



2020 Utah Wattsmart Business Program Evaluation

Final REPORT

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Introduction

This 2020 Utah Wattsmart Business report presents the major evaluation findings and a discussion of the Cadmus team's conclusions and recommendations. This 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) offers services and incentives to help commercial, industrial, and agricultural customers maximize the energy efficiency of their equipment and operations. These offerings are delivered through downstream, midstream, and direct install incentive mechanisms.

The 2020 program reported gross electricity savings of 197,173,117 kWh. RMP uses an outsourced delivery model for all demand-side management (DSM) services, and contracted with two program administrators—Cascade Energy and Resource Innovations—to implement all program offerings.

RMP contracted with the Cadmus team (comprising Cadmus and VuPoint Research) to conduct impact and process evaluations of the 2020 Utah Wattsmart Business program. At RMP's request, we evaluated program effectiveness and reported the 2020 evaluation findings.

The Cadmus team 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):** Through this offering, RMP targeted 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 who purchased through a nonparticipating distributor did not receive an instant discount, but they could apply to RMP for incentives after the purchase.
- **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, including maintenance and management practices. If eligible, customers could receive incentives for capital improvements through the other

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

Wattsmart Business program offerings. Through this offering, RMP also offered year-long strategic energy management 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	Participant Surveys	Partial Participant Surveys	Desk Review	Phone Verification	Net-to-Gross Analysis	Cost-Effectiveness	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, and trade allies ^a	✓	✓					
Provide data support for program cost-effectiveness assessments	✓		✓	✓	✓	✓	
Identify areas for potential improvements	✓	✓	✓	✓	✓	✓	✓
Document compliance with regulatory requirements							✓

^a Nonparticipant survey results and trade ally interview results will be included in 2021 report.

Methods

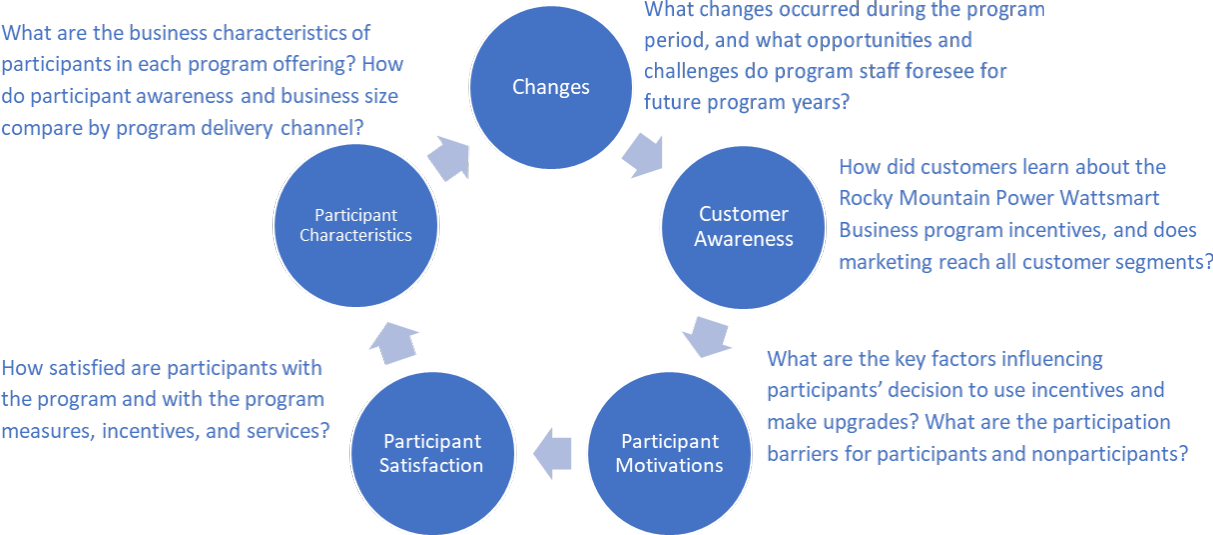
To evaluate energy impacts, the Cadmus team used desk reviews, phone verification, phone verification, and surveys to inform the engineering analyses, net-to-gross (NTG) analysis, and program cost-effectiveness analysis. Table 2 summarizes these activities.

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 participant surveys, to assess program delivery and efficacy, bottlenecks, barriers, and opportunities for improvements. The Cadmus team administered participant surveys online. VuPoint Research performed the partial participant 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 2020 projects (see *Appendix A. Gross Engineering Analysis Methodology* for information on the impact evaluation methodology). To calculate net savings, the Cadmus team conducted a participant survey to inform freeridership and spillover and a survey of nonparticipants to inform nonparticipant spillover. Please see the Evaluation Dashboard for additional detail on project-level results and across several years.

Impact Sampling

Table 3 shows total projects, total projects sampled, sample distribution, associated energy savings, and the sample’s percentage of the savings. Out of 9,234 projects, the Cadmus team analyzed 57 projects, which contributed approximately 12% of the 2020 program savings.²

Table 3. Utah 2020 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		
Compressed Air	51	20,471,636	4	2	13,304,289	65.0%
Energy Management	116	38,095,797	4	0	854,584	2.2%
HVAC	657	38,353,298	6	0	582,371	1.5%
Irrigation	146	3,108,899	4	1	879,420	28.3%
Lighting	1,150	43,062,488	8	0	773,303	1.8%
Midstream	4,612	18,306,242	8	0	55,458	0.3%
Motors	106	7,476,822	4	1	4,252,111	56.9%
Small Business Lighting	2,127	13,975,513	8	0	73,413	0.5%
Other	269	14,322,423	6	1	2,733,336	19.1%
Total	9,234	197,173,117	52	5	23,508,285	11.9%

Table 4 lists the evaluation findings, including number of projects, gross savings, precision, and net savings. Overall, the Wattsmart Business program achieved a 98.6% gross realization rate for the program year, though some variability occurred between measure categories. The impact evaluation achieved ±8.0% precision with 90% confidence overall. The Cadmus team calculated NTG of 76.5%, yielding evaluated net savings of 148,713,049 kWh. The *Measure Strata Findings* section describes specific details and findings per strata.

² Where there are small project sample sizes, the results should be viewed as directional in nature.

Table 4. 2020 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
Compressed Air	51	20,471,636	20,574,721	100.5%	0.74%	99%	20,368,974
Energy Management	116	38,095,797	38,095,797	100.0%	0.00%	59%	22,476,520
HVAC	657	38,353,298	38,405,444	100.1%	10.94%	42%	16,130,286
Irrigation	146	3,108,899	3,023,243	97.2%	18.19%	69%	2,086,038
Lighting	1,150	43,062,488	41,384,629	96.1%	4.94%	101% ^c	41,798,475
Midstream	4,612	18,306,242	19,664,738	107.4%	3.28%	91%	17,894,912
Motors	106	7,476,822	7,465,991	99.9%	0.32%	45%	3,359,696
Small Business Lighting	2,127	13,975,513	14,659,433	104.9%	5.64%	95%	13,926,461
Other	269	14,322,423	11,420,078	79.7%	22.63%	95%	10,849,074
Total	9,234	197,173,117	194,694,074	98.7%	3.24%	76.5%	148,890,437^{0.9}

^a Totals in tables may not sum due to rounding.

^b The measure category precision is based on 80% confidence; the Portfolio precision is based on 90% confidence.

^c NTG is 101% due to an evaluated lighting strata freeridership estimate of 0% and the application of a 1% portfolio-level nonparticipant spillover estimate.

Measure Strata Findings

The following sections provide a high-level summary of the findings in each measure strata. PacifiCorp defines a measure 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 Cadmus team mapped the measure categories within RMP’s measure database to strata used in the evaluation. Table 5 describes the measure mapping strategy.

Table 5. Measure Mapping

Measure Category	Program Name	Strata	Projects
Compressed Air	Wattsmart Business - UT	Compressed Air	51
Energy Management	Wattsmart Business – UT	Energy Management	116
HVAC	Midstream Lighting - UT	HVAC	657
Irrigation	Wattsmart Business – UT	Irrigation	146
Lighting	Wattsmart Business – UT	Lighting	1,150
Lighting	Midstream Lighting - UT	Midstream	4,612
Motors	Wattsmart Business – UT	Motors	106
Additional Measures	Wattsmart Business – UT	Other	2,127
Building Shell	Wattsmart Business – UT		
Food Service Equipment	Wattsmart Business – UT		
Oil & Gas	Wattsmart Business – UT		
Refrigeration	Wattsmart Business – UT		
Strategic Energy Management Payments	Wattsmart Business – UT		
Direct Install	Wattsmart Business – UT	Small Business Lighting	269
Total			9,234

Compressed Air

During 2020, RMP provided incentives for 51 compressed air measures and reported 20,471,636 kWh in energy savings, which accounted for 10% of all reported energy savings. The Cadmus team evaluated six sampled projects and extrapolated results to the population for a realization rate of 100.5% for the Compressed Air stratum.

Two of the sample projects accounted for 12,862,383 kWh. Both projects involved large custom compressed air system upgrades. PacifiCorp’s implementer appropriately utilized trend data to determine compressed air system load profiles and custom calculations to determine savings. Cadmus found no discrepancies in the calculations or the load profile justification. Four randomly sampled projects accounting for an average of 111,973 kWh reported savings each were evaluated with minimal discrepancies related to the load profiles and savings calculations.

Energy Management

During 2020, RMP provided incentives for 116 energy management measures and reported 38,095,797 kWh in energy savings, which accounted for 19% of all reported energy savings. The Cadmus team evaluated four sampled projects and extrapolated results to the population for a realization rate of 100% for the energy management stratum. All energy management measures involved retro-commissioning projects.

The Cadmus team found all projects were appropriately documented and savings calculations matched best practices for the associated energy efficiency measure types. We contacted customers representing the sampled projects and verified the energy efficiency improvements were implemented as described

and operating correctly. We found no discrepancies with the remaining projects, which resulted in a 100% realization rate for all sampled projects.

HVAC

During 2020, RMP provided incentives for 657 HVAC measures and reported 38,353,298 kWh in energy savings, which accounted for 19% of all reported energy savings. The Cadmus team evaluated six sampled projects and extrapolated results to the population for a realization rate of 100% for the HVAC stratum.

Three projects involved high-efficiency air conditioning units. Reported savings for all projects were calculated using PacifiCorp's in-house HVAC calculator. The Cadmus team calculated savings based on the air conditioner measure from the Idaho Power v2.2 Technical Reference Manual (TRM), and evaluated energy savings exhibited an average realization rate of 95%. Two projects involved evaporative cooling and variable frequency drives (VFDs). In both projects, the VFDs were responsible for the discrepancies in savings. PacifiCorp used deemed savings for VFD projects. We calculated saving based on the VFD for HVAC measure from the Idaho Power v2.2 TRM and found slightly lower realized energy savings, on average, for VFDs. The last evaluated project involved multiple high-efficiency measures installed at facility. The Cadmus team found no discrepancies in the reported calculations and documentation.

Irrigation

During 2020, RMP provided incentives for 146 Irrigation measures and reported 3,108,899 kWh in energy savings, which accounted for 2% of all reported energy savings. The Cadmus team evaluated five sampled projects and extrapolated results to the population for a realization rate of 97% for the irrigation stratum.

Three sampled projects involved irrigation hardware, and two sampled projects involved VFDs serving irrigation pumps. Irrigation hardware measures exhibited an average realization rate of 51%. RMP utilized deemed savings for all irrigation hardware measures, but savings did not align with the Regional Technical Forum's (RTF's) irrigation hardware workbook v4.1. The Cadmus team used the RMP's irrigation hardware workbook v4.1 (approved in May 2018) for evaluated savings. Three hardware measures (pressure regulators, drop tubes, and goosenecks) no longer realize energy savings when compared to the prior irrigation hardware version. Both sampled projects involving VFDs for irrigation pumps realized greater savings than reported. To calculate savings for these projects, we used project-specific inputs and a savings methodology based on the Irrigation Pump VFD Energy Savings Calculation Methodology whitepaper from Public Utility District No. 1 of Chelan County, which resulted in higher evaluated energy savings.

Lighting

During 2020, RMP provided incentives for 1,150 lighting measures. RMP reported 43,062,488 kWh in energy savings, which accounted for 22% of all reported program energy savings.

The Cadmus team evaluated eight sampled projects and extrapolated results to the population for a realization rate of 96% for the lighting stratum. Four of the eight sampled projects realized energy savings within 5% of the reported savings. We observed minimal discrepancies. Two projects realized energy savings less than 95% of reported savings, and two projects realized energy savings greater than 110% of reported. All four projects with low and high realization rates exhibited the same findings. For evaluated savings calculations, the Cadmus team used calculations identical those used for reported savings, which matched the RTF guidance. We updated hours of use, waste heat factors, and baseline wattages based on the lookup tables for lighting measures and building types from the RTF, which resulted in higher and lower savings than reported.

Midstream

During 2020, RMP provided incentives for 4,612 midstream measures. RMP reported 18,306,242 kWh in energy savings, which accounted for 9% of all reported program energy savings.

The Cadmus team evaluated eight sampled projects and extrapolated results to the population for a realization rate of 99% for the midstream stratum. Similar to the lighting stratum, we used evaluated savings calculations identical to those used to calculate reported savings, which matched the RTF guidelines. We updated hours of use, waste heat factors, and baseline wattages based on the lookup tables for lighting measures and building types from the RTF's midstream lighting measure, which resulted in higher and lower savings than reported.

Motors

During 2020, RMP provided incentives for 106 Motors measures and reported 7,476,822 kWh in energy savings, which accounted for 4% of all reported energy savings. The Cadmus team evaluated five sampled projects and extrapolated results to the population for a realization rate of 100% for the motors stratum.

Three sampled projects involved VFDs serving custom process applications, one project involved a green motor rewind process, and one project involved the installation of a VFD serving a hot water pump. The Cadmus team found the savings calculation methodology and supporting documentation was appropriate for the three projects involving custom VFDs. We found no discrepancies. The reported savings for the green motor rewind project accurately matched the RTF's green motor rewind measure and exhibited a 100% realization rate. RMP's reported savings for the VFD serving the hot water pump as a deemed value (kilowatt-hour per horsepower per year). We evaluated this project using the Idaho Power TRM v3.0, which had lower hours of use on hot water pumps and resulted in lower evaluated savings.

Small Business Direct Install

During 2020, RMP provided incentives for 2,127 Direct Install measures and reported 13,975,513 kWh in energy savings, which accounted for 7% of all reported energy savings. The Cadmus team evaluated eight sampled projects and extrapolated results to the population for a realization rate of 105% for the direct install stratum.

RMP utilized an in-house workbook to document installed direct install lighting measures and calculate savings. The workbook did not include formulas, and we were unable to verify calculations for reported savings. The Cadmus team calculated savings for all sampled projects based on the calculation methodology outlined by the RTF, with inputs and assumptions based on the building type, installed fixture, and lumen-equivalent baseline fixture. Realization rates for sampled projects varied between 82% and 127%. Because the calculation formulas and many calculation inputs for reported savings were not available for review, we were unable to determine the factors driving discrepancies between the reported and evaluated savings.

Other

During 2020, RMP provided incentives for 269 measures in the “other” category and reported 14,322,423 kWh in energy savings, which accounted for 7% of all reported energy savings. The Cadmus team evaluated seven sampled projects and extrapolated results to the population for a realization rate of 80% for the other stratum. Realization rates varied between 55% and 189% among sampled projects.

Six of the seven sampled project involved the installation of cool roofs. Cool roofs save energy by reflecting more sunlight than a traditional roof, which reduces the need for mechanical cooling of the indoor environment. The savings for cool roofs are dependent on the climate of the building location and the building characteristics. RMP utilized a single deemed value (kilowatt-hour per square foot) for all cool roof projects. We evaluated these projects by simulating energy use through the Oakridge Cool Roof Calculator and found evaluated savings were lower than reported for four projects and higher than reported for two projects. The non-cool roof sampled project involved custom calculations for a building management controls upgrade project. The implementer used custom calculations and trend data performance to calculate savings. The Cadmus team found the calculation methodology and documentation to be appropriate.

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. The evaluation includes three NTG components:

- **Freeridership** – freeridership refers to energy savings that would have occurred in the absence of the program and results in a reduction to program savings.
- **Participant Spillover** – participant spillover refers to additional energy savings obtained by customers who invested in additional energy-efficient projects due to program participation when no rebates or incentives were paid and are added to program savings.
- **Nonparticipant Spillover** – nonparticipant spillover refers to energy savings generated by customers who were motivated by information about energy efficiency provided by RMP, and/or past RMP program participation, to invest in energy efficiency projects for which they did not receive an incentive and are added to program savings.

We used self-report surveys from participants to estimate freeridership and participant spillover ratios by measure strata. The Cadmus team determined the percentage of nonparticipant spillover for the 2020 program based on the responses to questions in the 2020 general population survey of RMP businesses customers. See *Appendix B. Net-to-Gross Analysis Methodology* for more information on NTG calculation methodology.

The Cadmus team used the following formula to determine the final NTG ratio for each measure strata:

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

Table 6 summarizes the NTG evaluation results, shown as NTG and evaluated gross savings by program-measure strata. The program achieved 76.5% NTG overall.

Table 6. 2020 Utah Wattsmart Business NTG Results

Strata	Measure Responses (n)	Freeridership Ratio	Spillover Ratio ^a	Nonparticipant Spillover	NTG	Evaluated Net Program Population Savings (kWh)
Compressed Air	6	2% ^a	0%	1%	99%	20,368,974
Energy Management	5	42% ^b	0%	1%	59%	22,476,520
HVAC	7	59% ^a	0%	1%	42%	16,130,286
Irrigation	6	32% ^a	0%	1%	69%	2,086,038
Lighting	20	0% ^a	0%	1%	101%	41,798,475
Midstream	39	12% ^a	2%	1%	91%	17,894,912
Motors	4	56% ^a	0%	1%	45%	3,359,696
Small Business Lighting	103	7% ^a	1%	1%	95%	13,926,461
Other	7	6% ^a	0%	1%	95%	10,849,074
Total	197	24.8%^c	0.3%^c	1.0%	76.5%	148,890,437

^a Weighted by evaluated gross program savings.

^b Energy management strata freeridership ratio of 42% is heavily weighted towards a large chiller project estimated at 50% freeridership that represents 85% of the energy management strata analysis sample evaluated gross kWh savings.

^c Weighted by evaluated gross program population savings.

Process Evaluation Findings

The Cadmus team collected primary data from participants and partial participants of the Wattsmart Business program to identify 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. The team also conducted four stakeholder interviews with program implementation and RMP staff to gather their insights about the facilitation of the program.

Process Sampling

The Cadmus team surveyed participants and partial participants and interviewed stakeholders for the 2020 evaluation, as summarized in Table 7. The surveys were split into two different waves, one for Q1 and Q2 participants and a second wave for Q3 and Q4 participants. Among the three participant groups

surveyed, the response rates were 11% for typical upgrades and custom analysis, 9% for SBDI, and 5% for lighting Instant Incentives.

Table 7. Utah 2020 Wattsmart Business Program Process Activity Sampling

Program Offering/Measure Category	Sampling Frame ^a	Target Completes	Achieved Completes
Additional Measures	11	Census	1
Building Shell	24		5
Compressed Air	29		6
Custom	3		1
Energy Management Retro-Commissioning	30		4
Food Service Equipment	12		1
HVAC	91		8
Irrigation	47		6
Lighting (other than SBDI or Lighting Instant Incentives)	274		23
Motors	26		5
Refrigeration	12		1
Other ^b	3		1
SBDI	1,182		Census
Lighting Instant Incentives	771	Census	40
Participant Subtotal	2,515	Census	212^c
Partial Participants	54	Census	8
Stakeholder Interviews	N/A	4	4

^a Sampling frame based on unique customers with contact information after removing duplicates.

^b Other includes agriculture, food service, and oil & gas.

^c Total completes across all offerings (typical upgrades/custom analysis, SBDI, lighting instant incentives).

Participant Experience

The Cadmus team received completed surveys with Wattsmart Business, SBDI, and Lighting Instant Incentive program participants.

Wattsmart Business Typical Upgrades and Custom Analysis

As shown in Table 7, the Cadmus team received completed surveys from 62 participants across twelve measure categories in the Wattsmart Business program (typical upgrade and custom participants). This included respondents who completed typical upgrades that were readily available through the program as well as respondents who completed custom incentives and worked with a certified vendor to address their needs. Table 8 shows the breakdown of respondents by measure category and incentive type.

Table 8. 2020 Participant Survey Sample by Measure Type

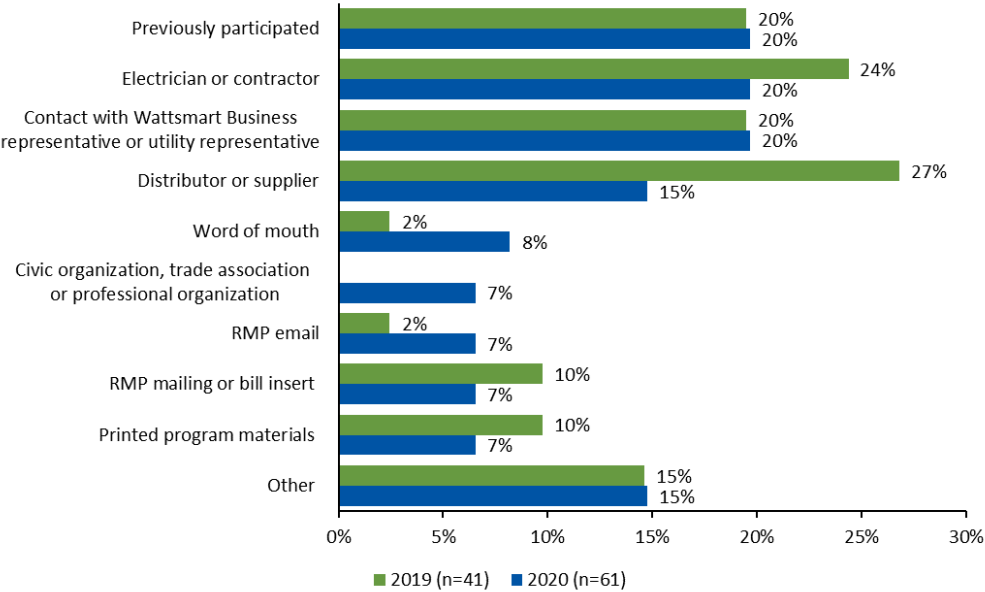
Measure Category	Typical Upgrades	Custom Analysis
Additional Measures	0	1
Building Shell	5	0
Compressed Air	2	4
Custom	0	1
Energy Management Retro-Commissioning	0	4
Food Service Equipment	1	0
HVAC	6	2
Irrigation	1	5
Lighting	24	0
Motors	1	4
Refrigeration	0	1
Total	40	22

Surveys with participants in the Wattsmart Business program asked about their program experience, satisfaction with various aspects of the program, perceived benefits of participating, and firmographic information.

Participant Experience

Respondents (n=61) reported that they most often learned about the incentives available for their project through previous program participation (20%), their electrician or contractor (20%), or through contact with a Wattsmart Business or utility representative (20%). This only slightly different from 2019 respondents who identified their distributor or supplier (27%) and their electrician or contractor (24%) as the most common sources of awareness (n=41). Figure 2 shows the full results from 2019 and 2020 respondents. The “other” category includes responses from the RMP website, a Wattsmart Business sponsored workshop or community event, and other sources.

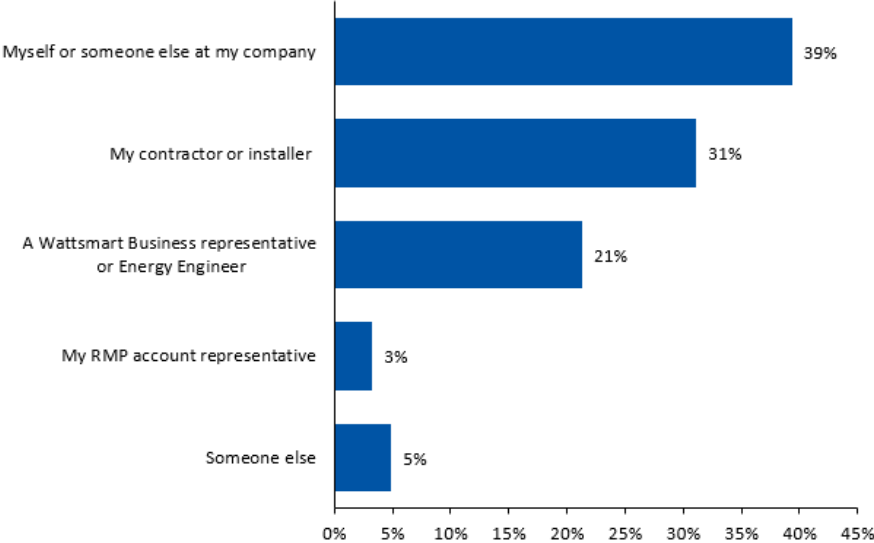
Figure 2. Sources of Awareness



Source: RMP Wattsmart Business Program 2020-2021 Wattsmart Business Participant Survey QA4. Don't know and refused responses removed. (n=61).

Respondents reported, on average, that the incentive they received covered 30% of their project cost (n=58). 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 3 shows the response breakdown by category.

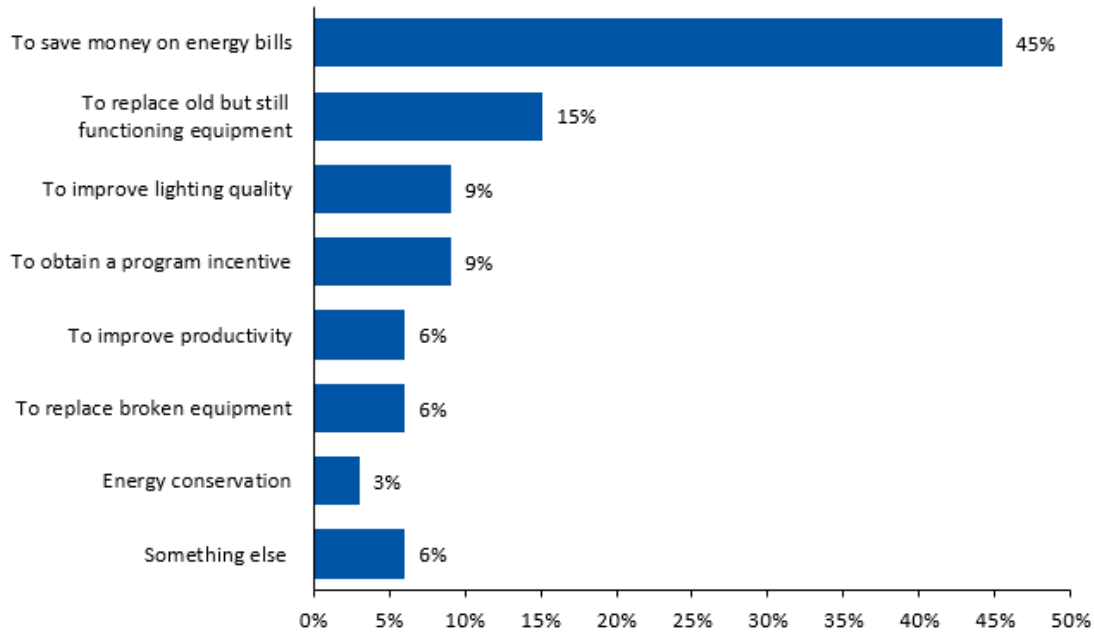
Figure 3. Who Completed the Application



Source: RMP Wattsmart Business Program 2020-2021 Wattsmart Business Participant Survey QB2. Don't know and refused responses removed. (n=61).

Beginning with the Q3 wave of surveys, the Cadmus team asked Wattsmart Business participants what the most important reason was for their company participating in the program. As shown in Figure 4, respondents said the most important reason was to save money on energy bills (45%), followed by replacing old but still functioning equipment (15%).

Figure 4. Most Important Reason for Participation

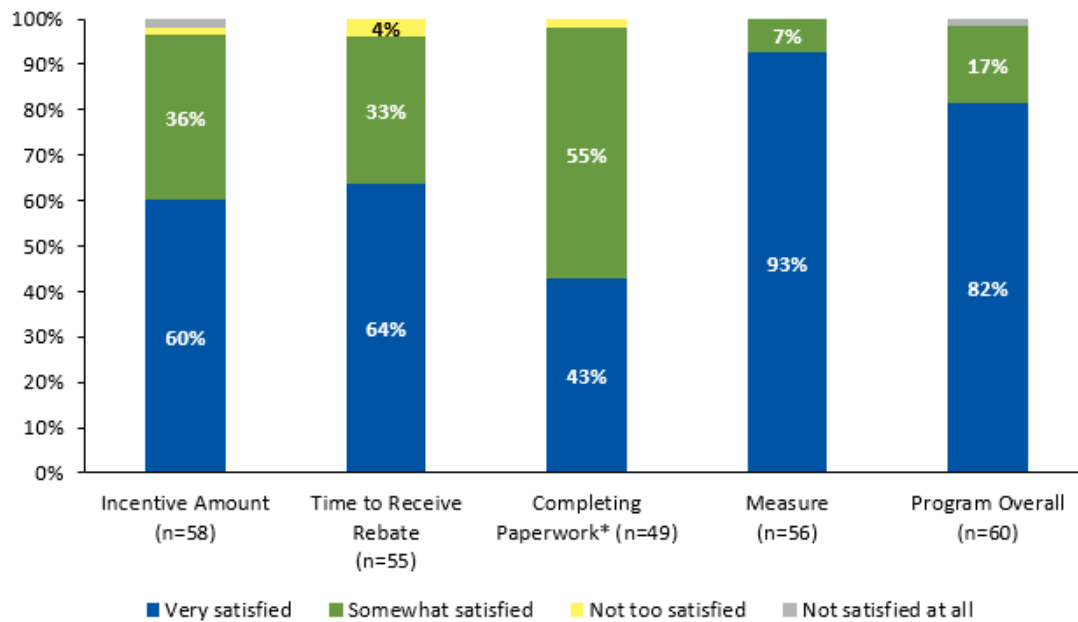


Source: RMP Wattsmart Business Program 2020-2021 Wattsmart Business Participant Survey QB1. Don't know and refused responses removed. (n=33).

Participant Satisfaction

As shown in Figure 5, 96% of participants were satisfied (either *very satisfied* or *somewhat satisfied*) with the amount of their incentive (n=58), 97% were satisfied with the time it took to receive their rebate (n=55), and 98% thought the paperwork was easy to complete (n=49). These ratings differed slightly from the 2019 surveys where these aspects all had satisfaction ratings of 100%. Despite this, the change was minimal, with only one or two customers giving lower satisfaction ratings. One hundred percent of participants were satisfied with the measure they received through the program. The overall satisfaction rating increased slightly from the 2019 survey responses, which had a 97% satisfaction rating (n=36).

Figure 5. Satisfaction with Program Components

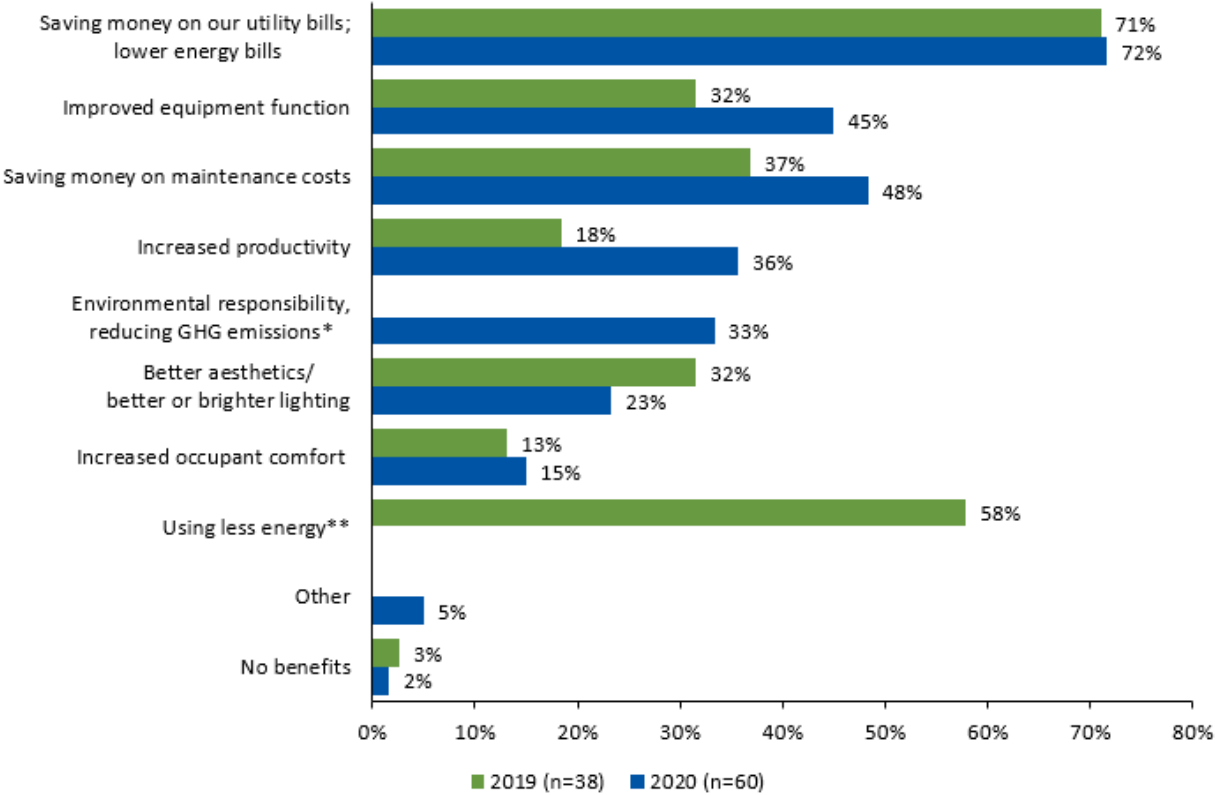


Source: RMP Wattsmart Business Program 2020-2021 Wattsmart Business Participant Survey QB3, QB5, QB8, QB13, QB16. Don't know and refused responses removed. *Question was asked on a scale using "easy" rather than "satisfied".

Project Benefits

Both typical upgrades or custom analysis participants reported one or more benefits that their companies experienced from the project they completed. Most respondents said benefits included lower energy bills or improved equipment function. This was slightly different from the 2019 responses in which other top responses included using less energy (this response option was only in the 2019 survey) and saving money on maintenance costs. As shown in Figure 6, participants also reported benefits such as increased productivity, environmental responsibility, and better or brighter lighting, among others. Across all 60 respondents, 73% reported some benefit from their project other than energy cost savings.

Figure 6. Project Benefits



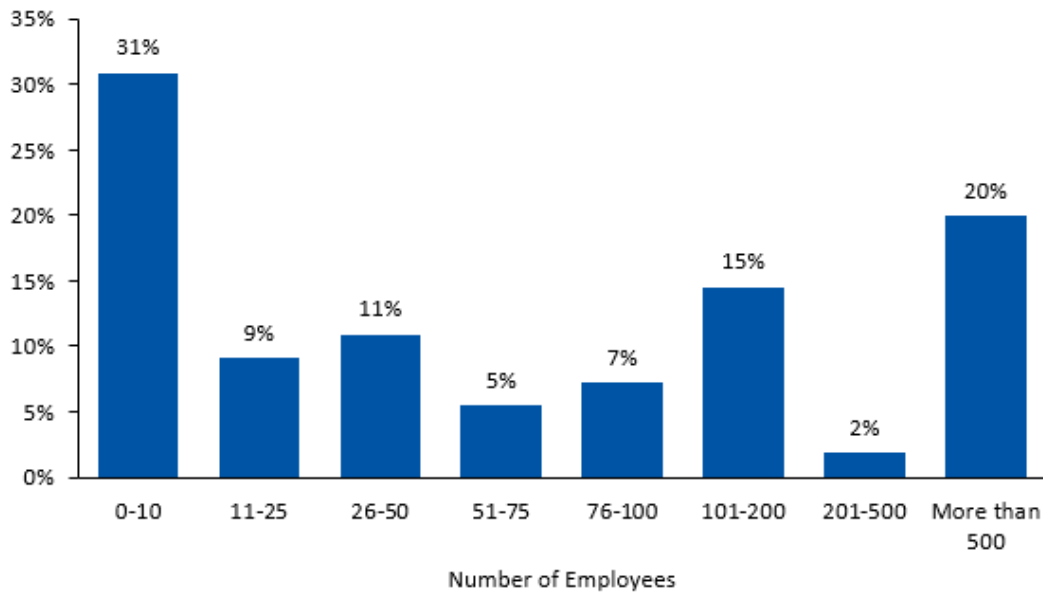
Source: RMP Wattsmart Business Program 2020-2021 Wattsmart Business Participant Survey QB15. Don't know and refused responses removed. *Response option only in 2020 survey. **Response option only in 2019 survey

Firmographics

Seventy-eight percent of respondents said their companies own the facility where the improvements were made, while 20% said they lease the facility, and 2% said they had a separate arrangement (n=54).

Additionally, the largest group of respondents said their companies employ between 0 to 10 people (31%). Figure 7 shows the full breakdown of responses.

Figure 7. Number of Employees



Source: RMP Wattsmart Business Program 2020-2021 Wattsmart Business Participant Survey QE5. Don't know and refused responses removed. (n=55).

Respondents also identified what type of fuel source their facilities use for space and water heating. For space heating, 87% of respondents said their facility uses gas, 6% said they use electric sources, and 8% said they use additional sources (n=53). For water heating, 75% of respondents said they use gas sources, 19% said they use gas, and 6% said they use additional sources (n=53).

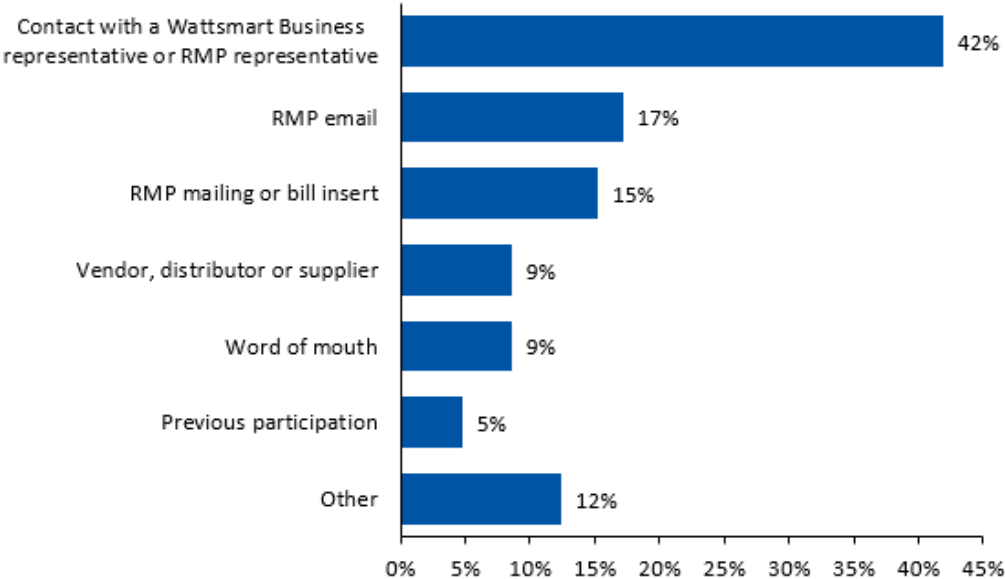
Small Business Direct Install

The Cadmus team collected responses from 110 SBDI participants. Surveys with SBDI participants asked about their experience, satisfaction with various aspects of the program, perceived benefits and challenges associated with participating, and firmographic information.

Participant Experience

As shown in Figure 8, the most common source of awareness reported by respondents was contact with a Wattsmart Business representative or RMP representative (n=105).

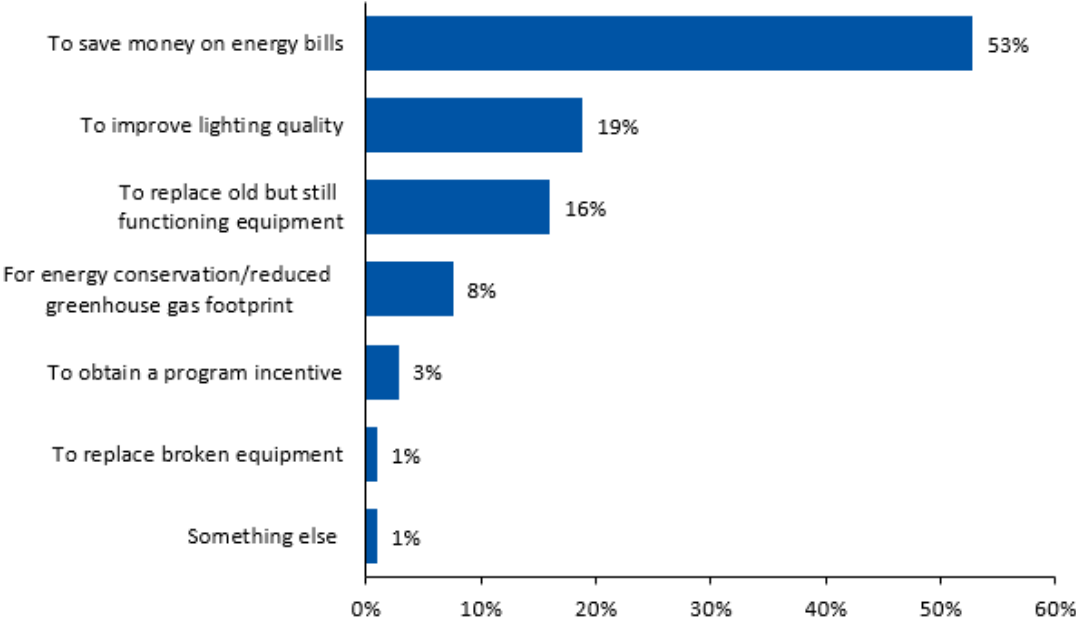
Figure 8. SBDI Sources of Awareness



Source: RMP Wattsmart Business Program 2020-2021 SBDI Participant Survey QB1. (n=105)

Additionally, most respondents said the most important reason their company decided to participate was to save money on energy bills (n=106). The full response breakdown is shown in Figure 9.

Figure 9. Most Important Reason for Participation



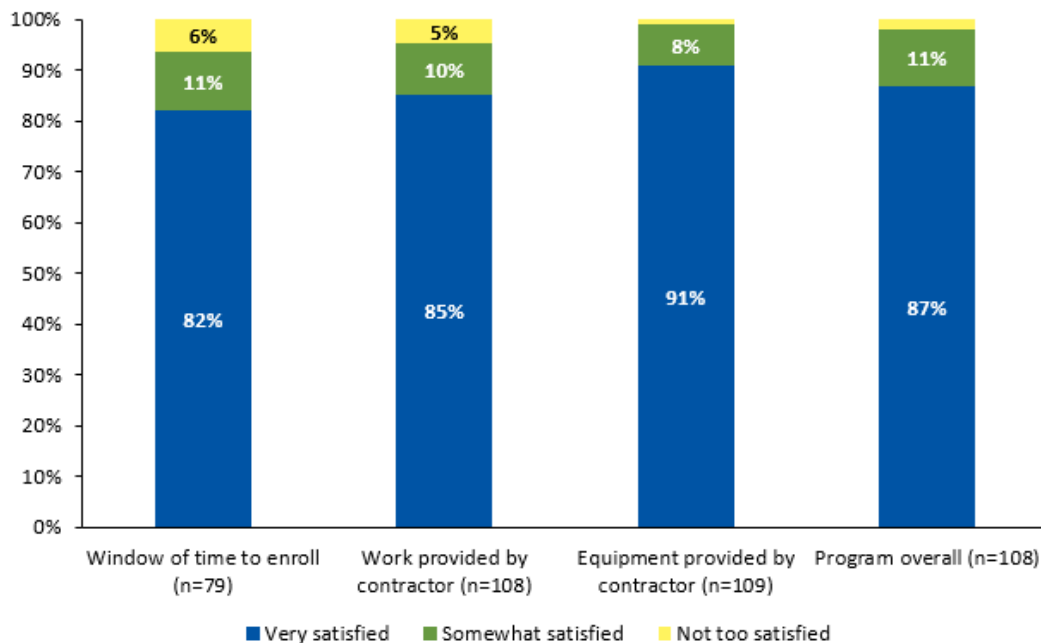
Source: RMP Wattsmart Business Program 2020-2021 SBDI Participant Survey QB2. (n=106)

Ninety-seven percent of respondents reported that they received a detailed project proposal with estimated incentive and energy bill saving amounts after their free energy assessment (n=107). And 55% of respondents said that project savings information was the most influential piece of the proposal to proceed with their project, while 39% said it was utility bill and energy savings information, 5% said something else, and 1% said no information was most influential (n=104). Twenty-three percent of respondents said there was other lighting equipment they wanted to install that was not offered in their project proposal (n=108). Of these respondents, 68% said they asked their contractor about this other equipment, but the contractor did not mention other Wattsmart Business incentives available for the equipment (n=25). The Cadmus team also asked respondents how their companies' interest in or ability to complete energy efficiency projects was impacted by the COVID-19 pandemic. Most respondents (57%) said it was not different as a result (n=110).

Participant Satisfaction

As shown in Figure 10, most participants were *very satisfied* with the work that was done by their contractor, the equipment they had installed, the window of time they had to enroll in the program, and the program overall. These results slightly differed from the 2019 respondents. The window of time to enroll had a slightly higher satisfaction of 98% (n=51), work provided by the contractor was slightly lower at 94% (n=66), equipment provided by the contractor was also slightly lower at 97% (n=68), and the program overall also had a slightly lower satisfaction rating at 97% (n=65).

Figure 10. Satisfaction with SBDI Program Components and Program Overall

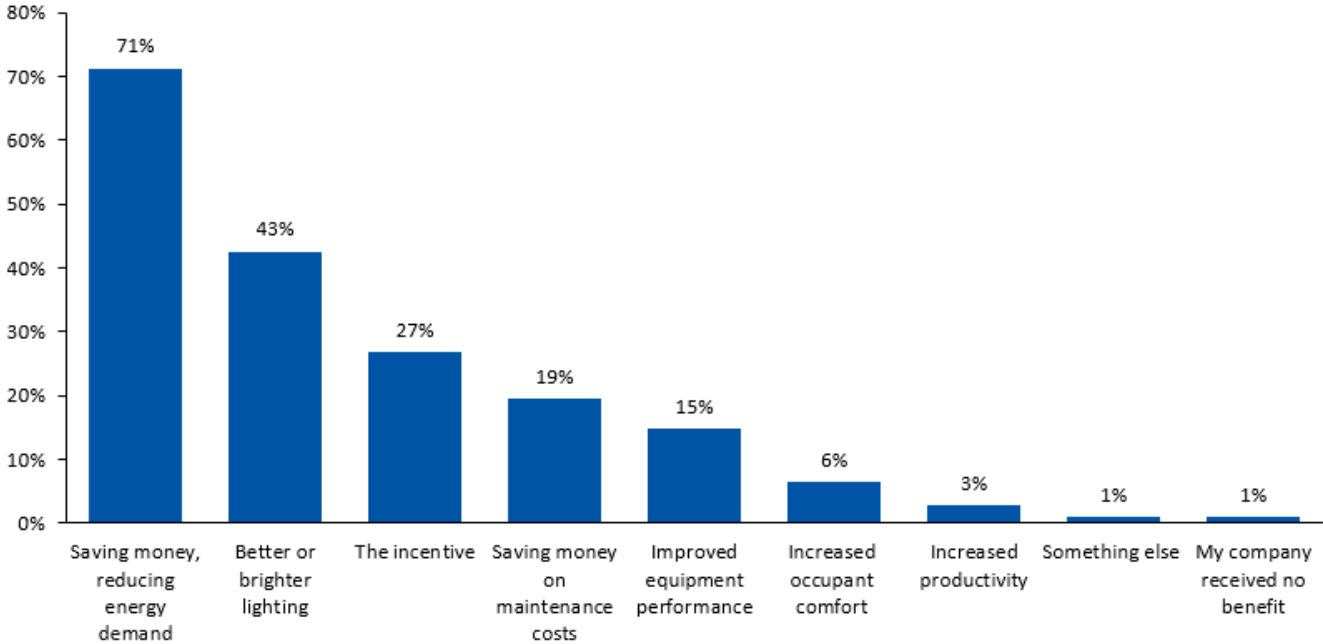


Source: RMP Wattsmart Business Program 2020-2021 SBDI Participant Survey QB7, QB9, QB16, QB21.

Project Benefits and Challenges

Ninety-seven percent of SBDI participants reported one or more benefits that their companies experienced due to the equipment they installed. As shown in Figure 11, participants reported a wide range of benefits. Fifteen percent of respondents reported experiencing challenges participating in the program (n=100). These challenges primarily related to completing the required paperwork and the work that was completed by contractors. Additionally, 13% of respondents offered suggestions for improving the program offering (n=102). Suggestions included increased measure offerings, better communication, and longer timeframes to enroll.

Figure 11. Project Benefits

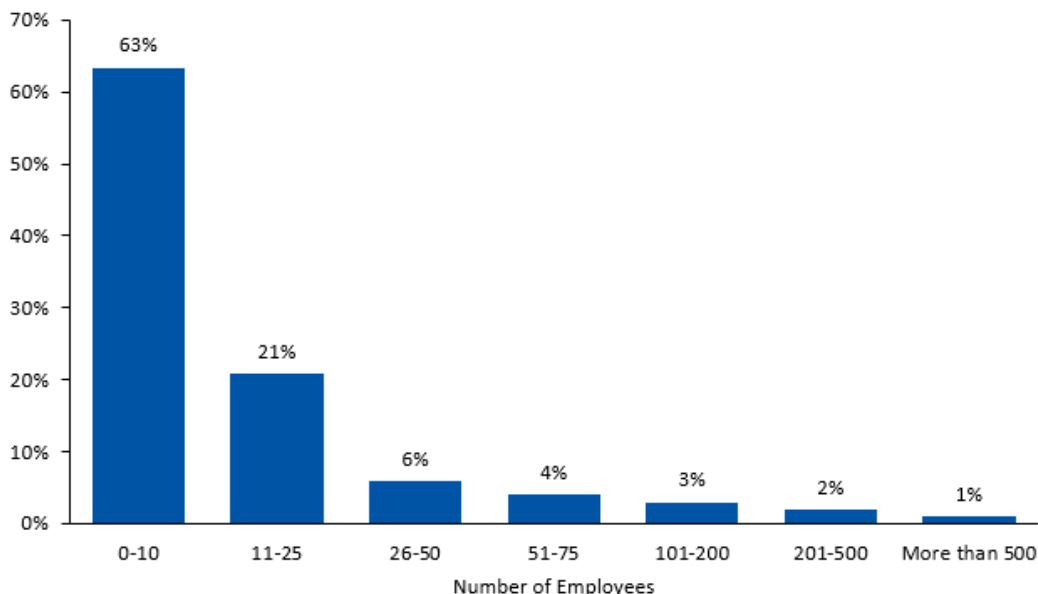


Source: RMP Wattsmart Business Program 2020-2021 SBDI Participant Survey QB17. (n=108)

Firmographics

The most common industries that respondents worked in (n=101) were repair and maintenance service (16%), manufacturing (13%), health care (11%), and retail (11%). Sixty-two percent of respondents said their companies own the facility where the improvements were made, while 37% lease their facility, and 1% of respondents have some other arrangement (n=97). Additionally, most respondents indicated their companies employ between 0-10 or 11-25 people (n=101). The full response breakdown is shown in Figure 12.

Figure 12. Number of Employees



Source: RMP Wattsmart Business Program 2020-2021 SBDI Participant Survey QE4. (n=101)

Respondents also identified what type of fuel source their facilities use for space and water heating. For space heating, 92% of respondents said their facility uses gas, 6% said they use electric sources, and 2% use other sources (n=100). For water heating, 60% of respondents said they use gas sources, 36% said they use electric, and 4% said they use other sources (n=97).

Lighting Instant Incentives

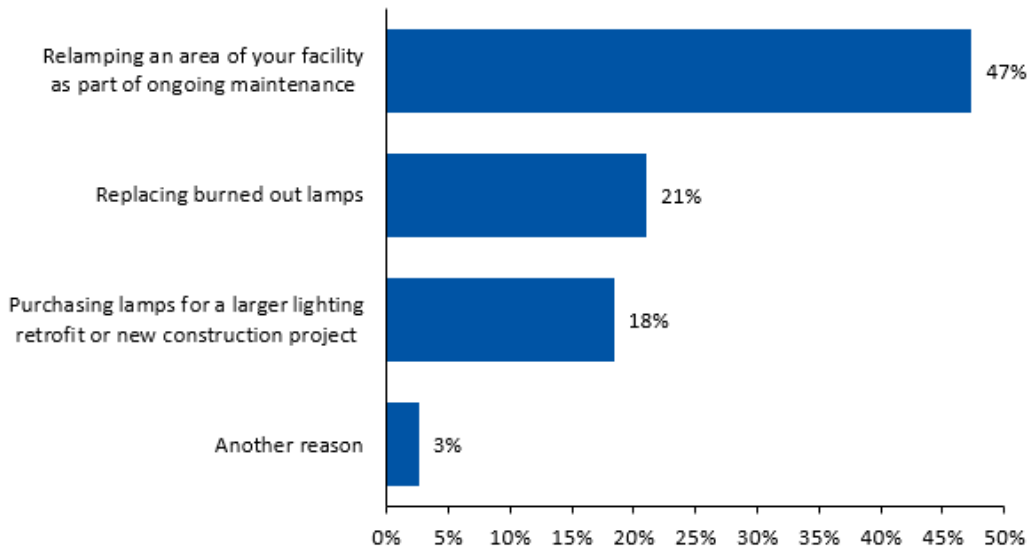
Cadmus surveyed 40 lighting instant incentives participants. Surveys with lighting instant incentives participants asked about their program experience and firmographic information.

Program Delivery

The majority, 82%, of respondents reported learning about the program incentives from their contractor, distributor, or lighting supplier (n=39). Other sources of awareness included contact with Wattsmart Business representative or RMP representative (5%), word of mouth (5%), something else (5%), a contractor or distributor/supplier website (3%), and a trade association or professional organization (3%).

Ninety-seven percent of respondents said they purchased their equipment through a vendor they had worked with previously (n=38). When asked if they purchased from the vendor primarily because they offered the instant incentive, 43% of respondents said yes, and 57% said no (n=37). Ninety-seven percent of the respondents said it was either *very easy* or *somewhat easy* to find a program discount on the equipment they wanted to purchase (n=38). Figure 13 shows the response breakdown to each participant’s reason for purchasing their equipment.

Figure 13. Reason for Purchasing Equipment



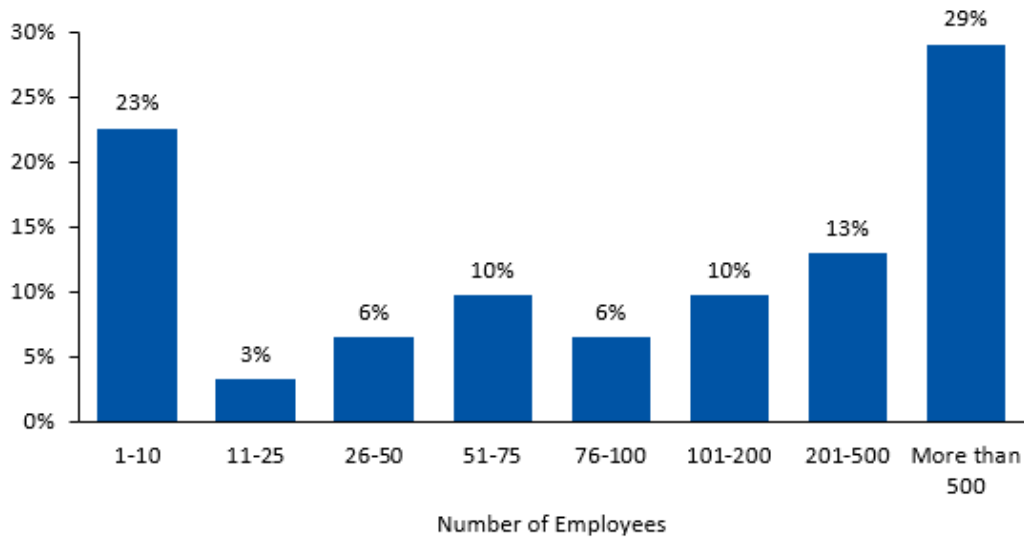
Source: RMP Wattsmart Business Program 2020-2021 Lighting Instant Incentives Participant Survey QB6. (n=38)

One hundred percent of respondents said they were either *very satisfied* or *somewhat satisfied* with the amount of the incentive they received (n=37). This was consistent with the 2019 responses (n=27). One respondent said they encountered challenges participating in the program. This respondent said they ran into a high frequency of changes and exclusions in terms of what LED lamps were included in the program. Additionally, ninety seven percent of respondents said they were either *very satisfied* or *somewhat satisfied* with the instant incentives program overall (n=37). This was slightly lower than the 2019 survey in which 100% of respondents said with were satisfied with the program overall (n=27). Three respondents offered recommendation to improve the instant incentives program. One respondent indicated there is disconnect in terms of the desire to make upgrades between building owners and leasing tenants and suggested introducing ways to incentivize both parties. Another respondent said they would not have known about the incentive if they were not told by their lighting company and suggested increased marketing. The third respondent suggested offering incentives to homeowners to increase participation.

Firmographics

The most common industries that respondents worked in (n=35) were manufacturing (14%), real estate/property management (14%), construction (11%), and public administration/government (11%). Eighty-four percent of respondents said their companies own the facility where the improvements were made, 10% rent, and 6% have some other arrangement (n=31). Figure 14 shows the percentage of respondents who said how many people are employed as each of their companies.

Figure 14. Number of Employees



Source: RMP Wattsmart Business Program 2020-2021 Lighting Instant Incentives Participant Survey QE3. (n=31)

Ninety-one percent of respondents said gas space heating was used at the facility where the improvements were made, while 6% of respondent said electric space heating was used and 3% said some other combination of fuels was used (n=33). Additionally, 76% of respondents said gas water heating is used at the facility, 21% said electric water heating is used, and 3% said some other combination of fuels was used (n=33).

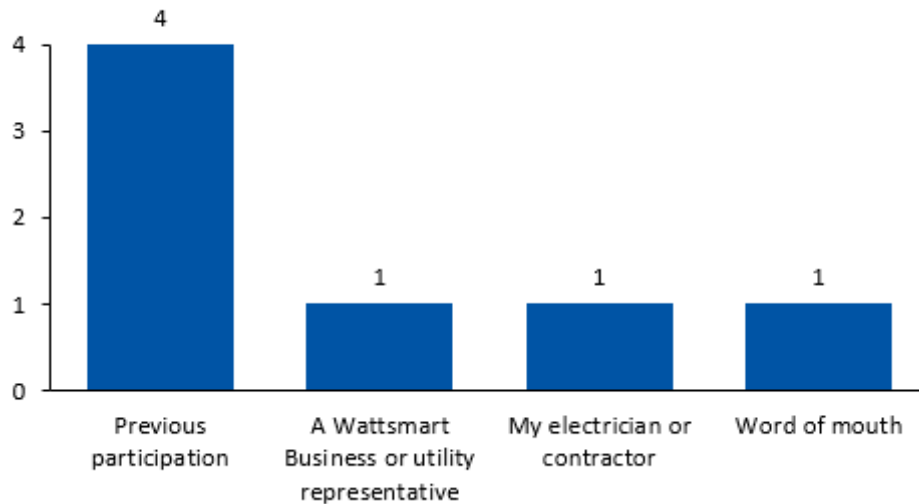
Partial Participant Experience

The Cadmus team received results from eight partial participants: four who considered (or began) a general energy efficiency upgrade project, three who considered (or began) lighting retrofits, and one who considered (or began) an advanced rooftop control project. Surveys with partial participants asked about their sources of awareness, motivation and barriers to participation, satisfaction with various aspects of the program, and firmographic information.

Awareness

As shown in Figure 15, the most common way that respondents learned about the program was through previous participation.

Figure 15. Partial Participant Awareness Sources



Source: RMP Wattsmart Business Program 2020-2021 Partial Participant Survey QC1. (n=8)

Additionally, two respondents said they were *very likely* to request an incentive for a project in the next six months, while three respondents said they were *somewhat likely*. Two other respondents said they were *not too likely*, and one last respondent said they were *not at all likely* (n=8). Seven of the eight respondents said the best way for RMP to keep them informed about incentives for energy efficiency improvements was through utility mailings, emails, newsletters with bills, or bill inserts, and the other respondent said the best way was through the vendor, distributor, or supplier where they purchase their lighting (n=8).

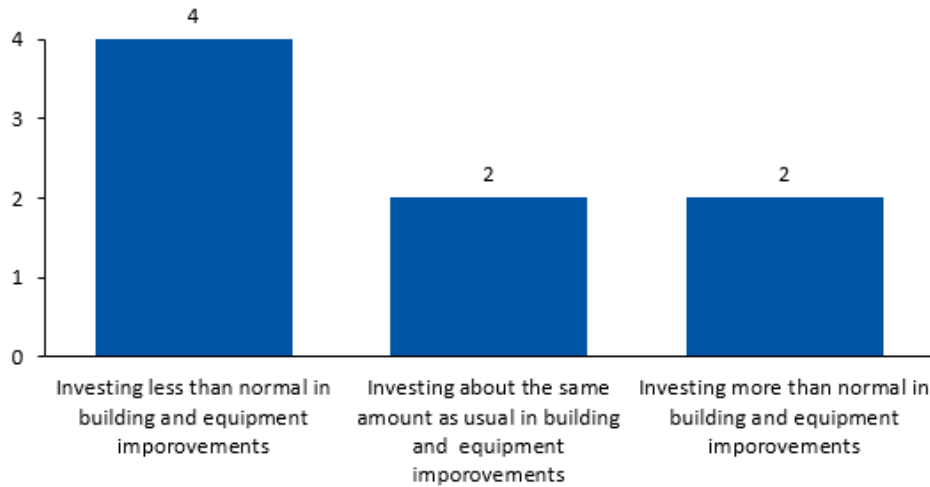
Motivation and Barriers

Seven of the eight respondents reported that their company’s most important motivating factor when making decisions about energy-efficient upgrades was saving money on energy bills, and the other respondent said it was to improve productivity (n=8). This is similar to custom analysis and typical upgrades (45%) and SBDI (53%) participants who also reported saving money on energy bills as their top motivation.

Four respondents reported that their company did not complete the project they initiated through the Wattsmart Business program. When asked why their company did not complete the project, these respondents provided answers relating to lack of budget (two respondents), needing to wait on specific equipment to complete (one respondent), and certain components of the project not qualifying for incentives (one respondent). Of the respondents who did complete their project, three said they applied for a Wattsmart Business incentive, and one was not sure. One respondent said they did not receive an incentive because they did not have qualified lighting, another respondent said the person they were working with on the project did not follow through and the effort to receive an incentive tailed off, and one respondent was not sure why they did not receive an incentive.

The Cadmus team also asked respondents about how the COVID-19 pandemic and related economic impacts had affected their company’s investments in building and equipment improvements. Figure 16 shows the respondents perceptions of how COVID-19 has impacted their businesses.

Figure 16. COVID-19 Impact on Partial Participants



Source: RMP Wattsmart Business Program 2020-2021 Partial Participant Survey QF1. (n=8)

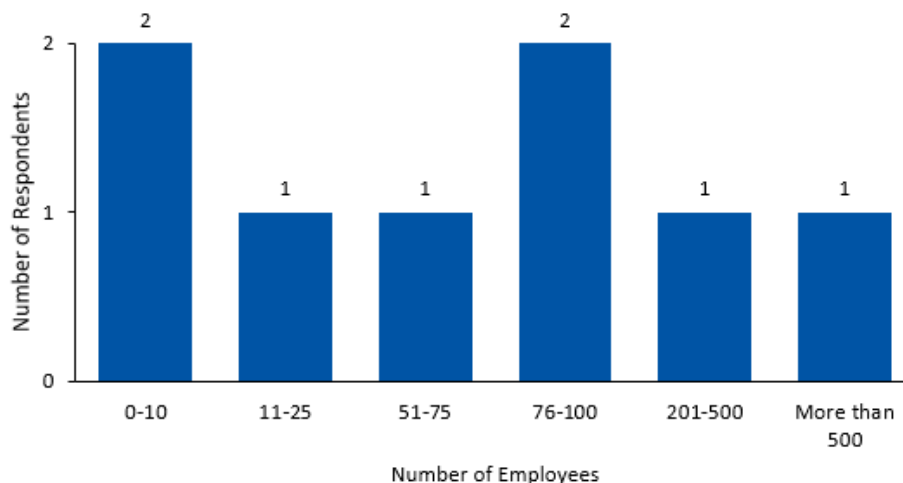
Satisfaction

One respondent reported being *very satisfied* with the program overall, four respondents said they were *somewhat satisfied*, and three respondents reported they were *not too satisfied* (n=8). Of the respondents who said they were *not too satisfied*, two said they gave that rating because they did not get the incentive, and one said they were not satisfied with the overall high rates for services. When asked what RMP could do to improve their experiences with the program, six respondents said there was nothing and two respondents said there could be better/more communication. One of these respondents said there could be better explanation about what products are available over email, and the other respondent said to improve on customer service to ensure projects are followed through with.

Firmographics

Two respondents each were from dairy/agricultural businesses, real estate/property management businesses, and food service business, while one respondent was from the educational services sector, and one last respondent was from a manufacturing business (n=8). Three respondents said their companies own the facility their business is located in. Figure 17 shows the number of employees at each of the respondent’s business.

Figure 17. Number of Employees



Source: RMP Wattsmart Business Program 2020-2021 Partial Participant Survey QG3. (n=8)

Seven of eight respondents said they did not consider their company to face barriers as a result of the sex, race, primary language, nation or origin, or other characteristics of the company owners, employees, or customer base, and one respondent was not sure. Additionally, seven of eight respondents said their company is owned by someone in a disadvantaged group, while one respondent was not sure. One respondent said their facility uses electric space heating, one other said their facility uses both electricity and gas, and five said their facilities use gas space heating (n=7). Four respondents said their facilities use electric water heating and four others said they use gas (n=8).

Cost-Effectiveness Results

As shown in Table 9, the Wattsmart Business program proved cost-effective for the 2020 evaluation period from the Utility Cost Test (UCT) perspective with a benefit/cost (B/C) ratio of 1.31 and the Participant Cost Test (PCT) perspective with a B/C ratio of 2.39. It was not cost-effective according to the PacifiCorp Total Resource Cost (PTRC), Total Resource Cost (TRC), and Ratepayer Impact Measure (RIM) test perspectives. Please see *Appendix C. Cost-Effectiveness Methodology and Measure Category Results* for more information on cost-effectiveness.

Table 9. 2020 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)	\$0.0567	\$66,302,373	\$56,785,193	(\$9,517,180)	0.86
Total Resource Cost Test (TRC No Adder)	\$0.0567	\$66,302,373	\$51,622,903	(\$14,679,470)	0.78
Utility Cost Test	\$0.0337	\$39,407,861	\$51,622,903	\$12,215,042	1.31
Ratepayer Impact Measure Test		\$133,001,044	\$51,622,903	(\$81,378,142)	0.39
Participant Cost Test		\$61,007,201	\$145,810,679	\$84,803,478	2.39
Life-Cycle Revenue Impacts (\$/kWh)					\$0.000433980
Discounted Participant Payback (years)					3.14

Conclusions and Recommendations

This section provides the Cadmus team's conclusions, along with key findings and associated recommendations.

The 2020 Utah program results indicate successful execution; however, there is room to improve lighting and cool roof measures. Compressed air, energy management, HVAC, and motors strata accounted for over 53% of the reported savings in Utah and exhibited realization rates between 99% and 100%. Cadmus found few discrepancies in the sampled projects. Where custom projects were incentivized, RMP's implementer appropriately used trend data to determine load profiles and sufficiently documented baseline and post-installation performance characteristics.

Lighting, midstream, and small business lighting strata exhibited similar characteristics, with a range of realization rates between 78% and 142%, which accounted for 47% of the reported 2020 savings. RMP reported lighting savings using RMP's prescriptive calculation workbooks. These workbooks calculate savings based on customer-reported or observed lighting schedules, fixture specifications, and space lighting control characteristics. The reported savings did not apply a waste heat factor or controls factor. It is industry standard for lighting savings to include a waste heat factor, which accounts for the reduction in lighting waste heat removed by an HVAC system as a result of switching to a more efficient lighting system. This is a summer cooling benefit and a winter heating penalty. Evaluated savings were higher than reported savings for most projects due to the use of a waste heat factor in the evaluated savings calculations. Midstream lighting projects reported hours of use based on an RMP's internally developed hours of use by facility type schedule. The Cadmus team used facility-specific hours of use specified in the RTF. In some instances, hours of use by facility resulted in higher or lower evaluated energy savings than reported.

Sampled measures in the Other stratum exhibited low realized energy savings due to six sampled cool roof measures. RMP utilized a single deemed value (kilowatt-hour per square foot) for all cool roof projects. We evaluated these projects by simulating energy use through the Oakridge Cool Roof Calculator and found evaluated savings were lower than reported for four projects and higher than reported for two projects.

Recommendation: The Cadmus team recommends RMP include a waste heat factor in its lighting calculation workbooks. Specifically, we recommend using values derived from the RTF, which are based on building type and weather zone.³ We also recommend RMP use facility-specific hours of use from the RTF in place of the RMP's internally developed hours of use by facility type. The hours of use for each facility type in the RTF was based on a weighted average using commercial building stock assessment building type weighting and the best available lighting hours of use study data from the past seven years.

³ Regional Technical Forum. "Non-Residential Lighting Midstream." Accessed January 2021.
<https://rtf.nwncouncil.org/measure/non-residential-lighting-midstream>

Implementation of the Wattsmart Business program and its various components resulted in high levels of satisfaction among participants and partial participants. Custom analysis and typical upgrade participants reported nearly 100% satisfaction with all aspects of the program, with the lowest rated aspect being the incentive (which received a 96% satisfaction rating). While these rating differed slightly from the previous round of surveys conducted in 2019, satisfaction remained high overall and steady across the board, notably with the measure installed which received a 100% satisfaction rating. Additionally, all four participant groups surveyed (custom and typical incentives, SBDI, instant incentives) gave the program at least a 97% satisfaction rating overall, indicating the process worked well for them. These overall satisfaction ratings were similar to the 2019 survey responses.

SBDI participants may benefit from a wider range of lighting equipment and better informed contractors. Twenty-three percent of SBDI respondents said there was other lighting equipment they wanted to install that was not offered in their project proposal (n=108). Of these respondents, 68% said they asked their contractor about this other equipment, but the contractor did not mention other Wattsmart Business incentives available for the equipment (n=25).

Recommendation: Consider expanding lighting offerings to include measures such as outdoor flood and pole lights, sign lighting, and can lights. Additionally, work with contractors to ensure they have a full understanding of lighting offerings across the Wattsmart Business program.

Saving money on energy bills is the key motivation to program participation for both participants and partial participants. Across all three survey efforts in which the Cadmus team assessed motivations for participating (custom analysis and typical upgrades, SBDI, and partial participants), respondents identified saving money on energy bills as their top motivation for participating in the Wattsmart Business program. This was identified as the top motivation among custom analysis and typical upgrades respondents (72%), SBDI respondents (53%), and partial participants (88%).

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).⁴ 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. Net-to-Gross Analysis Methodology*).

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 RMP program database then stratified the distribution of measures among sampled sites, primarily by end-use type. We 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. We also collected trend data for nine projects to document historical performance.

⁴ These reports are available online: <https://www.pacificorp.com/environment/demand-side-management.html>

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 Cadmus team conducted an engineering analysis using the appropriate measurement and verification options in the International Performance Measurement and Verification Protocol.⁵ 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 we 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, we surveyed nonparticipants to determine if nonparticipant spillover could be credited to the program (for projects that were otherwise not provided incentives).

Project Review

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

The Cadmus 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, conducted a phone interview with facility personnel to gather information such as equipment types replaced, and hours of operation.

⁵ Efficiency Valuation Organization. January 2012. *International Performance Measurement and Verification Protocol, Concepts and Options for Determining Energy and Water Savings, Volume 1* (p. 25). (EVO 10000 – 1:2012) <http://www.evo-world.org/>

Engineering Analysis

In general, the Cadmus team referenced current measure workbooks and saving estimation methodologies from the Idaho Power Technical Reference Manual and the Regional Technical Forum .^{6,7} The Idaho Power Technical Reference Manual was updated in 2018 and relies on sources such as the Northwest Power and Conservation Council, Northwest Energy Efficiency Alliance, the Database for Energy Efficiency Resources, the Energy Trust of Oregon, the Bonneville Power Administration, third-party consultants, and other regional utilities.

⁶ ADM Associates. October 15, 2018. *Technical Reference Manual 2.2*. Prepared for Idaho Power Company. <https://docs.idahopower.com/pdfs/EnergyEfficiency/Reports/2018TRM.pdf>

⁷ 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 indicate the portions of gross energy savings that were influenced by and are attributable to demand-side management 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 survey 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.

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

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 gross savings that would have occurred without program intervention and is often referred to as freeridership.

The Cadmus team 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 (NPSO) savings occur when market allies influenced by the program install or influence nonparticipants to install energy-efficient equipment (i.e., trade allies promote energy-efficient equipment to all customers as a result of the program training).

Freeridership Estimation

To determine freeridership, the interviewer 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 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 (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 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 nonfreerider. 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:

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

The initial freeridership score is then adjusted to account for the influence of prior program participation, which the respondent ranked on a scale of 1 to 5, with 5 being extremely important. Given Rocky Mountain Power's (RMP's) efforts to cross-promote its entire portfolio of energy efficiency programs, a respondent's prior participation in a RMP 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 RMP 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.

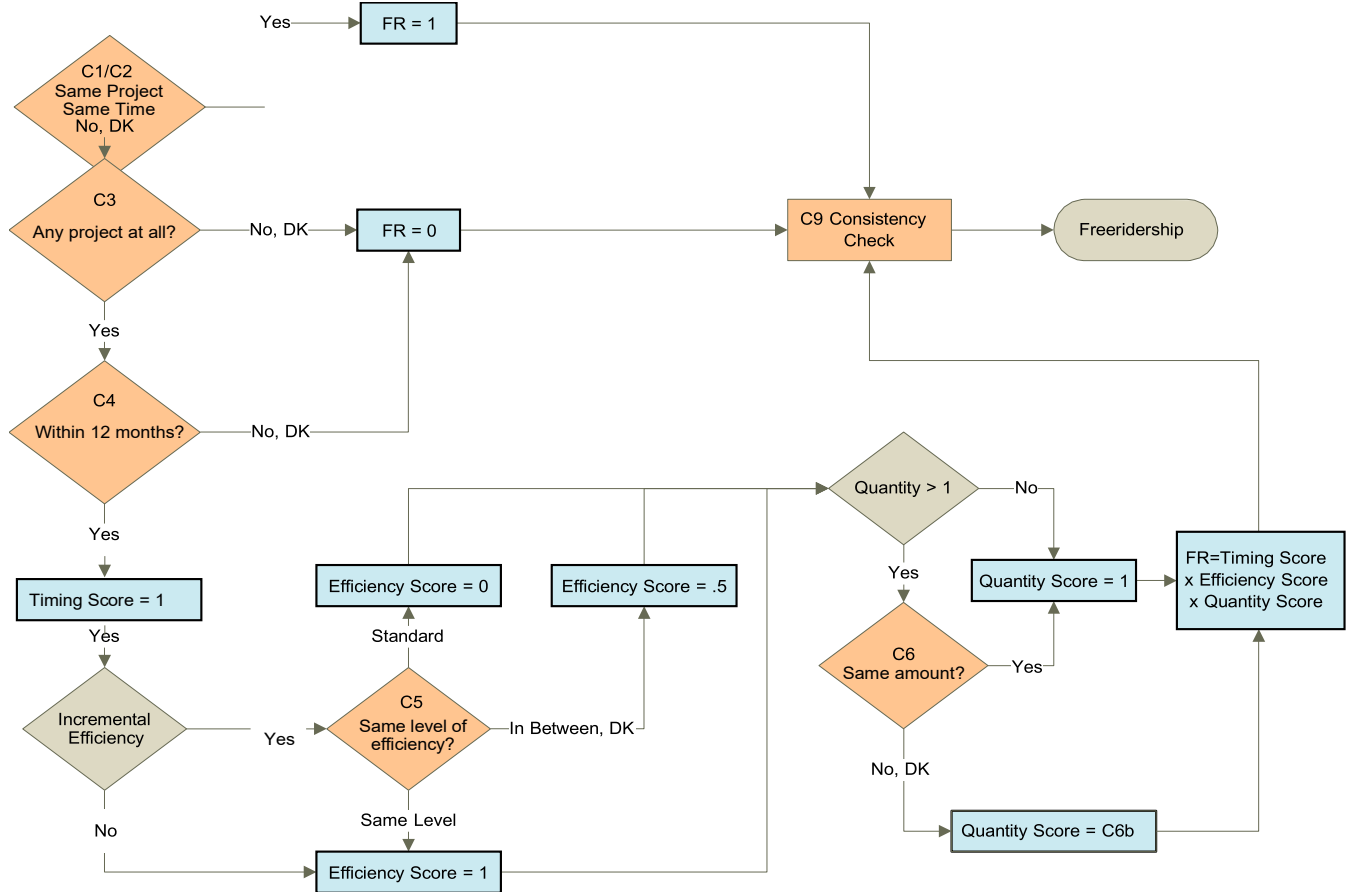
After adjusting the initial freeridership ratio for past program participation, a series of consistency check questions were reviewed. These questions asked about the influence of the program's interventions (e.g., financial incentives, technical assistance) and addressed the counter-factual (e.g., what 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 initial free-ridership by 75%
		If C9.6 = 4, reduce initial 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

Participant spillover occurs when a program influences participants to install additional energy-efficient equipment without a program incentive. The Cadmus team asked a sample of participants whether they completed any subsequent energy saving projects and whether they received an incentive for that project. 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 analysis only included survey respondents who did the following:

- Installed additional energy-savings measure(s) after participating in the Wattsmart Business program.
- Rated the program as highly important in the decision to install the additional measure(s)
- Did not obtain a Wattsmart Business program incentive for the additional measure(s)

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 similar to the equipment

offered through 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
D8	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
D9	What type of equipment did you install?	N/A
D10.# Series	Measure specific efficiency, capacity, fuel-type questions	If responses indicated non-program qualifying unit, potential spillover savings = 0
D10.b	How many did you purchase and install?	D10.b x program-evaluated per-unit savings = potential spillover savings
D11	Did you receive an incentive from Rocky Mountain Power or another organization for this equipment?	If yes, potential spillover savings = 0.
D14	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 only be characterized 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.

We 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 perceptions of their energy usage and motivate customers to take efficiency actions outside of the utility’s program. This is generally called NPSO, and it results in energy savings caused by, but not rebated through, utilities’ demand-side management activities.

To understand whether RMP’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 RMP.

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

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

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

We used estimated gross savings for the reported measures from the Wattsmart Business program evaluation activities.

Using the variables shown in Figure B-2, the Cadmus team determined total NPSO generated by RMP’s marketing and outreach efforts.

Figure B-2. 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	$A \div C$
E	Total Population Usage kWh	Rocky Mountain Power Customer Database
F	NPSO kWh Savings Applied to Population	$D \times E$
G	Total Gross Program Evaluated kWh Savings	Wattsmart Business Evaluation
H	NPSO as a Percentage of Total Wattsmart Business Evaluated kWh Savings	$F \div G$

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 DSM Portfolio Pro model.⁸ 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 (RMP) and from RMP customers’ perspectives (combined). On the benefit side, it includes avoided energy costs, capacity costs, and line losses, plus a 10% adder to reflect non-quantified benefits. On the cost side, it includes costs incurred by both the utility and participants.
- **Total Resource Cost (TRC) Test:** This test also examines program benefits and costs from RMP’s and from RMP customers’ perspectives (combined). On the benefit side, it includes avoided energy costs, capacity costs, and line losses. On the cost side, it includes costs incurred by both the utility and participants.
- **Utility Cost Test (UCT):** This test examines program benefits and costs solely from RMP’s perspective. The benefits include avoided energy, capacity costs, and line losses. Costs include program administration, implementation, and incentive costs associated with program funding.
- **Ratepayer Impact Measure (RIM) Test:** All ratepayers (participants and nonparticipants) may experience rate increases due to decreased kilowatt-hour sales. The benefits include avoided energy costs, capacity costs, and line losses. Costs include all RMP program costs and decreased revenues.
 - 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 exceed rates).
- **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 summarizes the five tests’ components.

⁸ 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. 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.

Table C-2 provides the needed cost analysis inputs for each year. RMP provided all of these values except for energy savings.

Table C-3. Wattsmart Selected Cost Analysis Inputs

Input Description	2020
Discount Rate	6.92%
Commercial Line Loss	5.86%
Industrial Line Loss	4.40%
Irrigation Line Loss	6.34%
Commercial Retail Rate (\$/kWh)	\$0.0809
Industrial Retail Rate (\$/kWh)	\$0.0568
Irrigation Retail Rate (\$/kWh)	\$0.0728
Inflation/Escalation Rate	2.28%

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. Table C-4 shows cost-effectiveness inputs for each measure stratum in Utah’s Wattsmart Business program.

Table C-4. Utah Wattsmart Business Measure Stratum Cost-Effectiveness Inputs

Input Description	Input Value
Average Measure Life (EUL) ^a	
Compressed Air	13.4
Energy Management	3.3
HVAC	12.3
Irrigation	13.4
Lighting	15.0
Midstream	8.2
Motors	14.1
Small Business Lighting	3.0
Other	11.5
Evaluated Net Energy Savings (kWh/year) ^b	
Compressed Air	20,368,974
Energy Management	22,476,520
HVAC	16,130,286
Irrigation	2,086,038
Lighting	41,798,475
Midstream	17,717,524
Motors	3,359,696
Small Business Lighting	13,926,461
Other	10,849,074
Total Utility Cost (including incentives) ^c	
Compressed Air	\$4,442,409
Energy Management	\$3,529,828
HVAC	\$8,800,760
Irrigation	\$537,246
Lighting	\$7,993,168
Midstream	\$2,583,463
Motors	\$1,566,417
Small Business Lighting	\$4,991,737
Other	\$4,962,834
Incentives	
Compressed Air	\$3,072,512
Energy Management	\$993,352
HVAC	\$6,245,315
Irrigation	\$335,953
Lighting	\$5,237,716
Midstream	\$1,287,133
Motors	\$1,069,320
Small Business Lighting	\$4,015,690
Other	\$4,202,468

^a Measure stratum EULs are based on individual measure EULs and weighted by reported gross savings in the program tracking data.

^b Evaluated net energy savings reflect impacts at the customer meter.

^c RMP provided program costs and incentives in annual report data, allocating program costs by weighted savings.

Compressed Air

As shown in Table C-5, the compressed air measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-5. 2020 Utah Compressed Air Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0456	\$8,912,891	\$10,310,988	\$1,398,097	1.16
TRC	\$0.0456	\$8,912,891	\$9,373,625	\$460,734	1.05
UCT	\$0.0277	\$5,423,668	\$9,373,625	\$3,949,958	1.73
RIM		\$20,107,103	\$9,373,625	(\$10,733,478)	0.47
PCT		\$6,596,981	\$17,904,265	\$11,307,285	2.71
Lifecycle Revenue Impacts (\$/kWh)					\$0.000040924
Discounted Participant Payback (years)					2.52

Energy Management

As shown in Table C-6, the energy management measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-6. 2020 Utah Energy Management Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0289	\$1,780,153	\$2,750,268	\$970,114	1.54
TRC	\$0.0289	\$1,780,153	\$2,500,243	\$720,090	1.40
UCT	\$0.0263	\$1,620,480	\$2,500,243	\$879,763	1.54
RIM		\$6,516,116	\$2,500,243	(\$4,015,872)	0.38
PCT		\$1,263,985	\$9,291,040	\$8,027,055	7.35
Lifecycle Revenue Impacts (\$/kWh)					\$0.000178748
Discounted Participant Payback (years)					0.17

HVAC

As shown in Table C-7, the HVAC measure stratum proved cost-effective according to the PCT test.

Table C-7. 2020 Utah HVAC Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0885	\$12,906,824	\$7,403,573	(\$5,503,251)	0.57
TRC	\$0.0885	\$12,906,824	\$6,730,521	(\$6,176,303)	0.52
UCT	\$0.0544	\$7,933,510	\$6,730,521	(\$1,202,988)	0.85
RIM		\$20,579,536	\$6,730,521	(\$13,849,015)	0.33
PCT		\$18,086,540	\$36,354,903	\$18,268,363	2.01
Lifecycle Revenue Impacts (\$/kWh)					\$0.000058416
Discounted Participant Payback (years)					10.97

Irrigation

As shown in Table C-8, the irrigation measure stratum proved cost-effective according to the PTRC, UCT, and PCT tests.

Table C-8. 2020 Utah Irrigation Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0533	\$1,067,062	\$1,125,647	\$58,585	1.05
TRC	\$0.0533	\$1,067,062	\$1,023,315	(\$43,746)	0.96
UCT	\$0.0296	\$592,628	\$1,023,315	\$430,687	1.73
RIM		\$2,166,900	\$1,023,315	(\$1,143,585)	0.47
PCT		\$1,023,538	\$2,617,507	\$1,593,969	2.56
Lifecycle Revenue Impacts (\$/kWh)					\$0.000004360
Discounted Participant Payback (years)					4.81

Lighting

As shown in Table C-9, the lighting measure stratum proved cost-effective according to the UCT and PCT tests.

Table C-9. 2020 Utah Lighting Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0568	\$25,233,343	\$21,643,148	(\$3,590,195)	0.86
TRC	\$0.0568	\$25,233,343	\$19,675,589	(\$5,557,754)	0.78
UCT	\$0.0229	\$10,172,879	\$19,675,589	\$9,502,710	1.93
RIM		\$47,250,038	\$19,675,589	(\$27,574,449)	0.42
PCT		\$20,149,067	\$41,947,775	\$21,798,708	2.08
Lifecycle Revenue Impacts (\$/kWh)					\$0.000088012
Discounted Participant Payback (years)					4.79

Midstream

As shown in Table C-10, the midstream measure stratum proved cost-effective according to the UCT and PCT tests.

Table C-10. 2020 Utah Midstream Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0473	\$5,492,971	\$5,490,817	(\$2,154)	1.00
TRC	\$0.0473	\$5,492,971	\$4,991,652	(\$501,319)	0.91
UCT	\$0.0219	\$2,539,173	\$4,991,652	\$2,452,479	1.97
RIM		\$12,422,411	\$4,991,652	(\$7,430,759)	0.40
PCT		\$4,533,065	\$12,147,835	\$7,614,769	2.68
Lifecycle Revenue Impacts (\$/kWh)					\$0.000053470
Discounted Participant Payback (years)					2.33

Motors

As shown in Table C-11, the motors measure stratum proved cost-effective according to the PTRC, UCT, and PCT test perspectives.

Table C-11. 2020 Utah Motors Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0507	\$1,725,028	\$1,771,980	\$46,952	1.03
TRC	\$0.0507	\$1,725,028	\$1,610,891	(\$114,137)	0.93
UCT	\$0.0433	\$1,473,374	\$1,610,891	\$137,516	1.09
RIM		\$3,825,495	\$1,610,891	(\$2,214,604)	0.42
PCT		\$1,628,550	\$6,296,254	\$4,667,704	3.87
Lifecycle Revenue Impacts (\$/kWh)					\$0.000007698
Discounted Participant Payback (years)					2.59

Other

As shown in Table C-12, the “other” measure stratum proved cost-effective according to the PCT test.

Table C-12. 2020 Utah Other Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0803	\$7,374,027	\$4,807,987	(\$2,566,040)	0.65
TRC	\$0.0803	\$7,374,027	\$4,370,897	(\$3,003,130)	0.59
UCT	\$0.0577	\$5,298,805	\$4,370,897	(\$927,908)	0.82
RIM		\$12,563,798	\$4,370,897	(\$8,192,901)	0.35
PCT		\$6,386,912	\$11,849,829	\$5,462,917	1.86
Lifecycle Revenue Impacts (\$/kWh)					\$0.000038614
Discounted Participant Payback (years)					2.82

Small Business Lighting

As shown in Table C-13, the small business lighting measure stratum proved cost-effective according to the PCT test.

Table C-13. 2020 Utah Small Business Lighting Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0474	\$1,810,075	\$1,480,786	(\$329,289)	0.82
TRC	\$0.0474	\$1,810,075	\$1,346,169	(\$463,905)	0.74
UCT	\$0.1140	\$4,353,345	\$1,346,169	(\$3,007,176)	0.31
RIM		\$7,569,648	\$1,346,169	(\$6,223,478)	0.18
PCT		\$1,338,563	\$7,401,271	\$6,062,708	5.53
Lifecycle Revenue Impacts (\$/kWh)					\$0.000277009
Discounted Participant Payback (years)					N/A