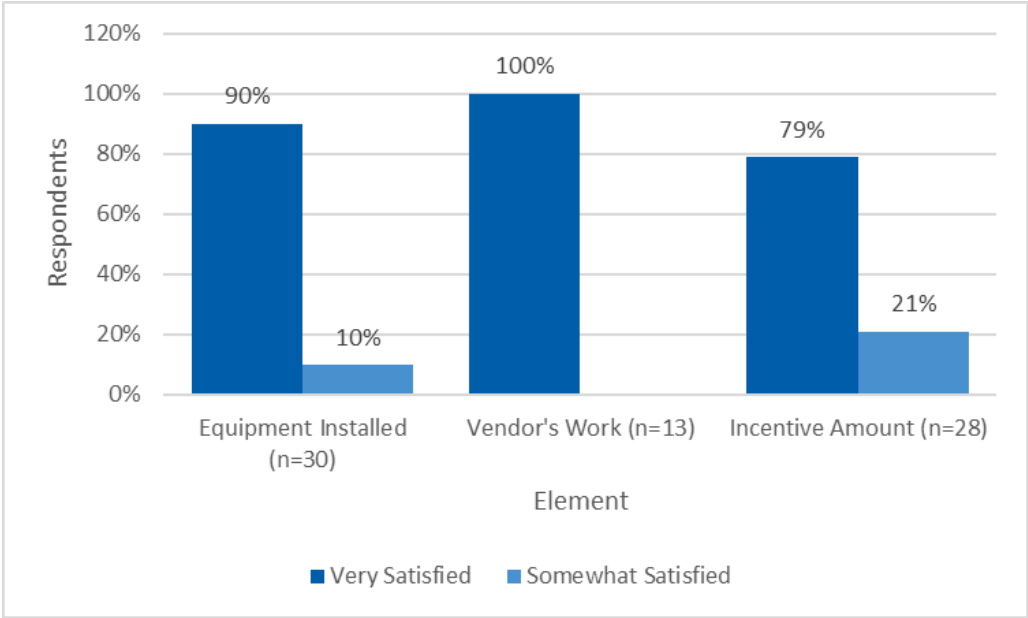
Typical Upgrades participants found it fairly easy to complete their project application: 43% said it was very easy, while 57% said it was somewhat easy, and none found it difficult (n=28). Six people had suggestions about making the process easier, which included simplifying the application form, allowing projects to be submitted online, and reducing the number of people involved in the entire application, approval, and installation process. These participants also asked for better communication from their vendor about what needed to be done, and asked if the number of invoices required could be reduced.



Figure 21 shows satisfaction levels with three elements of the Typical Upgrades delivery channel: equipment installed, participating vendor’s work, and incentives. A large majority of participants (90%, n=30) were very satisfied with the equipment they installed, and all 13 of the participants who used a participating **wattsmart** vendor reported being very satisfied with the vendor’s work.

Participants were generally satisfied with the amount of the incentive they received for their project, with 100% (n=28) responding they were either very satisfied (79%) or somewhat satisfied (21%). Four of the somewhat satisfied participants asked for higher incentives. The Cadmus team asked what amount of incentive would have elicited a very satisfied response, two of the four respondents said the program should pay at least 75% of the project cost, the other two did not designate an amount.

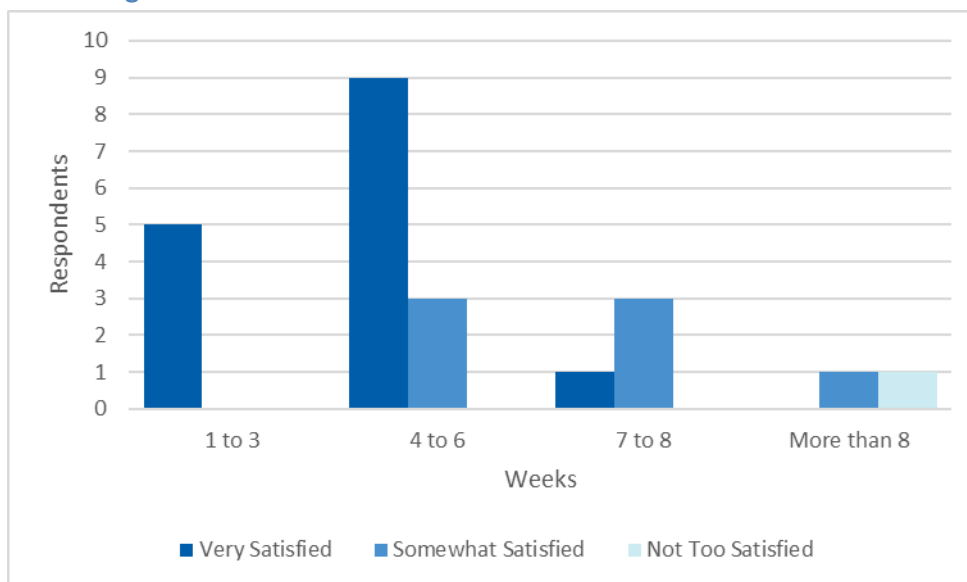
Figure 21. Participant Satisfaction Levels with Typical Upgrades Elements



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey QE4, QE9, and QE11. Don’t know and refused responses removed.

Participant satisfaction with the time it took for their incentives to arrive varied. The Cadmus team asked participants how long (in weeks) it took for their incentives to arrive. We grouped the responses into four categories from one week to more than eight weeks. All participants who received their incentives within three weeks said they were very satisfied, and a large percentage of participants who received their incentives within four to six weeks also reported being very satisfied. Figure 22 shows the drop in participant satisfaction as the time to receive their incentives extended beyond six weeks.

Figure 22. Customer Satisfaction with Time to Receive Incentive



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey QE6 and QE7. Don't know, has not arrived, and refused responses removed. (n=23)

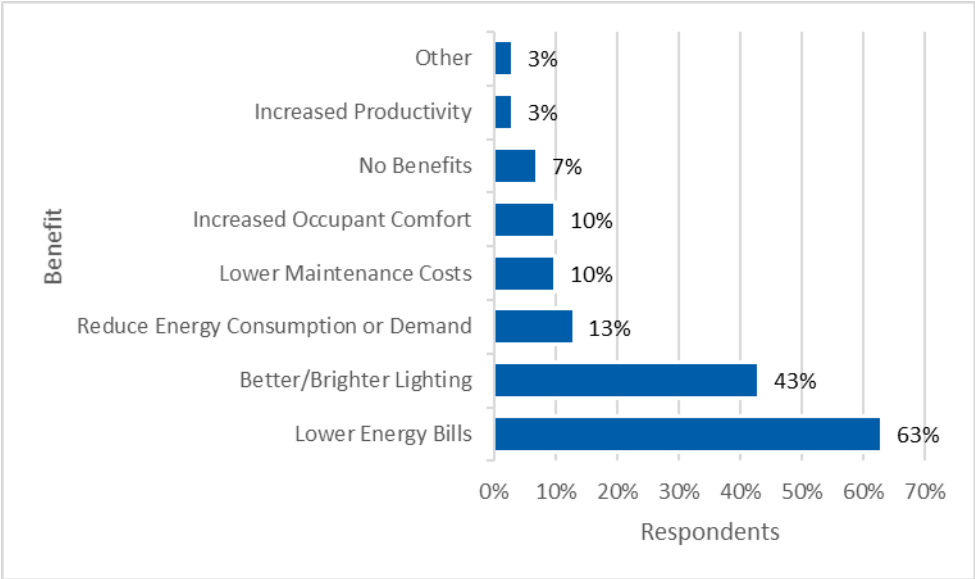
Benefits and Challenges

Twenty-eight of 30 participants in the Typical Upgrades delivery channel said they received one or more benefits as a result of installing the program equipment. As shown in Figure 23, the most frequent response was lower energy bills, followed by better or brighter lighting quality, then by reduced energy consumption, lower maintenance costs, increased occupant comfort, and other benefits (such as less expensive lighting fixtures).

While two participants reported no benefits from participating in the program, one of these two, who implemented a lighting retrofit project, also reported being very satisfied with each of the Typical Upgrades program elements and said that without the incentives, they would only have replaced the lamps, as cost savings was a big factor. The other participant gave no indication of why they did not identify a benefit.



Figure 23. Benefits of Equipment Installed Through the Typical Upgrades Delivery Channel



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey QE15. Don’t know and refused responses removed. Multiple responses allowed. (n=30)

While 87% of participants (26 of 30) reported no challenges when installing equipment through the Typical Upgrades delivery channel, 10% (three of 30) did have challenges, and one participant’s response was inconclusive. The challenges cited included selecting a fixture that qualified for the incentives, arranging for a man-lift to be used in the installation, and waiting for responses during the application and qualification process. RMP would have no influence on the availability of a man-lift; however, the other two sources of challenge—product selection and response times—are relevant to RMP.

In closing, when asked if RMP could do anything to improve their overall experience with the **wattsmart** Business Program, 25 of 30 participants said nothing was needed from RMP to improve their experience. Four participants offered one or more suggestions, which included:

- Identify the project site on the incentive check
- Send the incentive check faster
- Provide a larger selection of eligible equipment
- Provide better or more communication

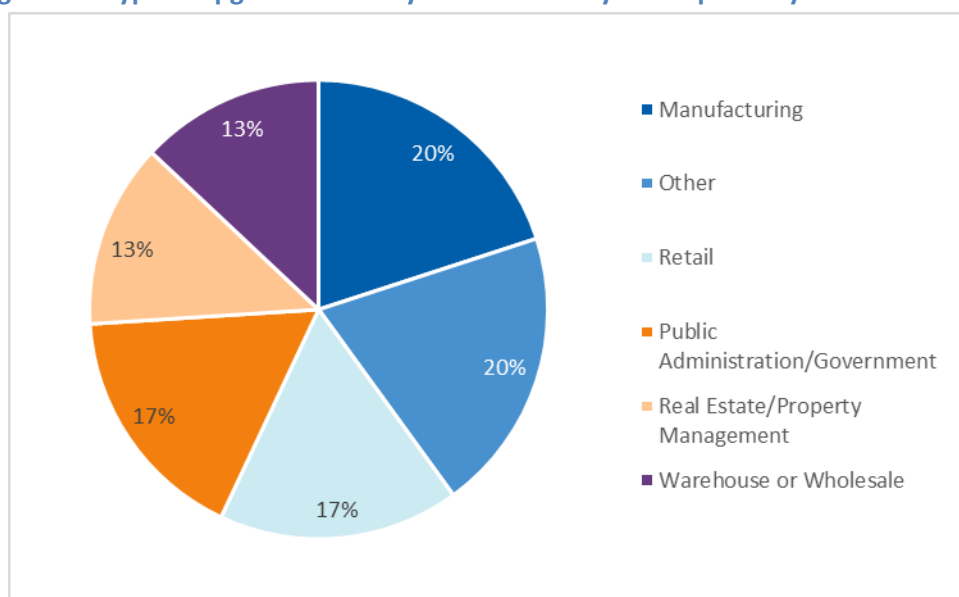
Firmographics

With the exception of the Public Administration/Government sector, participation the other business sectors in the 2014 and 2015 Typical Upgrades delivery channel, was comparable with participation in the same business sectors in the 2012 and 2013 FinAnswer Express Program. There was a statistically significant increase in Public Administration/Government participation between the two periods (17% in 2014 and 2015 versus 4% in 2012 and 2013; Figure 24 shows the distribution of all 2014 and 2015

surveyed participants by business sector). The “other” reported business sectors shown in the figure each represent less than 5% of the total, and include:

- Construction
- Educational Services
- Oil and Gas
- Professional/Scientific/Technical Services
- Repair and Maintenance
- Transportation

Figure 24. Typical Upgrades Delivery Channel Survey Participants by Business Sector



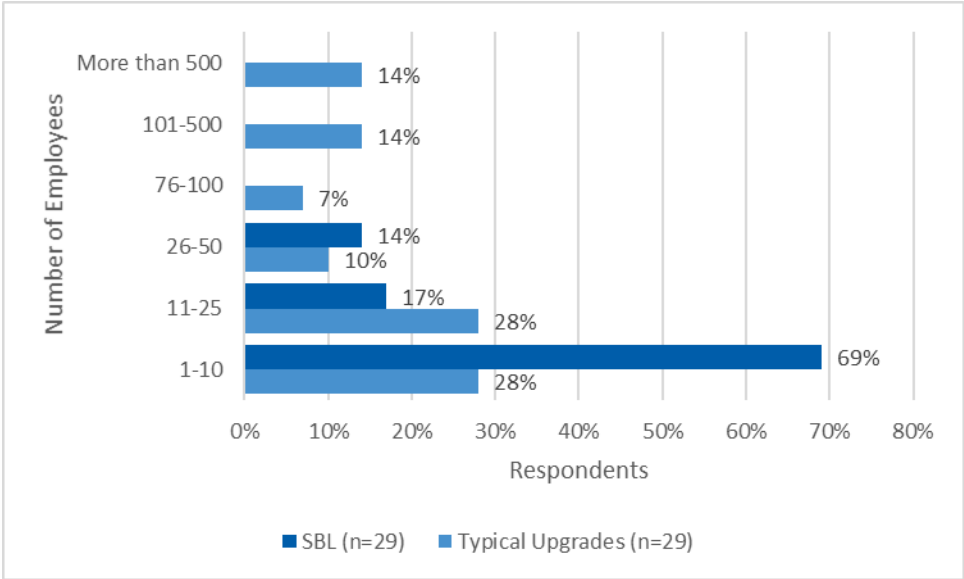
Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey: Q1. Don’t know and refused responses removed. Total may not equal 100% due to rounding. (n=30)

Half of the Typical Upgrades participants (15 out of 30) operate a single location, which they own. Overall, 83% of participants own all or a portion of their building(s) (one of these participants both own and lease facilities).

The majority of surveyed Typical Upgrades participants employ 25 or fewer people: 28% employ between one and 10, and 28% employ between 11 and 25 (n=29). Compared to the SBL channel, surveyed participants in the Typical Upgrades delivery channel are more evenly distributed across all employee-count categories, with 14% employing more than 500 people. These largest companies were not clustered in a single business sector; rather, they represented Educational Services, Warehouses/Wholesaler, Manufacturing, and Retail. Figure 25 provides more detail on the employee count distribution for surveyed participants in the Typical Upgrades delivery channel compared to the SBL delivery channel.



Figure 25. Typical Upgrades and SBL Delivery Channels Employee Count Distribution



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey: Q14. Don't know and refused responses removed.

Custom Analysis Delivery Channel

The Cadmus team surveyed 32 participants who received incentives through the **wattsmart** Business Program Custom Analysis delivery channel.¹⁸ Similar to the 2012 and 2013 FinAnswer Program, Custom Analysis participants represented a wide variety of business sectors. However, the single largest sector, Real Estate/Property Management, represents 16% of surveyed participants (n=32), which is a statistically significant increase from program years 2012 and 2013, when that sector represented only 2% of surveyed participants (n=61).¹⁹

Overall, Custom Analysis participants reported moderately high satisfaction with the various delivery channel components, and they most often cited the reduction in energy consumption and demand and better lighting quality as benefits from completing their projects. Most participants encountered no challenges with the program, but those who did described challenges with calculating savings, having an inexperienced contractor, lack of program clarity, and/or the amount of paperwork required.

¹⁸ This included four participants who received recommissioning incentives. Because these were only a small number of Custom Analysis respondents, the Cadmus team combined their responses into the Custom Analysis delivery channel responses unless otherwise noted.

¹⁹ Navigant Consulting, Inc. in partnership with EMI Consulting. "Evaluation Report for Utah's Energy FinAnswer Program (PY 2012 through 2013)." March 30, 2015. Available online: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2015/Energy_FinAnswer_Program_Evaluation_2012-2013.pdf

Motivation

Nine Custom Analysis and three recommissioning participants offered responses about what aspect of their custom energy analysis report had most influenced them to complete their project. While they listed a variety of influences, including their contractor, the reduced cost or energy savings, the incentives, or the payback, cost savings was most frequently cited by Custom Analysis participants, and payback was most frequently cited by those with recommissioning projects.

Participation and Satisfaction

Participants in the Custom Analysis delivery channel reported mixed experiences with completing the application paperwork for their projects. Twenty-nine percent said it was very easy, 68% found it somewhat easy, and 3% said it was not too easy (n=31). Participants described a process that required them to gather a great deal of information, such as account numbers and serial numbers from equipment, and several said they did not have enough information to understand the application requirements. These participants said RMP could improve the application process by making it available online, by having items such as account numbers prefill on the application, and by streamlining through reducing the number of forms required.

Fifteen respondents (12 with custom projects and three with a recommissioning project) said they participated in a pre-inspection of their site, and received a custom energy analysis report that identified efficiency measure opportunities, energy savings, costs, incentives, and payback. All 15 of these participants said the analysis was very or somewhat useful, and only one said it could have been improved, noting that the savings estimate could have been more accurate.

The Cadmus team also asked participants to rate their satisfaction with three program elements: their experience with the energy engineer provided through the **wattsmart** Business Program, their interaction with RMP, and the amount of incentive they received. Twenty Custom Analysis participants and three of those with a recommissioning project (85%, n=27) were very satisfied with their experience with the energy engineer. The remaining participants (15%, three in the Custom Analysis delivery channel and one with a recommissioning project) said they were somewhat satisfied, citing difficult and inconsistent application processes, the large amount of paperwork they were required to provide the engineers, a lack of options provided by the engineers, and disagreement with an engineer's approach.

Most participants (22 in the Custom Analysis delivery channel and all four participants with a recommissioning project) were also very satisfied with their interaction with RMP (87%, n=30). Of four Custom Analysis participants who rated their satisfaction level as somewhat satisfied (13%, n=30), two noted poor communication or slow response times (the other two did not offer further details).

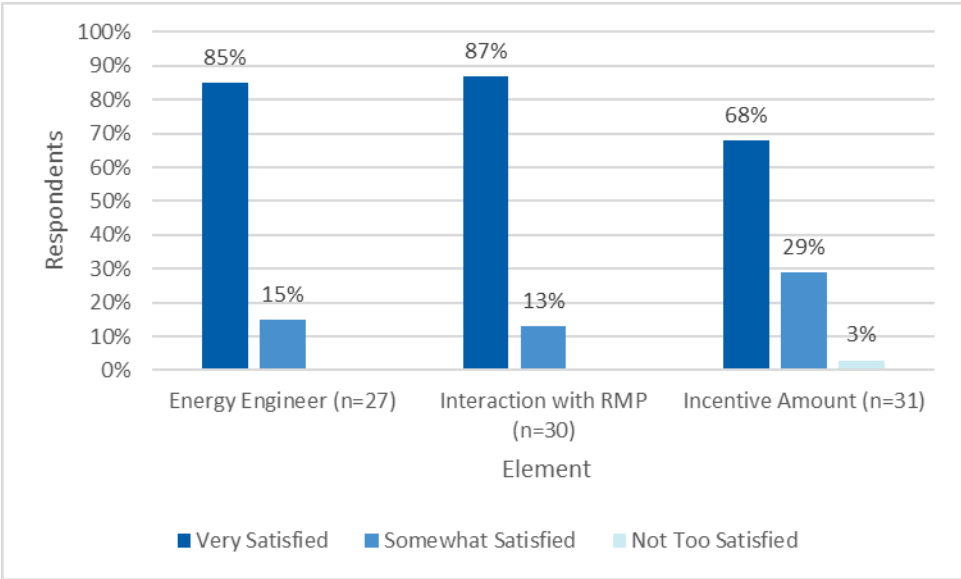
A majority of participants were also very satisfied with the amount of incentive they received for their project (68%, n=31). This included 18 Custom Analysis participants and three participants with a recommissioning project. Of the remaining participants, nine said they were somewhat satisfied, and one said they were not too satisfied (29% and 3% respectively). Two participants in the Custom Analysis delivery channel specified that a higher incentive amount would have garnered a higher satisfaction



rating from them (15% higher incentive and 25% higher incentive, respectively). The one Custom Analysis participant who said they were not too satisfied shared that the incentive amount was “very small” compared to the amount of money they spent on the project.

Figure 26 shows satisfaction levels with each element of the program.

Figure 26. Customer Satisfaction Levels with Custom Analysis Delivery Channel Elements

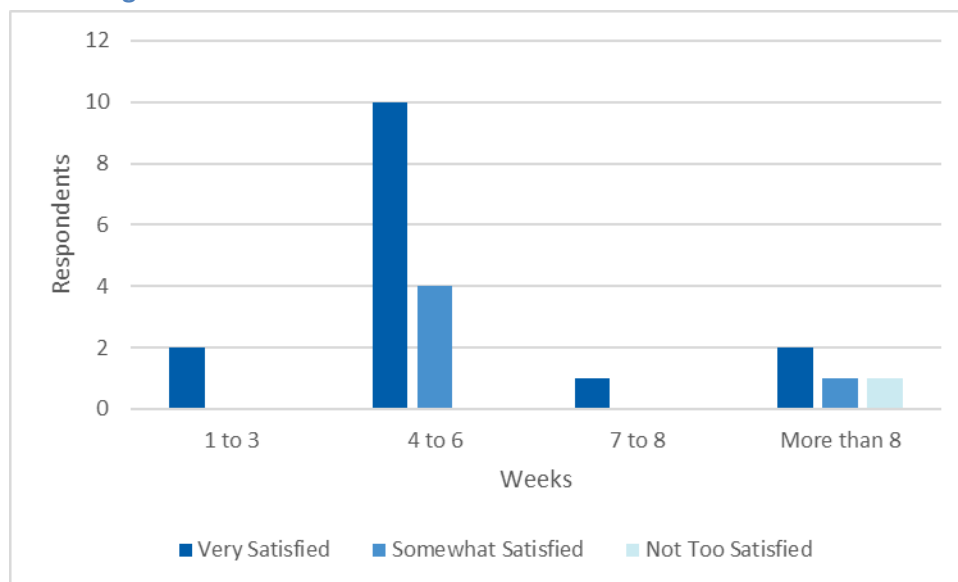


Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey: QF2, QF3, and QF12. Don’t know and refused responses removed.

Similarly to participants in the Typical Upgrades delivery channel, Custom Analysis participants were generally satisfied with the time it took to receive their incentive when it arrived in six weeks or less. Almost one-third of the participants (11 of 32) did not know how long it had taken for their incentives to be paid. Of the remaining 21 participants who did know, 15 reported being very satisfied with the timeframe, including two who waited more than eight weeks.

Five participants who said they were either somewhat satisfied or not too satisfied with the amount of time it took to receive their incentive provided further information; three indicated that three weeks or less would be acceptable, one said 30 days, and one simply said they would have preferred to receive their incentive as a credit on their next bill. Figure 27 shows the reported amount of time relative to participant satisfaction with that amount of time.

Figure 27. Customer Satisfaction With Time to Receive Incentive



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey: QF14 and F15. Don’t know and refused responses removed. (n=21)

When asked, participants said there was no other energy efficiency measures or equipment they wanted to install that did not qualify for the **wattsmart** Business Program.

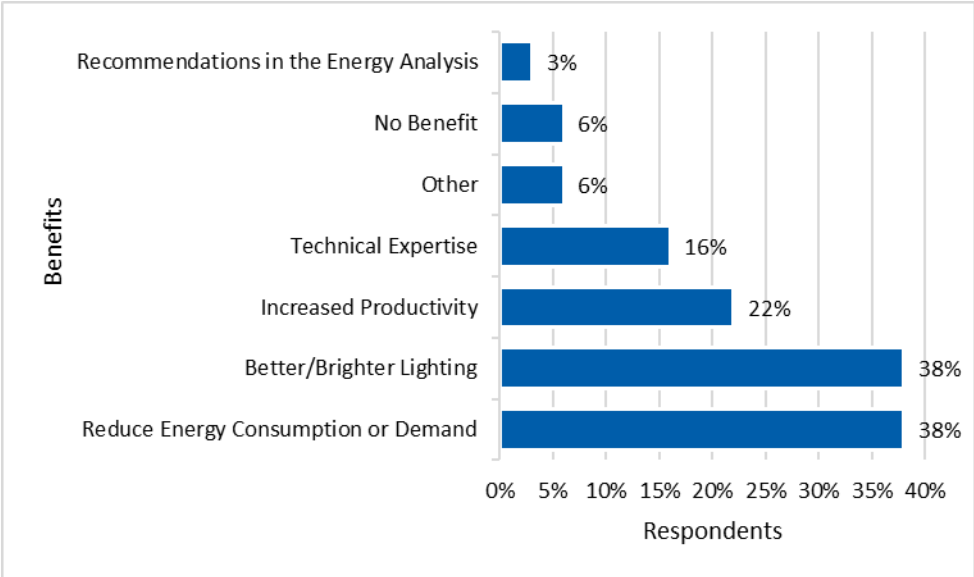
Benefits and Challenges

Overall, participants in the Custom Analysis delivery channel (n=32) said they received one or more benefits as a result of their energy efficiency upgrades. As shown in Figure 28, respondents equally cited reduced energy consumption or demand and better or brighter lighting. These were followed to a lesser extent by increased productivity and the technical expertise provided through the program. Two participants, categorized as “other,” said they increased the longevity of their lighting or increased the marketability of their space for leasing.

Two participants said they received no benefit from their program installation: one of these respondents said the results did not turn out as they had been told. The other participant had completed a pump motor retrofit, and the Cadmus team reviewed all of their responses and found that they cited the incentive as a key reason they progressed with the project. This participant rated fairly high satisfaction throughout the rest of the survey questions. For this reason, the team assumes that this participant simply did not identify the incentive as a program benefits.



Figure 28. Benefits of Equipment Installed through the Custom Analysis Delivery Channel



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey: QF19. Don’t know and refused responses removed; multiple responses allowed. (n=32)

While 74% of participants (23 of 31) reported no challenges while participating in the Custom Analysis delivery channel, the remaining 26% (eight of 31) noted these challenges:

- Inexperienced contractor specified more equipment than was needed (n=1)
- Calculating savings (n=1)
- Lack of clarity about the program (n=2)
- Additional paperwork that had to be completed (n=2)
- Finding the correct lights for the job (n=1)
- Waiting for product to arrive (n=1)

Four of the eight respondents who encountered challenges said RMP could help them by providing more precise information about the program, helping contractors better understand what equipment to install, and by simplifying the paperwork requirements.

In closing, when asked if RMP could do anything to improve their overall experience with the **wattsmart** Business Program, four of the 32 participants responded affirmatively, asking for better or more communication early in the process, increased incentives, more consistency with their program contact, and not to change the people who are working with them on their project.

Firmographics

As shown in Figure 29, participants in the Custom Analysis delivery channel are spread across a wide variety of business sectors. There were statistically significant differences in participation between evaluation periods 2012 to 2013 and 2014 to 2015 in the Real Estate/Property Management,

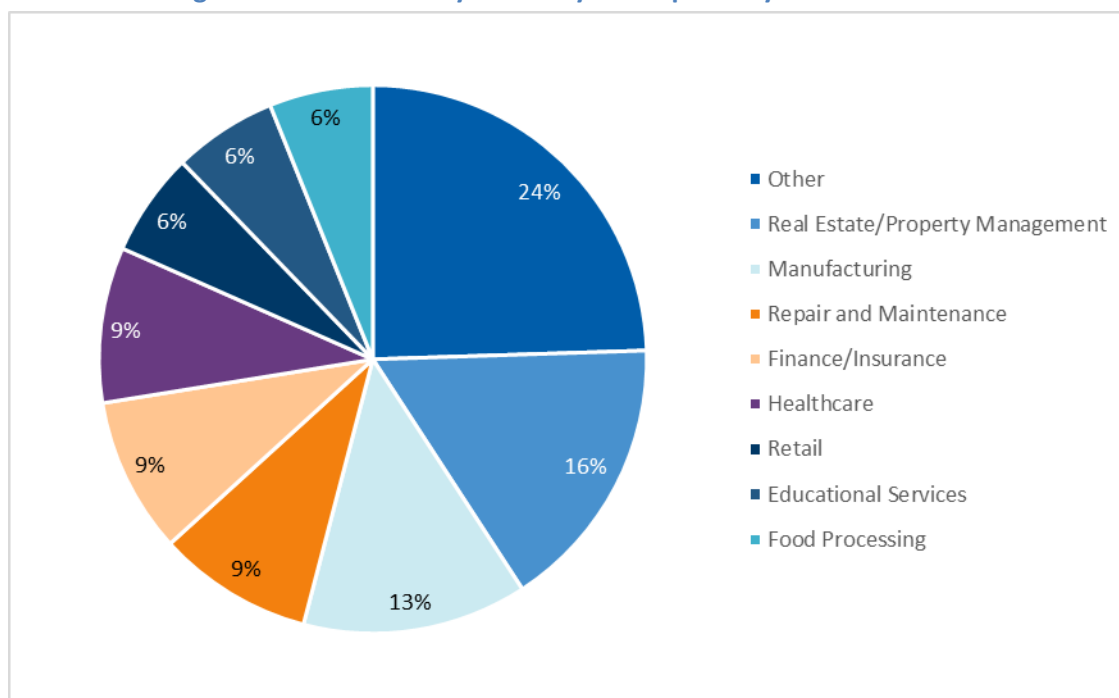
Manufacturing, and Dairy/Agriculture business sectors. As noted above, Real Estate/Property Management comprised 2% of the FinAnswer survey respondents in 2012 and 2013 (n=61), compared to 16% of the 2014 and 2015 Custom Analysis delivery channel survey respondents. Manufacturing comprised 28% in 2012 and 2013, compared to 13% in 2014 and 2015. Dairy/Agriculture comprised 15% in 2012 and 2013, compared to 3% in 2014 and 2015. There were no other statistically significant differences in business sector participation between the two evaluation periods.

The “other” category shown in Figure 29 includes eight sectors, each containing a single participant:

- Arts/Entertainment/Recreation
- Construction
- Dairy/Agriculture
- Food Service
- Mining
- Oil and Gas
- Public Administration/Government
- Warehouse or Wholesale

Participants with a recommissioning project are represented in three business categories shown in Figure 29: Mining (n=1), Real Estate/Property Management (n=1), and Manufacturing (n=2).

Figure 29. Custom Analysis Survey Participants by Business Sector



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey: Q11. Don't know and refused responses removed; may not total 100% due to rounding. (n=32)

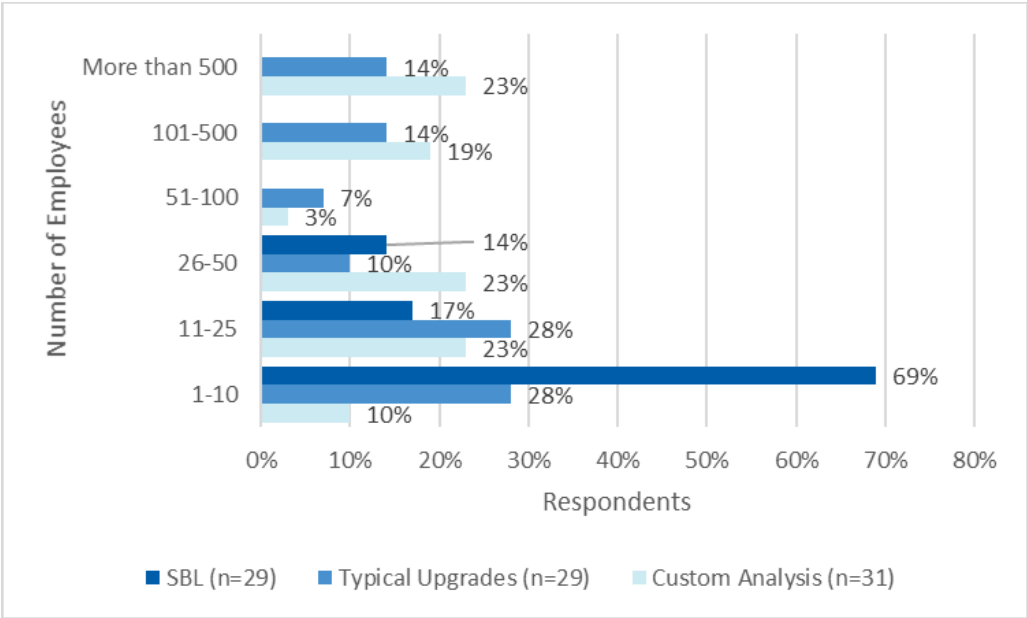


While half of the Custom Analysis participants (15 out of 30) occupy a single location, the other half occupy a various number of facilities. One of the respondents occupies 2,000 locations in Utah, one respondent occupies 120 locations, another occupies 60 locations, and the remaining 12 participants occupy between two and 25 locations, without any significant clustering around a specific number of sites. The participants with a recommissioning project are included in these numbers: three of them operate one site each, and one operates six sites.

Overall, 94% of participants (30 out of 32) own all or a portion of their building(s) (three of these participants both own and lease facilities). Those with a recommissioning project are included in this total: all four own their facilities.

Participants in the Custom Analysis delivery channel, similar to those in the Typical Upgrades delivery channel, tended to have employee counts that varied widely. As shown in Figure 30, most employed 50 or fewer people, or more than 101, with few falling into the 51 to 100 range. Of the four Recommissioning participants (included in Figure 30 below), one employed between 11 and 25 people, one employed 26 to 50 people and two employed more than 500 people.

Figure 30. Custom Analysis (including recommissioning projects), SBL and Typical Upgrades Delivery Channels Employee Count Distribution



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey: Q14. Don't know and refused responses removed.

LED Instant Incentives Delivery Channel

The Cadmus team focused much of the LED Instant Incentives survey on collecting data used to inform the impact evaluation savings calculations, freeridership, and NTG. As noted above, in an effort to

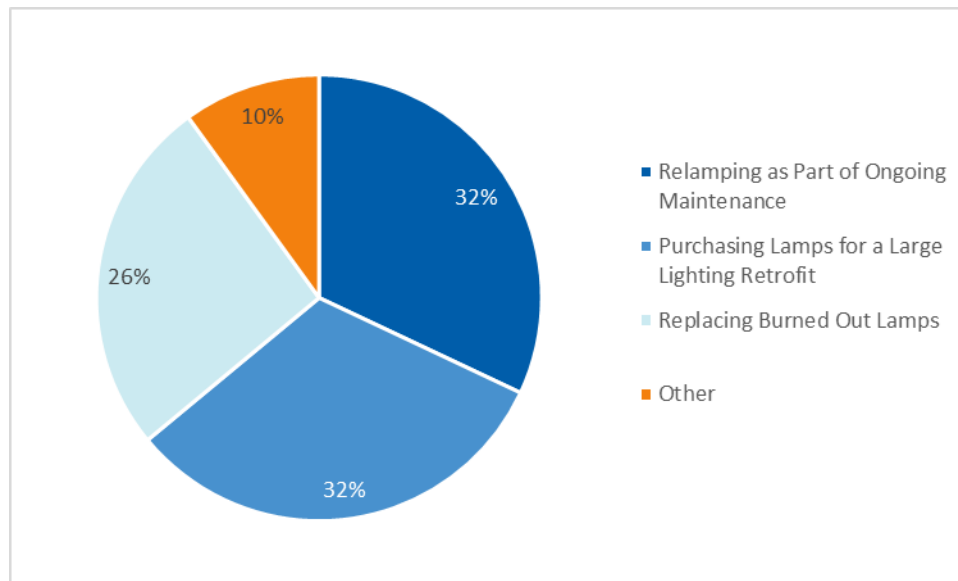
collect the necessary information without overburdening participants, and due to the straightforward nature of an instant incentive offering in which participants purchase LED lighting and receive a discount on-the-spot, we abbreviated the number of motivation, benefits, and challenges questions compared to the participant surveys for other program delivery channels.

The LED Instant Incentives delivery channel participants represent a wide variety of business sectors. They reported finding it easy to locate a participating lighting distributor, and most found it easy to purchase the product they wanted. While the majority (62%, n=37) encountered no challenges participating in the offering, 14 participants (38%) reported that they did encounter some challenges. Again, similar to those in the other delivery channels, this group of participants asked for additional and better communication about the offering, its incentives, and available products.

Motivation

Although the Cadmus team did not specifically ask about participant motivation, we did ask for what purpose the LED lamps were purchased. As shown in Figure 31, participants most frequently said they were relamping in the course of ongoing maintenance at their facility or they were purchasing the lamps for a large lighting retrofit. The participants included in the “other” category said they were remodeling or replacing existing lamps with LEDs to save money or improve energy efficiency, while one participant said they were updating their lighting to be more energy efficient.

Figure 31. Reason for Purchasing LED Lamps



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Midstream Participant Survey: QC8. Don’t know and refused responses removed. (n=38)

Satisfaction

LED Instant Incentives participants found it very easy or somewhat easy to find the product they wanted to purchase (76% and 21% respectively, n=38). Only one participant indicated having some difficulty finding a product because they would have liked more options in color spectrum and type of lighting.



While the majority of participants purchased their lighting from a distributor (84%), 16% (six participants) said they purchased through a retailer (n=37).²⁰ Participants who said they purchased through a distributor said it was very easy or somewhat easy to find a distributor who was offering the instant discount (90% and 10% respectively, n=30). The large majority of these participants also said they received very satisfactory assistance from their distributor with selecting the lamps they purchased (97%, n=31).

Participants were generally satisfied with the amount of the instant discount they received for their purchase. All of the participants said they were either very satisfied (58%) or somewhat satisfied (42%, n=38).

Challenges

When asked if RMP could do anything to improve their overall experience with the LED Instant Incentives delivery channel, 62% (n=37) said there was nothing that could improve their experience. Fourteen participants offered the following suggestions:

- Increase the incentive amount (n=5)
- Provide better communication directly to the customers about the products and incentives that are available rather than relying on the vendors to provide this information (n=2)
- Provide better communication by phone (this customer said they were repeatedly transferred between people; n=1)
- Provide a tool or incentive calculator that enables customers to input their purchase and view the incentive amount rather than reading through program information (n=1)
- Offer a greater variety in the incented LED lamps (for example, low wattage [15 watt] candelabra lamps are difficult to find, and plastic-faced energy-efficient lamps are very hard to change using a suction cup for those installed high above the floor; n=2)
- Improve distributor knowledge about how to input data and provide the instant incentive (n=1)
- Provide quicker approval of projects (n=1)
- Send the incentive check faster (n=1)

Firmographics

As would be expected with a midstream delivery channel such as LED Instant Incentives, participants from a wide variety of business sectors participated. The largest segment “other” represents seven

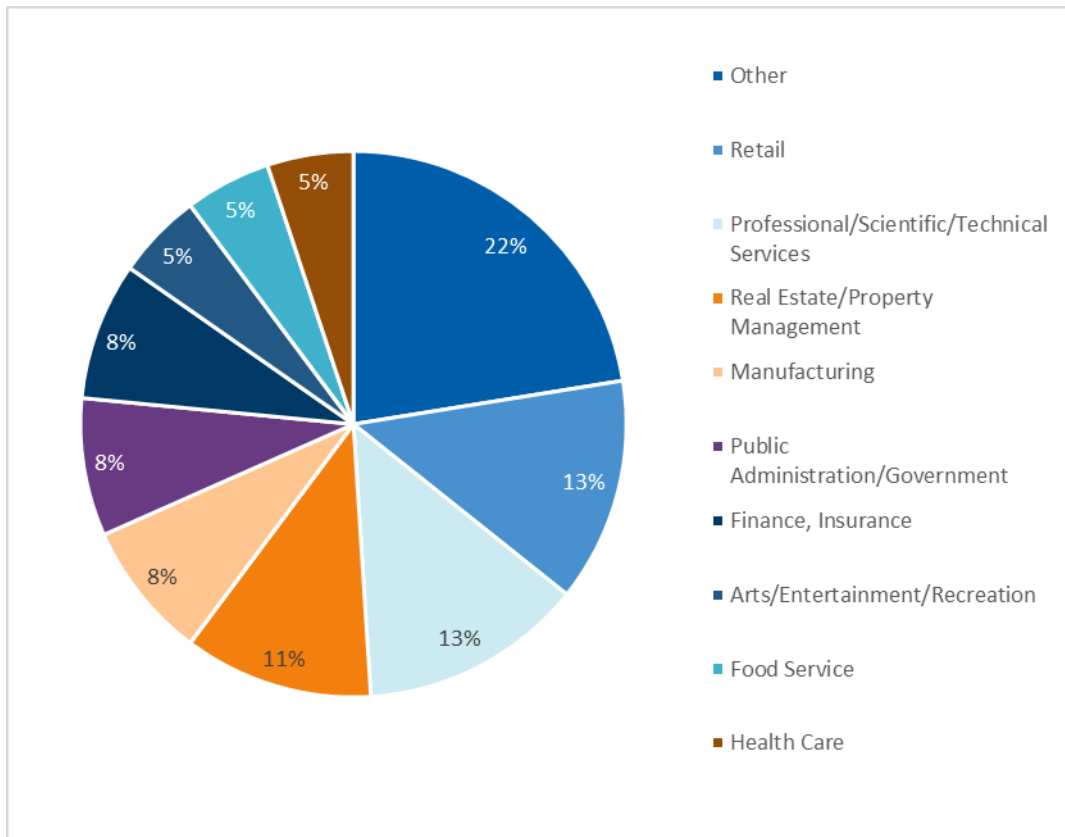
²⁰ The LED program is not offered through retailers and it is possible these six participants were simply unclear about the type of supplier from whom they purchased their lighting. However, these six participants were not asked the follow-up question about their satisfaction with assistance from the distributor. All other question in this section were asked to all participants.

business sectors which together comprise 22% (n=37), of all surveyed participants. Individually, each of these seven sectors represent less than 5% of the total surveyed participants; they include:

- Accommodation
- Educational Services
- Hospitality
- Mining
- Office
- Repair and Maintenance
- Transportation

Following the “other” category, at 13% each, Retail and Professional/Scientific/Technical Services were the two largest business sectors in the 2015 program year. The LED Instant Incentives delivery channel was added in May 2015; therefore, there is no data for 2014. Figure 32 shows the distribution of surveyed participants across all business sectors.

Figure 32. LED Instant Incentives Delivery Channel Survey Participants by Business Sector



Source: Rocky Mountain Power Utah *wattsmart* Business Program 2014–2015 Midstream Participant Survey: QH1. Don’t know and refused responses removed; Total may not equal 100% due to rounding. (n=37)



Participants in the LED Instant Incentives delivery channel also occupy a widely varying number of locations, from one to 300. While 44% (16 of 36) occupy a single location, 36% (13 participants) occupy between two and seven locations, and the remaining 19% (seven participants) occupy between 20 and 300 facilities in Utah. One of these seven reported managing 12,000 to 13,000 apartment units in Utah.

Eighty-four percent of LED Instant Incentives participants (n=37) said they own all or a portion of their building(s) (four of these participants both own and lease facilities). Two participants (5%) neither own nor lease their facilities, but manage them for someone else. Only 11% lease all of their facilities.

Although participants in the LED Instant Incentives delivery channel were distributed across all employee count categories, the largest percentage represent businesses employing more than 500 people (31%). The next largest cluster of number of companies in this delivery channel was in the smallest category, having one to 10 employees (28%). Table 30 shows a comparison of employee counts for all program delivery channels.

Table 30. Employee Count Distribution All Delivery Channels

Employee Count	SBL (n=29)	Typical Upgrade (n=29)	Custom Analysis (n=31)	LED Instant Incentives (n=36)
1-10	69%	28%	10%	28%
11-25	17%	28%	23%	8%
26-50	14%	10%	23%	8%
51-75			3%	8%
76-100		7%		3%
101-200		7%	3%	6%
201-500		7%	16%	8%
More than 500		14%	23%	31%

Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey: Q14. Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Midstream Participant Survey: QH4. Don't know and refused responses removed.

Nonparticipants and Partial Participants

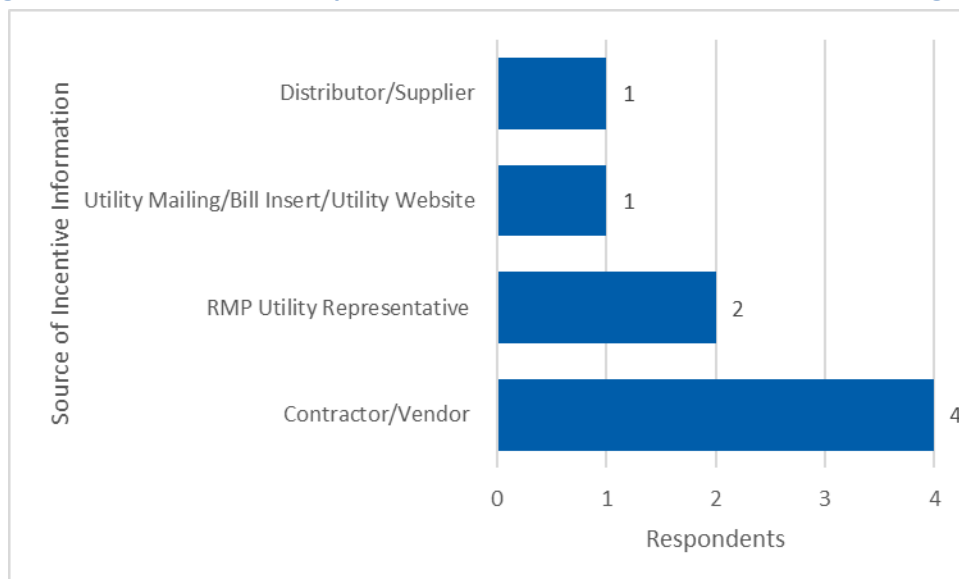
The Cadmus team surveyed 87 nonparticipants who either never completed a project through the program or had not completed a project through the program in 2014 or 2015. Sixteen of the 87 respondents were managed accounts, which are larger usage accounts that are managed in-house by RMP. The Cadmus team also surveyed nine partial participants who initiated but did not complete a project through the program during the evaluation period. Among the nonparticipants and partial participants who indicated their type of business, the largest single group (13%, n=96) operate in the Retail business sector. Respondents represented 23 discrete business sectors. Of the nonparticipants and partial participants, the majority (67%, n=92) operate a single facility in Utah, and 63% (n=95) own their facilities.

Awareness and Communication

When asked if they had heard of the **wattsmart** Business Program prior to the survey call, 67% of partial participants (six of nine) said they had heard of the program. Among nonparticipants, 50% of those with a managed account (n=16) but only 30% of those with a non-managed account (n=69) said they had heard of the program.

Partial participants who recalled where they learned about the program (eight of nine) most frequently named their contractor or vendor. Figure 33 shows all partial participant responses.

Figure 33. How Partial Participants Learned About the *wattsmart* Business Program

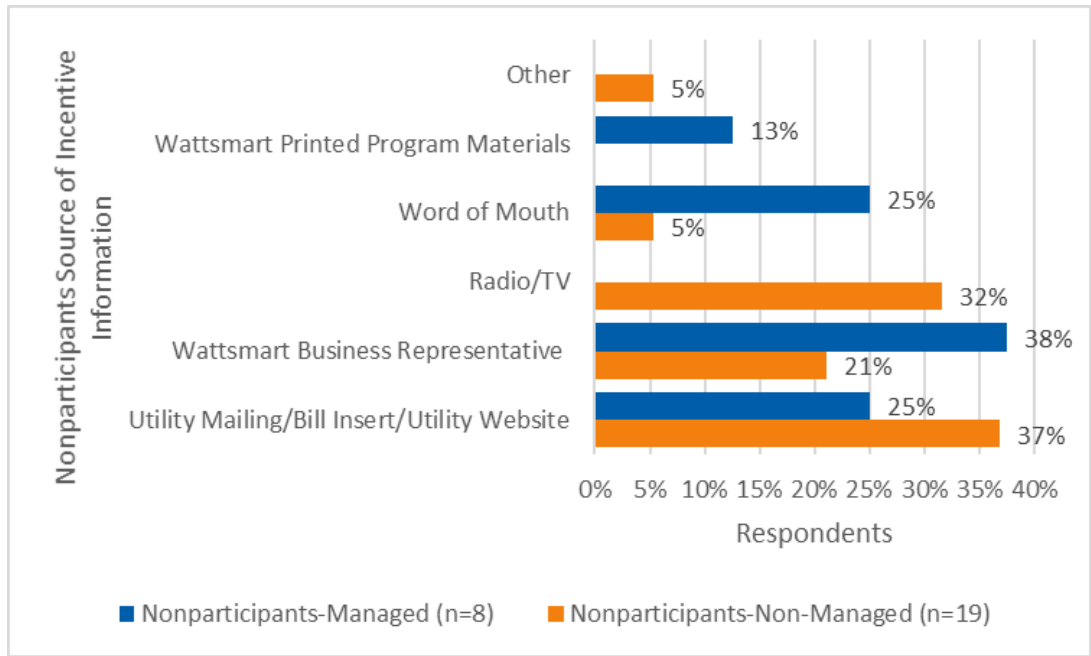


Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Partial Participant/Nonparticipant Survey: QC1. Don't know and refused responses removed. (n=8)

Of the 29 nonparticipants who had heard of the program, 27 (eight with managed accounts and 19 with non-managed accounts) could recall the source of that information. Those with a managed account most frequently said they heard about the program from a **wattsmart** Business representative, while those with a non-managed account heard from a RMP mailing, bill insert, or the website, followed closely by an advertisement on radio or TV (see Figure 34). Unlike the partial participants or those in the SBL, Typical Upgrades, and Custom Analysis delivery channel, none of the nonparticipants mentioned a contractor or vendor as their source of program information.



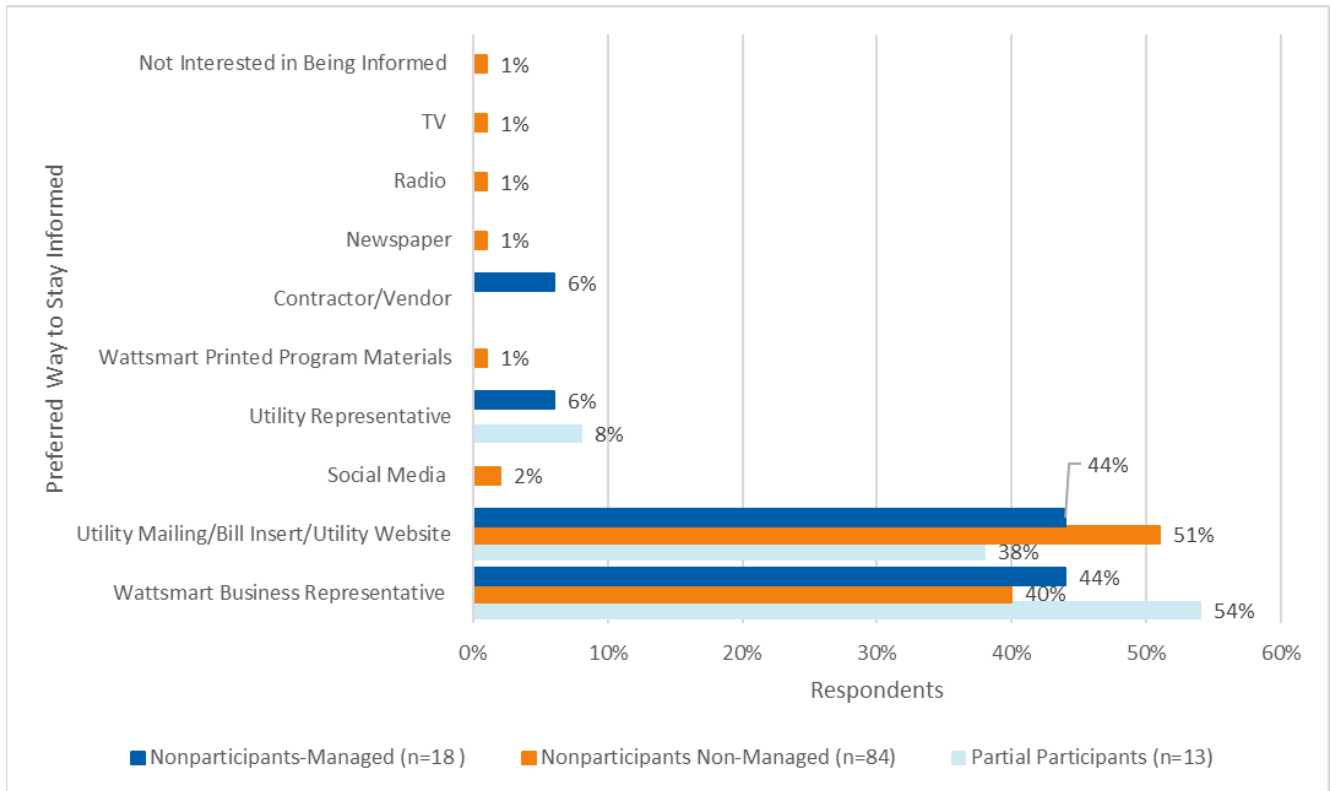
Figure 34. How Nonparticipants Learned About the *wattsmart* Business Program



Source: Rocky Mountain Power Utah *wattsmart* Business Program 2014–2015 Partial Participant/Nonparticipant Survey: QC3. Don't know and refused responses removed.

The majority of all nonparticipants, and partial participants who had begun a Typical Upgrades or Custom Analysis project, said they would like RMP to inform them about incentives for energy efficiency improvements through a *wattsmart* Business representative or through a utility mailing, bill insert, or the website. (Figure 35).

Figure 35. Preferred Method to Stay Informed for Nonparticipants and Partial Participants

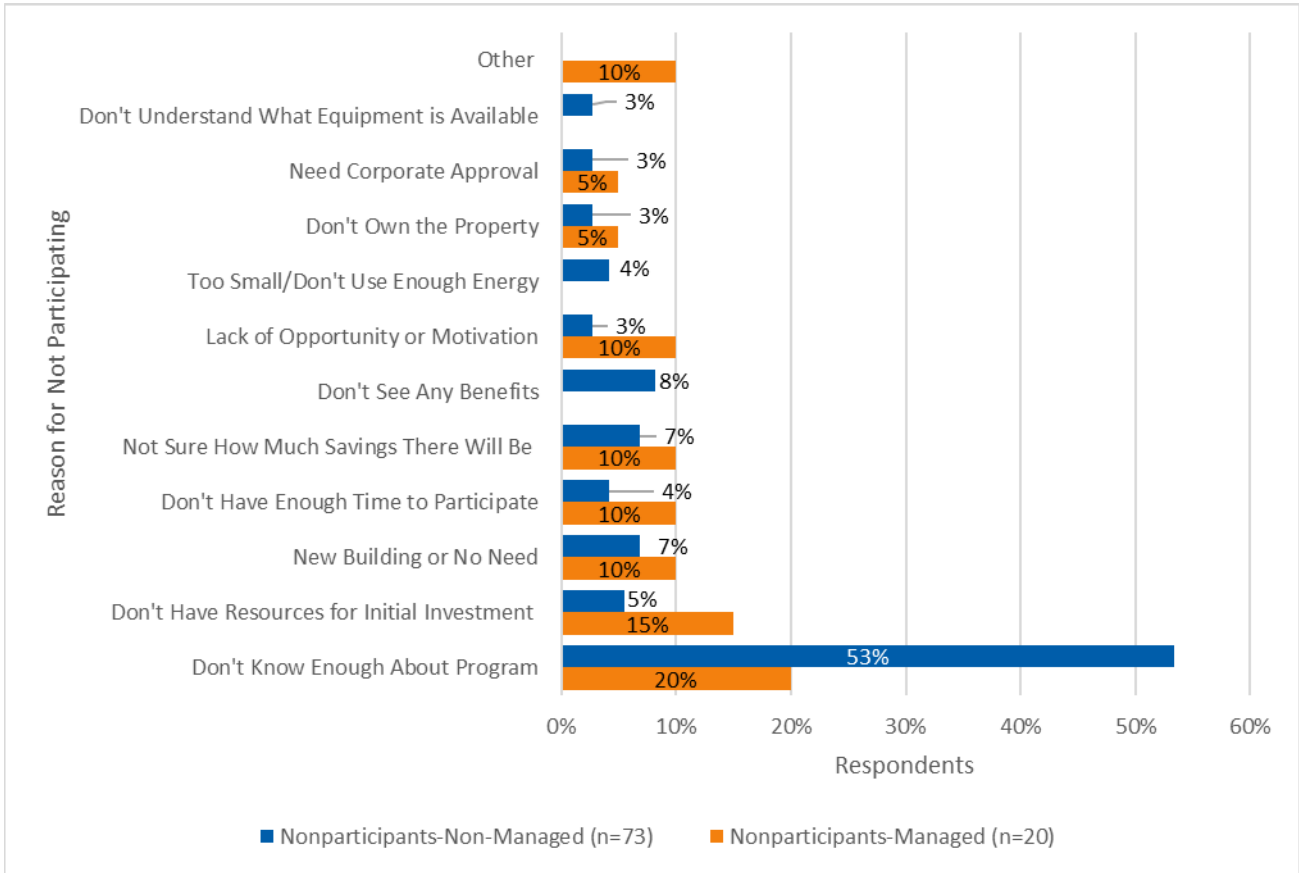


Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Partial Participant/Nonparticipant Survey: QC5. Don’t know and refused responses removed.

In assessing nonparticipants’ reasons for not using the **wattsmart** Business Program, the Cadmus team found that those with a managed account were influenced by what they lacked, such as financial resources, opportunity, time, or motivation, while those with a non-managed account were not using the program primarily because they did not know enough about it (Figure 36). The “other” category shown in the figure includes one customer who is an energy producer, and one who said that none of their projects qualified for the program.



Figure 36. Reasons for Not Participating



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Partial Participant/Nonparticipant Survey: QD13. Don't know and refused responses removed.

Motivation

Both nonparticipants and partial participants said that when considering energy efficiency upgrades, they are primarily motivated by the opportunity to save money on energy bills or to reduce energy consumption or energy demand (80%, n=85).

Nonparticipants

Nonparticipants with both managed and non-managed accounts most frequently said that lower equipment costs would motivate them to make more energy-efficient upgrades to their current equipment (56%, n=18 and 56%, n=71, respectively). Nonparticipants offered the suggestions listed below as ways RMP could help them participate in the program. While most suggestions were mentioned by one or two respondents, 25% of those with a managed account (n=12) and 62% with a non-managed account (n=52) asked for more information.

- Provide more information on program savings, costs, and benefits
- Offer grants or financing to help with upfront costs

- Guarantee the savings
- Simplify the paperwork
- Increase the incentives and improve payback
- Visit participants in-person or by phone to discuss options
- Expand the technologies covered by the program
- Offer free equipment installation

The Cadmus team further explored nonparticipants' attitudes about making energy efficiency upgrades at their facilities. We asked these customers the extent to which they agreed with the following series of statements (not all statements applied to every customer, and the team removed responses of "don't know" and "not applicable)."

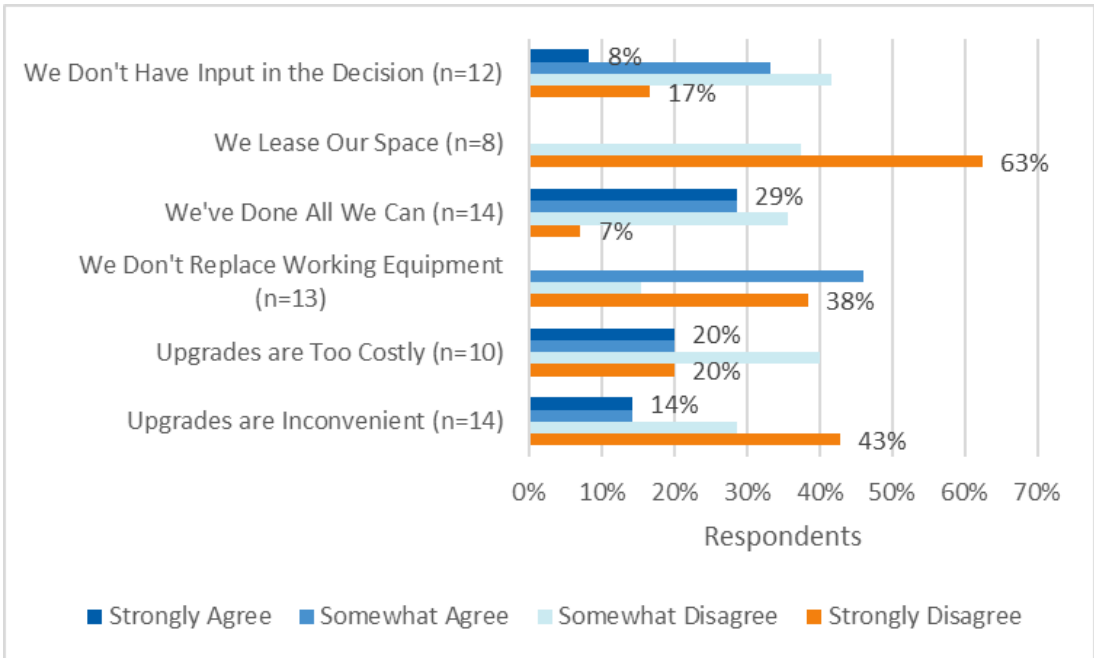
- Making upgrades at our facility is an inconvenience.
- Making energy efficiency upgrades to this facility is too costly.
- We don't replace working equipment even if it is not energy efficient.
- My company has made all the energy efficiency improvements we can without a substantial investment.
- My company leases space; we do not want to invest in energy efficiency upgrades.
- Decisions about equipment upgrades are made at a corporate office, and we don't have much input at this facility.

As the final question in this series, the Cadmus team asked nonparticipants: "When calculating the return on investment for proposed capital upgrades, does your company include savings gained from energy efficiency?"

The responses from nonparticipants with a managed account were mixed, but generally indicated that most of them own their space, and only 29% (n=14) said they have accomplished all the energy efficiency updates that are possible (Figure 37). Eighty-six percent reported that they do include savings gained from energy efficiency when calculating return on investment for capital upgrades.



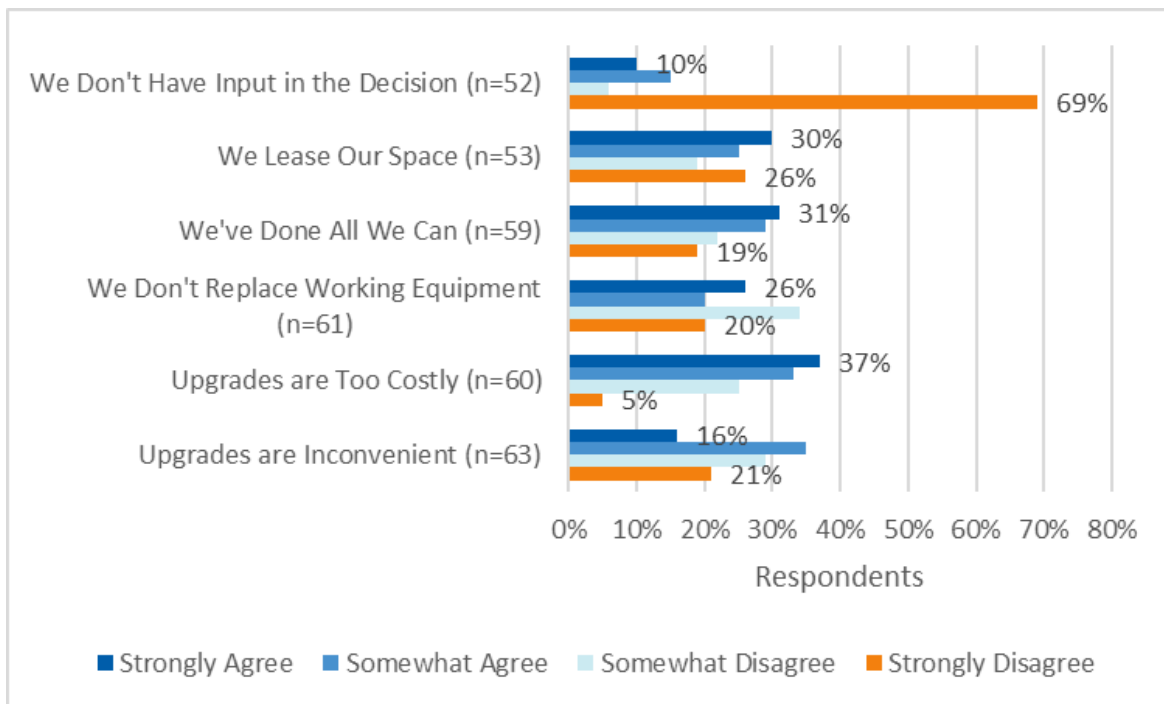
Figure 37. Attitudes About Energy Efficiency Improvements – Nonparticipants With Managed Accounts



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Partial Participant/Nonparticipant Survey: QD7a-QD7e. Not applicable and don't know responses were removed.

Responses from nonparticipants with a non-managed account (shown in Figure 38) indicate that they do have input into decisions about energy efficiency upgrades, and only 31% strongly agree they have accomplished all the energy efficiency updates that are possible at their facility. These respondents were split evenly regarding whether they include savings gained from energy efficiency when calculating return on investment for capital upgrades (50% said yes and 50% said no; n=58).

Figure 38. Attitudes About Energy Efficiency Improvements – Nonparticipants With a Non-Managed Account



Source: Rocky Mountain Power Utah wattsmart Business Program 2014–2015 Partial Participant/Nonparticipant Survey: QD7a-QD7e. Not applicable and don't know responses were removed.

The Cadmus team also found no statistical significance between the proportion of nonparticipants with a managed account (three out of eight) and the number with a non-managed account (three of 19) who said they were very likely or somewhat likely to request an incentive from the program in the next six months.

Partial Participants

As noted above, partial participants indicated that when considering energy efficiency upgrades, they are primarily motivated by the opportunity to save money on energy bills or to reduce energy consumption or energy demand; their second most frequent reason was to receive the incentive.

Of the nine partial participants we surveyed who initiated a project through the program, eight had a lighting retrofit project and one had a major lighting renovation project. Of these nine partial participants, four completed their project(s) outside of the program, and five had not completed the project(s) they initiated.

Of the five partial participants who did not complete their project, one said they lacked the funds, and four said the project costs were too high even after incentives. One of these four partial participants said that rather than completing the retrofit all at once, they are replacing lamps as they burn out.



Among the four partial participants who did complete their project, only one applied for a **wattsmart** Business Program incentive. The database indicates that this customer was sent an amendment to their application that was not signed, and the application was later cancelled. Of the three who did not apply, one said the application was too complicated and one said their contractor was supposed to apply on their behalf, but failed to do so. The third customer did not know why they did not apply, but the database indicates that Nexant was notified by the customer’s energy management consultant that the project had been cancelled.

Satisfaction

Four of the nine partial participants said they were somewhat satisfied with the **wattsmart** Business Program, while four said they were not too satisfied and one did not know. The Cadmus team asked those who said they were not too satisfied to give more detail about their rating, and received mixed answers. One customer (a different respondent than noted above who said the application was too complicated), shared that the overall process was too complicated, particularly the equipment eligibility. One customer reiterated that their contractor did not work well with them, and another said the cost of replacing equipment was simply too high, and they would prefer to work directly with RMP rather than a contractor.

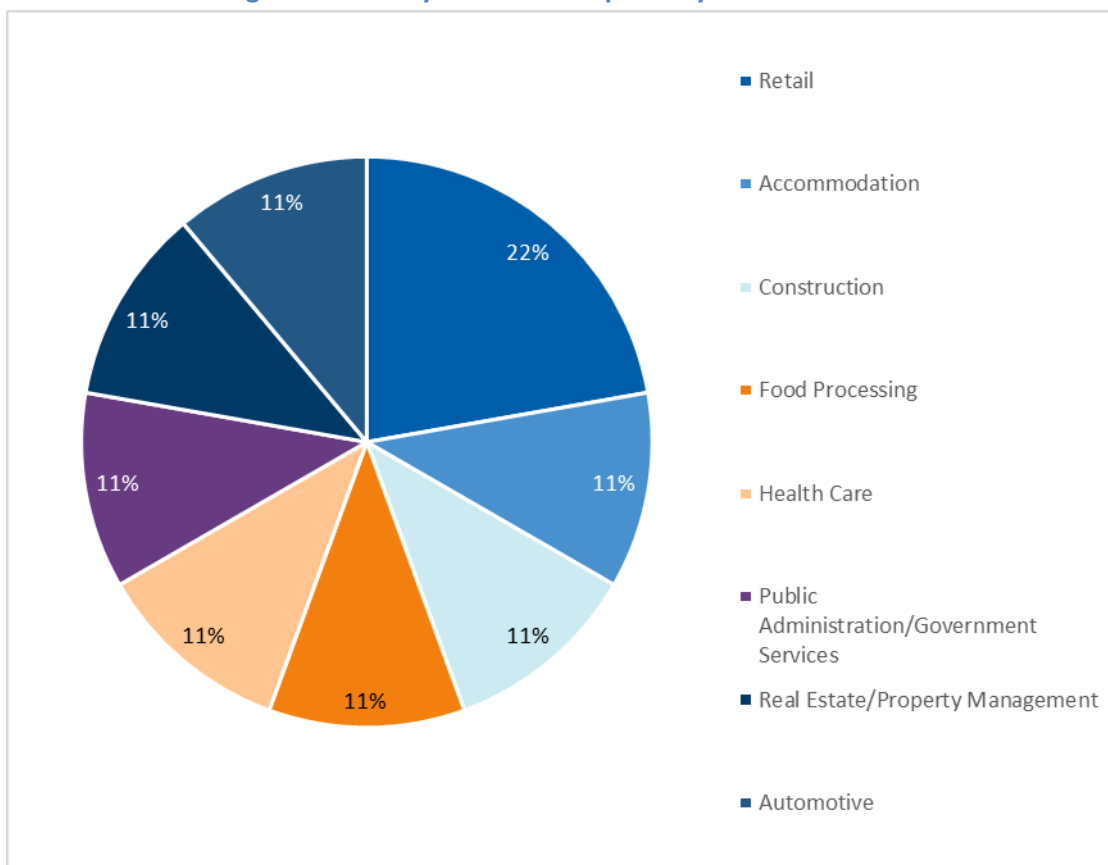
The fourth customer who was not too satisfied with the program said they had been denied incentives for projects at their other facilities. The Cadmus team reviewed Nexant’s partial participant database, which showed four additional projects for this customer, all of which indicated having been cancelled. Closing comments from this customer during the survey indicated that the issue may have been with product qualification. When we asked if RMP could do anything to improve their experience with the program, this customer asked for a different approach to approving incentives, and asked why similar lamps from different manufacturers do not both qualify.

Interestingly, three of the four partial participants who said they were not too satisfied with the program also said they were very likely to request another incentive from the program in the next six months. Two of the partial participants who rated their satisfaction higher were less certain about future participation.

Firmographics

The surveyed partial participants and nonparticipants are scattered across many business sectors. As shown in Figure 39, partial participants’ largest individual business sector was Retail (22%, n=9); however, with only nine partial participant respondents, this represents two customers. The remaining respondents were evenly spread across eight other sectors.

Figure 39. Survey Partial Participants by Business Sector



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Partial Participant/Nonparticipant Survey: QF1. Don’t know and refused responses removed; may not total 100% due to rounding. (n=9)

Nonparticipants with a managed account were somewhat unique from partial participants and nonparticipants with a non-managed account, in that the largest individual business sector was not Retail (at only 6%; n=16), but Dairy/Agriculture (25%) followed by Oil and Gas (19%). The single “other” customer in this group works at a tire recycling facility (Figure 40).

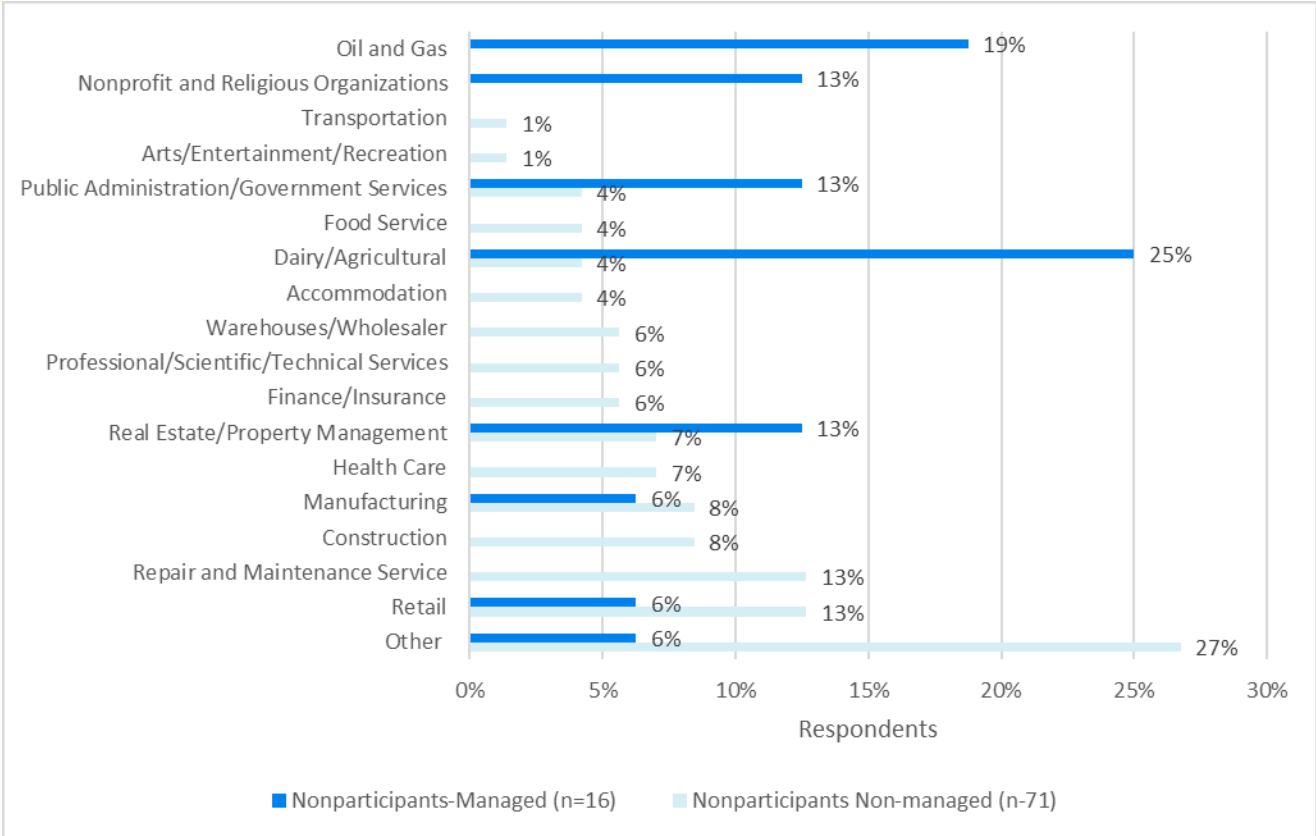
The nonparticipants with non-managed accounts represent a greater diversity of RMP customers than partial participants and nonparticipants with managed accounts. These nonparticipants represent 19 business sectors, 10 of which fell are shown in largest category of “other” shown in Figure 40. The “other” category is made up of the following sectors:

- Accommodation
- Arts/Entertainment/Recreation
- Automotive
- Cleaning/Janitorial
- Dairy/Agricultural



- Food Service
- Irrigation
- Photography
- Public Administration/Government Services
- Transportation

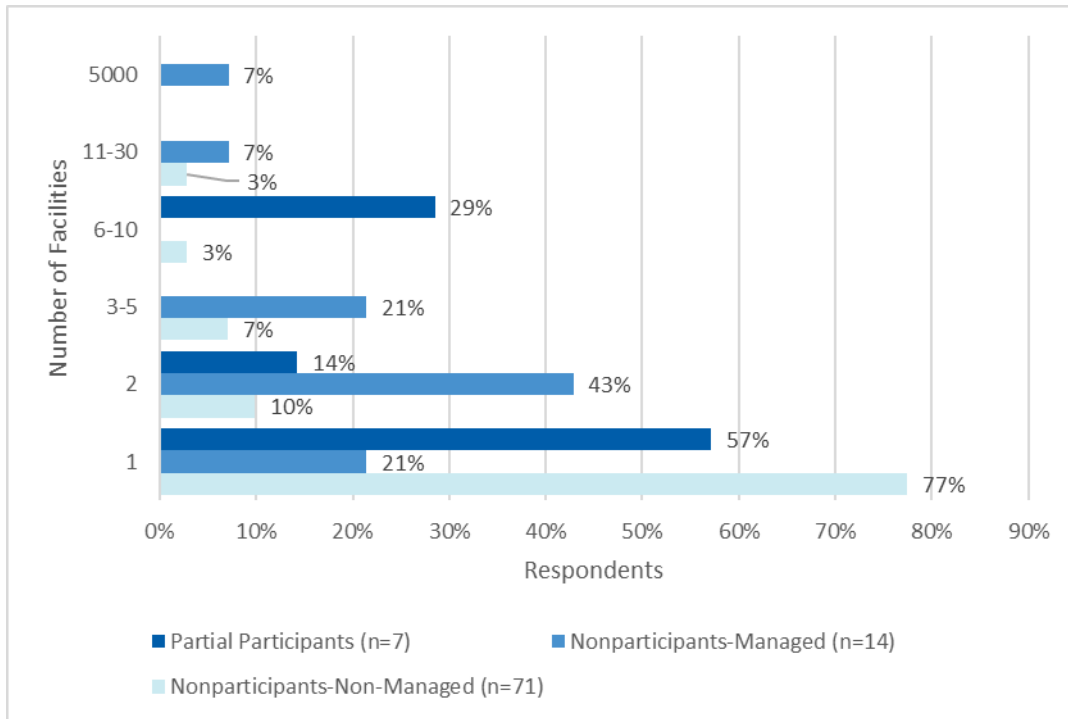
Figure 40. Survey Nonparticipants with Managed and Non-Managed Accounts by Business Sector



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Partial Participant/Nonparticipant Survey: QF1. Don't know and refused responses removed; may not total 100% due to rounding.

Nonparticipants and partial participants operate a various number of facilities, ranging from a single facility to one participant who operates 5,000 facilities in the state of Utah; however, a majority operate two or fewer facilities. As shown in Figure 41, the majority of nonparticipants with non-managed accounts and partial participants own a single facility (77%, n=71 and 57%, n=7, respectively). The largest majority of nonparticipants with a managed account own two facilities (43%, n=14).

Figure 41. Number of Facilities in Utah



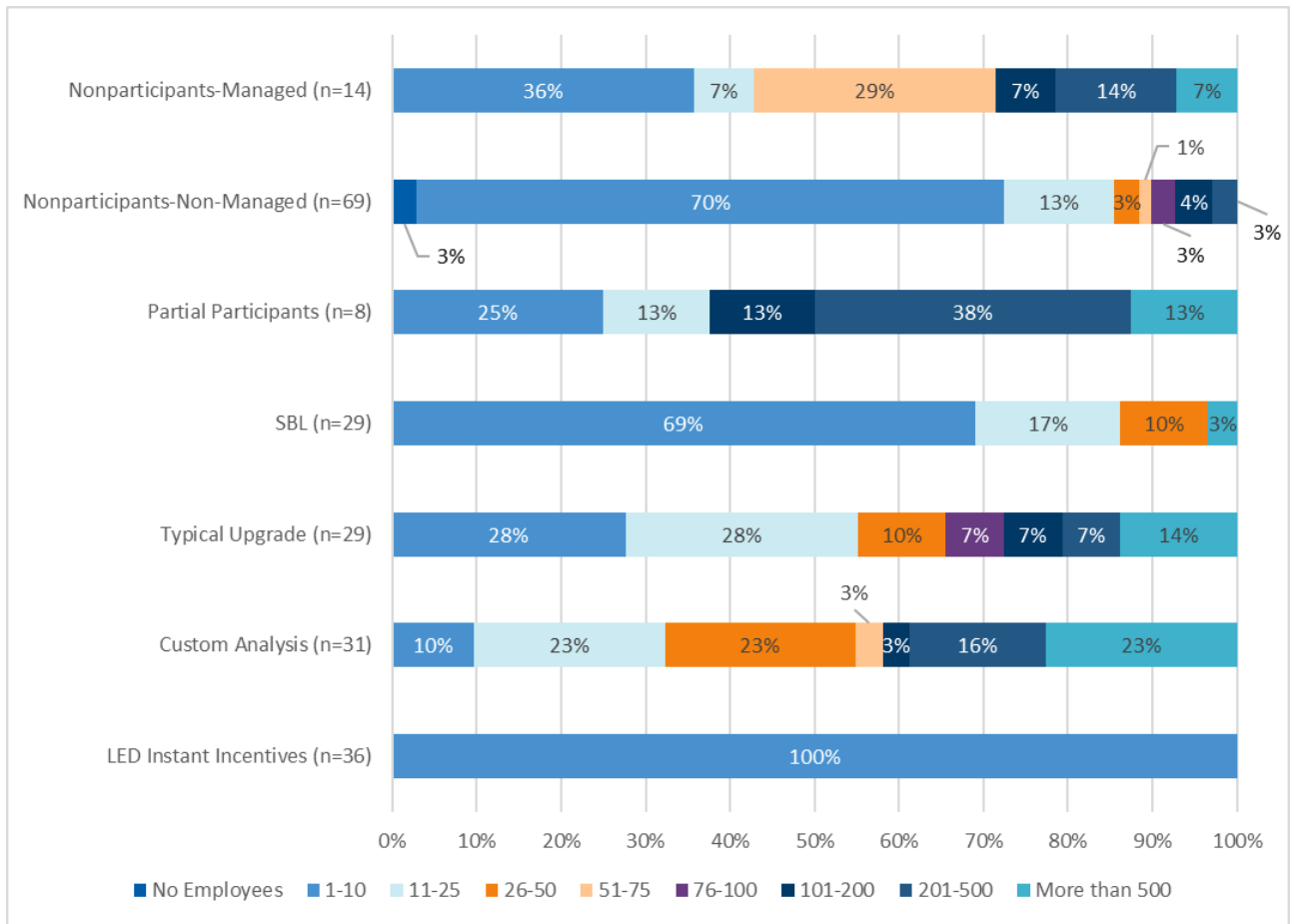
Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Partial Participant/Nonparticipant Survey: QF2. Don't know and refused responses removed.

A majority of all nonparticipants (65%, n=86) own all or a portion their facilities (four nonparticipants both own and lease). There were no statistically significant differences between the ownership rates of those with managed versus non-managed accounts. Eight of the nine partial participants (89%) own their facilities; one indicated that they lease.

Most of the surveyed nonparticipants with non-managed accounts work at a company that employs 10 or fewer people, while nonparticipants with managed accounts and partial participants were more evenly distributed in terms of number of employees. Figure 42 shows the proportion of businesses employing a given number of people, segmented by the four program delivery channels (SBL, Typical Upgrades, Custom Analysis, and LED Instant Incentives) and by nonparticipants (managed and non-managed) and partial participants.



Figure 42. Employee Count Distribution: All Program Delivery Channels Plus Nonparticipants/Partial Participants



Source: Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Participant Survey: Q14. Rocky Mountain Power Utah **wattsmart** Business Program 2014–2015 Partial Participant/Nonparticipant Survey: QF4. Don't know and refused responses removed.

Cost-Effectiveness

In assessing *wattSmart* Business Program cost-effectiveness, the Cadmus team analyzed program benefits and costs from five different perspectives, using Cadmus' DSM Portfolio Pro model.²¹ The California Standard Practice Manual for assessing demand-side management program cost-effectiveness describes the benefit/cost ratios for the following five tests:

- **PacifiCorp Total Resource Cost (PTRC) Test:** This test examines program benefits and costs from RMP and RMP 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 RMP and RMP 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 RMP'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 RMP 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.

Table 31 summarizes the five tests' components.

²¹ 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 31. Benefits and Costs Included in Various Cost-Effectiveness Tests

Test	Benefits	Costs
PTRC	Present value of avoided energy and capacity costs,* 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*	Program administrative and marketing costs, and costs incurred by participants
UCT	Present value of avoided energy and capacity costs*	Program administrative, marketing, and incentive costs
RIM	Present value of avoided energy and capacity costs*	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

* These tests include avoided line losses.

Table 32 provides selected cost analysis inputs for each year, including evaluated energy savings, discount rate, line loss, inflation rate, and total program costs. RMP provided all of these values, except for energy savings and the discount rate, which the Cadmus team derived from the RMP 2013 and 2015 Integrated Resource Plans.

Table 32. Selected Cost Analysis Inputs

Input Description	2014	2015	Total Evaluated Net Savings
Evaluated Net Energy Savings (kWh/year)*	82,578,237	94,442,366	177,020,603
Discount Rate	6.88%	6.66%	N/A
Commercial Line Loss	8.71%	8.71%	N/A
Industrial Line Loss	5.85%	5.85%	N/A
Irrigation Line Loss	9.24%	9.24%	N/A
Inflation Rate**	1.9%	1.9%	N/A
Total Program Costs	\$23,899,445	\$28,584,033	\$52,483,478

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

** This inflation rate is based on PacifiCorp's 2015 Integrated Resource Plan, Volume I – Chapter 7 – Modeling and Portfolio Evaluation. Available online:

https://www.rockymountainpower.net/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2015IRP/PacifiCorp_2015IRP-Vol1-MainDocument.pdf. The Cadmus team determined future retail rates using a 1.9% annual escalator.

wattsmart Business Program benefits included energy savings and their associated avoided costs. For the cost-effectiveness analysis, the Cadmus team used this study's evaluated net energy savings and

measure lives from sources such as the RTF.²² For all analyses, the team used avoided costs associated with the RMP 2013 and 2015 IRP Eastside Class 2 DSM Decrement Values.^{23, 24}

The Cadmus team analyzed **wattsmart** Business Program cost-effectiveness for net savings by incorporating the evaluated freeridership and spillover.

Table 33 presents the 2014 and 2015 program years’ cost-effectiveness analysis results, including the evaluated NTG (but 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, which includes two SEM projects, proved cost-effective from all perspectives, except the RIM test. The primary criterion for assessing cost-effectiveness in Utah is the UCT, which achieved a 1.99 benefit/cost ratio for the combined years’ net savings.

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. A passing RIM test indicates that rates, as well as costs, will decrease as a result of the program. Typically, this only happens for demand response programs or programs that are targeted to the highest marginal cost hours (when marginal costs are greater than rates).

Table 33. wattsmart Business Program Cost-Effectiveness Summary of 2014 and 2015 Net Savings

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC	\$0.055	\$79,402,248	\$110,847,433	\$31,445,185	1.40
TRC	\$0.055	\$79,402,248	\$100,770,394	\$21,368,146	1.27
UCT	\$0.035	\$50,553,314	\$100,770,394	\$50,217,080	1.99
RIM		\$166,788,671	\$100,770,394	(\$66,018,276)	0.60
PCT		\$82,104,050	\$186,049,418	\$103,945,368	2.27
Lifecycle Revenue Impacts (\$/kWh)				\$0.000219894	
Discounted Participant Payback (years)					3.52

²² See Appendix E for detailed cost-effectiveness inputs and results at the measure category level.

²³ Appendix N of PacifiCorp’s 2013 Integrated Resource Plan, Volume II - Appendices details the IRP decrements. This report is available online:
http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2013IRP/PacifiCorp-2013IRP_Vol2-Appendices_4-30-13.pdf

²⁴ PacifiCorp’s Class 2 DSM Decrement Study details the IRP decrements. This report is dated April 20, 2015, and is available online:
http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2015/2015_Class_2_DSM_Decrement_Study.pdf



Table 34 presents the 2014 program cost-effectiveness analysis results, including the evaluated NTG, but 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.

Table 34. wattsmart Business Program Cost-Effectiveness Summary of 2014 Net Savings

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/ Cost Ratio
PTRC	\$0.049	\$38,781,978	\$65,463,027	\$26,681,049	1.69
TRC	\$0.049	\$38,781,978	\$59,511,842	\$20,729,865	1.53
UCT	\$0.030	\$23,892,778	\$59,511,842	\$35,619,064	2.49
RIM		\$89,401,898	\$59,511,842	(\$29,890,055)	0.67
PCT		\$40,465,559	\$102,060,835	\$61,595,276	2.52
Lifecycle Revenue Impacts (\$/kWh)				\$0.000117652	
Discounted Participant Payback (years)					2.93

Table 35 presents the 2015 program cost-effectiveness analysis results, including evaluated NTG, but not accounting for non-energy benefits (except those represented by the 10% conservation adder included in the PTRC test). Also for this scenario, the **wattsmart** Business Program proved cost-effective from all perspectives except the RIM test. Cost-effectiveness decreased in 2015, due to decreases in avoided costs for all decrements used except for the commercial cooling decrement.

Table 35. wattsmart Business Program Cost-Effectiveness Summary of 2015 Net Savings

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit / Cost Ratio
PTRC	\$0.063	\$43,325,580	\$48,407,008	\$5,081,428	1.12
TRC	\$0.063	\$43,325,580	\$44,006,371	\$680,791	1.02
UCT	\$0.042	\$28,436,127	\$44,006,371	\$15,570,244	1.55
RIM		\$82,540,732	\$44,006,371	(\$38,534,361)	0.53
PCT		\$44,411,615	\$89,582,222	\$45,170,608	2.02
Lifecycle Revenue Impacts (\$/kWh)				\$0.000128351	
Discounted Participant Payback (years)					2.73

Conclusions and Recommendations

RMP, in collaboration with their implementers, Cascade Energy and Nexant, Inc., are successfully delivering energy efficiency incentives and services to their customers across a large number of business sectors through the **watt**smart Business Program. Customers are recognizing and reporting benefits from their participation in the program. With some exceptions, customers reported being satisfied with both the incentives and measures offered, as well as with the program staff and with the vendor/contractor/engineer /distributor involved in their individual projects. However, across all delivery channels, customers said they wanted better and more communication about the program offerings, processes, and eligible equipment. Because this was mentioned by participants in all delivery channels, and the services are mostly delivered by trade allies (and, to a lesser extent, by RMP and the program implementers), this feedback applies to participating vendors or distributors and program staff.

The 2014 and 2015 program evaluation yielded an overall gross realization rate of 99.7% with a precision of $\pm 8.5\%$ at 90% confidence. There were varying degrees of realization rates and precision within each of the nine measure categories. The Cadmus team calculated NTG as 77% for the program overall.

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

Savings Considerations

Conclusion – Cool Roofs

To determine energy savings from cool roofs for the 2014 and 2015 program years, RMP used a deemed value of 0.33 kWh per year, per square foot. This deemed value comes from DEER, and was based on California's varied climate. Based on the one cool roof project included in the evaluation sample, the evaluated energy savings for a conditioned warehouse in Salt Lake City using the ORNL Commercial RSC is 0.01 kWh per year, per square foot.

Recommendation – Cool Roofs

Based on our findings in Utah as well as other PacifiCorp territories, the Cadmus team recommends reducing the deemed claimed savings amount for cool roofs. According to the ORNL Commercial RSC, the default energy savings factor for an office building in Salt Lake City with baseline and installed cool roof is 0.11 kWh per year, per square foot (66% less than the DEER value). We recommend using the ORNL Commercial RSC to calculate an average deemed energy savings factor for cool roof projects in Utah, as it accounts for climate, facility type, space conditioning type, and various baseline roof membranes. RMP could use the RSC on a case-by-case basis or sample past projects to derive a new deemed value.

Conclusion – Irrigation Hardware

RMP’s deemed energy savings for irrigation hardware equipment are lower than the RTF’s Irrigation Hardware calculator deemed values. Of the 10 irrigation hardware projects included in the evaluation sample, nine used RMP’s deemed savings factors to calculate savings. RMP’s deemed savings factors are based on Nexant’s calculations in the Idaho market characterization report, which are based on estimated lift, operation hours, and pump efficiency. The Cadmus team used the RTF’s Irrigation Hardware calculator to evaluate the energy savings for projects in eastern and southern Idaho, which showed that six of the nine projects had realization rates greater than 100%.

Recommendation – Irrigation Hardware

The Cadmus team recommends increasing the deemed savings amount for irrigation hardware to match the RTF tool. The RTF calculators are updated regularly and are vetted by regional industry experts. Table 36 outlines the RTF’s Irrigation Hardware calculator deemed energy savings factors for irrigation hardware measures in eastern and southern Idaho. The calculator has input data for eastern and southern Idaho, western Idaho, western Washington and Oregon, eastern Washington and Oregon, and Montana. The tool does not include specific factors Utah and the closest geographical climate is eastern and southern Idaho.

Table 36. Regional Technical Forum Deemed Energy Savings Factors for Irrigation Hardware in Eastern and Southern Idaho

Irrigation System	Measure Description	Energy Savings (kWh/year)
Wheel/hand line system	Replace worn nozzle with new flow controlling type nozzle for impact sprinklers	40.62
	Replace worn nozzle with new nozzle	40.62
	Rebuild/replace leaking impact sprinkler with new/rebuilt impact sprinkler	27.29
	Replace leaking gasket with new gasket	163.30
	Replace leaking drain with new drain	169.25
	Cut and pipe press repair of leaking hand lines, wheel lines, and portable main lines	81.25
Thunderbird wheel line system	Replace leaking hub with new hub	70.31
Wheel line system	Rebuild/replace leaking or malfunctioning leveler with new/rebuilt leveler	40.49
Center pivot/linear move system	Install new sprinkler package on an existing system	97.92
	Install new gooseneck elbows	7.47
	Install new drop tubes (3 feet minimum)	7.47
	Replace leaking pivot boot gasket with new pivot boot gasket	1,423.76
	Replace leaking tower gasket with new tower gasket	35.59

Conclusion –VFD Air Compressors

VFD air compressors have become popular and are known for being energy efficient. However, while these air compressors are more efficient than load/unload air compressors at reduced loads, there is a slight penalty from the VFD when fully loaded that makes load/unload air compressors more efficient in this situation. Of the 15 compressed air projects in the evaluation sample, two use VFD air compressors as their lead (base-loaded) compressors.

Conclusion – HVAC Interactive Effects

High-performance and reduced wattage indoor lighting systems, including LEDs and fluorescent T5s and T8s, are more efficient than CFLs and T12s, and also output less heat during operation. The reduced heat output is an energy benefit during cooling months, but causes additional heating load during winter months. Currently, the RMP lighting calculator does not include HVAC interactive effects. Depending on the location of the facility and the heating and cooling systems used, there could be an overall energy penalty for including HVAC interactive effects.

Recommendation – HVAC Interactive Effects

We recommend adding an HVAC interactive effect factor for indoor lighting systems to the RMP lighting savings calculator based on a weighted average of the heating and cooling systems within RMP's commercial and industrial customers in Utah. HVAC interactive effect factors are included in many national TRMs, ranging from approximately 0.90 to 1.10 and account for energy saving interactions that occur when energy efficient lighting is installed.

Conclusion – Prescriptive VFDs

RMP's deemed savings value for prescriptive VFD projects does not account for motor service. All six prescriptive VFD motor systems projects in the evaluation sample used RMP's deemed value to determine savings. To evaluate the energy savings for these projects, the Cadmus team used the deemed savings values from Cadmus' *2014 Variable Speed Drive Loadshape Project* report created for the NEEP, which led to realization rates greater than 100% for five of the six deemed VFD projects. The deemed savings from Cadmus' study vary based on motor use (supply, return, or exhaust).

Recommendation – Prescriptive VFDs

Based on our findings, the Cadmus team recommends increasing the deemed savings for prescriptive VFD projects to match the Cadmus *2014 Variable Speed Drive Loadshape Project* report for HVAC fan projects (these savings are shown in Table 37).



Table 37. Deemed Energy Savings for HVAC Fan Projects

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

* These deemed savings values are based on the Cadmus 2014 *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 (hot/chilled water pumps, condenser water pumps, and cooling tower fans), we recommend using the average savings from the 2016 PA TRM. Using the average energy savings factors, operating hours, and default load factor of 75% from the PA TRM, and assuming a motor full-load efficiency of 93% (which is the National Electrical Manufacturers Association’s premium efficiency for a 20-horsepower motor), the deemed savings factor is 1,191 kWh per year per horsepower. There were no prescriptive VFD projects for central equipment in the evaluation sample, but we still recommend updating this deemed savings value to reflect typical central equipment motor sizes and efficiencies.

Conclusion – Green Motor Rewinds

Green motor rewinds are typically performed on motors that have failed or require service. While being rewound, the motor is typically replaced by a spare. After being rewound, the motor can be reinstalled or kept as a spare to replace another failed motor. It can take months or years for the rewound motor to be reinstalled. All four of the green motor rewind projects included in the evaluation sample resulted in a 0% realization rate: for two this was because the rewind was performed on spare motors that were still in storage during our inspection, and for two projects this was because the rewind motors could not be located on the site. Green motor rewinds represent a small percentage of total program savings (green motor rewind projects account for 0.034% of the total claimed savings in the evaluation sample), but first-year savings are not being realized.

Recommendation – Green Motor Rewinds

The Cadmus team recommends RMP consider additional training to participating motor service centers regarding the need to provide a more accurate estimate for when the motor will be installed, as opposed to always entering six months from time of service. After the training or new instructions have been delivered, the Cadmus team recommends the program begin reviewing applications and tracking estimated reinstall dates to make sure the motor service centers are providing a more reliable estimate and to better understand when the savings may be realized. If the motor replacements are being estimated to occur beyond a year, the Cadmus team recommends considering prorating energy savings by project or based on an average of applications submitted.

Overall Program Management

Conclusion

RMP has an opportunity to reduce customer participation challenges and increase customer satisfaction by improving communication to participants in all delivery channels. The most common challenges reported across all delivery channels was the need for better communication and more detailed information about the program. To a lesser extent participants asked for more accurate savings projections and better performance and communication from their contractors.

Recommendation

To further increase customer satisfaction with their participation in the various program delivery channels, by enhancing trade ally, contractor, vendor and distributor knowledge of the program tools and program delivery, the Cadmus team recommends that the implementers reinforce to the trade allies, contractors, and vendors the need to provide detailed and accurate cost, savings, and benefit information to participants. The implementers can review with each of these groups, the steps necessary to accurately calculate the costs, projected energy savings, and incentives, and should also review with lighting distributors how to input program data to calculate incentives for the LED Instant Incentives delivery channel.

Program Data Interface

Conclusion

Opportunities exist to further streamline the data exchange process between RMP and the implementers, and to potentially reduce time-consuming and periodic system reconciliations.

Recommendation

Assess the size of any data exchange inconsistencies and associated impacts, and identify the most appropriate solution, which could include the following:

- Continue the same process
- Revise the implementers' databases to use drop-down menus with precise measure names and formulas, or provide look-up tables of saving/incentive amounts, and update this as needed
- Have RMP revise the DSMC batch process to allow some room for variations in DSMC uploads
- Have RMP provide implementers with a direct interface to the DSMC rather than using their own databases
- Have RMP provide trade allies with direct access to the DSMC



Small Business Lighting

Conclusion

SBL participants' stated preferences for ongoing communication about the program are not aligned with the most cost-effective program design for this delivery channel. Participants prefer to receive updates through **wattsmart** Business Program representatives rather than the more cost-effective method of interaction with contractors and vendors.

Recommendation

Recommendation: While an account management approach may not prove cost effective, if RMP chooses to grow participation in the SBL delivery channel, consider ways to increase direct contact from RMP or the implementer staff. This could include expanding the "Targeted town" luncheon event format to other small business associations. A second possible way to increase the program's personal touch would be to consider adding a chat or instant messaging feature to the website, thus more seamlessly assisting customers who prefer this method for asking questions over a phone call or email.

Typical Upgrades and Custom Analysis

Conclusion

RMP has an opportunity to improve Typical Upgrades and Custom Analysis participants' experience with the program. While no one in the Typical Upgrades delivery channel found it difficult to participate, a majority reported that it was only "somewhat easy." Similarly, a majority of Custom Analysis participants reported that it was only "somewhat easy" to participate, and one participant said it was "not too easy."

Recommendation

Provide clear and specific instructions about the application process and specifically what is required of the participant. Review the number of people involved in the application approval and installation process to determine steps that could be streamlined, reduced, or eliminated. Review and simplify the application where possible by allowing it to be filled and submitted online, and to auto-populate fields where possible. Also, consider ways to reduce or streamline the data or supplemental invoices and documentation required for each field on the application.

Nonparticipants and Partial Participants

Conclusion

While RMP is providing partial participants and nonparticipants with program information through **wattsmart** Business Program representatives or through utility mailings, bill inserts, and the website (which matches these customers' preferred methods of being kept informed), it appears that contractor or vendor contact is more effective in driving participation. Both partial participants and participants are learning about the program through their contractors or vendors. The Cadmus team speculates that the

contractor or vendor contact is discussing the program and benefits for a customer in more detail than the generalized, less direct marketing can provide.

Having RMP or implementer staff increase one-to-one contact with customers is not cost-effective because the nonparticipants with non-managed accounts are frequently smaller energy users, and nonparticipants with both managed and non-managed accounts are dispersed across a large number of business sectors, making it more difficult to reach them through industry centric events.

Recommendation

If additional program growth is desired in any of the program delivery channels, encourage and/or incent contractors, vendors, and distributors to increase outreach to their nonparticipant customers. Talk to contractors, vendors and distributors to gain insight into how much they have penetrated their target market and to determine what resources RMP could provide to help them increase outreach to those customers without an active ongoing project.

Conclusion

There is significant potential for RMP to increase participation among small business owners. While these customers are situated to benefit from the program (as most own their facilities and less than one-third reported having maximized their energy efficiency), these nonparticipants with non-managed accounts appear to lack a reason to participate. Less than one-third know about the program, and 47% reported barriers to participation that RMP and the implementers may reduce or overcome by effectively engaging these customers.

Recommendation

If additional program growth is desired in any of the program delivery channels, RMP could consider performing a comprehensive marketing effectiveness assessment to evaluate the impact of existing marketing and outreach activities, as well as to investigate how to better reach and motivate these customers.



Appendices

Appendix A. Self-Report NTG Methodology

Appendix B. Nonparticipant Spillover

Appendix C. Participant Survey Guide

Appendix D. Nonparticipant Survey Guide

Appendix E. Measure Category Cost-Effectiveness

Appendix A. 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 NTG for the Small Business Lighting, Prescriptive, and Custom program categories, as this method can gauge net effects for different program categories at once and enables the team to monitor freeridership and spillover over several evaluation efforts. The Cadmus team used the same net savings methodology used for the 2009-2011 and 2012-2013 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 2014-2015 **watt**smart 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.,

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



trade allies install additional energy efficiency equipment for customers that choose not to participate as a results of the program).

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:

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

After scoring the initial freeridership ratio, 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 (G9.2 = 5 – extremely important) but that they would have installed the exact same equipment at the same time without the program (G2 = Yes and G1= Yes), the interviewer asks them to describe in their own words what impact the program had on their decision (G8). 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.

Finally, the freeridership score was adjusted to account for prior program participation. Given Rocky Mountain Power's efforts to cross-promote their entire portfolio of energy efficiency programs, a respondent's prior participation in a Rocky Mountain Power (RMP) 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 Rocky Mountain 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.

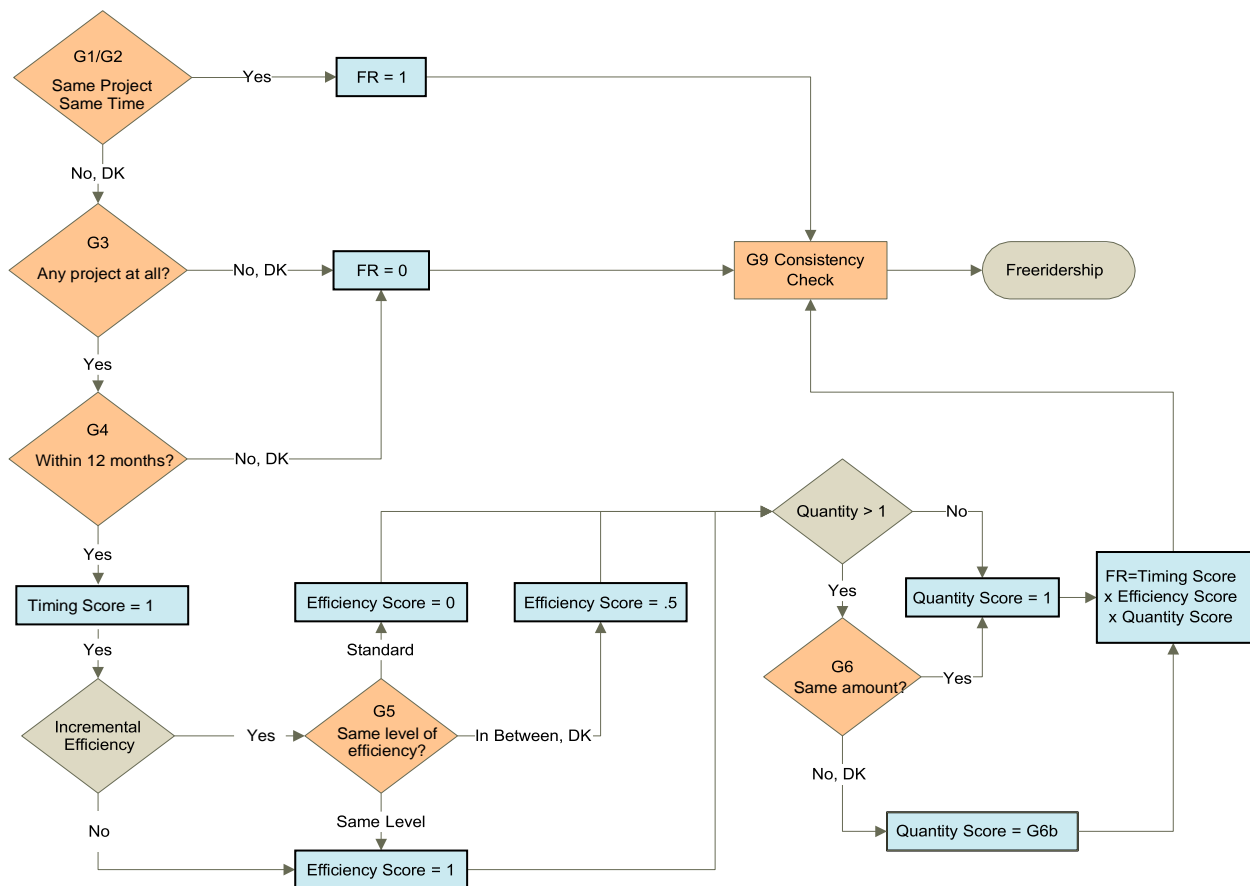
Table 1 provides detailed scoring and descriptions of each question.



Table 1. Freeridership Calculation Approach

Question	Question Text	Scoring
G1	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
G2	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 G2=yes and G1=yes then freeridership = 1
G3	Without the program, would you have installed any [MEASURE] equipment?	If G4=no, freeridership = 0
G4	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
G5	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
G6	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
G9.2	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 Rocky Mountain Power on energy saving opportunities	Consistency Check
G9.4	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 Rocky Mountain Power incentive or discount	Consistency Check
G8	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 G9.2 or G9.4 Initial freeridership score is reduced by 50% if G8 response merits an adjustment
G9.6	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 Rocky Mountain Power program	If G9.6 = 5, reduce adjusted free-ridership by 75% If G9.6 = 4, reduce adjusted free-ridership by 50%

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 1 provides detailed scoring and descriptions of each “like” spillover question.

Table 2. Participant Spillover Calculation Approach

Question	Question Text	Scoring
H1	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?	If no, potential spillover savings = 0
H2	Did you purchase and install any energy efficient improvements that are the same as the [MEASURE] you installed through the program?	If no, potential spillover savings = 0
H3	How many did you purchase and install?	H3 x program-evaluated per-unit savings = potential spillover savings
H4	H4. Relative to the energy efficiency of the equipment installed through the program, how would you characterize the efficiency of this equipment?	If same as program but higher than standard, full potential spillover savings. If lower than program but higher than standard, reduce potential spillover savings by half. If standard efficiency, potential spillover savings = 0.
H5	Did you receive an incentive from Rocky Mountain Power or another organization for this equipment?	If yes, potential spillover savings = 0.
H7	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).	"4" or 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 program level spillover percentages by dividing the sum of additional spillover savings by the total incentivized gross savings achieved for all respondents in the program category:

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

Appendix B. 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 Rocky Mountain Power’s (RMP) 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 57 nonparticipating customers from a sample of 22,295 randomly generated nonresidential nonparticipant accounts provided by RMP.

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 RMP. This question determined whether RMP’s energy efficiency initiatives motivated energy-efficient purchases. The surveys asked respondents to address the following factors:

- General information about energy efficiency provided by RMP
- Information from RMP program staff or contractors
- Past participation experience participating in a RMP 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 2014-2015 **wattSmart** Business Program evaluation activities.

Using the variables shown in Table 1, the Cadmus team determined total NPSO generated by RMP’s marketing and outreach efforts during the 2014 and 2015 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



Variable	Metric	Source
C	Average kWh Spillover Savings Per Nonparticipant Surveyed	$A \div B$
D	Total RMP Nonresidential Population - minus 2014-2015 wattSmart Business Participants	Rocky Mountain Power Customer Database
E	NPSO kWh Savings Applied to Population	$C \times D$
F	Total Gross Program Evaluated kWh Savings	2014-2015 wattSmart Business Evaluation
G	NPSO as a Percentage of Total 2014-2015 wattSmart Business Evaluated kWh Savings	$E \div F$

Results

Of 83 RMP nonparticipant customers surveyed, seven nonparticipant respondents reported installing three measure types attributed to RMP's influence. Table 2 presents measure types and gross evaluated kWh savings the Cadmus team attributed to RMP, generating total savings of 1,364 kWh.

Table 2. NPSO Response Summary

Reported Spillover Measure Type	Quantity	Unit Energy Savings (kWh) ¹	Total Savings (kWh)
LED Lighting	20	25.0 per unit	500
T8 Fluorescent Lighting	10	86.4 per unit	864
Total	30		1,364

¹ Unit energy savings (kWh) estimated for each measure were generated from the 2014-2015 **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.

Table 3 presents variables used to estimate overall NPSO for the RMP nonresidential portfolio, a figure the Cadmus team estimated as 0.2% of total 2014-2015 **wattSmart Business** Program evaluated savings.

Table 3. NPSO Analysis Results

Variable	Metric	Value	Source
A	Total kWh Spillover Savings from Survey Respondents	1,364	Survey data / Engineering Analysis
B	Total Nonparticipant Customers Surveyed	57	Survey disposition
C	Average kWh Spillover Savings Per Nonparticipant Surveyed	24	$A \div B$
D	Total RMP Nonresidential Population - minus 2014-2015 wattSmart Business Participants	23,363	Rocky Mountain Power Customer Database
E	NPSO kWh Savings Applied to Population	559,072	$C \times D$
F	Total Gross Program Evaluated kWh Savings	230,834,291	2014-2015 wattSmart Business Evaluation
G	NPSO as a Percentage of Total 2014-2015 wattSmart Business Evaluated kWh Savings	0.2%	$E \div F$

**Appendix C. Pacificorp wattsmart Business Program
(2014 - 2015) Participant Survey**

Researchable Questions		
Key Research Topics	Areas of Investigation	Related Questions
Screening	Project initiation process	E1
Marketing and Outreach	Program Awareness	B2-B4
	Future communication preferences	J4
Barriers	Obstacles to installing high-efficiency equipment	C2, C4, D4, D14-D15, D17-0, E2, E13-E14, E16, E17
Satisfaction	Assess satisfaction with Program application process, various program components and reasons for dissatisfaction among participants	C6-C7, D2-D3, D7-D13, E4-E5, E7-E12, F1-F4, F12-F16, J1-J3
Firmographics	Determine building and company characteristics of participants	Section I
Decision Making	Key factors influencing customers' decision to participate in program	D1, D9, D16, E1, E15, F11, F19
Freeridership and Spillover	Assess net savings	Sections G and H

Target Quota = [Up to 80 per state stratified by channel as sample population will support.]

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] CONTACT NAME**
- **[COMPANY NAME] CUSTOMER NAME**
- **[SITE ADDRESS] SITE ADDRESS**
- **[PROJECT STATE] PROJECT STATE**
- **[UTILITY] UTILITY**
- **[CHANNEL] (WATTSMART PROGRAM DELIVERY CHANNEL)**
- **[PROGRAM YEAR] PROGRAM YEAR**
- **[MEASURE_1] UPDATED MEASURE NAME 7/12**
- **[MEASURE_2] UPDATED MEASURE NAME 7/12 (TO BE INCLUDED FOR THOSE CUSTOMERS WITH TWO MEASURES)**
- **[INCENTIVE_1] (FOR MEASURE 1)**
- **[INCENTIVE_2] (FOR MEASURE 2)**
- **[BILL_CREDIT1] (FOR MEASURE 1)**

- **[BILL_CREDIT2] (FOR MEASURE 2)**
- **[MULT_MEASURES]** Flag for multiple measure participant

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 ROCKY MOUNTAIN POWER INCENTIVE FOR **[INSERT COMPANY 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 **[INSERT COMPANY 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]** 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 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 20 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. **[IF CUSTOMER IS UNFAMILIAR WITH "WATTSMART" STATE "between 2013 and 2015 the programs energy Finanswer, Finanswer Express, Recommissioning, Self-Direction Credit, and Irrigation Energy Services, were combined under one umbrella, the Wattsmart Business Program."]**
 4. **[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]**, and **[MEASURE2]**, at **[INSERT SITE ADDRESS]** in **[INSERT PROGRAM YEAR]**? Is this correct? **[IF NEEDED: "General Illuminance includes interior or exterior lighting and controls." OR "NON-general illuminance includes exit signs, LED signs, LED case lighting, and refrigerator case occupancy sensors."]**
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]**
 (MEASURE2 IS INCORRECT **[Correct: _____]**) **[CALL THIS VARIABLE C_MEASURE2]**
 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 [If 1 measure insert: this / If 2 measures insert: these] upgrades? The incentive may have been in the form of a check from the utility, a utility bill credit, an instant incentive on the product you purchased 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 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. **[IF CHANNEL = MIDSTREAM]** (Through the store where I purchased the LEDs)
 11. (Word of mouth (family, friend, or business colleague))
 12. (Other **[SPECIFY: _____]**)
 98. (Don't know)
 99. (Refused)
- B4. **[UTILITY]** recently combined its business energy efficiency incentive programs under one name—*wattsmart* Business. Before this call today had you heard of the *wattsmart* Business program? **[IF NEEDED: THE PROGRAMS COMBINED INTO WATTSMART BUSINESS ARE: ENERGY FINANSWER, FINANSWER EXPRESS, RECOMMISSIONING, SELF-DIRECTION CREDIT, AND IRRIGATION ENERGY SERVICES]**
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)

[IF CHANNEL = MIDSTREAM ASK SECTION C]

C. *Midstream (LED Instant Incentives) SECTION C –MIDSTREAM NOT ASKED THIS VERSION*

Thank you. I'd like to ask you about the LEDs you purchased through the LED Instant Incentive program. This is the midstream program where you may have purchased LEDs through an electrical or lighting distributor or supplier.

- C1. Did your company purchase your LED lighting direct from a retailer or a distributor? **[DO NOT READ LIST; RECORD ONE ANSWER]**?
1. (Retailer)
 2. (Distributor)
 3. (Other) **[SPECIFY: _____]**
 98. (Don't know)
 99. (Refused)

[IF C1=1, 2, OR 3]

- C2. How easy was it to find a **[INSERT ANSWER FROM C1]** offering the instant incentive? 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?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)
- C4. How easy was it to find the LED 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=2, 3 OR 4]

- C5. What would have made it easier?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)
- C6. Thinking about the instant incentive you received, how satisfied were you with the amount of the instant 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 C6=2, 3 OR 4]

- C7. Because you responded that you are less than very satisfied, we'd like to ask you three follow-up questions.

C7.1 What incentive amount would have been enough for you to say you were very satisfied?

[RECORD VERBATIM: _____]

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

C7.2 What return on investment does your company typically look for on these kinds of projects?

[RECORD VERBATIM: _____]

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

C7.3 What payback period does your company typically look for on these kinds of projects?

[RECORD VERBATIM: _____]

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

[IF CHANNEL = SMALL BUSINESS-LIGHTING (SBL) ASK SECTION D]

D. Small Business-Lighting (SBL) Incentives

Thank you. I'd like to ask you about your participation in the Small Business lighting incentives.

D1. What factor was most important to your company's decision to participate in the Small Business lighting incentives? **[DO NOT READ LIST; RECORD ONE RESPONSE]**

1. (To save money on energy bills, reduce energy consumption or energy demand)
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)

D2. Thinking about the incentive or discount that was applied to your project invoice by the approved contractor, how satisfied were you with the amount of the incentive or discount? 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 D2=2, 3 OR 4]

D3. Because you responded that you are less than very satisfied, we'd like to ask you three follow-up questions.

D3.1 What incentive or discount amount would have been enough for you to say you were very satisfied?

RECORD VERBATIM: _____

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

[NOT ASKED] D3.2 What return on investment does your company typically look for on these kinds of projects?

RECORD VERBATIM: _____

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

D3.3 What payback period does your company typically look for on these kinds of projects?

RECORD VERBATIM: _____

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

D4. How easy was it to find a *wattsmart* Small Business 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 D4=2, 3 OR 4]

D5. What would have made it easier to find a *wattsmart* Small Business approved contractor?

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

D6. After the free facility assessment, did you receive a lighting proposal with estimates of your energy incentive and cost savings?

- 1. (Yes)
- 2. (No) **[SKIP TO D10]**
- 98. (Don't know) **[SKIP TO D10]**
- 99. (Refused) **[SKIP TO D10]**

[IF D6=1]

D7. How satisfied were you with the lighting proposal 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 D7=2, 3 OR 4]

- D8. How could the lighting proposal be improved? **[RECORD VERBATIM: _____]**
- 98. (Don't know)
 - 99. (Refused)

[IF D6=1]

- D9. What information in the lighting proposal was most influential in your decision to proceed with your project....? **[PROBE FOR SPECIFICS OF WHAT WAS INFLUENTIAL]**
- 1. **[RECORD VERBATIM: _____]**
 - 2. Nothing
 - 98. (Don't know)
 - 99. (Refused)

- D10. 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 D10=2, 3 OR 4]

- D11. Why do you say you were **[INSERT ANSWER FROM D10]** with the work provided by the contractor?
- 1. **[RECORD VERBATIM: _____]**
 - 98. (Don't know)
 - 99. (Refused)

- D12. 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 D12=2, 3 OR 4]

D13. Why do you say you were **[INSERT ANSWER FROM D12]** with the equipment provided by the contractor?

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

D14. Was there other lighting equipment you wanted to install, which did not qualify for Small Business-Lighting incentives?

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

[IF D14=1]

D15. What equipment?

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

D16. What would you say are the main benefits your company has experienced as a result of the lighting 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)

D17. What challenges, if any, did you encounter participating in the Small Business-Lighting incentives?

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

[ASK IF D17=1]

- D18. 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 D18=5]

D18.5 You mentioned providing better information about the program. What type of information do you need? **[SPECIFY: _____]**

- D19. Do you have any suggestions for improving the Small Business-Lighting incentives?
1. (Yes) **[SPECIFY: _____]**
 2. (No)
 98. (Don't know)
 99. (Refused)

[IF CHANNEL = PRESCRIPTIVE AND B1=1, 2, 3, OR 4 ASK SECTION E]

E. Prescriptive Lighting and Equipment Upgrades

Thank you. I'd like to ask you about your project where you installed **[INSERT MEASURE1 AND MEASURE2]**.

- E1. 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, AND MEASURE2 OR C_MEASURE2]**. **[READ LIST AND MARK 1= YES, 2=NO, 98=DON'T KNOW; 99 REFUSED FOR EACH]**
[RANDOMIZE LIST]
1. A wattsmart Business participating vendor
 2. Your independent consultant
 3. Other **[SPECIFY: _____]**
 98. (Don't know)
 99. (Refused)

- E2. 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 E2=2, 3 OR 4]

- E3. What would have made this paperwork easier to complete?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)
- E4. 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 E4=2, 3 OR 4]

- E5. Because you responded that you are less than very satisfied, we'd like to ask you three follow-up questions.

E5.1 What incentive amount would have been enough for you to say you were very satisfied?

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

[NOT ASKED] E5.2 What return on investment does your company typically look for on these kinds of projects? **[RECORD VERBATIM: _____]**

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

E5.3 What payback period does your company typically look for on these kinds of projects? **[RECORD VERBATIM: _____]**

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

E6. About how long did it take the incentive to arrive? **[READ LIST]**

- 1. 1-3 weeks
- 2. 4-6 weeks
- 3. 7-8 weeks
- 4. Over 8 weeks
- 5. (Has not yet arrived?)
- 98. (Don't know)
- 99. (Refused)

[IF E6=1, 2, 3, OR 4]

E7. 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 E7=2, 3 OR 4]

E8. What amount of time would have been appropriate? **[RECORD VERBATIM: _____]**

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

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

[IF E1=1] [ASK E9-E12 FOR EACH MEASURE]

E9. How satisfied were you with the work provided by the **PARTICIPATING VENDOR FOR MEASURE**? 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 E9=2, 3 OR 4]

- E10. Why do you say that?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)
- E11. How satisfied were you with the **[MEASURE]** 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 E11=2, 3 OR 4]

- E12. Why do you say that?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)
- E13. Was there other energy-efficient equipment you wanted to install, which did not qualify for *wattsmart* Business prescriptive incentives?
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)

[IF E13=1]

- E14. What equipment?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)

E15. 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)

E16. What challenges, if any, did you encounter participating in the *wattsmart* Business program prescriptive incentives?

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

[IF E16=1]

E17. 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 E17=5]

E17.5 You mentioned you would like more information. What type of information do you need?
[RECORD VERBATIM: _____]

[IF CHANNEL = CUSTOM AND B1=1, 2, 3 OR 4 ASK SECTION F] OR [IF CHANNEL = CUSTOM-RECOMMISSIONING AND B1=1, 2, 3 OR 4 ASK SECTION F]

F. Custom and Custom-Recommissioning Projects

Thank you. I'd like to ask you about your **[IF CUSTOM CHANNEL INSERT "CUSTOM ENERGY EFFICIENCY". IF CUSTOM-RECOMMISSIONING CHANNEL INSERT "RECOMMISSIONING"]** project.

- F1. Thinking about your project, how satisfied are you with your experience with the Energy Engineer provided by **[UTILITY]**? Are you ... **[READ LIST]**
1. Very satisfied
 2. Somewhat satisfied
 3. Not too satisfied
 4. Not satisfied at all
 98. (Don't know)
 99. (Refused)

[IF F1=2, 3, OR 4]

- F2. Why do you say you were **[INSERT ANSWER FROM F1]** with the Energy Engineer?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)

- F3. 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
 98. (Don't know)
 99. (Refused)

[IF F3=2, 3, OR 4]

- F4. Why do you say you were **[INSERT ANSWER FROM F3]** with **[UTILITY]**?
1. **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)

F5. Thinking about the general application 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
4. Not at all easy
98. (Don't know)
99. (Refused)

[ASK IF F5=2, 3 or 4]

F6. What would have made this paperwork easier to complete?

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

F7. Did your company participate in a pre-inspection to identify the equipment options available to receive incentives?

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

[IF F7=1]

F8. Following the pre-inspection, the Program provides a custom energy analysis to identify efficiency measures, energy savings, costs, incentives and payback. Did your company receive this custom energy analysis?

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

[IF F8=1]

F9. And thinking about the custom energy analysis, how useful was the information you received?

Would you say...? [READ LIST]

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

[IF F9=2, 3 or 4]

F10. What would have made the information more useful to you? [RECORD VERBATIM: _____]

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

[IF F8=1]

F11. What information in the custom energy analysis was most influential in your decision to proceed with your project....? [PROBE FOR SPECIFICS OF WHAT WAS INFLUENTIAL]

1. [RECORD VERBATIM: _____]
2. (Nothing)
98. (Don't know)
99. (Refused)

F12. And now thinking about the incentive you received, how satisfied were you 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 F12=2, 3 OR 4]

F13. Because you responded that you are less than very satisfied, we'd like to ask you three follow-up questions.

F13.1 What incentive amount would have been enough for you to say you were very satisfied?

RECORD VERBATIM: _____

98. Don't know)

99. (Refused)

[NOT ASKED] F13.2 What return on investment does your company typically look for on these kinds of projects?

RECORD VERBATIM: _____

98. (Don't know)

99. (Refused)

F13.3 What payback period does your company typically look for on these kinds of projects?

RECORD VERBATIM: _____

98. (Don't know)

99. (Refused)

F14. About how long did it take the incentive to arrive? **[READ LIST]**

1. 1-3 weeks

2. 4-6 weeks

3. 7-8 weeks

4. Over 8 weeks

5. (Has not yet arrived?)

98. (Don't know)

99. (Refused)

[IF F14=1, 2, 3, or 4]

F15. 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 F15=2, 3 or 4]

F16. What amount of time would have been appropriate? **[RECORD VERBATIM:**

_____]

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

F17. Were there other energy-efficiency measures or equipment you wanted to install, which did not qualify for *watts*smart Business **[IF CUSTOM CHANNEL INSERT "CUSTOM INCENTIVES". IF CUSTOM-RECOMMISSIONING CHANNEL INSERT "RECOMMISSIONING INCENTIVES"]?**

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

[IF F17=1]

F18. What equipment?

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

F19. What would you say are the main benefits your company has experienced as a result of the energy efficiency upgrades we've discussed? **[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. (Technical expertise provided by the Program)
- 9. (Recommendations and information contained in the energy analysis)
- 10. (Other **[SPECIFY: _____]**)
- 11. (NO BENEFITS)
- 98. (Don't know)
- 99. (Refused)

F20. What challenges, if any, did you encounter participating in the *wattsmart* Business Program **[IF CUSTOM CHANNEL INSERT “CUSTOM INCENTIVES”. IF CUSTOM-RECOMMISSIONING CHANNEL INSERT “RECOMMISSIONING INCENTIVES”]** ?

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

[ASK IF F20=1]

F21. What could **[UTILITY]** have done 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 F21=5]

F21.5 You mentioned you would like more information. What type of information do you need?

F22. [RECORD VERBATIM _____]

[ASK ALL SURVEY RESPONDENTS SECTIONS G, H, I AND J]

G. Freeridership

[IF MULT_MEASURES=1, say “I’ll be asking the next questions first about [MEASURE_1/C_MEASURE1 and again for MEASURE_2/C_MEASURE2] [IF NEEDED: “General Illuminance includes interior or exterior lighting and controls.” OR “NON-general illuminance includes exit signs, LED signs, LED case lighting, and refrigerator case occupancy sensors.”]

[ASK QUESTIONS G1 TO G8 FOR EACH MEASURE_# (MEASURE_1/C_MEASURE1 AND MEASURE_2/C_MEASURE2)]

- G1. Without the program, meaning without either the technical assistance or the financial incentive, would you have still completed the exact same [MEASURE_#] project?
1. (Yes)
 2. (No) [SKIP TO G3]
 98. (Don’t know) [SKIP TO G3]
 99. (Refused) [SKIP TO G3]
- G2. Without the program, meaning without either the technical assistance or the financial incentive, would you have still installed the [MEASURE_#] at the same time?
1. (Yes) [SKIP TO G7]
 2. (No) [SKIP TO G4]
 98. (Don’t know) [SKIP TO G4]
 99. (Refused) [SKIP TO G4]
- G3. Without the program, would you have installed any [MEASURE_#] equipment?
1. (Yes)
 2. (No) [SKIP TO G8]
 98. (Don’t know) [SKIP TO G8]
 99. (Refused) [SKIP TO G8]
- G4. Without the program, in terms of timing, when would you have installed the [MEASURE_#]?
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 G8]
 98. (Don’t know)
 99. (Refused)

- G5. Relative to the energy efficiency of [MEASURE_#] installed through the program, how would you characterize the efficiency of equipment you would have installed without the program?
1. Just as efficient as installed with the program
 2. Lower than installed through the program, but better than standard efficiency
 3. Standard efficiency
 98. (Don't know)
 99. (Refused)
- G6. Would you have installed more, less, or the same amount of [MEASURE_#] without the program?
1. (More)
 - G6a. Compared to the installed amount, how much more?
[RECORD PERCENTAGE: _____]
 2. (Less)
 - G6b. Compared to the installed amount, how much less?
[RECORD PERCENTAGE: _____]
 98. (Don't know)
 99. (Refused)
- G7. Prior to hearing about the program, was the cost of [MEASURE_#] included in your organization's most recent capital budget?
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)

- G8. In your own words, can you please describe what impact the program had on your decision to complete these energy efficiency improvements for [MEASURE_#]?
 [REPEAT QUESTIONS G1 TO G8 FOR MEASURE2/C_MEASURE2 IF MULT_MEASURES=1]
- G9. With the [CHANNEL] program, your company received financial incentives, or credits, or discounts [IF INCENTIVES/BILL CREDIT ARE PROVIDED IN DATA BASE READ, “of [INCENTIVE 1] or [BILL CREDIT1] and [INCENTIVE 2] or [BILL CREDIT2] for installing [MEASURE_1/C_MEASURE1] and [MEASURE_2/C_MEASURE2]. [IF CHANNEL=PRESCRIPTIVE add “You may have also received technical assistance identifying energy saving opportunities”].

For the [MEASURE_1/C_MEASURE1] and [MEASURE_2/C_MEASURE2] 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

H. Spillover

- H1. 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 I]
 98. (Don’t know) [SKIP TO SECTION I]
 99. (Refused) [SKIP TO SECTION I]

[IF MULT_MEASURES=1, say “I’ll be asking the next questions first about MEASURE_1 OR C_MEASURE1 and again for MEASURE_2 OR C_MEASURE2]

[ASK QUESTIONS H2 TO H8 FOR EACH MEASURE_# (MEASURE_1/C_MEASURE1 AND MEASURE_2/C_MEASURE2)]

- H2. Did you purchase and install any energy efficient improvements that are the same as the [MEASURE_#] you installed through the program?
1. (Yes)
 2. (No) [IF MULTI_MEASURES=1 SET MEASURE_#=MEASURE_2 AND GO BACK/RE-ASK H2; ELSE GO TO H9]
 98. (Don't know) [IF MULTI_MEASURES=1 SET MEASURE_#=MEASURE_2 AND GO BACK/RE-ASK H2; ELSE GO TO H9]
 99. (Refused) [IF MULTI_MEASURES=1 SET MEASURE_#=MEASURE_2 AND GO BACK/RE-ASK H2; ELSE GO TO H9]
- H3. How many did you purchase and install?
1. [RECORD RESPONSE]
 98. (Don't know)
 99. (Refused)
- H4. 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)
- H5. 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 H5=1]
- H6. What program or sponsor provided the incentive?
1. [ENTER PROGRAM OR UTILTY]
 98. (Don't know)
 99. (Refused)
- H7. 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] [CHANNEL] program was in your decision to install [this/these] energy efficient product(s).
1. RECORD RATING: _____]
 98. (Don't know)
 99. (Refused)

[ASK IF H5=2]

- H8. Why did you not apply for an incentive from [UTILITY] for this equipment?
1. [RECORD RESPONSE]
 98. (Don't know)
 99. (Refused)

[REPEAT H2 TO H8 FOR MEASURE_2/C_MEASURE2 IF MULT_MEASURES=1]

- H9. 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 I]**
 98. (Don't know) **[SKIP TO SECTION I]**
 99. (Refused) **[SKIP TO SECTION I]**

- H10. 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)
 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 I]**
 98. (Don't know) **[SKIP TO SECTION I]**
 99. (Refused) **[SKIP TO SECTION I]**

[ASK H10.11-H10.14 AND H11-H15 if H10=1]

H10.11 What type of lighting was purchased and installed? **[SPECIFY TYPE EXAMPLE: CFL, LED, FLUORESCENT]:** _____

H10.12 What is the wattage of the lighting? **[SPECIFY]:** _____

H10.13 In what location was it installed (Wall/Ceiling/Outdoors)? **[SPECIFY]:** _____

H10.14 What type of equipment was removed or replaced? **[SPECIFY]:** _____

[ASK H10.21-H10.24 AND H11-H15 if H10=2]

H10.21 What type of HVAC equipment was purchased and installed? **[SPECIFY TYPE]:** _____

H10.22 What Fuel type is used? **[SPECIFY]:** _____

H10.23 What is the efficiency rating of the equipment? **[SPECIFY]:** _____

H10.24 What is the capacity of the equipment? **[SPECIFY]:** _____

[ASK H10.31-H10.34 AND H11-H15 if H10=3]

H10.31 What type of water heating equipment was purchased and installed? **[SPECIFY TYPE]:** _____

H10.32 What Fuel type is used? **[SPECIFY]:** _____

H10.33 What is the efficiency rating of the equipment? **[SPECIFY]:** _____

H10.34 (If water heater with storage) What is the capacity of the equipment? **[SPECIFY]:** _____

[ASK H10.41-H10.42 AND H11-H15 if H10=4]

H10.41 What type of motor was it installed on? **[SPECIFY TYPE]:** _____

H10.42 What is the horsepower of the motor? **[SPECIFY]:** _____

[ASK H10.51-H10.52 AND H11-H15 if H10=5]

H10.51 What equipment was the motor installed on? **[SPECIFY TYPE]:** _____

H10.52 What is the horsepower of the motor? **[SPECIFY]:** _____

[ASK H10.61 AND H11-H15 if H10=6]

H10.61 What type of refrigeration equipment was purchased and installed? **[SPECIFY TYPE]:** _____

[ASK H10.71-H10.73 AND H11-H15 if H10=7]

H10.71 What building envelope measure was purchased and installed? **[SPECIFY TYPE]:**

H10.72 What is the efficiency (R-value) of the measure? **[SPECIFY]:** _____

H10.73 In what location was it installed (Wall/Roof/Floor)? **[SPECIFY]:** _____

[ASK H10.81-H10.82 AND H11-H15 if H10=8]

H10.81 FOR What type of application was the compressed air equipment purchased and installed? **[SPECIFY APPLICATION]:** _____

H10.82 What is the horsepower of the compressor motor? **[SPECIFY]:** _____

[ASK H10.91-H10.92 AND H11-H15 if H10=9]

H10.91 FOR What type of application was the chiller purchased and installed? **[SPECIFY APPLICATION]:** _____

H10.92 What size chiller did you install? **[SPECIFY]:** _____

[ASK H10.101-H10.103 AND H11-H15 if H10=10]

H10.101 FOR What type of application was the pump purchased and installed? **[SPECIFY APPLICATION]:** _____

H10.102 What is the horsepower of the motor for the pump? **[SPECIFY]** _____

H10.103 What is the efficiency rating of the pump? **[SPECIFY]:** _____

[ASK H10.111 AND H11-H15 if H10=11]

H10.111 WHAT IRRIGATION EQUIPMENT DID YOU purchase and install? **[SPECIFY GASKETS, DRAINS, SPRINKLERS, ETC.]:** _____

[ASK IF H10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN H10]

H11. How many did you purchase and install? [ASK FOR EACH MEASURE MENTIONED IN H10] [IF H10 MEASURE = 'BUILDING ENVELOPE' THEN ASK HOW MANY 'SQUARE FEET']

1. [RECORD RESPONSE]

98. (Don't know)

99. (Refused)

[ASK IF H10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN H10]

- H12. Just to confirm, did you receive an incentive from [UTILITY] or another organization for this equipment? [ASK FOR EACH MEASURE MENTIONED IN H10]
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)

[ASK FOR EACH YES IN H12]

- H13. What utility or organization provided the incentive? [ASK FOR EACH MEASURE MENTIONED IN H10]
1. [RECORD UTILITY OR ORGANIZATION]
 98. (Don't know)
 99. (Refused)

[ASK IF H10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN H10]

- H14. What information did you rely upon to determine that the equipment installed was energy efficient? [ASK FOR EACH MEASURE MENTIONED IN H10]
1. [RECORD RESPONSE]
 98. (Don't know)
 99. (Refused)

[ASK IF H10=1-12] [ASK ABOUT EACH ITEM MENTIONED IN H10]

- H15. 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 H10]
1. [RECORD RATING: _____]
 98. (Don't know)
 99. (Refused)

[ASK SECTION I TO ALL SURVEY RESPONDENTS]

I. Firmographics

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

11. 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)

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

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

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

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

14. 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)
15. **[NOT ASKED]** What type of fuel is used for space heating at your facility where the [MEASURE 1] was installed?
1. Electric
 2. Gas
 3. (Other) **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)
16. **[NOT ASKED]** What type of fuel is used for water heating at your facility where the [MEASURE 1] was installed?
1. Electric
 2. Gas
 3. (Other) **[RECORD VERBATIM: _____]**
 98. (Don't know)
 99. (Refused)

J. Closing

- J1. **[NOT ASKED]** 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)

J2. 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)

J2.1 **[ASK IF J2 = 1]** You mentioned you would like better communication. Who would you like more communication from? **[RECORD RESPONSE_____]**

J2.2 **[ASK IF J2 = 2]** You mentioned a quicker response time. Who would you like a quicker response time from? **[RECORD RESPONSE_____]**

J2.3 **[ASK IF J2 = 3]** What other energy-efficient equipment should *wattsmart* business offer incentives for? **[RECORD RESPONSE_____]**

J2.5 **[ASK IF J2=5]** In what way would you like them to simply the application process? **[RECORD RESPONSE_____]**

J2.6 **[ASK IF J2 = 6]** In what way would you like them to simplify the website? **[RECORD RESPONSE_____]**

J3. **[NOT ASKED]** Other than what we've already talked about, do you have any suggestions for improving the *wattsmart* Business program?

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

- J4. 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 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. (Contact with a vendor/contractor)
 7. (Through a trade association, trade publication or professional organization) **[SPECIFY: _____]**)
 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.

**Appendix D. Pacificorp wattsmart Business Program
(2014/2015) 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:

Utah Managed (20), Nonmanaged (50)
 Washington Managed (20), Nonmanaged (50)
 Idaho Managed (20), Nonmanaged (50)
 Wyoming Managed (20), Nonmanaged (50)

Partial participants: (Utah =26, Washington =19, Idaho =21, Wyoming =18)

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 Nonparticipant Survey

- **[CUSTOMER NAME]**
- **[STANDARD INDUSTRIAL CLASS CODE]**
- **[ADDRESS] CITY NAME, STATE CODE**
- **[PROJECT STATE] STATE CODE**
- **[UTILITY]**
- **NONPARTICIPANT OR PARTIAL PARTICIPANT**
- **MANAGED ACCOUNT**

Variables to be Pulled into Partial Participant Survey

- **[CONTACT NAME]**
- **[CUSTOMER NAME]**
- **[ADDRESS] SITE ADDRESS 1, CITY, STATE**
- **[PROJECT STATE]**
- **[UTILITY]**

- [MEASURE]
- NONPARTICIPANT OR PARTIAL PARTICIPANT

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 [ADDRESS] 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. 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. **[IF CUSTOMER IS UNFAMILIAR WITH "WATTSMART" STATE "between 2013 and 2015 the programs energy Finanswer, Finanswer express, Recommissioning and Self-Direction Credit, and Irrigation Energy Services, were combined under one umbrella, the Wattsmart Business Program."]**
 4. **[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 **[ADDRESS]** with **[UTILITY]** in 2014 or 2015, but did not complete this project through the wattsmart Business program? Is this correct? **[IF CUSTOMER IS UNFAMILIAR WITH WATTSMART BUSINESS OR UNSURE, READ: You may know the program by another name: Energy Finanswer, Finanswer Express, Recommissioning and Self-Direction Credit, and Irrigation Energy Services.]**
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 energy efficient equipment in 2014 or 2015? 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. **[IF CUSTOMER IS UNFAMILIAR WITH WATTSMART BUSINESS OR UNSURE, READ:** You may know the program by another name: Energy Finanswer, Finanswer Express, Recommissioning and Self-Direction Credit, and Irrigation Energy Services.]
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. 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 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 EVERYONE]

- C2. **[UTILITY]** recently combined its business energy efficiency incentive programs under one name— *wattsmart* Business. Before this call today had you heard of the *wattsmart* Business program? **[IF NEEDED: THE PROGRAMS COMBINED INTO WATTSMART BUSINESS ARE: ENERGY FINANSWER, FINANSWER EXPRESS, RECOMMISSIONING, SELF-DIRECTION CREDIT, AND IRRIGATION ENERGY SAVERS]**
1. (Yes) **[PARTIAL PARTICIPANTS SKIP TO C4] [NONPARTICIPANTS CONTINUE TO C3]**
 2. (No) **[SKIP TO C5]**
 98. (Don't know) **[SKIP TO C5]**
 99. (Refused) **[SKIP TO C5]**
- 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)
- 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. RECORD UP TO THREE RESPONSES]**
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. (Contact with a vendor/contractor)
 7. (Through a trade association, trade publication or professional organization)
[SPECIFY: _____]
 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, reduce energy consumption or energy demand)
 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? **[IF NEEDED: You may have applied under one of the programs that became *wattsmart* Business. These include Energy FinAnswer, FinAnswer Express, Recommissioning, Self-Direction Credit, and Irrigation Energy Services.]**
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 2014 or 2015, 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]**

[ASK FOR EACH YES IN E3]

- E4. What program or sponsor provided the incentive(s)? **[RECORD FOR EACH MEASURE MENTIONED IN E2]**
- 1. **[UTILITY]**
 - 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 5E.1 = 1-3]** Does this rating differ for any of the improvements you mentioned?

- 1. YES
- 2. NO
- 3. 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 E52 =1-3] Does this rating differ for any of the other improvements you mentioned?

- YES
- NO
- Don't Know

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].

E5.2b [ASK IF E52a = 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]

[If needed read: If needed: on a scale from 1 to 5, with 1 being not important at all and 5 being very important]. If needed, record rating 1 to 5 for each response.

- 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 E53=1-3] Does this rating differ for any of the other improvements you mentioned?

YES

NO

Don't Know

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].

E5.3b [ASK IF E53a = 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]

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

[PARTIAL PARTICIPANTS ONLY: ASK G1-G3] [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)

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. Measure Category Cost-Effectiveness

Completed at the end-use category level, cost-effectiveness was reported for evaluated net savings. Net results apply the evaluated NTG to evaluated gross savings. Table E1 shows cost-effectiveness inputs for net results.

Table E1. Utah wattsmart Business End-Use Category Cost-Effectiveness Inputs

Input Description	2014	2015	Total
Average Measure Life*			
Agricultural	6	10	8
Compressed Air	13	14	14
HVAC	14	13	14
Recommissioning	3	3	3
Lighting - Large	13	7	10
Lighting - Small	13	9	11
Motor Systems	14	13	14
Other	12	13	12
Refrigeration	13	14	14
SEM	N/A	3	3
Evaluated Net Energy Savings (kWh/year)**			
Agricultural	932,636	1,563,212	2,495,849
Compressed Air	1,671,713	3,510,757	5,182,470
HVAC	7,256,039	6,259,828	13,515,867
Recommissioning	197,365	5,222,707	5,420,072
Lighting - Large	26,482,130	23,387,821	49,869,952
Lighting - Small	26,814,443	34,159,519	60,973,962
Motor Systems	6,230,526	5,547,788	11,778,314
Other	12,112,515	2,775,375	14,887,890
Refrigeration	880,870	5,404,766	6,285,636
SEM	-	6,610,591	6,610,591
Total Utility Cost (including incentives)***			
Agricultural	\$281,167	\$500,949	\$782,117
Compressed Air	\$696,187	\$1,395,440	\$2,091,628
HVAC	\$2,263,592	\$2,294,108	\$4,557,700
Recommissioning	\$28,549	\$823,844	\$852,393
Lighting - Large	\$7,930,243	\$7,342,072	\$15,272,314
Lighting - Small	\$7,348,517	\$11,473,355	\$18,821,872
Motor Systems	\$1,136,346	\$1,153,141	\$2,289,487
Other	\$3,968,153	\$1,672,501	\$5,640,655
Refrigeration	\$240,024	\$1,386,793	\$1,626,816
SEM	\$0	\$393,924	\$393,924



Incentives			
Agricultural	\$172,284	\$297,356	\$469,640
Compressed Air	\$480,296	\$889,649	\$1,369,946
HVAC	\$1,522,703	\$1,581,068	\$3,103,771
Recommissioning	\$6,189	\$163,783	\$169,972
Lighting - Large	\$5,218,472	\$4,670,374	\$9,888,846
Lighting - Small	\$5,279,672	\$8,533,211	\$13,812,883
Motor Systems	\$612,725	\$633,014	\$1,245,740
Other	\$2,419,001	\$1,276,516	\$3,695,517
Refrigeration	\$153,283	\$793,066	\$946,349
SEM	\$0	\$33,338	\$33,338
Commercial Retail Rate	\$0.0838	\$0.0840	N/A
Industrial Retail Rate	\$0.0583	\$0.0591	N/A
Irrigation Retail Rate	\$0.0740	\$0.0767	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.

***Rocky Mountain Power provided program costs and incentives in annual report data, allocating program costs by weighted savings.

Agricultural

Table E2, Table E3, and Table E4 show the agriculture end-use category cost-effectiveness results for net evaluated savings. The agricultural end-use category proved cost-effective from the UCT and PCT perspectives (Table E2).

**Table E2. Utah Agricultural 2014-2015 Net
(2014 Decrement East System 70% – Load Shape Irrigation)
(2015 Decrement East Industrial 40% – Load Shape Irrigation)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.076	\$1,312,610	\$1,175,043	(\$137,567)	0.90
TRC	\$0.076	\$1,312,610	\$1,068,221	(\$244,389)	0.81
UCT	\$0.043	\$750,837	\$1,068,221	\$317,385	1.42
RIM		\$2,031,496	\$1,068,221	(\$963,275)	0.53
PCT		\$1,332,693	\$2,136,151	\$803,459	1.60
Lifecycle Revenue Impacts (\$/kWh)					\$0.00003664
Discounted Participant Payback (years)					4.85

**Table E3. Utah Agricultural 2014 Net
(2014 Decrement East System 70% – Load Shape Irrigation)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.106	\$557,343	\$373,775	(\$183,568)	0.67
TRC	\$0.106	\$557,343	\$339,795	(\$217,548)	0.61
UCT	\$0.053	\$281,167	\$339,795	\$58,628	1.21
RIM		\$652,530	\$339,795	(\$312,735)	0.52
PCT		\$590,078	\$660,920	\$70,841	1.12
Lifecycle Revenue Impacts (\$/kWh)	\$0.000001231				
Discounted Participant Payback (years)	5.07				

**Table E4. Utah Agricultural 2015 Net
(2015 Decrement East Industrial 40% – Load Shape Irrigation)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.063	\$805,569	\$854,633	\$49,065	1.06
TRC	\$0.063	\$805,569	\$776,939	(\$28,629)	0.96
UCT	\$0.039	\$500,949	\$776,939	\$275,990	1.55
RIM		\$1,470,805	\$776,939	(\$693,866)	0.53
PCT		\$792,073	\$1,573,482	\$781,410	1.99
Lifecycle Revenue Impacts (\$/kWh)	\$0.000002639				
Discounted Participant Payback (years)	3.32				

Other

Table E5, Table E6, and Table E7 show the other end-use category cost-effectiveness results for net evaluated savings. The other end-use category proved cost-effective from all perspectives except for the RIM (Table E5). In 2015 the other end-use category only proved cost effective from the PCT (Table E7)



Table E5. Utah Other 2014-2015 Net
(2014 Decrement East System 70% – Load Shape Commercial Plug Load)
(2015 Decrement East Industrial 40% – Load Shape Commercial Plug Load)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.060	\$8,009,214	\$10,371,844	\$2,362,630	1.29
TRC	\$0.060	\$8,009,214	\$9,428,949	\$1,419,735	1.18
UCT	\$0.042	\$5,536,221	\$9,428,949	\$3,892,728	1.70
RIM		\$16,787,382	\$9,428,949	(\$7,358,433)	0.56
PCT		\$8,011,581	\$18,419,969	\$10,408,387	2.30
Lifecycle Revenue Impacts (\$/kWh)					\$0.000024510
Discounted Participant Payback (years)					3.13

Table E6. Utah Other 2014 Net
(2014 Decrement East System 70% – Load Shape Commercial Plug Load)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.052	\$5,650,766	\$8,658,857	\$3,008,091	1.53
TRC	\$0.052	\$5,650,766	\$7,871,688	\$2,220,922	1.39
UCT	\$0.037	\$3,968,153	\$7,871,688	\$3,903,535	1.98
RIM		\$13,124,036	\$7,871,688	(\$5,252,347)	0.60
PCT		\$5,396,860	\$14,466,214	\$9,069,354	2.68
Lifecycle Revenue Impacts (\$/kWh)					\$0.000020674
Discounted Participant Payback (years)					2.30

Table E7. Utah Other 2015 Net
(2015 Decrement East Industrial 40% – Load Shape Commercial Plug Load)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.096	\$2,515,520	\$1,827,072	(\$688,449)	0.73
TRC	\$0.096	\$2,515,520	\$1,660,974	(\$854,546)	0.66
UCT	\$0.064	\$1,672,501	\$1,660,974	(\$11,527)	0.99
RIM		\$3,907,326	\$1,660,974	(\$2,246,351)	0.43
PCT		\$2,788,862	\$4,217,074	\$1,428,212	1.51
Lifecycle Revenue Impacts (\$/kWh)					\$0.000007482
Discounted Participant Payback (years)					5.48

Motor Systems

Table E8, Table E9, and Table E10 show the motor systems end-use category cost-effectiveness results for net evaluated savings. The motor systems end-use category proved cost-effective from all perspectives except for the RIM (Table E8).

**Table E8. Utah Motor Systems 2014-2015 Net
(2014 Decrement East System 70% – Industrial Machinery General)
(2015 Decrement East Industrial 40% – Industrial Machinery General)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.028	\$3,227,900	\$8,620,093	\$5,392,193	2.67
TRC	\$0.028	\$3,227,900	\$7,836,448	\$4,608,548	2.43
UCT	\$0.019	\$2,217,484	\$7,836,448	\$5,618,964	3.53
RIM		\$9,173,558	\$7,836,448	(\$1,337,110)	0.85
PCT		\$2,916,618	\$10,358,943	\$7,442,325	3.55
Lifecycle Revenue Impacts (\$/kWh)					\$0.000005086
Discounted Participant Payback (years)					2.57

**Table E9. Utah Motor Systems 2014 Net
(2014 Decrement East System 70% – Industrial Machinery General)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.027	\$1,697,095	\$5,065,428	\$3,368,333	2.98
TRC	\$0.027	\$1,697,095	\$4,604,935	\$2,907,840	2.71
UCT	\$0.018	\$1,136,346	\$4,604,935	\$3,468,588	4.05
RIM		\$4,934,599	\$4,604,935	(\$329,665)	0.93
PCT		\$1,544,045	\$5,610,427	\$4,066,382	3.63
Lifecycle Revenue Impacts (\$/kWh)					\$0.000001298
Discounted Participant Payback (years)					1.99

**Table E10. Utah Motor Systems 2015 Net
(2015 Decrement East Industrial 40% – Industrial Machinery General)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.029	\$1,632,757	\$3,791,405	\$2,158,648	2.32
TRC	\$0.029	\$1,632,757	\$3,446,732	\$1,813,975	2.11
UCT	\$0.021	\$1,153,141	\$3,446,732	\$2,293,591	2.99
RIM		\$4,521,273	\$3,446,732	(\$1,074,541)	0.76
PCT		\$1,463,987	\$5,064,767	\$3,600,781	3.46
Lifecycle Revenue Impacts (\$/kWh)					\$0.000004087
Discounted Participant Payback (years)					1.97

HVAC

Table E11, Table E12, and

Table E13 show the HVAC end-use category cost-effectiveness results for net evaluated savings. The HVAC end-use category proved cost-effective from all perspectives except for the RIM (Table E11).



Table E11. Utah HVAC 2014-2015 Net
(2014 Decrement East System 70% – Load Shape HVAC)
(2015 Decrement East Industrial 40% – Load Shape HVAC)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.071	\$9,454,615	\$13,556,945	\$4,102,331	1.43
TRC	\$0.071	\$9,454,615	\$12,324,496	\$2,869,881	1.30
UCT	\$0.033	\$4,414,453	\$12,324,496	\$7,910,043	2.79
RIM		\$15,832,453	\$12,324,496	(\$3,507,957)	0.78
PCT		\$10,585,801	\$18,028,731	\$7,442,930	1.70
Lifecycle Revenue Impacts (\$/kWh)					\$0.000013344
Discounted Participant Payback (years)					6.62

Table E12. Utah HVAC 2014 Net
(2014 Decrement East System 70% – Load Shape HVAC)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.067	\$5,000,804	\$6,222,246	\$1,221,441	1.24
TRC	\$0.067	\$5,000,804	\$5,656,587	\$655,783	1.13
UCT	\$0.030	\$2,263,592	\$5,656,587	\$3,392,995	2.50
RIM		\$8,621,793	\$5,656,587	(\$2,965,205)	0.66
PCT		\$5,605,151	\$9,888,756	\$4,283,605	1.76
Lifecycle Revenue Impacts (\$/kWh)					\$0.000011671
Discounted Participant Payback (years)					5.70

Table E13. Utah HVAC 2015 Net
(2015 Decrement East Industrial 40% – Load Shape HVAC)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.075	\$4,750,434	\$7,823,191	\$3,072,756	1.65
TRC	\$0.075	\$4,750,434	\$7,111,991	\$2,361,557	1.50
UCT	\$0.036	\$2,294,108	\$7,111,991	\$4,817,884	3.10
RIM		\$7,690,890	\$7,111,991	(\$578,899)	0.92
PCT		\$5,312,361	\$8,682,097	\$3,369,736	1.63
Lifecycle Revenue Impacts (\$/kWh)					\$0.000002202
Discounted Participant Payback (years)					6.07

Compressed Air

Table E14, Table E15, and Table E16 show the compressed air end-use category cost-effectiveness results for net evaluated savings. The compressed air end-use category proved cost-effective from all perspectives (Table E14). In 2014 the compressed air end-use category was not cost-effective from the TRC or RIM perspectives.

Table E14. Utah Compressed Air 2014-2015 Net
(2014 Decrement East System 70% – Load Shape Industrial Machinery General)
(2015 Decrement East Industrial 40% – Load Shape Industrial Machinery General)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.060	\$2,926,147	\$3,501,175	\$575,028	1.20
TRC	\$0.060	\$2,926,147	\$3,182,886	\$256,739	1.09
UCT	\$0.041	\$2,004,494	\$3,182,886	\$1,178,392	1.59
RIM		\$5,030,565	\$3,182,886	(\$1,847,678)	0.63
PCT		\$2,942,168	\$5,296,066	\$2,353,898	1.80
Lifecycle Revenue Impacts (\$/kWh)					\$0.000006696
Discounted Participant Payback (years)					5.64

Table E15. Utah Compressed Air 2014 Net
(2014 Decrement East System 70% – Load Shape Industrial Machinery General)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.076	\$1,215,616	\$1,235,986	\$20,370	1.02
TRC	\$0.076	\$1,215,616	\$1,123,623	(\$91,993)	0.92
UCT	\$0.044	\$696,187	\$1,123,623	\$427,436	1.61
RIM		\$1,662,896	\$1,123,623	(\$539,273)	0.68
PCT		\$1,315,428	\$1,752,282	\$436,854	1.33
Lifecycle Revenue Impacts (\$/kWh)					\$0.000002238
Discounted Participant Payback (years)					7.58

Table E16. Utah Compressed Air 2015 Net
(2015 Decrement East Industrial 40% – Load Shape Industrial Machinery General)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.052	\$1,824,452	\$2,416,051	\$591,598	1.32
TRC	\$0.052	\$1,824,452	\$2,196,410	\$371,957	1.20
UCT	\$0.039	\$1,395,440	\$2,196,410	\$800,970	1.57
RIM		\$3,591,955	\$2,196,410	(\$1,395,545)	0.61
PCT		\$1,735,081	\$3,779,800	\$2,044,719	2.18
Lifecycle Revenue Impacts (\$/kWh)					\$0.000005057
Discounted Participant Payback (years)					3.27

Lighting Large

Table E17, Table E18, and Table E19 show the lighting large end-use category cost-effectiveness results for net evaluated savings. The lighting large end-use category proved cost-effective from all perspectives except for the RIM (Table E17). In 2015 the lighting large end-use category was only cost-effective from the UCT and PCT perspective.

Table E17. Utah Lighting Large 2014-2015 Net
(2014 Decrement East System 70% – Load Shape Commercial Lighting)
(2015 Decrement East Commercial Lighting 53% – Load Shape Commercial Lighting)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.060	\$23,407,382	\$29,559,561	\$6,152,178	1.26
TRC	\$0.060	\$23,407,382	\$26,872,328	\$3,464,946	1.15
UCT	\$0.038	\$14,813,865	\$26,872,328	\$12,058,463	1.81
RIM		\$47,522,875	\$26,872,328	(\$20,650,547)	0.57
PCT		\$23,935,182	\$52,635,392	\$28,700,210	2.20
Lifecycle Revenue Impacts (\$/kWh)					\$0.000087948
Discounted Participant Payback (years)					3.40

Table E18. Utah Lighting Large 2014 Net
(2014 Decrement East System 70% – Load Shape Commercial Lighting)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.053	\$13,742,986	\$21,462,667	\$7,719,681	1.56
TRC	\$0.053	\$13,742,986	\$19,511,516	\$5,768,530	1.42
UCT	\$0.031	\$7,930,243	\$19,511,516	\$11,581,273	2.46
RIM		\$29,942,392	\$19,511,516	(\$10,430,876)	0.65
PCT		\$14,514,757	\$34,181,826	\$19,667,069	2.35
Lifecycle Revenue Impacts (\$/kWh)					\$0.000043291
Discounted Participant Payback (years)					3.37

Table E19. Utah Lighting Large 2015 Net
(2015 Decrement East Commercial 53% – Load Shape Commercial Lighting)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.073	\$10,308,045	\$8,636,147	(\$1,671,899)	0.84
TRC	\$0.073	\$10,308,045	\$7,851,042	(\$2,457,003)	0.76
UCT	\$0.052	\$7,342,072	\$7,851,042	\$508,971	1.07
RIM		\$18,751,343	\$7,851,042	(\$10,900,301)	0.42
PCT		\$10,047,825	\$19,682,573	\$9,634,748	1.96
Lifecycle Revenue Impacts (\$/kWh)					\$0.000071779
Discounted Participant Payback (years)					2.14

Lighting Small

Table E17, Table E18, and Table E19 show the lighting small end-use category cost-effectiveness results for net evaluated savings. The lighting small end-use category proved cost-effective from all perspectives except for the RIM (Table E17). In 2015 the lighting small end-use was only cost-effective from the UCT and PCT perspectives.

**Table E20. Utah Lighting Small 2014-2015 Net
(2014 Decrement East System 70% – Load Shape Commercial Lighting)
(2015 Decrement East Commercial Lighting 53% – Load Shape Commercial Lighting)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.054	\$27,341,152	\$37,371,447	\$10,030,295	1.37
TRC	\$0.054	\$27,341,152	\$33,974,043	\$6,632,891	1.24
UCT	\$0.036	\$18,105,459	\$33,974,043	\$15,868,584	1.88
RIM		\$60,491,714	\$33,974,043	(\$26,517,672)	0.56
PCT		\$29,625,987	\$69,051,446	\$39,425,459	2.33
Lifecycle Revenue Impacts (\$/kWh)					\$0.000112935
Discounted Participant Payback (years)					3.39

**Table E21. Utah Lighting Small 2014 Net
(2014 Decrement East System 70% – Load Shape Commercial Lighting)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.040	\$10,484,704	\$21,731,993	\$11,247,289	2.07
TRC	\$0.040	\$10,484,704	\$19,756,357	\$9,271,654	1.88
UCT	\$0.028	\$7,348,517	\$19,756,357	\$12,407,840	2.69
RIM		\$29,636,887	\$19,756,357	(\$9,880,530)	0.67
PCT		\$11,073,498	\$34,606,475	\$23,532,977	3.13
Lifecycle Revenue Impacts (\$/kWh)					\$0.000041007
Discounted Participant Payback (years)					1.34

**Table E22. Utah Lighting Small 2015 Net
(2015 Decrement East Commercial 53% – Load Shape Commercial Lighting)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.069	\$17,979,088	\$16,681,042	(\$1,298,046)	0.93
TRC	\$0.069	\$17,979,088	\$15,164,584	(\$2,814,505)	0.84
UCT	\$0.044	\$11,473,355	\$15,164,584	\$3,691,229	1.32
RIM		\$32,909,759	\$15,164,584	(\$17,745,175)	0.46
PCT		\$19,788,085	\$36,739,006	\$16,950,921	1.86
Lifecycle Revenue Impacts (\$/kWh)					\$0.000094719
Discounted Participant Payback (years)					1.61

Refrigeration

Table E23, Table E24, and Table E25 show the refrigeration end-use category cost-effectiveness results for net evaluated savings. The refrigeration end-use category proved cost-effective from all perspectives except for the RIM (Table E23).

Table E23. Utah Refrigeration 2014-2015 Net
(2014 Decrement East System 70% – Load Shape Industrial Machinery General)
(2015 Decrement East Industrial 40% – Load Shape Industrial Machinery General)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.043	\$2,561,720	\$4,264,343	\$1,702,623	1.66
TRC	\$0.043	\$2,561,720	\$3,876,675	\$1,314,956	1.51
UCT	\$0.026	\$1,540,223	\$3,876,675	\$2,336,452	2.52
RIM		\$6,447,636	\$3,876,675	(\$2,570,961)	0.60
PCT		\$2,524,112	\$7,353,951	\$4,829,839	2.91
Lifecycle Revenue Impacts (\$/kWh)					\$0.000009317
Discounted Participant Payback (years)					3.85

Table E24. Utah Refrigeration 2014 Net
(2014 Decrement East System 70% – Load Shape Industrial Machinery General)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.049	\$408,318	\$672,421	\$264,102	1.65
TRC	\$0.049	\$408,318	\$611,292	\$202,973	1.50
UCT	\$0.029	\$240,024	\$611,292	\$371,268	2.55
RIM		\$750,875	\$611,292	(\$139,584)	0.81
PCT		\$423,128	\$825,456	\$402,327	1.95
Lifecycle Revenue Impacts (\$/kWh)					\$0.000000549
Discounted Participant Payback (years)					4.32

Table E25. Utah Refrigeration 2015 Net
(2015 Decrement East Industrial 40% – Load Shape Industrial Machinery General)

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.042	\$2,296,818	\$3,831,144	\$1,534,327	1.67
TRC	\$0.042	\$2,296,818	\$3,482,858	\$1,186,041	1.52
UCT	\$0.025	\$1,386,793	\$3,482,858	\$2,096,066	2.51
RIM		\$6,076,165	\$3,482,858	(\$2,593,307)	0.57
PCT		\$2,240,910	\$6,963,293	\$4,722,384	3.11
Lifecycle Revenue Impacts (\$/kWh)					\$0.000009398
Discounted Participant Payback (years)					2.52

SEM

Table E26 shows the Strategic Energy Management (SEM end-use category cost-effectiveness results for net evaluated savings. The SEM end-use category proved cost-effective from all perspectives except for the RIM (Table E26).

**Table E26. Utah Refrigeration 2015 Net
(2015 Decrement East Industrial 40% – Load Shape Industrial Machinery General)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.019	\$393,924	\$1,667,084	\$1,273,160	4.23
TRC	\$0.019	\$393,924	\$1,515,531	\$1,121,607	3.85
UCT	\$0.019	\$393,924	\$1,515,531	\$1,121,607	3.85
RIM		\$1,912,095	\$1,515,531	(\$396,564)	0.79
PCT		\$33,338	\$1,551,509	\$1,518,171	46.54
Lifecycle Revenue Impacts (\$/kWh)					\$0.000005602
Discounted Participant Payback (years)					0.06