CADMUS

2018-2019 Utah Wattsmart Business Program Evaluation

FINAL REPORT

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Introduction

This 2018-2019 Wattsmart Business evaluation presents all of the major findings and a discussion of conclusions and recommendations. This evaluation report is intended to be viewed in conjunction with the Utah Wattsmart Business Evaluation Dashboard,[1] which provides further information on project-level results, trends, and historical performance.

Through its Wattsmart Business program, Rocky Mountain Power (RMP) offered services and incentives to help commercial, industrial, and agricultural customers maximize the energy efficiency of their equipment and operations. These offerings were delivered through downstream, midstream, and direct install incentive mechanisms.

The 2018-2019 Utah Wattsmart Business program reported gross electricity savings of 325,364,512 kWh.

During the 2018-2019 program period, RMP switched to an outsourced delivery model for all demand-side management (DSM) services. Previously, RMP had implemented DSM services for managed accounts directly and outsourced DSM services only for non-managed accounts. RMP contracted with three program administrators—Cascade Energy, Willdan, and Nexant—to implement all program offerings.

RMP contracted with the Cadmus team (comprising Cadmus and VuPoint Research) to conduct impact and process evaluations of the 2018-2019 Utah Wattsmart Business program. At RMP's request, Cadmus evaluated program effectiveness and reported the 2018-2019 evaluation findings.

Cadmus evaluated the following offerings:

- **Wattsmart Business (Typical Upgrades and Custom Analysis):** RMP offered customers prescriptive incentives (Typical Upgrades) for measures such as agricultural, compressed air, HVAC, lighting, motors, building shell, food service equipment, and irrigation. RMP also offered custom incentives (Custom Analysis) for verified first-year energy savings resulting from the installation of qualifying capital equipment upgrades not covered by Typical Upgrades incentives or other Wattsmart Business program offerings.
- **Lighting Instant Incentive (Midstream).** RMP targets the lighting maintenance market by offering customers instant point-of-purchase incentives on qualified LEDs, occupancy sensors, and retrofit kits purchased through a participating lighting distributor. Customers purchasing through a nonparticipating distributor do not receive an instant discount, but they may apply to RMP for incentives after the purchase.

[1] The Utah Wattsmart Business Evaluation Dashboard is available on the website: https://www.pacificorp.com/environment/demand-side-management.html

- **Small Business Direct Install (SBDI):** RMP provided a free energy assessment, instant incentives, and turnkey installations for geotargeted, eligible, small business customers who made recommended interior and/or exterior lighting upgrades within a designated offer window.
- **Energy Management:** RMP provided expertise and custom incentives for verified savings, achieved through improved operations, maintenance, and management practices. Customers could get incentives for capital improvements, if eligible, through the other Wattsmart Business program offerings. Through this offering, RMP also offered year-long strategic energy management (SEM) training to a cohort of water and wastewater customers.

Objectives

Table 1 lists the study objectives and the evaluation activities.

Table 1. Evaluation Objectives and Activities

Rocky Mountain Power Evaluation Objectives	Management Interviews	Participant Surveys	Partial Participant and Nonparticipant Surveys	Trade Ally Interviews	Virtual Assessment	Engineering Measurement	Site-Level Billing Analysis	Net-to-Gross Analysis	Reporting
Document and measure program effects	●	●	●	●	●	●	●	●	●
Verify installation and savings		●			●	●	●	●	
Evaluate the program's process and the effectiveness of delivery and efficiency	●	●	●	●					
Understand the motivations of participants, nonparticipants, partial participants, and trade allies		●	●	●					
Provide data support for program cost-effectiveness assessments		●			●	●	●	●	
Identify areas for potential improvements	●	●	●	●	●	●	●	●	
Document compliance with regulatory requirements									●

Methods

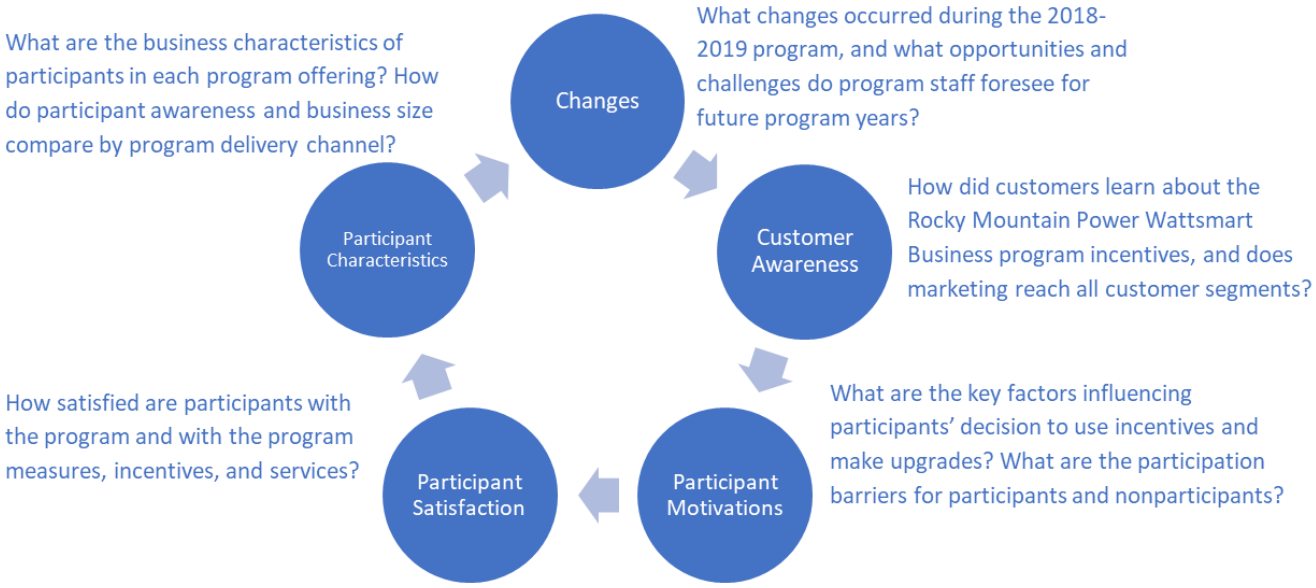
To evaluate energy impacts, Cadmus used virtual assessments and participant surveys to inform the engineering analyses, NTG analysis, and program cost-effectiveness analysis.

Table 2. 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 savings based on actual installation rates
	3	Unit Energy Savings: Validate saving calculations (i.e., engineering review, analysis, meter data)
	4	Realization Rates: Extrapolate realization rates to the population, if applicable
Evaluated Net Savings	5	Attribution: Apply NTG adjustments

Figure 1 shows the research objectives that the process evaluation addressed. The process evaluation also relied on the participant surveys, as well as partial and nonparticipant surveys and interviews with different groups, to assess program delivery and efficacy, bottlenecks, barriers, and opportunities for improvements. Cadmus administered participant surveys online and conducted phone interviews. VuPoint Research performed the partial participant and nonparticipant telephone surveys.

Figure 1. Process Evaluation Research Areas and Questions



Evaluation Findings

Impact Evaluation

To determine gross savings, the Cadmus team conducted verification and engineering analyses on a sample of 2018 and 2019 projects (see Appendix A for information on the impact evaluation methodology). To calculate net savings, a survey of participants informed freeridership and spillover, and a survey of nonparticipants informed nonparticipant spillover. Additional detail on project level results and across several years can be found in the Evaluation Dashboard, linked above.

Impact Sampling

Table 3 shows total projects, total projects sampled, sample distribution, associated energy savings, and the sample's percentage of the savings. Of 13,515 total projects, the Cadmus team analyzed 160 projects that contributed 19% of the 2018 and 2019 program savings.

Table 3. Utah 2018-2019 Wattsmart Business Program Impact Sampling Summary

Strata	Projects	Total Reported Savings (kWh)	Unique Sampled Projects		Sample Reported Savings (kWh)	Percent of Reported Savings Sampled
			Random	Selected		
Lighting	8,540	145,743,009	28	-	2,289,228	1.6%
HVAC	913	46,483,117	14	2	10,400,453	22.4%
Energy Management	213	41,936,108	21	2	12,254,946	29.2%
Direct Install	2,861	22,704,438	13	-	78,275	0.3%
Other	335	15,362,120	12	2	8,412,169	54.8%
Motors	209	16,539,411	10	3	5,509,373	33.3%
Strategic Energy Management	14	13,644,049	0	13	13,393,382	98.2%
Compressed Air	90	10,959,973	7	6	5,474,993	50.0%
Refrigeration	76	7,408,497	4	4	2,054,948	27.7%
Agricultural	264	4,583,790	15	4	1,971,474	43.0%
Total	**13,515**	**325,364,512**	**124**	**36**	**61,839,241**	**19.0%**

Table 4 lists the evaluation findings, including number of projects, gross savings, precision, and net savings. Overall, the Wattsmart Business program achieved a 104.8% gross realization rate for the two program years, though some variability occurred between measure categories. The impact evaluation achieved ±8.0% precision with 90% confidence overall. The Cadmus team calculated NTG of 90.8%, yielding evaluated net savings of 309,560,997 kWh. The *Measure Strata Findings* section describes specific details and findings per strata.

Table 4. 2018 and 2019 Wattsmart Business Program Savings

Strata	Projects	Reported Savings (kWh) [a]	Evaluated Gross Savings (kWh) [a]	Gross Realization Rate	Precision [b]	NTG	Evaluated Net Savings (kWh) [a]
Lighting	8,540	145,743,009	167,932,879	115.2%	12.0%	87%	146,101,605
HVAC	913	46,483,117	40,533,320	87.2%	10.4%	103%	41,749,320
Energy Management	213	41,936,108	40,925,579	97.6%	5.0%	82%	33,558,975
Direct Install	2,861	22,704,438	24,410,305	107.5%	11.5%	100%	24,410,305
Other	335	15,362,120	13,547,202	88.2%	3.7%	91% [c]	12,300,860
Motors	209	16,539,411	16,467,850	99.6%	0.6%	103%	16,961,886
Strategic Energy Management	14	13,644,049	13,994,373	101.8%	0.0%	88%	12,227,048
Compressed Air	90	10,959,973	11,083,787	101.1%	0.6%	103%	11,416,300
Refrigeration	76	7,408,497	7,122,464	96.1%	0.8%	91% [c]	6,467,197
Agricultural	264	4,583,790	4,907,305	107.1%	7.2%	89%	4,367,502
Total	**13,515**	**325,364,512**	**340,825,064**	**104.8%**	**8.0%**	**90.8%**	**309,560,997**

[a] Totals in tables may not add exactly due to rounding.
[b] The measure category precision is based on 80% confidence; the Portfolio precision is based on 90% confidence.
[c] Applied the overall savings weighted NTG for measures due to survey respondents not informing a specific measure-strata estimate. The overall NTG estimate was the savings-weighted average of measure strata with survey respondents.

Table 5 and Table 6 show impact evaluation findings by program year (for 2018 and 2019, respectively). In performing the analysis, the Cadmus team combined the 2018 and 2019 program years, applying overall realization rates achieved to each year.

Table 5. 2018 Wattsmart Business Program Savings

Strata	Projects	Reported Gross Savings (kWh) [a]	Evaluated Gross Savings (kWh) [a]	Gross Realization Rate	NTG	Evaluated Net Savings (kWh) [a]
Lighting	4,769	93,955,169	108,260,164	115.2%	87%	94,186,343
HVAC	450	19,340,365	16,864,816	87.2%	103%	17,370,760
Energy Management	104	13,395,467	13,072,678	97.6%	82%	10,719,596
Direct Install	1,286	10,317,597	11,092,796	107.5%	100%	11,092,796
Other	165	9,655,270	8,514,573	88.2%	91% [b]	7,731,232
Motors	122	6,143,377	6,116,797	99.6%	103%	6,300,301
Strategic Energy Management	2	2,201,491	2,241,881	101.8%	88%	1,972,855
Compressed Air	46	5,562,809	5,625,651	101.1%	103%	5,794,421
Refrigeration	44	3,910,283	3,759,312	96.1%	91% [b]	3,413,455
Agricultural	138	2,206,739	2,362,486	107.1%	89%	2,102,613
Total	**7,124**	**166,688,567**	**177,911,154**	**106.7%**	**90.3%[c]**	**160,684,372**

[a] Totals in tables may not add exactly due to rounding.
[b] Applied the overall 2018 and 2019 combined program years savings weighted NTG for measures due to survey respondents not informing a specific measure-strata estimate. The overall NTG estimate was the savings-weighted average of measure strata with survey respondents.
[c] NTG total is different from the two-year weighted average due to one-year measure strata weighting.

Table 6. 2019 Wattsmart Business Program Savings

Strata	Projects	Reported Gross Savings (kWh)	Evaluated Gross Savings (kWh)	Gross Realization Rate	NTG	Evaluated Net Savings (kWh)
Lighting	3,771	51,787,840	59,672,716	115.2%	87%	51,915,263
HVAC	463	27,142,752	23,668,504	87.2%	103%	24,378,560
Energy Management	118	28,540,641	27,852,901	97.6%	82%	22,839,379
Direct Install	1,575	12,386,841	13,317,509	107.5%	100%	13,317,509
Other	163	5,706,850	5,032,629	88.2%	91%[b]	4,569,627
Motors	87	10,396,034	10,351,054	99.6%	103%	10,661,585
Strategic Energy Management	12	11,442,558	11,652,492	101.8%	88%	10,254,193
Compressed Air	44	5,397,164	5,458,135	101.1%	103%	5,621,879
Refrigeration	32	3,498,214	3,363,152	96.1%	91%[b]	3,053,742
Agricultural	126	2,377,051	2,544,819	107.1%	89%	2,264,889
Total[a]	**6,391**	**158,675,945**	**162,913,910**	**102.7%**	**91.4%**	**148,876,625**

[a] Totals in tables may not add exactly due to rounding.

[b] Applied the overall 2018 and 2019 combined program years savings weighted NTG for measures due to survey respondents not informing a specific measure-strata estimate. The overall NTG estimate was the savings-weighted average of measure strata with survey respondents.

Measure Strata Findings

The following sections provide a high-level summary of the findings in each measure strata. For additional detailed information on each sampled project, visit the Evaluation Dashboard. A measure is defined as a specific measure type within a category. For example, one lighting project may have three different lighting measures, such as high-bay, linear LEDs, and wall sconces. Within each of these three measure types, there will be several unit counts. The evaluation team mapped the measure categories within RMP's measure database to ten strata. Table 7 describes the measure mapping strategy.

Table 7. Measure Mapping

Measure Category	Evaluation Strata	Projects
Lighting	Lighting	8,540
HVAC	HVAC	913
Energy Management	Energy Management	213
Direct Install	Direct Install	2,861
Additional Measures	Other	335
Custom		
Food Service Equipment		
Building Shell		
Electronics		
Oil & Gas		
Motors	Motors	209
Strategic Energy Mgmt	Strategic Energy Management	14
Compressed Air	Compressed Air	90
Refrigeration	Refrigeration	76
Irrigation	Agricultural	264
Farm & Dairy		
Total		**13,515**

Lighting

During 2018 and 2019, RMP provided incentives for 8,540 lighting measures. RMP reported 145,743,009 kWh in energy savings, which accounted for 44.8% of all reported program energy savings.

Cadmus evaluated 28 sampled projects and extrapolated results to the population, for a realization rate of 115% for the Lighting stratum. Most of the traditional lighting projects exhibited minimal deviations in realization rates, mainly due to differences in installed bulbs and installed bulb wattages.

For midstream lighting measures, Cadmus found that realized energy savings deviated for every sampled project, with realization rates between 34% and 359%. This is not unexpected because reported hours are based on a prescribed value for energy savings whereas evaluated savings are based on specifics for the project. Hours of use and baseline fixture wattage were the driving factors for variances in realization rates. To further explain, energy savings were reported based on average hours of use across the entire midstream program. Evaluated savings used hours of use specific to the facility type, installation rates from the Regional Technical Forum (RTF), and a lumen equivalence method to determine the baseline bulb wattage. Differences between reported and evaluated hours of use have the greatest impact on variability in realization rates.

HVAC

During 2018 and 2019, RMP provided incentives for 913 HVAC measures and reported 46,483,117 kWh in energy savings, which accounted for 14.3% of all reported energy savings. Cadmus evaluated 16

sampled projects and extrapolated results to the population for a realization rate of 87% for the HVAC stratum.

The largest projects reported over 2,250,000 kWh in savings and drove the realization rate. Cadmus found no discrepancies for the largest projects and reported savings were calculated appropriately. Each remaining sampled project reported less than 500,000 kWh with realization rates between 20% and 105%. For projects reporting low realization rates (0%, 42%, 52%, and 78%), Cadmus found that incentivized equipment did not meet one of the following:

- Code minimum efficiency was not met.
- Custom calculations were used, and simulated performance was unrealistic and unrepresentative of installed equipment.
- Reported energy simulation model results did not match reported savings.
- Deemed savings were used for a custom project where custom spreadsheet calculations would more accurately assess energy savings.

Energy Management

During 2018 and 2019, RMP provided incentives for 213 Energy Management measures and reported 41,936,108 kWh in energy savings, which accounted for 12.9% of all reported energy savings. Cadmus evaluated 23 sampled projects and extrapolated results to the population for a realization rate of 98% for the Energy Management stratum. All Energy Management measures involved retrocommissioning projects.

Cadmus found the majority of projects were appropriately documented and savings calculations matched best practices for the associated measure types. Of the 20 sampled projects, three had realization rates greater than 110% or less than 90%. For these, Cadmus had contacted the customer to verify project performance and found that installed conditions did not match reported conditions. Customers had provided more trend data of post-implementation performance than was available to the implementation team during the program year. Based on these longer datasets, Cadmus found the measure performance deviated from what was expected from the reporting period.

Direct Install

During 2018 and 2019, RMP provided incentives for 2,861 Direct Install measures and reported 22,704,438 kWh in energy savings, which accounted for 7.0% of all reported energy savings. Cadmus evaluated 13 sampled projects and extrapolated results to the population, for a realization rate of 101% for the Direct Install stratum.

Similar to midstream lighting measures, differences in lighting hours of use per project and the use of HVAC interactive effects were the primary drivers for differences between evaluated and reported energy savings. Where hours of use differed, either the program implementer had classified the building where the lights were installed differently than verified by Cadmus or the hours of use associated with the building type did not match the hours of use by building type from the RTF.

Other

During 2018 and 2019, RMP provided incentives for 335 measures in the Other category and reported 15,362,120 kWh in energy savings, which accounted for 4.7% of all reported energy savings. Cadmus evaluated 14 sampled projects (Controls, Cool Roof, Custom, Ice Machines, and LED Case Lighting) and extrapolated results to the population for a realization rate of 88.2% for the Other stratum. Realization rates varied between 34% and 131% among sampled projects, with the majority accounting for less than 10,000 kWh savings per project using deemed savings. Variability is expected when evaluating projects based on the project specific details.

The largest sampled projects, which realized 100% and 92% of reported energy savings, were evaluated based on trend data collected from the customer. The trend data indicated differences in performance from the reported period. Three randomly selected projects, which had realization rates between 30% and 60%, drove the Other stratum realization rate. These projects were identical in scope and implemented at convenience stores owned by the same customer. Cadmus found that the calculation methodology and support documentation was insufficient to justify these savings and instead evaluated these projects using custom calculations based on savings in similar programs from other utilities.

Motors

During 2018 and 2019, RMP provided incentives for 209 Motors measures and reported 16,539,411 kWh in energy savings, which accounted for 5.1% of all reported energy savings. Cadmus evaluated 13 sampled projects and extrapolated results to the population for a realization rate of 99.6% for the Motors stratum.

Sampled projects greater than 10,000 kWh had minimal variability in evaluated energy savings. Four projects reporting less than 10,000 kWh had realization rates between 48% and 120%. Similar to the Other stratum, these projects used deemed savings for reporting energy savings. Three of these projects involved incentives for green motor rewind projects. These projects reported savings that matched an older version of the RTF's green motor rewind measure. When updated using the current measure, these projects realized lower energy savings.

Strategic Energy Management (SEM)

During 2018 and 2019, RMP provided incentives for 14 SEM projects and reported 13,644,049 kWh in energy savings, which accounted for 4.2% of all reported energy savings. Cadmus evaluated 13 sampled projects and extrapolated results to the population for a realization rate of 101.8% for the SEM stratum. Cadmus evaluated SEM projects by generating energy use regression models based on actual utility meter data, weather data, and production data. Differences between reported and evaluated savings were driven primarily by Cadmus' access to longer date ranges than were available to the implementation team.

Compressed Air

During 2018 and 2019, RMP provided incentives for 90 Compressed Air measures and reported 10,959,973 kWh in energy savings, which accounted for 3.4% of all reported energy savings. Cadmus

evaluated 13 sampled projects and extrapolated results to the population for a realization rate of 101.1% for the Compressed Air stratum.

For six of the eight projects, Cadmus found that savings were calculated appropriately with supporting documentation to justify calculation inputs. For the two hand-picked projects (therefore results were not extrapolated to the population) where discrepancies were identified, Cadmus found that savings calculation inputs did not match the installed compressor specifications for one project and calculated savings from zero-loss drains based on site-specific findings for the other project.

Refrigeration

During 2018 and 2019, RMP provided incentives for 76 Refrigeration measures and reported 7,408,497 kWh in energy savings, which accounted for 2.3% of all reported energy savings. Cadmus evaluated eight sampled projects and extrapolated results to the population for a realization rate of 96.1% for the Refrigeration stratum.

Cadmus found that savings were calculated appropriately with supporting documentation to justify calculation inputs for six of the eight sampled projects. One project involved installation of high-efficiency refrigeration display cases. RMP's implementer calculated savings based on custom spreadsheet calculations but did not provide supporting documentation to justify the calculation inputs. Cadmus used the calculation methodology for the RTF's walk-in/reach-in door retrofit measure and calculation inputs specific to the project and found that evaluated savings were lower than reported.

Agricultural

During 2018 and 2019, RMP provided incentives for 264 Agricultural measures and reported 4,583,790 kWh in energy savings, which accounted for 1.4% of all reported energy savings. Cadmus evaluated 19 sampled projects and extrapolated results to the population for a realization rate of 107.1% for the Agricultural stratum.

Irrigation hardware measures reported the lowest savings, but the greatest variability in realization rates (42% to 185%). For these measures, RMP used deemed savings, but these savings by hardware type do not align with the irrigation hardware measure from the RTF's v3.3 calculator. Irrigation pump variable frequency drives (VFDs) accounted for 75% of the sampled project savings and exhibited limited deviations between the reported and evaluated savings. The majority of differences were between savings calculation inputs that Cadmus collected directly from customers and the savings calculation inputs from the project applications. These discrepancies increased evaluated savings, resulting in a 104.7% average realization rate from irrigation pump VFD measures.

Net-to-Gross

Net-to-gross (NTG) estimates are a critical part of DSM 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. The Cadmus team evaluated net savings by conducting a freeridership and spillover analysis using self-reported responses from participating and nonparticipating customers.

True freeriders are customers who would have purchased an incented appliance or equipment without any support from the Wattsmart Business. These questions asked whether participants would have installed the same equipment in the program's absence at the same time, in the same amount, and at the same efficiency level. Participant spillover is the amount of additional savings obtained by customers who invested in additional energy-efficient measures or activities due to their program participation. Nonparticipant spillover (NPSO) is savings by customers who did not receive an incentive but, motivated by the program's reputation and marketing, installed energy efficiency products or services.

The percentage of NPSO was determined from responses to questions in the 2018-2019 general population survey of RMP customers. 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 ratios by measure strata. See Appendix B for more information on NTG calculation methodology.

The Cadmus team used the following formula to determine the final NTG ratio for all 2018 and 2019 participants:

Net-to-gross ratio = 100% – Freeridership Percentage + Participant Spillover Percentage + Nonparticipant Spillover Percentage

Table 7 presents NTG evaluation results, shown as evaluated gross savings and NTG by program-measure strata. Cadmus weighted estimates of measure strata freeridership by their evaluated program savings. The program achieved 90.8% NTG overall.

Table 7. 2018-2019 Utah Wattsmart Business NTG Results

Strata	Measure Responses (n)	Freeridership Ratio	Spillover Ratio	NPSO	NTG	Evaluated Net Program Population Savings (kWh)
Lighting	39	16% [a]	0%	3%	87%	146,101,605
HVAC	6	0% [a]	0%	3%	103%	41,749,320
Energy Management	4	21% [a]	0%	3%	82%	33,558,975
Direct Install	66	9% [a]	6%	3%	100%	24,410,305
Other	N/A	N/A	N/A	N/A	91% [c]	12,300,860
Motors	2	0% [a]	0%	3%	103%	16,961,886
Strategic Energy Management	17	15% [a]	0%	3%	88%	12,227,048
Compressed Air	3	0% [a]	0%	3%	103%	11,416,300
Refrigeration	N/A	N/A	N/A	N/A	91% [c]	6,467,197
Agricultural	7	16% [a]	2%	3%	89%	4,367,502
Total	**144**	**12.7% [b]**	**0.5%[b]**	**3.0%**	**90.8%**	**309,560,997**

[a] Weighted by evaluated gross program savings.
[b] Weighted by evaluated gross program population savings.
[c] Applied the overall savings' weighted NTG for measures with survey respondents due to an insufficient number of survey respondents to inform the specific measure-strata estimate. The overall NTG estimate is the savings-weighted average of measure strata with survey respondents.

Process Evaluation Findings

Cadmus used primary data collection from several groups involved in the Wattsmart Business Program to capture insights about how the program is meeting its objectives and serving RMP customers, and where there may be opportunities to strengthen or expand the program.

Process Sampling

Cadmus interviewed participants, partial participants, and nonparticipants, stakeholders, trade allies, and SEM participants for the 2018-2019 evaluation, as shown in Table 8.

Table 8. Utah 2018–2019 Wattsmart Business Program Process Activity Sampling

Data Collection Activity	Project Population	Sampling Frame[a]	Target Completes	Achieved Completes
Typical Upgrades and Custom Analysis				
Agricultural	91	39	62	8
Energy Management	105	24		4
HVAC	316	74		6
Lighting (other than Small Business Direct Install or Lighting Instant Incentives)	804	154		16
Motors	103	21		2
Other[b]	96	68		6
Small Business Direct Install	2,749	900	Census	72
Lighting Instant Incentives	1,791	565	Census	28
Participant Subtotal	**5,708**	**1,845**	**1,527**	**142**
Partial Participants	**358**	**152**	**Census**	**11**
Nonparticipants	**37,829**	**5,300**	**200**	**200**
Stakeholder Interviews	**N/A**	**N/A**	**4**	**4**
Trade Ally Interviews	**55**	**55**	**7**	**8**
SEM Participant Interviews	**10**	**10**	**Census**	**9**

[a] Sampling frame based on unique customers with contact information after removing duplicates.
[b] Other includes compressed air and refrigeration.

Trade Ally Feedback

Introduction & Approach

Cadmus interviewed eight participating RMP Wattsmart Business trade allies to collect feedback about their involvement and to gather insights about the experience for customers and vendors. These trade allies included six installers and two distributors. The Cadmus team targeted active participating installers and distributors who had completed jobs in 2018-2019.

Participation

All eight trade allies mentioned positive effects from their participation and said the programs fit well into their sales model. Two installers and two distributors also mentioned either a competitive advantage, lead generation and business expansion opportunity, or ease of selling projects due to participation in the program. The other four installers mentioned added benefits for customers, such as

incentives to help finance projects, or had general positive remarks about the program. In addition, one distributor and four installers positively noted the responsiveness and helpfulness of program staff.

Three of the interviewed installers were listed as premium vendors. Nexant assigns premium vendor status to top ranked trade allies that have installed a large number of projects through the program, and met minimum thresholds for customer satisfaction, application accuracy, job installation quality and other criteria.

Premium vendors show up first in search results on the RMP website, and occasionally are offered other privileges. Of these three premium vendors, two mentioned specific benefits to the designation, such as having certain marketing advantages like co-branded shirts that help provide credibility. The third installer claimed not to have experienced any benefits from the designation. All three said they would work to maintain the designation. Of the remaining five, one distributor and one installer indicated they would like to have the designation and were working toward obtaining it. Two other installers said they were not currently working toward obtaining the designation—one did not rely on the program for leads and saw no benefit, and the other thought the test required for the designation was expensive and outdated. The fifth installer was not familiar with the designation.

Cadmus also asked respondents about quarterly scorecards, issued by the program administrator to help trade allies improve their own and their customers' experiences with the program by giving trade allies quantitative data on their application accuracy and customer satisfaction, and tracking how frequently they are using the program. About half of respondents had little to no familiarity with the scorecards. Three installers were not aware of the scorecards, and two others (one installer, one distributor) knew of them but did not know their purpose or content. One distributor and two installers were familiar with the scorecards, and two found them to be helpful. One of these two appreciated the scorecard tracked application accuracy, related to use of the lighting tool. This respondent said the scorecard had helped him identify a systematic error in his applications due to incompatibility between Mac spreadsheets and Windows Excel, which is the program used to develop the tool. The second respondent especially valued the customer satisfaction data on the score cards.

Suggestions

Trade allies also offered suggestions for improvement and areas where they need more support. Five installers said updates or improvements to the online experience would be helpful for them as well as their customers. They suggested incorporating status updates for online application submissions, a live chat function for customers to use, and making the website easier to navigate and more user-friendly for themselves and their customers.

One installer also suggested incorporating DocuSign for documents as part of the application process to make obtaining signatures easier. One other installer requested issuing payments faster but did not specify a time period. Two trade allies (one installer, one distributor) expressed some frustration with the Small Business Direct Install offering in the RMP territory because the eligibility criteria were broad enough to include some customers that did not seem to be small businesses. The Small Business Direct Install incentive is substantially higher than typical incentives. Installers reported losing customers after they were offered a better deal for a similar project by the Small Business Direct Install subcontractors.

Strategic Energy Management (SEM) Participant Experience

RMP's Strategic Energy Management offering (SEM) is a unique program design that focuses on management practices within an organization, rather than on one-off improvement projects. The theory of SEM is that by reforming how an organization manages energy – in terms of their policies, staff organization, budgeting, and data collection and monitoring – the organization will be better able to identify and act cost-effective energy saving opportunities, on a long-term basis. The management changes implemented through SEM coaching will lead to behavior savings, increased participation in other incentive-based offering, and other savings from upgrades and process improvements that may not use an incentive. These savings are expected to endure over several years. RMP's SEM participants achieved savings of one million kWh each, on average, just in the first year – an indication that the SEM engagement is having an impact. Cadmus interviewed SEM participants to learn more about their experience in the program, what aspects of SEM work well for them and which ones are challenging, the likelihood that SEM practices and savings will persist, and to identify possible opportunities to improve the program.

Cadmus interviewed nine of the 10 participants about the following topics:

- Reasons and motivations for participation
- Value of the program and SEM to organization and future commitment to SEM
- Interaction with energy management providers and engagement with cohort
- Satisfaction with program components

Eight of the nine respondents worked for municipal water suppliers and one worked for a health care company. All interviewees served as their organization's energy manager and the individual that participated in the SEM trainings.

Motivation and Value of SEM

All respondents said energy cost savings was a major motivation for participating in the SEM program. A few respondents also mentioned wanting to achieve better energy efficiency as a service to their customers, or wanting to understand their facility better as additional motivators. Most respondents were convinced to participate in the program after talking to Cascade Energy or RMP staff, and one respondent was convinced based on the experience of a peer organization nearby.

All respondents also felt that the program, and the changes in their facility operations as a result of their participation, were valuable. Seven of the nine respondents reported setting an initial savings goal as a percentage of baseline total facility usage and/or energy bill costs, and all of these respondents had already exceeded that target. Most set a target of around 5% of total facility energy usage or energy costs, and one respondent had set a goal based on energy cost per unit of production (cost per acre-foot of water delivered). (In Cadmus experience with other SEM programs, the latter type of target, based on energy usage per unit of production, is a best practice. This kind of target allows efficiency improvements to be isolated from outside factors such as increased production volume.)

Respondents observed that savings to date typically greatly exceeded this target and ranged from 10% to 40% of the baseline. In most cases, respondents were measuring their savings as an increase or

decrease in their utility bill, which may be impacted by factors other than improved efficiency or conservation. The majority continue to monitor their utility bills, or operational setting such as thermostat settings and pump scheduling, to continue to operate more efficiently relative to the initial baseline. However, none of the respondents had reset their savings goal after achieving it, so most are currently operating without a specific goal or updated baseline. Two are no longer tracking energy usage or costs.

Two respondents reported not setting specific savings goals, but they also reported that savings to date have not met their expectations. For one respondent, this was the organization's third round of participation, and the smallest facility it had enrolled to date. The respondent thought savings were unexpectedly less due to the smaller size of the facility, as well as a less effective energy coach, but also noted that the organization had not yet completed its engagement in the program for this facility.

The second facility had based its savings expectations on a nearby organization but had not factored in differences in how the two facilities operate. The example facility had achieved substantial savings by directing pumping to more efficient units and scheduling pumping for off-peak hours; however, the participant facility uses mostly gravitational distribution so did not have the same savings opportunities from pumping. In addition, this facility reported that the standard measurement and tracking approach used by other facilities—that is, setting a target based on total annual usage—was not appropriate for the facility because its customer base is growing. This facility is still developing efficiency-based metrics it can track, rather than absolute quantity-based metrics.

When asked if they thought their organization's practices would change once they were no longer receiving a subsidy from RMP, seven respondents said they believe no practices would change. Most of these respondents reported some level of cost savings due to their involvement and said they would continue the practices they learned as a result. However, one of these respondents represented the facility that was still considering appropriate savings goals, and said because the facility had made few operational changes to date, there was little SEM activity to maintain. The two other respondents were less confident that their facility would continue SEM. One indicated the facility was going to try to continue energy team meetings and other practices, but expected it would become difficult to maintain SEM as a priority given limited staff capacity. The other respondent indicated that because they were already struggling to get staff engaged in SEM practices, that without the incentive, there would be little motivation to continue to pursue improvements.

Management Practices

All nine respondents said their organizations had tried to adopt some SEM practices as a result of participating in the program. Table 9 shows some of the SEM practices encouraged through the program, and which respondents had adopted them.

Table 9. Participant Adoption of SEM Practices*

SEM Practices	*Respondent ID*								
	#1	*#2*	*#3*	*#4*	*#5*	*#6*	*#7*	*#8*	*#9*
Designated energy champion	X	X	X	X	X	X	X	X	X
Staff assigned to energy team, team actively meets		O	X		X	X			X
Identification of energy efficiency/conservation opportunities	X	X	X	X	X	X	X	X	X
Implementation of upgrades or behaviors to save energy	X	X	X	X	X		X	X	X
Employee training and engagement	X	X	X	X	O	O	O		X
Set energy savings baseline and target	X	X	X	O	X	O	X	X	X
Monitoring (regular review of usage performance against goals)	X	X	X	X	X	X	X	X	X
Achieved target	X	X	X	O	X	O	X	X	X

*The "X" indicates the respondent adopted the practice, while the O indicates the respondent has not adopted the practice or is struggling to adopt it. Blank cells indicates the respondent did not say whether they had adopted the practice or not.

All participants designated an energy champion, as a requirement of their participation. In addition, all participants identified energy saving opportunities they could pursue, and all participants continue to monitor their energy usage.

Some participants reported challenges with some practices, most commonly getting all staff in the facility engaged and supportive of changes resulting from SEM. The respondents described different degrees of staff engagement at their organizations. Seven said they had noticed more awareness of energy use among employees, including practices like operating wells and pumps more efficiently, willingness to learn about how their actions impact energy use, and helping develop new energy-saving practices. However, one of these said staff engagement had been a struggle, and they expected it would require ongoing education to maintain good habits. Two respondents said they had not yet achieved increased awareness or engagement from employees. One of these said the primary opportunity for energy savings involved pumping water during non-peak hours and emphasizing storage throughout the day. The employee engagement challenge was that the weekend shift was not as aware of the improved scheduling practices as the weekday group. This respondent said the company was using part of the funding received through the program to try to overcome this barrier through activities such as an employee party to increase awareness. The second respondent that struggled with employee engagement had participated in the program previously with a different facility. This respondent said engaging the staff at the current facility was proving more difficult than at the previous facility, due in part to fewer energy saving opportunities, and in part to a less effective relationship with the energy consultant.

Respondents reported other challenges related to factors outside the program. One respondent said the organization had moved its offices to a different building in the middle of the year, making the previous work to identify upgrade opportunities in the office meaningless. Another respondent said optimizing

time of day pumping had limited benefits for the facility, because it has no control over when the sewage stations feeding the facility are active, and the facility is required to pump sewage as it arrives. A third respondent had struggled to budget for certain equipment, which made improvements harder to implement. A fourth respondent said an unintended consequence of participation was an increase in demand charges. Because the facility shut down certain well pumps for longer periods, it triggered a state requirement to run the pumps for two-hour increments to test water quality, even though the wells were not needed as part of normal operation. This respondent had not yet found a way to avoid this charge.

Most of the respondents said that COVID-19 had not presented any significant challenges with regard to SEM. Several said that their facilities were not operating any differently. However, some comments indicated that respondents were only considering whether the pandemic had led to an increase in total energy usage, rather than any potential impacts on optimizing energy efficiency, or being able to implement SEM practices. For example, one respondent said that the facility was being used less and lights were off more, so there hadn't been any impact on their energy management. Other participants however, demonstrated a more sophisticated understanding of the long-term aspects of SEM. For example, one respondent said that irregular usage due to the pandemic was making it difficult to assess the potential savings for some improvement opportunities the facility was considering. Another respondent mentioned that working offsite was impacting the energy team's ability to operate as they had previously.

Satisfaction with Wattsmart Business Components

Overall, respondents had positive experiences with the SEM offering and had a high level of satisfaction. All nine respondents had positive experiences interacting with their energy management provider. However, as mentioned above, one respondent that had participated previously thought the current provider was not as knowledgeable or helpful as the previous provider they had worked with. This respondent also had some disagreement with the provider about how energy savings were being calculated and thought the provider's calculation method underestimated the natural gas savings the facility had achieved. Most respondents thought the information they received was provided at the correct technical level to be useful to them, and thought the time commitment for training through the program was appropriate.

Eight respondents said they participated as part of a cohort. Seven said the most helpful aspect of the cohort was being able to discuss how other members were engaging with the program and learning new practices from them. The other respondent said that Cascade provided knowledge and experience from other past cohorts which gave them specific ideas of improvements for their facility. When asked for ways that the cohort experience could be improved, one participant said they felt that some information that was helpful to some cohort members was not applicable to their situation. However, this participant acknowledged that was a likely outcome of a larger cohort experience, and felt the benefit from the interactions with several other organizations outweighed the challenges.

Participant Experience

Surveys with participants through the Wattsmart Business Program provided information on entry into the program, how participants navigated identifying projects and submitting their applications, and their satisfaction with various aspects of the program.

Wattsmart Business Typical Upgrades and Custom Analysis

The Cadmus team surveyed 45 participants from eight measure categories:

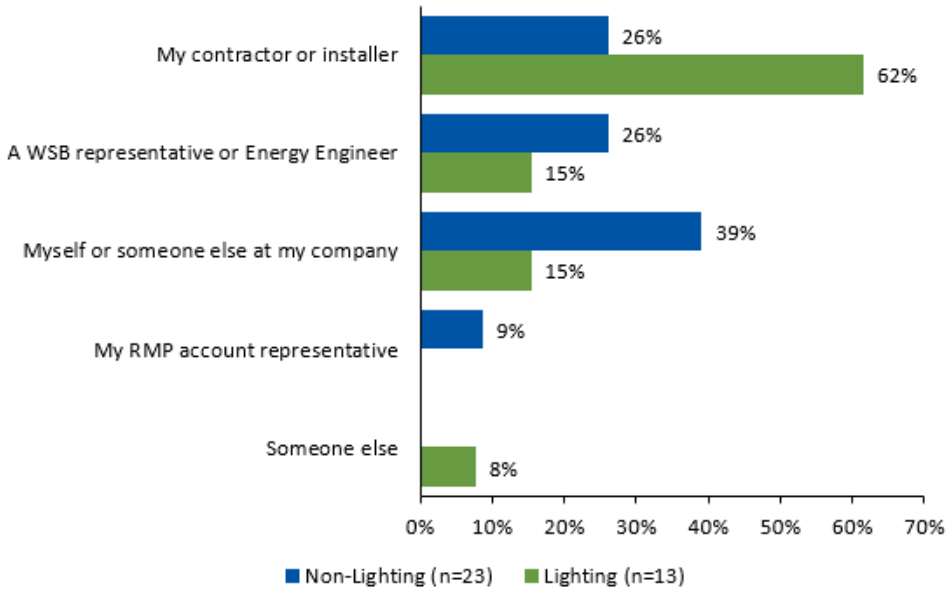
Table 10. 2018-2019 Participant Survey Sample by Measure Type

Measure Category	Typical Upgrades	Custom Analysis
Lighting	16	1
Agricultural	8	0
HVAC	7	0
Energy Management	0	4
Motor Systems	0	3
Compressed Air	2	1
Other	2	0
Refrigeration	0	1
Total	**35**	**10**

Participant Experience

Respondents who completed lighting projects reported, on average, that the incentive they received covered 13% of their project cost (n=17) while respondents who completed non-lighting projects reported the incentive covering 18% of their project cost, on average (n=28). Additionally, non-lighting respondents most often reported that they or someone else at their company filled out their application for the program while lighting respondents were most likely to have it filled out by their contractor or installer. Figure 2 shows the response breakdown by category.

Figure 2. Who Completed the Application

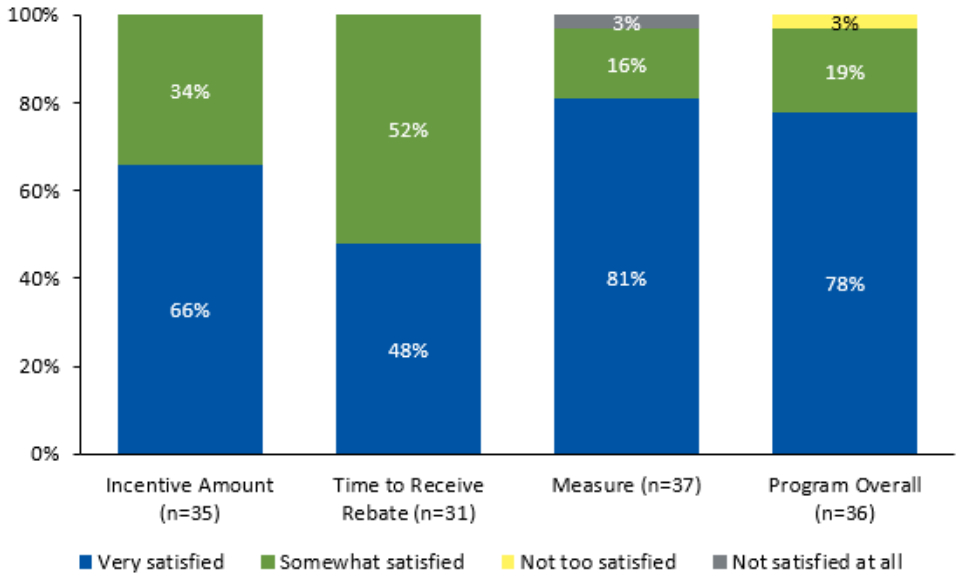


Source: RMP Wattsmart Business Program 2018-2019 Wattsmart Business Participant Survey QB1. Don't know and refused responses removed. (n=36).

Participant Satisfaction

As shown in Figure 3, 100% of participants were satisfied (either *very satisfied* or *somewhat satisfied*) with the amount of their incentive (n=35), and the time it took to receive their rebate (n=31). Ninety-seven percent reported they were satisfied with the measure they had installed (n=37) and with the program overall (n=36).

Figure 3. Satisfaction with Program Components



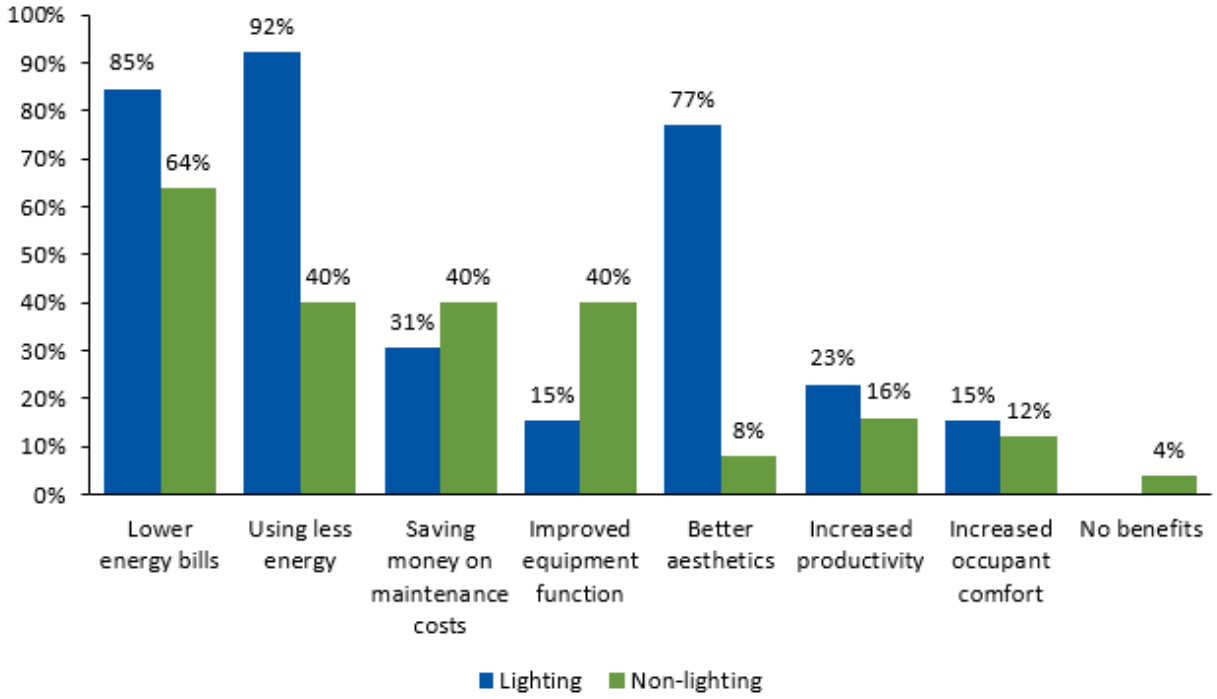
Source: RMP Wattsmart Business Program 2018-2019 Wattsmart Business Participant

Survey QB4, QB7, QB12, QB15. Don't know and refused responses removed. (n=36).

Project Benefits

Nearly all Typical Upgrades or Custom Analysis participants (97%, n=38) reported one or more benefits that their companies experienced from the project they completed. Most respondents said benefits included lower energy bills or reduced consumption. As shown in Figure 4, participants also reported operational benefits such as better or brighter lighting, improved equipment function, and saving money on maintenance costs. Across all 38 respondents, 71% reported some benefit from their project other than energy cost savings (including 11 of 13 lighting respondents, and 16 of 25 non-lighting respondents).

Figure 4. Project Benefits



Source: RMP Wattsmart Business Program 2018-2019 Wattsmart Business Participant Survey QB14. Don't know and refused responses removed. (n=38).

Small Business Direct Install

The Cadmus team surveyed 72 customers who participated in the Small Business Direct Install program.

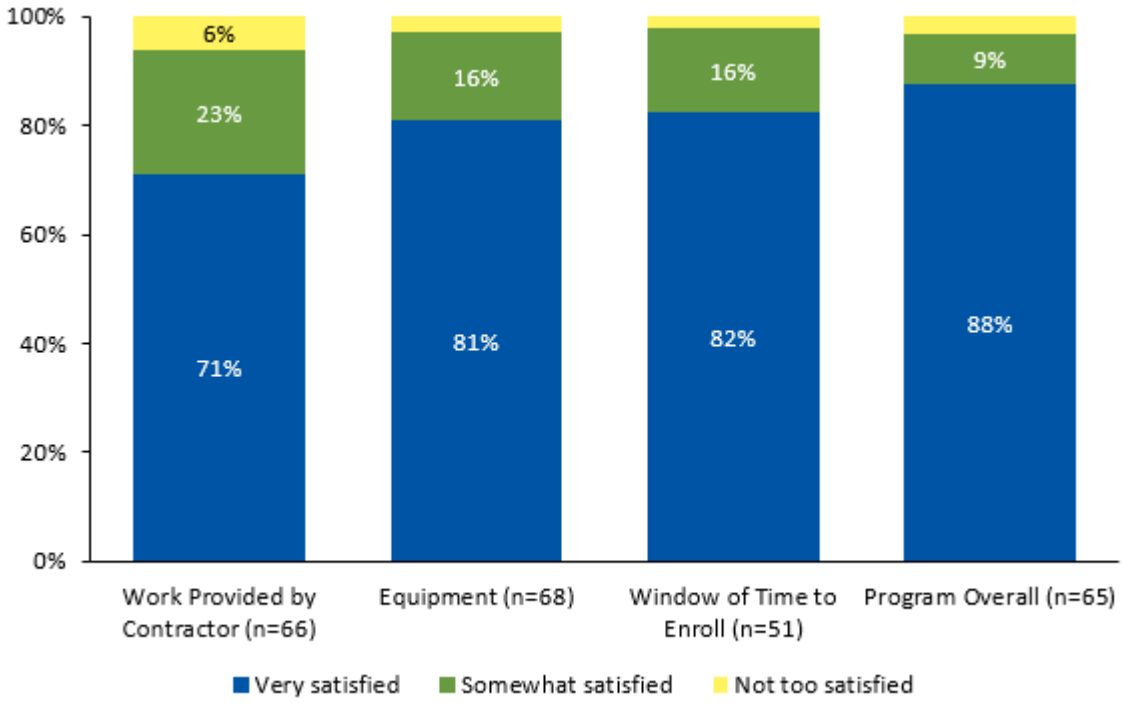
Participant Experience

Nearly all respondents (94%, n=65) reported that they received a detailed project proposal with estimated incentive and energy bill saving amounts. Respondents were slightly more likely to say the incentive estimates were the most influential information in the proposal than to say the utility bill savings were (54% and 38% respectively, n=61). Almost a third of respondents (31%, n=67) said they had additional lighting equipment they wanted that was not offered through SBDI.

Participant Satisfaction

As shown in Figure 5, nearly all participants were satisfied (either *very satisfied* or *somewhat satisfied*) with the work that was done by their contractor, the equipment they had installed and the window of time they had to enroll in the program. Correspondingly, 97% were satisfied with the program overall (n=65). The percentage of respondents who said they were *very satisfied* with the program overall was slightly higher than for the individual components. This indicates that many factors that led to a reduced rating for individual components were not important enough to the respondents to lower their overall satisfaction.

Figure 5. Satisfaction with SBDI Program Component and Program Overall

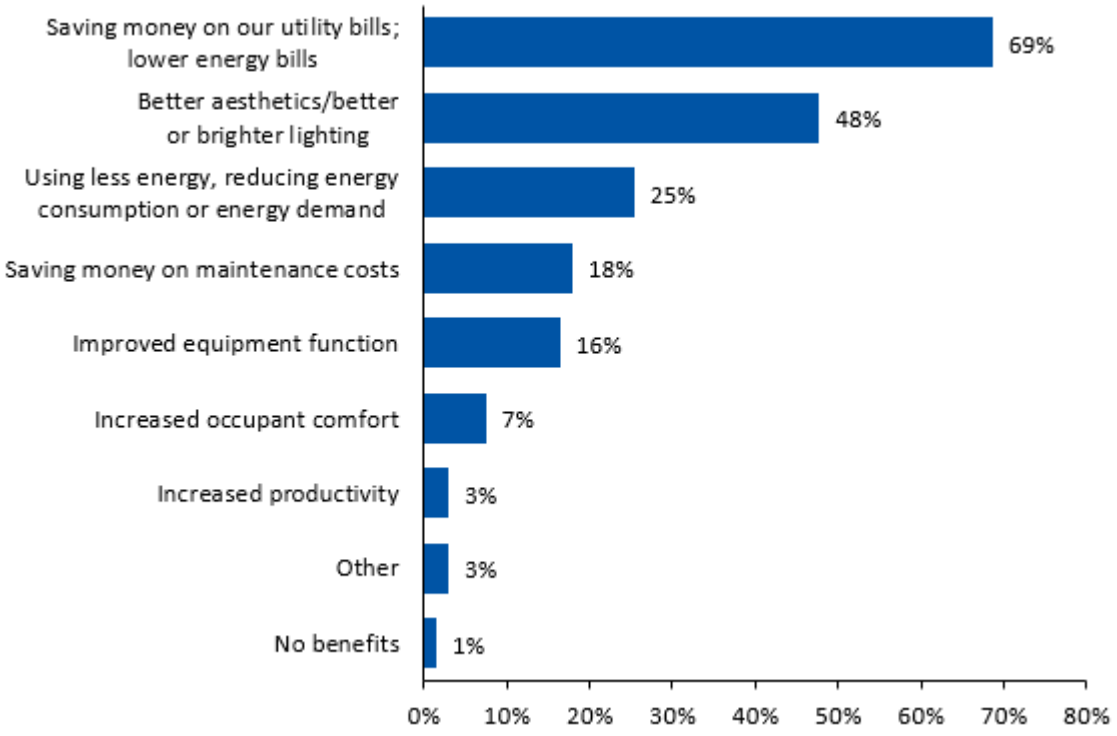


Source: RMP Wattsmart Business Program 2018-2019 SBDI Participant Survey QB7, QB9, QB16, QB21. Don't know and refused responses removed.

Project Benefits

As with the Typical Upgrades and Custom Analysis respondents, nearly all Small Business Direct Install participants (99%, n=67) reported one or more benefits that their companies experienced due to the equipment they installed. Most respondents said benefits included lower energy bills or reduced consumption. As shown in Figure 6, participants also reported operational benefits such as better or brighter lighting, improved equipment function, and saving money on maintenance costs. Across all 67 respondents, 70% reported some benefit from their project other than energy cost savings.

Figure 6. Project Benefits



Source: RMP Wattsmart Business Program 2018-2019 SBDI Participant Survey QB17. Don't know and refused responses removed. (n=67).

Lighting Instant Incentives

Cadmus surveyed 27 Lighting Instant Incentives participants.

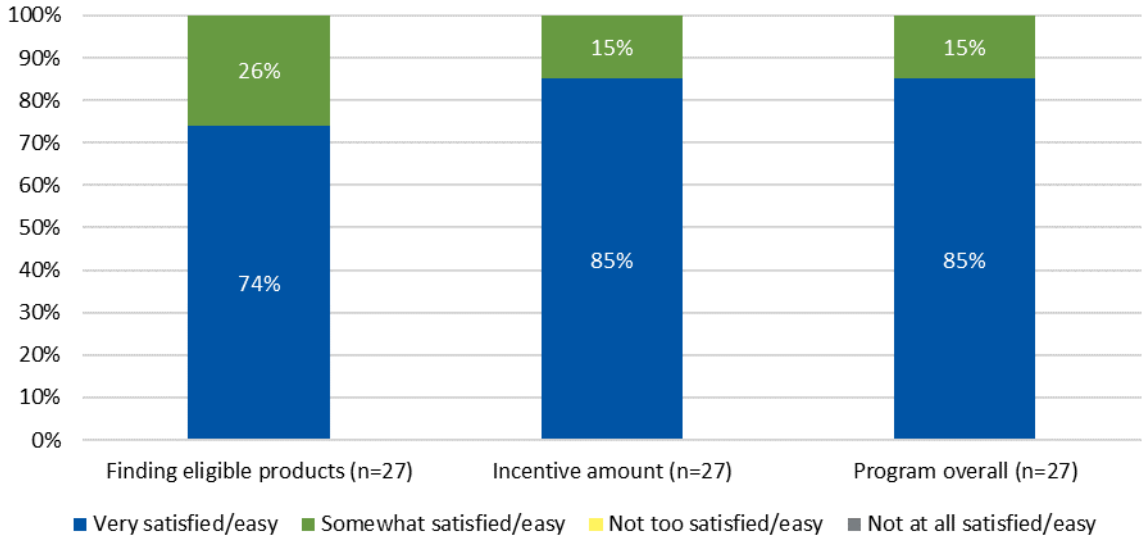
Program Delivery

As expected, the majority of respondents (78%, n=27) learned about the program incentives from their contractor, distributor, or lighting supplier. Other primary sources of information about the incentives included Wattsmart business outreach (Nexant representatives, RMP representatives and the RMP website), the Building Owner and Managers Association, and the DSIRE website.

Results show the incentives are offered by distributors to their repeat customers. Almost all respondents (92%, n=26) accessed the incentives through a vendor they had worked with previously. However, two respondents that learned of the incentives either through Wattsmart Business outreach or the vendor themselves, said they were working with a new company. Although the majority had a relationship with the vendor they worked with, 65% (n=26) said they chose that vendor primarily because the vendor offered the incentives.

Satisfaction

All respondents said finding eligible products was easy, and that they were satisfied with the incentive amount and the program overall.

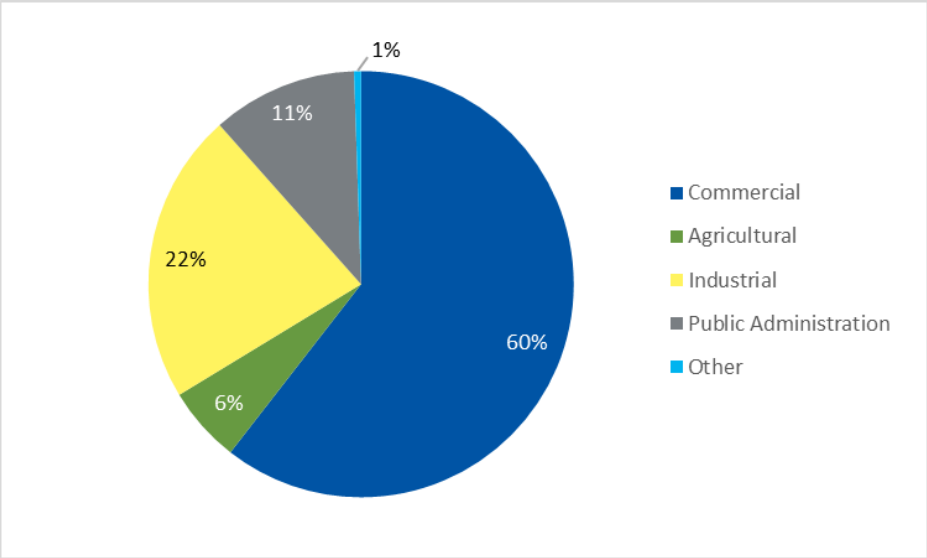


Source: RMP Wattsmart Business Program 2018-2019 Midstream Participant Survey QB4, QB7, QB9.

Nonparticipants

The Cadmus team surveyed 200 nonparticipants, identified as customers who had not completed a project through the program in the past two years. As shown in Figure 7, nonparticipant respondents included several business types. The largest was commercial businesses (60%, n=193). Most respondents (55%, n=185) employed one to 10 people, and others employed anywhere from 11 to more than 500 people.

Figure 7. Nonparticipant Respondents by Business Sector

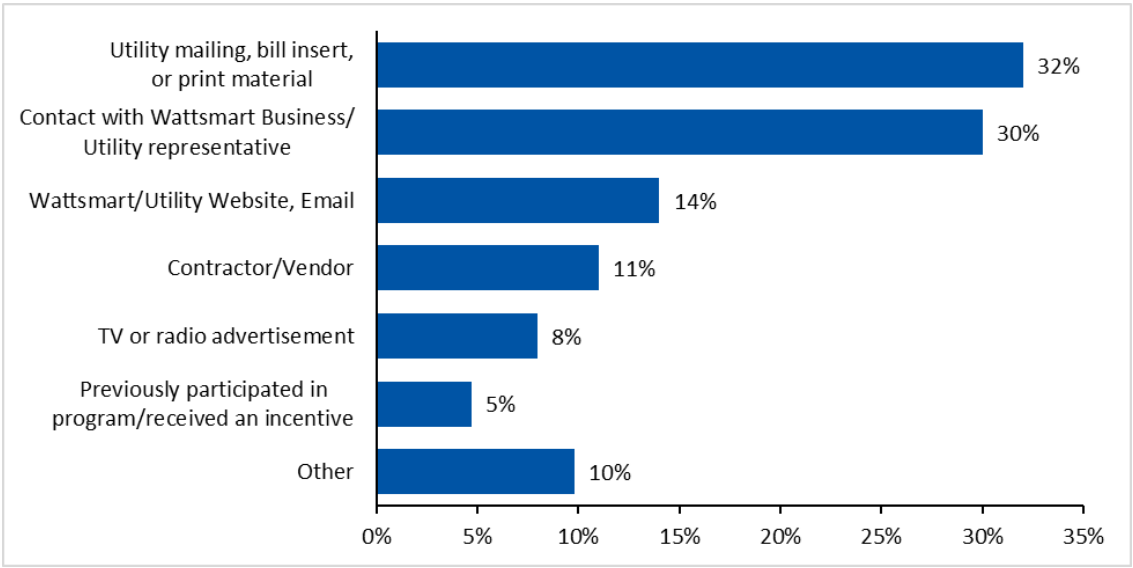


Source: RMP Wattsmart Business Program 2018-2019 Nonparticipant-Partial Participant Survey QF1. Don't know and refused responses removed. (n=193).

Awareness

The majority of nonparticipants (60%, n=196) did not know of the Wattsmart Business program prior to participating in the survey, and the level of awareness was similar across all sectors. Most of the respondents who were aware of the program learned of it through a utility mailing or print material (32%, n=46) or through a Wattsmart Business or utility representative. Figure 8 shows all information channels mentioned by nonparticipants. Of the nonparticipants who were aware of the program, 22% indicated they were somewhat or very likely to apply for an incentive in the next six months.

Figure 8. Nonparticipants Source of Awareness of Wattsmart Business Program

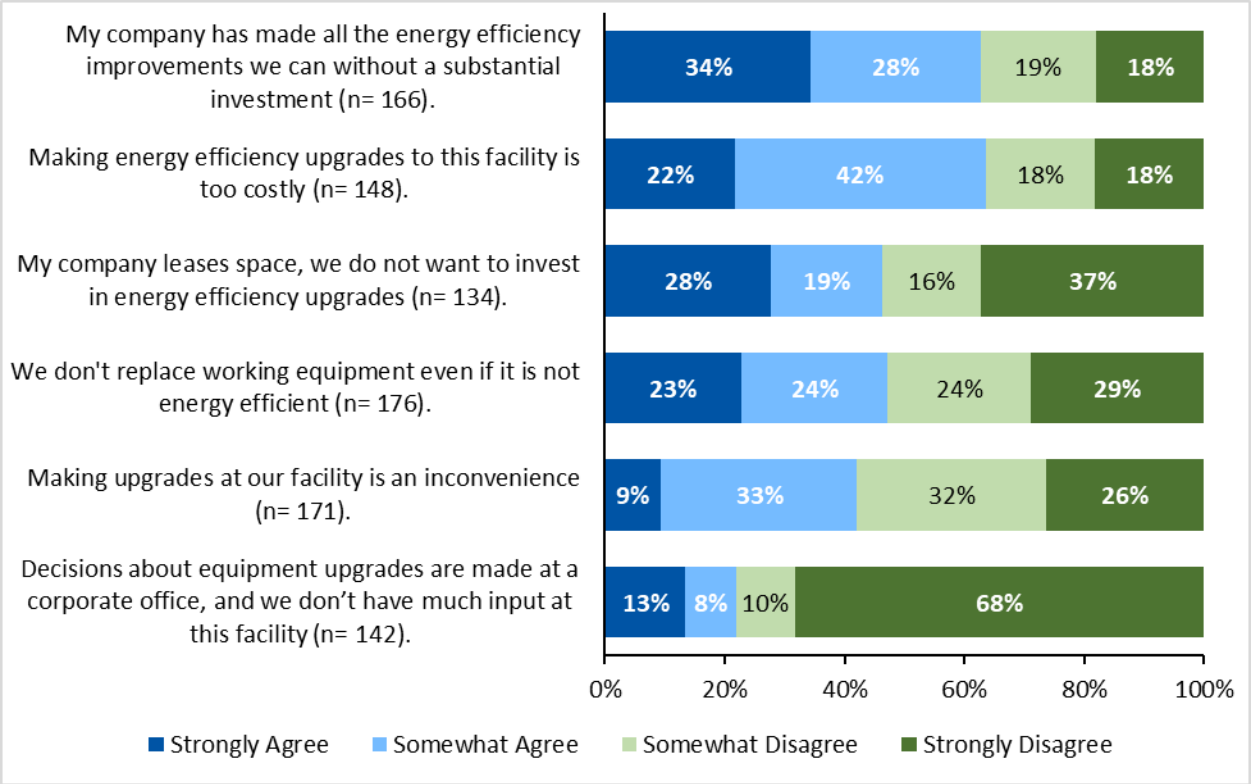


Source: RMP Wattsmart Business Program 2018-2019 Nonparticipant-Partial Participant Survey QC3. Don't know and refused responses removed. (n=64).

Motivation

Nonparticipant respondents indicated they were currently primarily motivated to make energy-efficient upgrades to save money on energy bills (75%, n=169). The most important factor to motivate nonparticipants would be lower costs of efficient equipment (53%, n=161), followed by higher incentives (15%). Nonparticipants provided similar responses when asked to indicate the extent to which they agreed with several statements referring to barriers to participation, as shown in Figure 9. Respondents were most likely to *strongly* or *somewhat agree* with the statement that their company had done all the efficiency upgrades it could without a substantial investment and that additional efficiency upgrades to their facility would be too costly.

Figure 9. Nonparticipants' Attitudes About Energy Efficiency Improvements



Source: RMP Wattsmart Business Program 2018-2019 Partial Participant/Nonparticipant Survey: QD7a-QD7f. Not applicable, don't know, and refused responses were removed.

Cost-Effectiveness Results

As shown in Table 11 the program proved cost-effective for the 2018 and 2019 evaluation period from the utility cost test (UCT) perspective with a benefit/cost (B/C) ratio of 2.04, the PacifiCorp total resource cost test (PTRC) perspective with a B/C ratio of 1.18, the total resource cost test (TRC) perspective with a B/C ratio of 1.08, and the participant cost test (PCT) perspective with a B/C ratio of 2.89. It was not cost-effective according to the ratepayer impact measure (RIM) test perspective. Please see Appendix C for more information on cost-effectiveness.

Table 11. 2018–2019 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 (TRC + 10% Conservation Adder)	$0.0408	$115,961,907	$137,332,470	$21,370,563	1.18
Total Resource Cost Test (TRC No Adder)	$0.0408	$115,961,907	$124,847,700	$8,885,793	1.08
Utility Cost Test (UCT)	$0.0215	$61,190,055	$124,847,700	$63,657,645	2.04
Ratepayer Impact Measure Test (RIM)		$287,405,261	$124,847,700	($162,557,561)	0.43
Participant Cost Test (PCT)		$97,814,465	$282,539,205	$184,724,740	2.89
Life Cycle Revenue Impacts ($/kWh)					$0.000530064
Discounted Participant Payback (years)					2.69

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

Table 12 and Table 13 present the 2018 and 2019 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). In 2018, the Wattsmart Business program proved cost-effective from all perspectives except for the RIM test; in 2019, it proved cost-effective from the PTRC, UCT, and PCT perspectives.

Table 12. Wattsmart Business Program Cost-Effectiveness Summary for 2018 Net Savings

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC	$0.0352	$55,166,371	$72,969,046	$17,802,675	1.32
TRC	$0.0352	$55,166,371	$66,335,496	$11,169,125	1.20
UCT	$0.0190	$29,817,437	$66,335,496	$36,518,059	2.22
RIM		$153,239,204	$66,335,496	($86,903,708)	0.43
PCT		$47,265,730	$154,421,398	$107,155,668	3.27
Lifecycle Revenue Impacts ($/kWh)					$0.000255443
Discounted Participant Payback (years)					2.42

Table 13. Wattsmart Business Program Cost-Effectiveness Summary for 2019 Net Savings

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC	$0.0468	$60,795,536	$64,363,424	$3,567,888	1.06
TRC	$0.0468	$60,795,536	$58,512,204	($2,283,332)	0.96
UCT	$0.0241	$31,372,618	$58,512,204	$27,139,586	1.87
RIM		$134,166,057	$58,512,204	($75,653,853)	0.44
PCT		$50,548,735	$128,117,807	$77,569,072	2.53
Lifecycle Revenue Impacts ($/kWh)					$0.000246690
Discounted Participant Payback (years)					2.98

Conclusions and Recommendations

RMP, in collaboration with the program administrators—Cascade Energy, Nexant, and Willdan Energy Solutions—is successfully delivering energy efficiency incentives and services to its customers, as designed in the Wattsmart Business program. Participation in all offerings was relatively even across 2018 and 2019.

Overall, customers reported high satisfaction levels with the program and its elements. Most SEM participants reported adopting new energy-saving behaviors, and they expected to retain those behaviors even after the program engagement ended. Trade allies also reported satisfaction with the program, with the exception of confusion over similar customer and project eligibility requirements between the Small Business Direct Install offering and the Typical Incentives offering.

Over 2018 and 2019, the Wattsmart Business Program in Utah completed over 13,000 projects and produced over 311,531 MWh as evaluated net savings. The impact evaluation found an overall realization rate of 105.4%, with 8.0% precision at 90% confidence, and a 90% NTG ratio. The two-year period exhibited a cost-effectiveness of 2.06 for the Utility Cost Test. The three largest strata – lighting, HVAC, and Energy Management – accounted for 72% of the reported savings.

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

Savings Considerations

Conclusion—Lighting Hours of Use

RMP reported lighting hours of use for small business direct install projects and midstream based on internally developed tables defining hours of use by facility type. Cadmus evaluated these lighting projects by using the tables in the RTF and Idaho Power Technical Reference Manual (TRM) that define hours of use by facility type and lamp type. Because of differences in the lighting tables used by RMP and Cadmus, evaluated energy savings were found to be higher or lower than reported.

Recommendation

For midstream projects, Cadmus recommends that RMP adopt the RTF's Non-Residential Midstream Lighting Measure lighting tables defining hours of use by bulb type. The lighting tables prescribed by the RTF are based on three different light metering studies and midstream lighting evaluation reports with hours of use evaluated by bulb type. The RTF has updated the Non-Residential Midstream Lighting measure annually since 2017 and incorporates data from the most recent and relevant studies into the measure savings inputs and assumptions.

For small business direct install projects, Cadmus recommends that RMP adopt the RTF's Non-Residential Lighting Retrofits Standard Protocol lighting tables defining hours of use by facility type. The lighting tables prescribed by the RTF are based on six different light metering and non-residential lighting evaluation reports with hours of use evaluated by facility type. The RTF

updates the Non-Residential Lighting Retrofits Standard Protocol on an annual basis and incorporates results from the most relevant and recent studies into the measure savings inputs and assumptions. Additionally, adopting the lighting tables from the RTF will ensure consistency with reported lighting savings among other regional utility energy efficiency programs.

Conclusion—Midstream Lighting Methodology

RMP uses a review of previous RMP midstream program data and product reviews to arrive at average efficient lamp wattages and average lumen values. RMP's baseline wattage is calculated by dividing the fixture type-specific average lumens by an efficacy value. To evaluate midstream lighting savings, the evaluation team used the methodology outlined in the RTF and used the lumen equivalence method to determine baseline wattages. This methodology accounted for HVAC interactive effects by applying a Waste Heat Factor (WHF). HVAC interactive effects refers to the HVAC cooling energy required in conditioned spaces to match the heat load from lighting. When high efficiency lighting is installed, less HVAC cooling energy is used to satisfy the reduced heating load. Evaluated savings include a WHF when determining total energy savings. Reported savings do not use WHF.

Recommendation

Cadmus recommends using the methodology outlined in the RTF to calculate midstream savings, which includes accounting for HVAC interactive effects through applying a WHF. In addition, Cadmus recommends using the lumen equivalence method to calculate baseline wattage for midstream lighting projects instead of using the fixture type-specific average lumens multiplied by an efficacy value. Due to the nature of LED fixture design, efficacy values vary among various LED fixture shapes and designs. By using a single efficacy value to represent all lighting fixture types, energy use from specific fixture types that typically have higher or lower efficacy values may not be accurately represented. The lumen equivalence method improves on this efficacy-based methodology by accounting for fixture type and purpose when comparing LED fixtures to baseline lighting fixtures.

Conclusion—Green Motor Rewind Energy Savings

RMP reports energy savings for green motor rewind projects based on a green motor rewind measure from the RTF that was updated on December 28, 2017. The newer version of the green motor rewind measure from the RTF show reduced energy savings for most motor sizes. Cadmus evaluated these projects based on the newer version of the green motor rewind measure and found lower savings were realized for all sampled green motor rewind projects.

Recommendation

Cadmus recommends RMP adopt the energy savings specified by motor size from the newest version of the green motor rewind measure from the RTF. The most recent version of the RTF's Green Motor Rewind (Version 3.1) was adopted in December, 2017. This measure is expected to receive an update by October, 2022.

Conclusion

Cadmus sampled several projects within the Other stratum that did not include sufficient documentation of baseline or post-installation period performance. For these project types, equipment performance trend data during these periods are vital to the understanding of implementation success. For three projects within the Other Stratum, no documentation was provided to justify baseline or post-installation performance. Instead, energy savings were based on assumed performance and engineering judgement. Cadmus evaluated these projects based on similar measures from programs in other utilities.

Recommendation

Cadmus recommends RMP provide documentation of baseline and post-installation period performance for Other stratum projects where measure characteristics are custom or unique. For these projects, trend or meter data of equipment performance is critical to understanding the measure load profile and associated energy savings.

Trade Ally Experience

Conclusion

Trade allies overall reported high levels of satisfaction with the Wattsmart Business Program. All interviewees noted positive outcomes from their participation, such as improved competitiveness or the ability to expand their business using the program as a sales tool. A few trade allies also reported that the quarterly scorecards were beneficial, making them aware of errors in their applications, and giving them visibility on customer satisfaction. However, most trade allies limited familiarity with the quarterly scorecards indicates that the scorecards are likely not serving their intended purpose of improving the average program experience for trade allies and participants.

Recommendation

Attempt to increase trade ally awareness of the quarterly scorecard process so they are able to utilize the feedback that is included in them. Tying the scorecards to a personal incentive for the trade ally employees would help get them engaged in the process. The incentives do not need to be monetary to be effective. For example, offering non-monetary prizes, such as sporting equipment, tablets, restaurant gift certificates or other “interesting” prizes to top performers could capture trade allies’ attention and foster a spirit of competition. Similarly, recognizing top performers in front of their peers at an annual dinner event could offer trade allies a unique opportunity for networking and professional recognition, in addition to focusing their attention on their performance in the program.

SEM Program

Conclusion

Participants were generally satisfied with their participation in the SEM program, reported achieving savings, and expected to continue to practice some behaviors they had adopted as a result of their participation (such as adjusting pumping schedules to rely on more efficient pumps more often). However, most participants also reported that they were no longer working to achieve a specific savings target, and had not updated their baseline savings. Most facilities had initially set a simple target of 5% of their baseline energy usage, and achieved that goal. While participants expected to maintain more efficient processes that they had already put in place, respondents were less focused on continuing to identify new opportunities for savings. As a result, these facilities are at risk of not achieving year over year savings going forward, as SEM theory indicates they should.

In addition, it is not clear that participants really achieved the level of efficiency that they perceived. Most participants reported they set simple goals based on an absolute reduction in total facility usage, rather than a reduction in energy needed for a specific unit of output. As a result, it was not clear they were able to monitor changes in their energy usage due to improved efficiency separate from changes due to other factors, such as decreased or varying demand resulting from the pandemic or economic shutdowns. One participant, who recognized that a target based on absolute total usage would not serve his growing organization well, had not yet set any savings targets despite collecting detailed baseline data and benchmarking other similar facilities. It was not clear why this participant and their provider were not able to establish efficiency-based goals that could be monitored independently from changes factors not related to efficiency.

Recommendation

Energy management providers should work with participants to develop energy efficiency savings goals based on the participant's unit of production (such as acre-feet of water pumped), and referencing a continuously updating baseline, to help participants achieve continuous year-over-year improvements in energy efficiency. For example, a target that is a 2% reduction in energy per acre-foot of water pumped is independent of any changes in total water pumped that may be out of the participant's control, due to increasing or decreasing demand or other factors. A target of a 2% reduction *over the prior year's average* energy used per acre-foot of water pumped gives the participant an automatically updated baseline and target each year, and also allows the participant's energy team to organize themselves and their activities to support a predictable, long-term continuous improvement objective.

Appendix A. Gross Engineering Analysis Methodology

The Wattsmart Business program's impact evaluation data analysis incorporated the following activities:

- Customer interviews
- Engineering analysis
- Site-level billing analysis

This section addresses reported gross evaluated savings. Reported gross savings are electricity savings (kWh) that Rocky Mountain Power (RMP) reported in its *Rocky Mountain Power Energy Efficiency and Peak Reduction Annual Reports* (annual reports).[2] Gross evaluated savings are the savings achieved after engineering analysis. Net savings are program savings, net of what would have occurred in the program's absence. These savings provide observed impacts attributable to the program.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1. To determine evaluated net savings, the team applied the fifth step (discussed in Appendix B).

Table A-1. 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, meter data)
	4	Realization Rates: Extrapolate realization rates to the population
Evaluated Net Savings	5	Attribution: Apply net-to-gross adjustments

Step 1: To verify 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 team selected a sample of sites from the Rocky Mountain Power program database then stratified the distribution of measures among sampled sites, primarily by end-use type. The team evaluated sampled projects as part of the program evaluation using phone interviews and customer-provided photos and site documentation to verify measure installations.

Step 3: The team reviewed all project documentation; developed an evaluation, measurement, and verification plan; and in a few instances performed virtual site assessments to verify the installation, specifications, and operations of incented measures. The team also collected trend data for nine projects to document historical performance.

Step 4: This step involved reviewing measure savings assumptions, equations, and inputs, which included conducting a billing analysis for selected measures. For complicated or custom measures, the

[2] These reports are available online: https://www.pacificorp.com/environment/demand-side-management.html

team conducted an engineering analysis using the appropriate measurement and verification options in the International Performance Measurement and Verification Protocol.[3] The team used interviews and other operational data to determine hours of use or power consumption for metered equipment types. In some instances, customers provided trend data from their building management systems, which the team used to determine equipment load profiles, hours of use, and performance characteristics.

Step 5: The team used the participant survey to calculate freeridership using an industry-standard self-report methodology. In addition, the team surveyed nonparticipants to determine if nonparticipant spillover (NPSO) could be credited to the program (for projects that were otherwise not provided incentives).

Project Review

Cadmus reviewed all project documentation available from Rocky Mountain Power. Documentation included project applications, equipment invoices, reports published by the pre-contracted group of energy engineering consultants, and savings calculation spreadsheets.

The team performed the following tasks for each site:

- Reviewed the reported documentation to verify the quantity and specifications of equipment receiving incentives matched the associated reported energy savings calculations and confirmed that installed equipment met program eligibility requirements
- Performed a detailed review of site project files to collect additional necessary data for each site savings analyses
- Where applicable, the team conducted a phone interview with facility personnel to gather information such as equipment types replaced, and hours of operation

Engineering Analysis

In general, Cadmus referenced current measure workbooks and saving estimation methodologies from the Idaho Power Technical Reference Manual (TRM) and the Regional Technical Forum (RTF).[4,5] The Idaho Power TRM was updated in 2018 and relies on sources such as the Northwest Power and Conservation Council (NWPCC), Northwest Energy Efficiency Alliance (NEEA), the Database for Energy Efficiency Resources (DEER), the Energy Trust of Oregon, the Bonneville Power Administration (BPA), third-party consultants, and other regional utilities.

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[3] Efficiency Valuation Organization. January 2012. International Performance Measurement and Verification *Protocol, Concepts and Options for Determining Energy and Water Savings, Volume 1.* Page 25. (EVO 10000 – 1:2012) http://www.evo-world.org/

[4] ADM Associates. October 15, 2018. *Technical Reference Manual 2.2.* Prepared for Idaho Power Company. https://docs.idahopower.com/pdfs/EnergyEfficiency/Reports/2018TRM.pdf

[5] Regional Technical Forum. "UES Measures." Accessed January 2021. https://rtf.nwcouncil.org/measures

Appendix B. Net-to-Gross Analysis 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. The following sections describe the NTG methodology used by the Cadmus team for the Wattsmart Business program.

Overview

This section presents an overview of the Cadmus team's NTG methodology. To determine net savings, the team used a self-report approach and analyzed the collected data to estimate freeridership and spillover—this approach is typically considered the most cost-effective, transparent, and flexible method for estimating NTG and, consequently, the NTG methodology most frequently employed in the industry.

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

Net-to-gross ratio = 100% – Freeridership Percentage + Participant Spillover Percentage + Nonparticipant Spillover Percentage

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 amount 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—participant and nonparticipant. Participant spillover savings occur directly (i.e., program participants install additional energy-efficient equipment). Nonparticipant spillover savings occur indirectly (i.e., trade allies install additional energy-efficient equipment for customers who choose not to participate as a result of the program).

Freeridership Estimation

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 freerider; 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 freerider; 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 freerider. 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-freerider. If the project would have occurred within the same 12-month period but was altered in respect to its size or efficiency level, the respondent is scored as a partial freerider. To assess the level of partial freeridership, 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 freeridership ratio, as shown here:

$$Initial\ Freeridership\ Ratio = Efficiency\ Score\ x\ Quantity\ Score$$

The initial freeridership score was adjusted to account for prior program participation. Given Rocky Mountain Power's efforts to cross-promote its entire portfolio of energy efficiency programs, a respondent's prior participation in a Rocky Mountain Power program may have been influential in the 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 rated previous participation as a 4 or 5, the respondent's adjusted freeridership was reduced by either 50% or 75%, respectively.

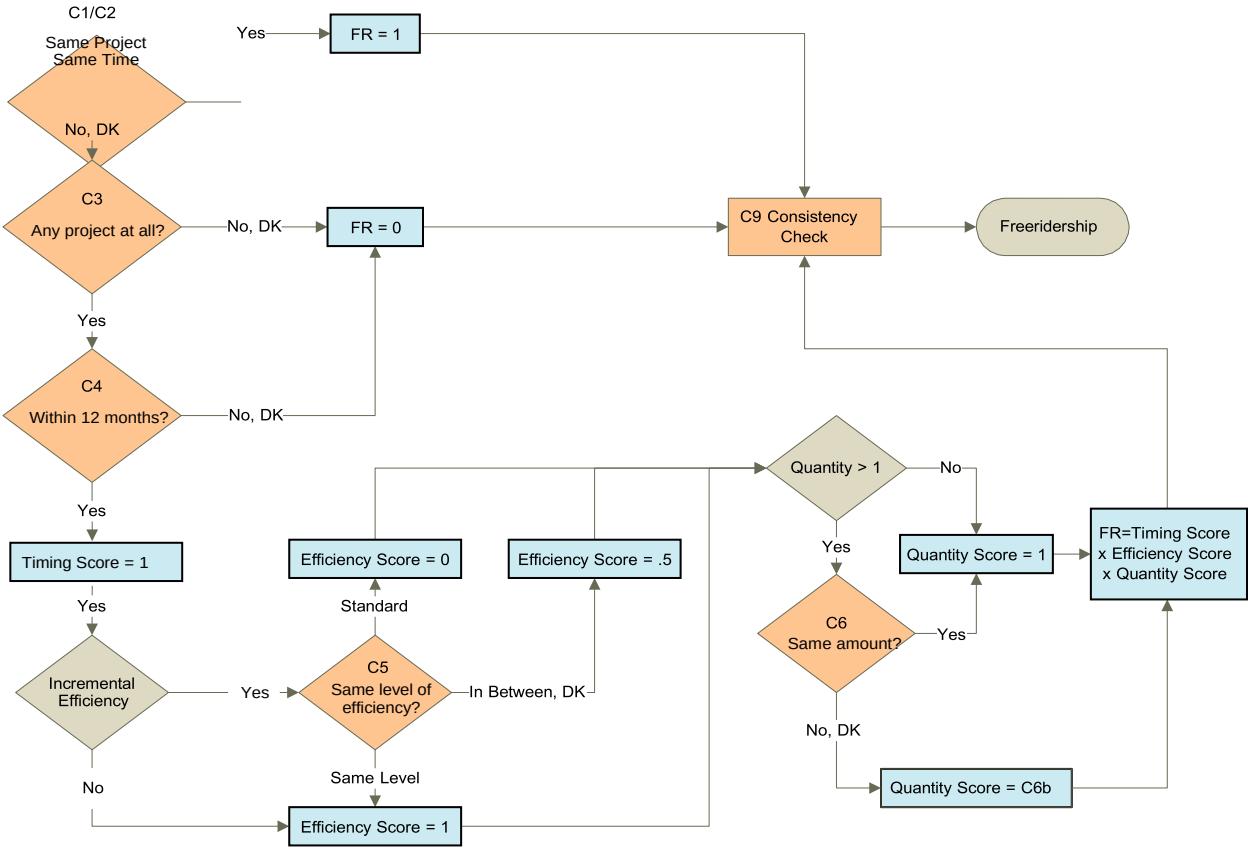
After adjusting the initial freeridership ratio for past program participation, a series of consistency check questions were reviewed. These questions asked about the influence of the program's interventions (e.g., financial incentives, technical assistance) and addressed the counter-factual (e.g., what would have happened without the program). For example, if the respondent stated that the financial incentive was extremely important to their decision (question C9.2 = 5 – extremely important) but that they would have installed the exact same equipment at the same time without the program (question C2 = Yes and question C1= Yes), the interviewer asked the respondent to describe in their own words what impact the program had on their decision (C8). During the scoring process, these responses were reviewed by analysts to determine which scenario is correct and scored accordingly to create an adjusted freeridership score. Table B-1 provides detailed scoring and descriptions of each question.

Table B-1. Wattsmart Freeridership Calculation Approach

Question	Question Text	Scoring
C1	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
C2	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 C2=yes and C1=yes then freeridership = 1
C3	Without the program, would you have installed any [MEASURE] equipment?	If C4=no, freeridership = 0
C4	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
C5	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
C6	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
C9.6	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 C9.6 = 5, reduce adjusted free-ridership by 75%
		If C9.6 = 4, reduce adjusted free-ridership by 50%
C9.2	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
C9.4	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
C8	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 C9.2 or C9.4 Initial freeridership score is reduced by 50% if C8 response merits an adjustment free-ridership by 50%

Figure B-1 shows the freeridership calculation approach.

Figure B-1. Freeridership Calculation Approach



Participant Spillover Estimation

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

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 action because of their program participation). The team also asked these respondents to rate the relative importance of the Wattsmart Business program (and incentives) on their decisions to pursue additional energy- efficient activities.

The Cadmus team used a top-down approach to calculate spillover savings. The team began its 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. The team 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 B-2 provides detailed scoring and descriptions of each like spillover question.

Table B-2. Wattsmart Participant Spillover Calculation Approach

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

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

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

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

Nonparticipant Spillover Estimation

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), and it results in energy savings caused by, but not rebated through, utilities' demand-side management activities.

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

Methodology

The Cadmus team randomly selected and surveyed 200 nonparticipating customers from a sample of randomly generated nonresidential nonparticipant accounts provided by Rocky Mountain Power.

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

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

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

The Cadmus Team used estimated gross savings for the reported measures from the Wattsmart Business program evaluation activities.

Using the variables shown in Table B-3, the Cadmus team determined total NPSO generated by Rocky Mountain Power's marketing and outreach efforts.

Table B-3. Wattsmart NPSO Analysis Method

Variable	Metric	Source
A	Total kWh Spillover Savings from Survey Respondents	Survey data / Engineering Analysis
B	Total Nonparticipant Customers Surveyed	Survey disposition
C	Sample Usage	Rocky Mountain Power Customer Database
D	Sample NPSO	A ÷ C
E	Total Population Usage kWh	Rocky Mountain Power Customer Database
F	NPSO kWh Savings Applied to Population	D x E
G	Total Gross Program Evaluated kWh Savings	Wattsmart Business Evaluation
H	NPSO as a Percentage of Total Wattsmart Business Evaluated kWh Savings	F ÷ G

Appendix C. Cost-Effectiveness Methodology

In assessing the Wattsmart Business program's cost-effectiveness, the Cadmus team analyzed program benefits and costs from five different perspectives, using Cadmus' DSM Portfolio Pro model.[6] The California Standard Practice Manual for assessing demand-side management (DSM) 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 Rocky Mountain Power and from Rocky Mountain Power 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 Rocky Mountain Power's and from Rocky Mountain Power 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 Rocky Mountain Power's perspective. The benefits include avoided energy, capacity costs, and line losses. Costs include program administration, implementation, and incentive costs associated with program funding.
- **Ratepayer Impact Measure (RIM) Test:** All ratepayers (participants and nonparticipants) may experience rate increases due to decreased kWh sales. The benefits include avoided energy costs, capacity costs, and line losses. Costs include all Rocky Mountain Power program costs and decreased 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 C-1. Wattsmart Benefits and Costs Included in Various Cost-Effectiveness Tests

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

[a] These tests include avoided line losses.

[6] 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 C-2 provides the needed cost analysis inputs for each year. Rocky Mountain Power provided all of these values except for energy savings.

Table C-2. Wattsmart Selected Cost Analysis Inputs

Input Description
Evaluated Net Energy Savings (kWh/year)[a]
Discount Rate
Commercial Line Loss
Industrial Line Loss
Irrigation Line Loss
Inflation Rate
Total Program Costs

The 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 (incorporating freeridership and spillover) and measure lives documented in the program's tracking data.