

2021 Utah Wattsmart Business Program Evaluation

FINAL REPORT

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Introduction

This report presents the 2021 Utah Wattsmart Business evaluation findings and a discussion of the Cadmus team's 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) 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 2021 program reported gross electricity savings of 164,725,632 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 2021 Utah Wattsmart Business program. This report includes details of our 2021 program effectiveness and evaluation findings.

The Cadmus team evaluated several Wattsmart Business program offerings:

- **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 Incentives (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 Survey	Partial Participant Survey ^a	Trade Ally Interviews	Nonparticipant Interviews	Desk Review	Phone Verification	Net-to-Gross Analysis	Cost-Effectiveness 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, and trade allies	✓	✓	✓						
Provide data support for program cost-effectiveness assessments	✓				✓	✓	✓	✓	
Identify areas for potential improvements	✓	✓	✓	✓	✓	✓	✓	✓	✓
Document compliance with regulatory requirements									✓

^aWith a sample of twelve partial participants, VuPoint attempted to reach each contact a total of five times throughout the month of November of 2021. However, as only one interview was completed, findings were insufficient to conduct an analysis.

Methods

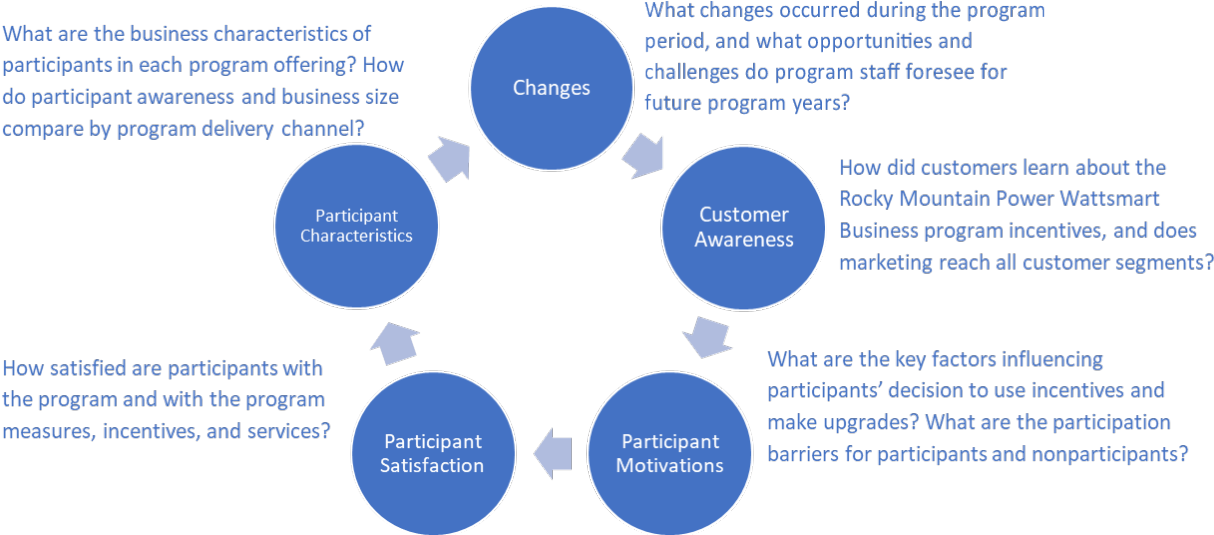
To evaluate energy impacts, the Cadmus team used desk reviews and surveys to inform the engineering analyses, net-to-gross (NTG) analysis, and program cost-effectiveness analysis. Table 2 summarizes these activities.

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 savings calculations (through engineering review, analysis, and 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 addressed by the process evaluation. The Cadmus team relied on an online participant survey and nonparticipant and trade ally interviews to assess program delivery and efficacy, bottlenecks, barriers, and opportunities for improvements.

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 2021 projects (see *Appendix A* for information on our 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 results across several years.

Impact Sampling

Table 3 shows the total projects, total projects sampled, sample distribution, associated energy savings, and the sample’s percentage of the savings. Out of 6,063 projects, the Cadmus team analyzed 57 projects that contributed approximately 15.4% of the 2021 program savings.²

Table 3. 2021 Utah Wattsmart Business Program Impact Sampling Summary

Strata	Projects	Total Reported Savings (kWh)	Unique Sampled Projects		Sample Reported Savings (kWh)	Percentage of Reported Savings Sampled
			Random	Selected		
Compressed Air	24	11,227,772	4	2	8,760,328	78.0%
Energy Management	96	18,928,849	4	0	558,945	3.0%
HVAC	229	32,034,150	6	0	218,485	0.7%
Irrigation	47	2,233,265	4	1	1,276,733	57.2%
Lighting	1,000	49,945,959	7	1	11,433,202	22.9%
Midstream	3,596	17,509,897	8	0	43,787	0.3%
Motors	46	7,509,588	4	1	2,654,361	35.3%
Other	147	18,591,973	7	0	460,137	2.5%
Small Business Lighting	878	6,744,179	8	0	28,316	0.4%
Total	6,063	164,725,632	52	5	25,434,294	15.4%

Table 4 lists the evaluation findings including number of projects, gross savings, precision, and net savings. Overall, the Wattsmart Business program achieved a 95.5% gross realization rate for the 2021 program year, though some variability occurred between measure categories. The impact evaluation achieved ±4.7% precision with 90% confidence overall. The Cadmus team calculated NTG of 81.1%, yielding evaluated net savings of 127,577,374 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.

Table 4. 2021 Utah 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	24	11,227,772	11,235,798	100.1%	0.1%	100%	11,235,798
Energy Management	96	18,928,849	18,806,616	99.4%	1.3%	60%	11,283,969
HVAC	229	32,034,150	26,453,015	82.6%	18.1%	40%	10,581,206
Irrigation	47	2,233,265	1,942,916	87.0%	20.1%	70%	1,360,042
Lighting	1,000	49,945,959	48,858,529	97.8%	1.7%	102% ^c	49,835,699
Midstream	3,596	17,509,897	19,181,482	109.5%	12.8%	95%	18,222,408
Motors	46	7,509,588	7,437,705	99.0%	1.8%	46%	3,421,344
Other	147	18,591,973	17,075,905	91.8%	20.0%	91%	15,539,074
Small Business Lighting	878	6,744,179	6,351,911	94.2%	10.0%	96%	6,097,834
Total	6,063	164,725,632	157,343,876	95.5%	4.7%	81.1%	127,577,374

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

^b The measure category precision is based on 80% confidence, while the portfolio precision is based on 90% confidence.

^c NTG is 102% due to an evaluated lighting strata freeridership estimate of 2%, a participant spillover estimate of 2%, and the application of a 2% 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 project. 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. 2021 Utah Wattsmart Business Program Measure Mapping

Strata	Measure Category	Program Name	Measures
Compressed Air	Compressed Air	Wattsmart Business - UT	32
Energy Management	Energy Management	Wattsmart Business - UT	93
	Energy Project Manager Co-Funding	Energy Project Manager - UT	14
HVAC	HVAC	Wattsmart Business - UT	455
Irrigation	Agriculture	Wattsmart Business - UT	44
	Farm and Dairy		1
	Irrigation		43
	Agriculture	Wattsmart Business Intake - UT	4
Lighting	Lighting	Wattsmart Business - UT	1,094
	Lighting	Small Business Direct Install - UT	996
Midstream	HVAC	Midstream - UT	136
	Lighting		4,917
Motors	Motors	Wattsmart Business - UT	54
Other	Additional Measures	Wattsmart Business - UT	32
	Building Shell		80
	Electronics		21
	Food Service		21
	Food Service Equipment		3
	Refrigeration		89
Small Business Lighting	Direct Install	Small Business Direct Install - UT	686
	Lighting	Wattsmart Business Intake - UT	236
			9,051

Compressed Air

During 2021, RMP provided incentives for 24 compressed air projects and reported 11,227,772 kWh in energy savings, which accounted for 7% of all reported energy savings. The Cadmus team evaluated six sampled projects and extrapolated results to the population, for a realization rate of 100.0% for the compressed air stratum.

All sampled projects involved custom compressed air system upgrades. PacifiCorp’s implementer developed load profiles unique to each project based on trend data or power metering data. RMP reported energy savings based on custom calculations and following best practices for compressed air savings. The Cadmus team verified project performance using post-implementation trend data and/or power metering data. The Cadmus team found no discrepancies among the six sampled projects and evaluated this stratum as fully realizing reported savings.

Energy Management

During 2021, RMP provided incentives for 96 energy management projects and reported 18,928,849 kWh in energy savings, which accounted for 11% of all reported energy savings. The Cadmus team evaluated two strategic energy management projects and two retro-commissioning projects. The team extrapolated results to the population for a realization rate of 99.4% for the energy management stratum.

Strategic energy management projects involve the implementation of multiple energy efficiency opportunities at one or more facilities. Because of the interactive effects between energy efficiency measures and the difficulty in isolating measure performance, RMP reported savings in accordance with Option B of the *International Performance Measurement and Verification Protocol (IPMVP)*.³ RMP used three years of utility data to develop the baseline energy model and performed a statistical analysis with key indicators to ensure the model validity. RMP used one year of post-implementation utility data for the verified performance. The Cadmus team found that the reported energy models satisfy the model validity tests and meet the guidance outlined in the IPMVP.

The team found no discrepancies with one retro-commissioning project involving optimized air-handling unit (AHU) schedules and minor discrepancies with the other retro-commissioning project involving the repair of compressed air system leaks.

HVAC

RMP provided incentives for 229 HVAC projects and reported 32,034,150 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 82.6% for the HVAC stratum.

Four of six sampled projects involved the implementation of advanced rooftop controls (ARC) on AHUs. RMP reported savings for these projects using its in-house ARC Excel workbook. RMP used minimal inputs to report savings for the ARC projects and did not provide calculation formulas for review. The Cadmus team evaluated these projects based on the “Advanced Rooftop Control” measure from the Regional Technical Forum (RTF).⁴ To determine evaluated savings, the Cadmus team used AHU system configuration, facility hours of operation, and primary fuel type. The team found the ARC projects to realize 45%, 64%, 67%, and 95% of reported savings when following the RTF energy-savings calculation methodology.

One sampled project involved the implementation of direct evaporative cooling on an AHU. The calculations assumed 100% effectiveness⁵ from the evaporative cooling media, resulting in 100% relative humid air being supplied by the AHU. However, 100% effectiveness would cause water to condense on the ductwork. The Cadmus team revised the savings calculation formula to use a more appropriate, conservative evaporative cooling effectiveness, which resulted in lower realized energy savings. The last sampled project involved custom controls optimization for an AHU. The savings documentation was appropriate and the Cadmus team found no discrepancies.

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

⁴ Regional Technical Forum. Accessed January 2021. “UES Measures.” <https://rtf.nwcouncil.org/measures>

⁵ Evaporative media performance (“Effectiveness”) is determined by how close the dry-bulb temperature of the outlet air approaches the intake air wet-bulb temperature. If an evaporative cooling system achieved 100% effectiveness, the outlet air would exhibit 100% relative humidity.

Irrigation

During 2021, RMP provided incentives for 47 irrigation projects and reported 2,233,265 kWh in energy savings, which accounted for 1% of all reported energy savings. The Cadmus team evaluated five sampled projects and extrapolated results to the population for a realization rate of 87% for the irrigation stratum.

Three sampled projects involved irrigation hardware and two sampled projects involved variable frequency drives (VFDs) serving irrigation pumps. Irrigation hardware measures exhibited an average realization rate of 35%. RMP used deemed savings for all irrigation hardware measures, but savings did not align with the RTF's "Irrigation Hardware Workbook v4.1" (approved in May 2018), which the Cadmus team used for evaluated savings. Three hardware measures (pressure regulators, drop tubes, and goosenecks) no longer realize energy savings when compared to the prior "Irrigation Hardware Workbook." Both sampled projects involving VFDs for irrigation pumps realized savings that exhibited minimal discrepancies, resulting in realization rates 100% and 101%.

Lighting

RMP provided incentives for 1,000 lighting projects and reported 49,945,959 kWh in energy savings, which accounted for 30% of all reported program energy savings.

The Cadmus team evaluated eight sampled projects and extrapolated results to the population for a realization rate of 98% for the lighting stratum. RMP typically uses an in-house prescriptive calculator to determine savings and the Cadmus team found that realized energy savings were within 5% of reported savings for seven of eight sampled projects. We observed minor discrepancies related to the installed fixture wattage and waste heat factor when compared to invoices and reported documentation. The results from one project reporting 11,097,713 kWh in savings heavily influenced the stratum performance. This project involved the installation of high-efficiency lighting for indoor agriculture. Because lighting hours of use are directly correlated to agriculture production, the portion of reported savings related to lighting control schedule changes do not qualify as an energy efficiency measure. After excluding energy savings from lighting control schedule changes, the project realized 95% of the reported energy savings.

Midstream

During 2021, RMP provided incentives for 3,596 midstream projects and reported 17,509,897 kWh in energy savings, which accounted for 11% of all reported program energy savings.

The Cadmus team evaluated eight sampled projects and extrapolated results to the population for a realization rate of 109.5% for the midstream stratum. For midstream measures, RMP provided the customer application and invoice of incentivized lighting measures. The Cadmus team evaluated savings based on the methodology outlined in the RTF's "Midstream Lighting" measure. The team based hours of use and waste heat factor on the building type identified in the customer application. We determined the baseline fixture based on the manufacturer's recommended placement or the lumen equivalence method if the manufacturer literature did not define a replacement fixture. While realization rates

varied from 85% to 332% among sampled projects, the aggregated results realized 109.5% of reported savings.

Motors

RMP provided incentives for 46 motors projects and reported 7,509,588 kWh in energy savings, which accounted for 5% of all reported energy savings. The Cadmus team evaluated five sampled projects and extrapolated results to the population for a realization rate of 99% for the motors stratum.

Three sampled projects involved green motor rewind projects. The Cadmus team evaluated these projects based on the RTF's "Green Motor Rewind v3.1" measure (approved in December 2017) and determined that they realized 74% to 77% of reported energy savings. Two sampled projects involved VFDs serving custom process applications: the savings calculation methodology and supporting documentation were appropriate and the Cadmus team found no discrepancies.

Other

RMP provided incentives for 147 projects in the "other" stratum and reported 18,591,973 kWh in energy savings, which accounted for 11% of all reported energy savings. The Cadmus team evaluated seven sampled projects and extrapolated results to the population for a realization rate of 92% for the other stratum. Realization rates varied between 39% and 242% among sampled projects.

Four sampled projects 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, building characteristics, and roof membrane specifications. RMP used 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 that evaluated savings were higher than reported for all cool roof projects.

The remaining three sampled projects included electronically commutated motors serving compressor head fans, a process system upgrade, and refrigeration door upgrades. While evaluated savings differed from reported savings for these projects, the team did not find systematic discrepancies among the three projects. Generally, projects using trend data and custom calculations consistently reported accurate savings. Projects using deemed savings realize higher or lower savings than reported, as expected.

Small Business Lighting

RMP provided incentives for 878 small business lighting projects and reported 6,744,179 kWh in energy savings, which accounted for 4% of all reported energy savings. The Cadmus team evaluated eight sampled projects and extrapolated results to the population for a realization rate of 94% for the small business lighting stratum.

RMP used an in-house workbook to document direct install lighting measures and calculate savings. The workbook did not include formulas, and the Cadmus team was unable to verify calculations for reported savings. The team calculated savings for all sampled projects based on the calculation methodology

outlined in the RTF, with inputs and assumptions based on the building type, installed fixture, and lumen-equivalent baseline fixture. Where the manufacturer specified a replacement fixture (such as high-bay applications), the Cadmus team used the manufacturer’s specified replacement fixture as the baseline. Realization rates for sampled projects varied between 50% and 123%. 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.

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 collected through the process evaluation surveys. The evaluation includes three NTG components:

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

We used self-report surveys from a combined analysis sample of 2020 and 2021 participants to estimate freeridership and participant spillover by measure strata for the 2021 program.⁶ The Cadmus team determined the percentage of nonparticipant spillover for the 2021 program based on responses to questions in the 2020 and 2021 general population survey of RMP businesses customers. See *Appendix B* for more information on our NTG calculation methodology.

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

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

Table 6 summarizes the NTG evaluation results, shown as NTG and evaluated gross savings by program-measure strata. The program resulted in 81.1% NTG overall.

⁶ The Cadmus team combined the 2020 and 2021 respondents into one analysis sample due to low number of participants and low number of survey responses. Cadmus did conduct a census of 2021 participants.

Table 6. 2021 Utah Wattsmart Business Net-to-Gross Results

Strata	Measure Responses (n)			Freeridership	Participant Spillover	Nonparticipant Spillover	NTG	Evaluated Net Program Population Savings (kWh)
	2020	2021	2020/2021 Combined					
Compressed Air	6	2	8	2% ^a	0%	2%	100%	11,235,798
Energy Management	5	0	5	42% ^b	0%	2%	60%	11,283,969
HVAC	7	4	11	62% ^a	0%	2%	40%	10,581,206
Irrigation	6	2	8	35% ^a	3%	2%	70%	1,360,042
Lighting	20	6	26	2% ^a	2%	2%	102%	49,835,699
Midstream	39	30	69	11% ^a	4%	2%	95%	18,222,408
Motors	4	0	4	56% ^a	0%	2%	46%	3,421,344
Other	7	1	8	11% ^a	0%	2%	91%	15,539,074
Small Business Lighting	103	34	137	7% ^a	1%	2%	96%	6,097,834
Total	197	79	276	22.1%^c	1.2%^c	2.0%	81.1%	127,577,374

^a This is weighted by evaluated gross program savings.

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

^c This is weighted by evaluated gross program population savings.

Process Evaluation Findings

The Cadmus team 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 Pacific Power customers, and where there may be opportunities to strengthen or expand the program.

Process Sampling

The Cadmus team surveyed participants and nonparticipants and interviewed trade allies for the 2021 evaluation, as summarized in Table 7. The surveys were split into two waves, one wave for Q1 and Q2 participants and a second wave for Q3 and Q4 participants. Among the participants and nonparticipants surveyed, the response rates were 10% for typical upgrades and custom analysis projects, 8% for SBDI projects, and 6% for Lighting Instant Incentives projects. Among trade allies, the response rate was 30%. Note that the number of responses may vary because not all respondents were asked each question due to survey branching and not all survey respondents provided responses to all questions.

Table 7. 2021 Utah Wattsmart Business Program Process Activity Sampling

Program Offering/Measure Category	Sampling Frame ^a	Target Completes	Achieved Completes
Incentive List and Custom Analysis			
Additional Measures	17	Census	2
Building Shell	8		0
Compressed Air	16		2
Custom	4		1
Electronics	1		0
Energy Management Retro-Commissioning	25		3
Farm and Dairy	1		0
Food Service Equipment	1		0
HVAC	60		5
Irrigation	12		2
Lighting (other than SBDI or Lighting Instant Incentives)	157		13
Motors	16		0
Refrigeration	9		0
Other ^b	26		7
Total Wattsmart Business	353		Census
SBDI	420	Census	34
Lighting Instant Incentives	511	Census	30
Trade Allies	23	7	7
Participant Subtotal ^c	1,307	Census	106 ^c
Nonparticipants	46,159	Census	197

^a The sampling frame was based on unique customers with contact information after removing duplicates.

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

^c This represents the total completes across all offerings (typical upgrades and custom analysis, SBDI, and Lighting Instant Incentives, as well as responses from trade allies).

Participant Experience

Participants in the Wattsmart Business program answered questions about their entry into the program, how they identified projects and submitted their applications, and their satisfaction with various program aspects. The Cadmus team received completed surveys from typical upgrades and custom analysis participants (n=35), SBDI participants (n=34), Lighting Instant Incentives participants (n=30), and trade allies (n=7).

Typical Upgrades and Custom Analysis

The team completed surveys with 35 participants across eight measure categories in the Wattsmart Business program typical upgrades and custom analysis offering. The sample 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; however, only typical upgrades customers responded to the survey. Table 8 shows the breakdown of respondents by measure category.

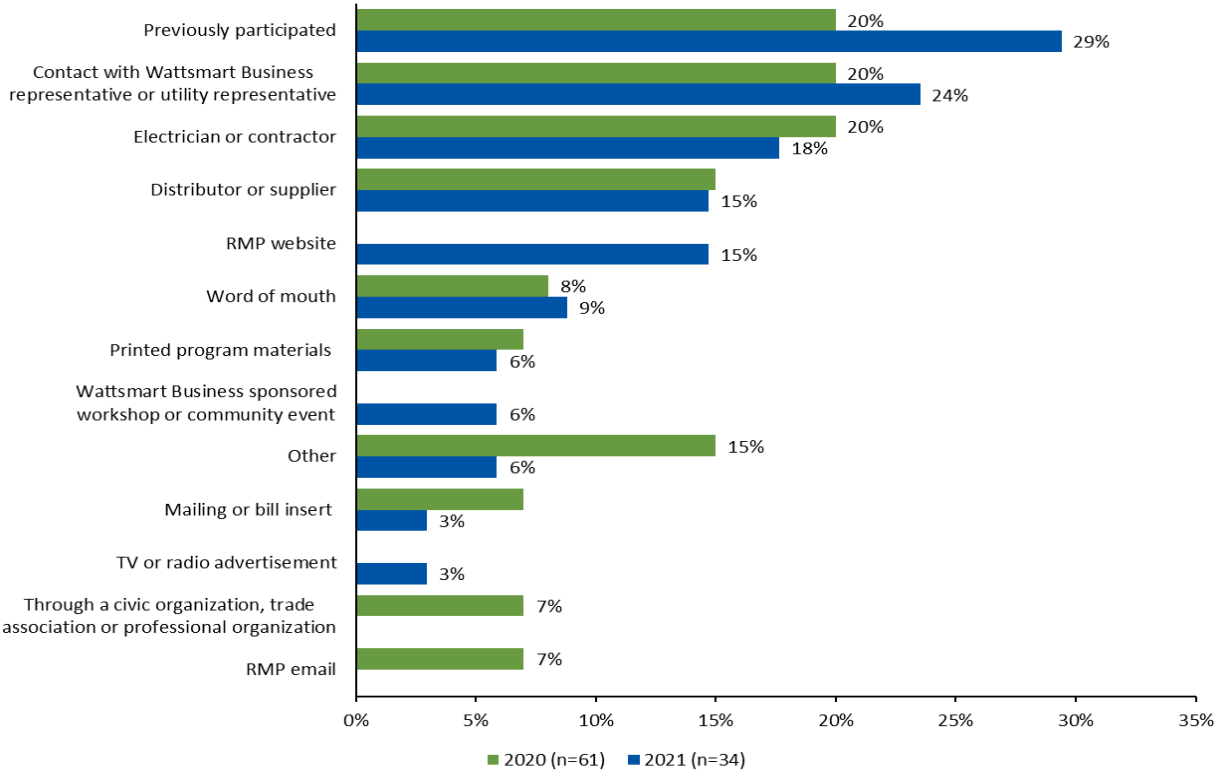
Table 8. 2021 Utah Wattsmart Business Program Typical Upgrade Participant Survey Sample by Measure Type

Measure Category	Total
Additional Measure	2
Compressed Air	2
Custom	1
Energy Management	3
HVAC	5
Irrigation	2
Lighting	13
Other	7
Total	35

Participant Experience

Survey respondents (n=34) most commonly reported learning about program incentives through previous program participation (29%) and through contact with a Wattsmart Business or utility representative (24%), followed by their electrician or contractor (18%). This only slightly different from 2020 respondents where 20% learned about the program through each of these three channels (n=61). Figure 2 shows the full results from 2020 and 2021 respondents. The “other” category includes one participant who conducted a search to find incentives and another who made a purchase through their partner, who applied on their behalf (6%, n=34).

Figure 2. Typical Upgrades and Custom Analysis Sources of Awareness

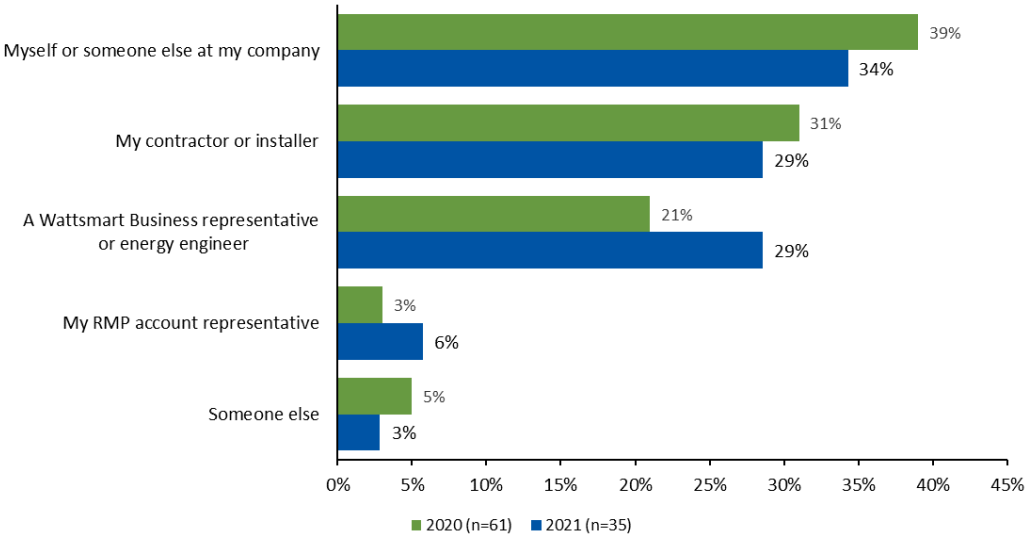


Source: 2020-2021 RMP Wattsmart Business Program Typical Upgrades and Custom Analysis Participant Survey Question A4. Multiple answers allowed. Don't know and refused responses removed.

On average, 2021 respondents reported that the incentive they received covered 18% of their project cost (n=35), compared to an average of 30% for 2020 respondents (n=58).

Additionally, non-lighting respondents most often reported that they or someone else at their company filled out their program application, while half of the lighting respondents said their contractor or installer filled out the application. Figure 3 shows that typical upgrades respondents most commonly continued to report that they or someone else at their company filled out their application, followed by their contractor or installer or a Wattsmart Business representative.

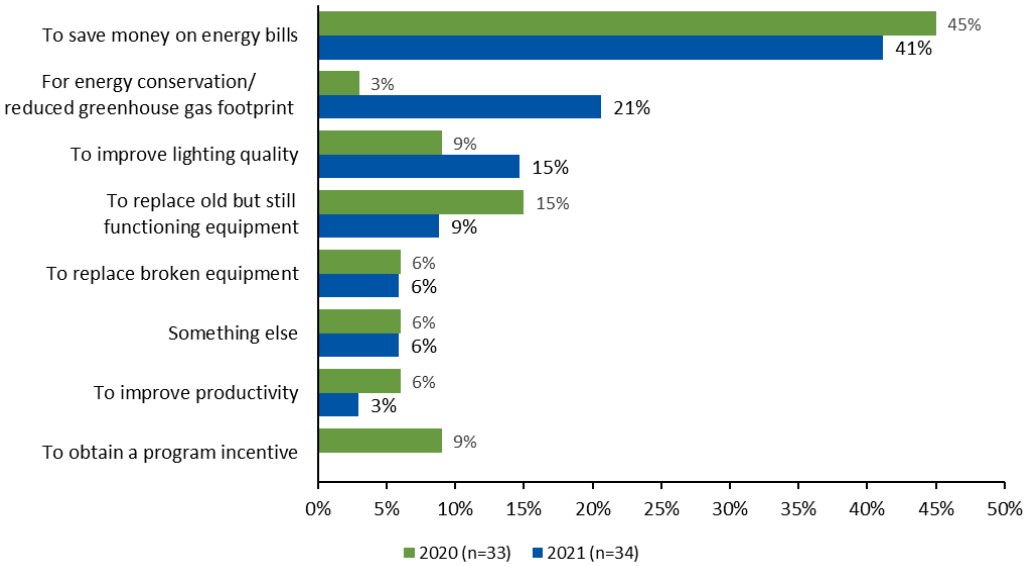
Figure 3. Who Completed the Typical Upgrades and Custom Analysis Application



Source: 2020-2021 RMP Wattsmart Business Program Typical Upgrades and Custom Analysis Participant Survey Question B2. Don't know and refused responses removed.

Wattsmart Business typical upgrades respondents shared the most important reason for their company to participate in the program. As shown in Figure 4, respondents said the most important reason was to save money on energy bills (41%), followed by energy conservation and reducing their greenhouse gas footprint (21%, n=34). In 2020, saving money on energy bills was also the most commonly identified reason for their company to participate in the program (45%, n=33).

Figure 4. Most Important Reason for Typical Upgrades and Custom Analysis Participation

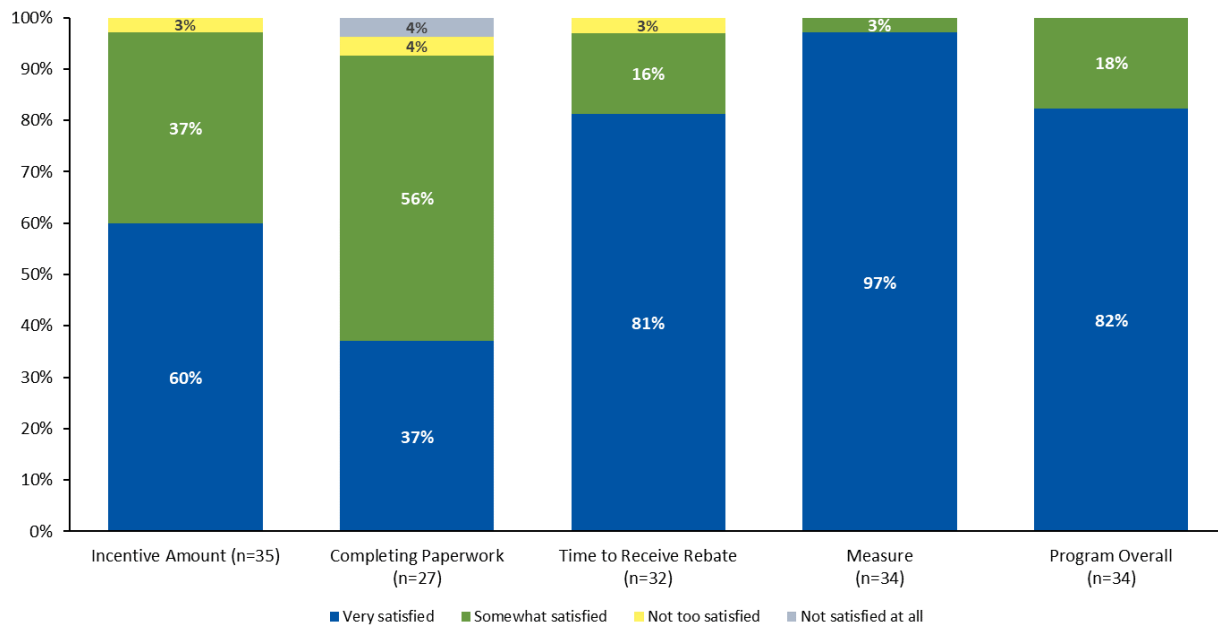


Source: 2020-2021 RMP Wattsmart Business Program Typical Upgrades and Custom Analysis Participant Survey Question B1. Multiple answers allowed. Don't know and refused responses removed.

Participant Satisfaction

As shown in Figure 5, 97% of respondents were satisfied (either *very satisfied* or *somewhat satisfied*) with the amount of their incentive (n=35), 97% were satisfied with the time it took to receive their rebate (n=32), and 93% thought the paperwork was easy to complete (n=27). These ratings slightly differed from the 2020 surveys, in which 96% of respondents 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). In addition, 100% of 2021 respondents were satisfied with the measures they received (n=34), which is the same as the 2020 survey findings (100%, n=60), and 100% of the 2021 respondents were satisfied with the program overall (n=34), which was a slight increase from 99% of the 2020 respondents (n=60).

Figure 5. Satisfaction with Typical Upgrades and Custom Analysis Program Components

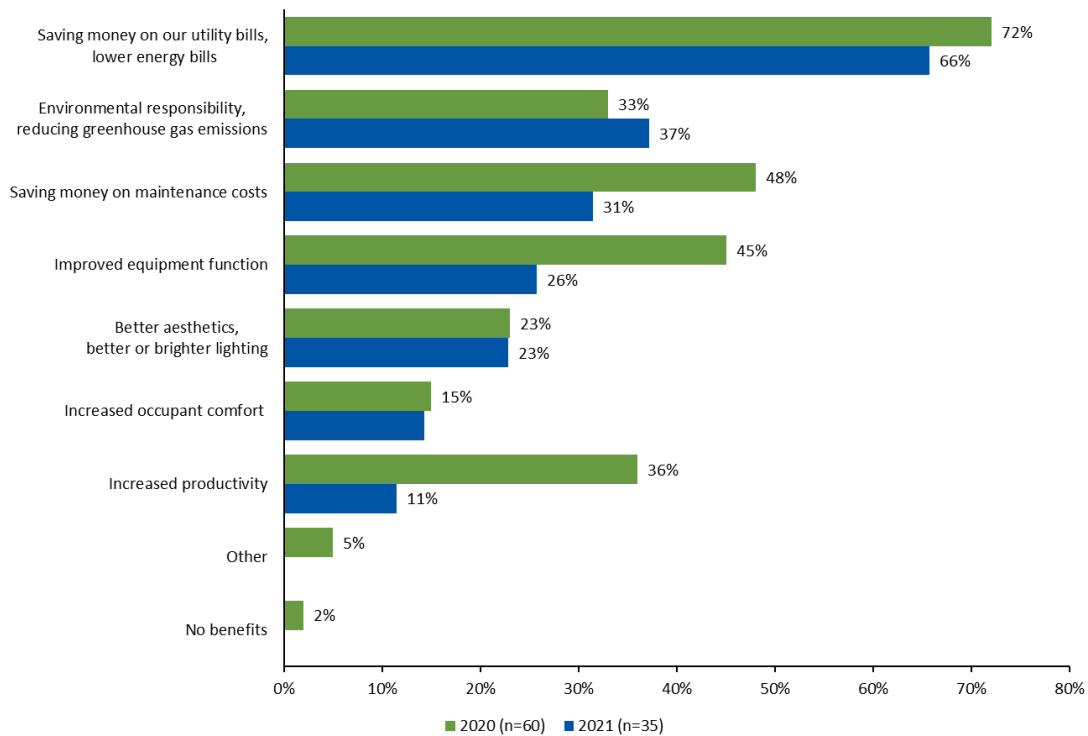


Source: 2021 RMP Wattsmart Business Program Typical Upgrades and Custom Analysis Participant Survey Questions B3, B5, B8, B13, and B16. Don't know and refused responses removed. Completing paperwork was asked on a scale using "easy" rather than "satisfied."

Project Benefits

As shown in Figure 6, all typical upgrades and custom analysis respondents reported one or more benefits that their companies experienced from the project they completed. Most respondents said these benefits included lower energy bills or environmental responsibility. This was slightly different from the top responses in 2020 of lower energy bills and saving money on maintenance cost. Across all 35 respondents in 2021, 74% reported some benefit from their project other than energy cost savings.

Figure 6. Typical Upgrades and Custom Analysis Project Benefits



Source: 2020-2021 RMP Wattsmart Business Program Typical Upgrades and Custom Analysis Participant Survey Question B15. Multiple answers allowed. Don't know and refused responses removed.

Firmographics

Ninety-four percent of respondents said their company owns the facility where the improvements were made, while 6% said they lease the facility (n=33). Additionally, 31% of respondents said their company employs 1 to 10 people, 10% said between 11 and 25 people, 14% said 26 to 50 people, 10% said 76 to 100 people, 10% said 201 to 500 people, and 25% of respondents reported 500 or more people (n=29). Respondents also identified what type of fuel source their facility uses for space and water heating. For space heating, 78% of respondents said their facility uses natural gas, 6% said they use electric sources, and 16% said they use additional sources (n=32). For water heating, 75% of respondents said they use natural gas, 19% said they use electric sources, and 6% said they use additional sources (n=32).

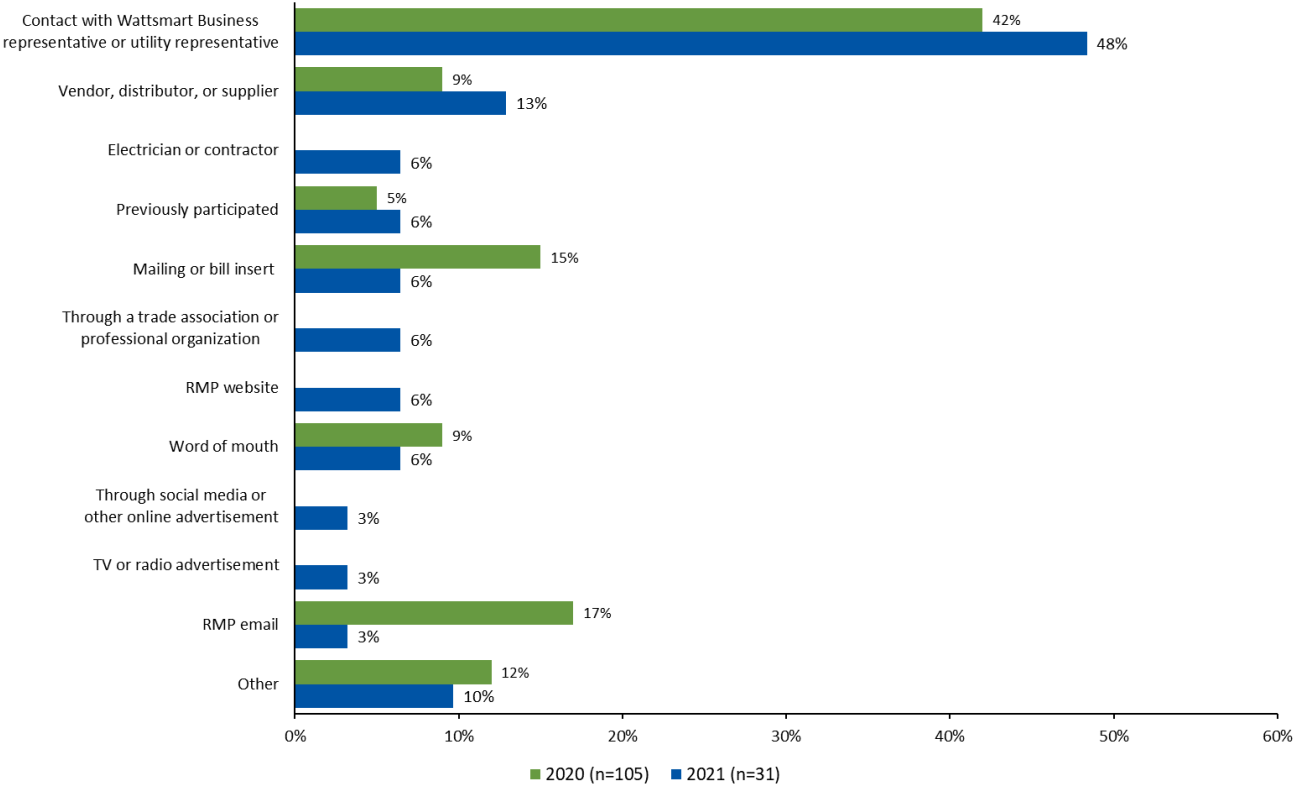
Small Business Direct Install

The Cadmus team surveyed 34 SBDI participants to ask about their experience, satisfaction with various program aspects, perceived benefits and challenges associated with participating, and firmographic information.

Participant Experience

As shown in Figure 7, the most common source of program awareness reported by respondents was contact with a Wattsmart Business representative or RMP representative (48%, n=31), which was also the most commonly reported source of awareness in 2020 (42%, n=105).

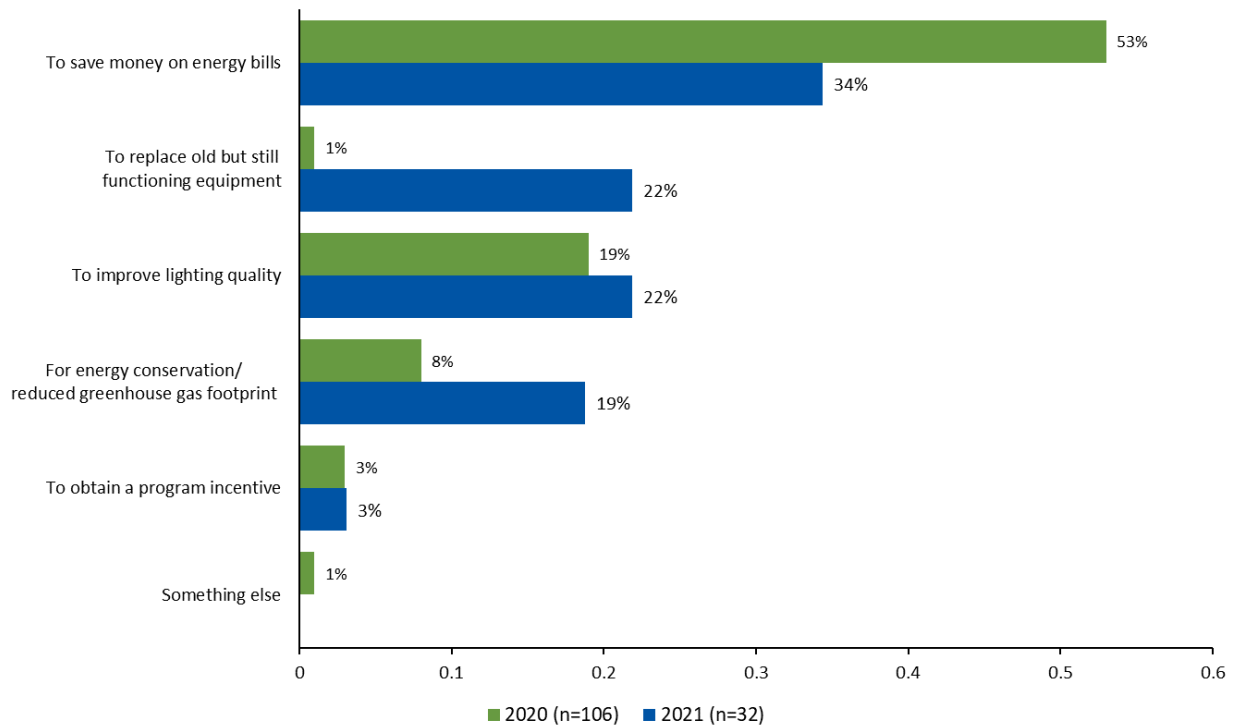
Figure 7. SBDI Sources of Awareness



Source: 2020-2021 RMP Wattsmart Business Program SBDI Participant Survey Question B1. Multiple answers allowed. Don't know and refused responses removed.

Furthermore, 34% of respondents indicated that the most important reason their company decided to participate in the program was to save money on energy bills, followed by replacing old but still functioning equipment (22%) and improving lighting quality (22%, n=32). In 2020, respondents also commonly indicated saving money on energy bills as an important reason their company decided to participate in the program, as well as to improve lighting quality and to conserve energy (see Figure 8).

Figure 8. Most Important Reason for SBDI Participation



Source: 2020-2021 RMP Wattsmart Business Program SBDI Participant Survey Question B2. Multiple answers allowed. Don't know and refused responses removed.

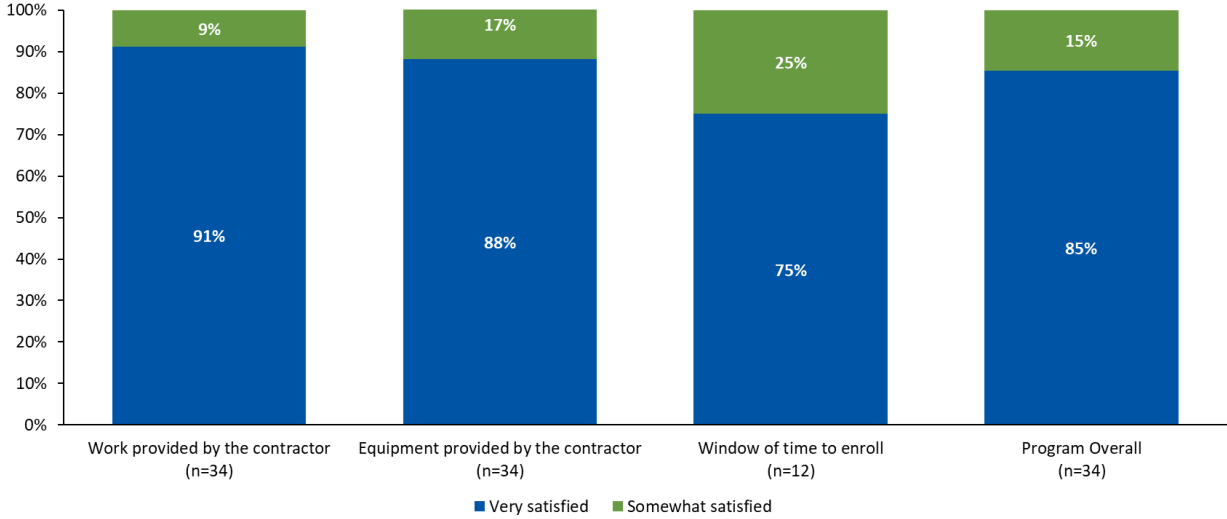
Most SBDI respondents (88%) said they had received a project proposal with estimates of their incentive or discount and projected utility bill savings after their free energy assessment (n=34). When asked what information in the project proposal was the most influential in their company’s decision to proceed with their project, respondents most commonly said the information about saving money on energy bills (40%) and saving money on project costs (40%, n=30).

Nine percent of respondents said there was other lighting equipment they wanted to install that was not offered in their project proposal (n=34). Of these respondents, one said they asked their contractor about this other equipment, but the contractor did not mention other Wattsmart Business incentives available for the equipment (n=3).

Participant Satisfaction

As shown in Figure 9, most participants were *very satisfied* with their contractor’s work, the equipment they had installed, the timeframe they had to enroll in the program, and the program overall. Overall, all respondents were either *very satisfied* or *somewhat satisfied* with the program and its aspects. These results are slightly higher than the 2020 results, when 93% of respondents were either *very satisfied* or *somewhat satisfied* with the timeframe to enroll (n=79), 95% were satisfied with their contractor’s work (n=108), 99% were satisfied with the equipment provided (n=109), and 98% were satisfied the program overall (n=108).

Figure 9. Satisfaction with SBDI Program Components and Program Overall

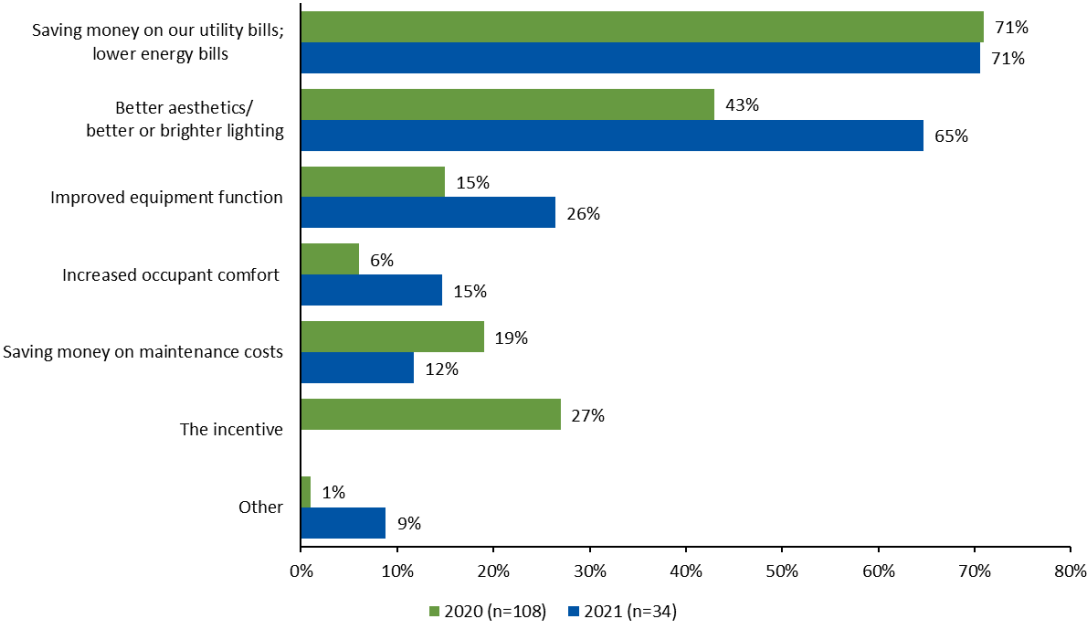


Source: 2021 RMP Wattsmart Business Program SBDI Participant Survey Questions B7, B9, B16, and B21.

Project Benefits and Challenges

All SBDI participants reported one or more benefits that their companies experienced due to the equipment they installed. As shown in Figure 10, saving money on utility bills/lowering energy bills continued to be the most commonly reported benefit. However, better lighting was also reported by over half (65%) of the 2021 respondents as a key benefit (n=34).

Figure 10. SBDI Project Benefits



Source: 2020-2021 RMP Wattsmart Business Program SBDI Participant Survey Question B17. Multiple answers allowed. Don't know and refused responses removed.

However, 28% of respondents reported experiencing challenges with participating in the program in 2021 (n=32), compared to 15% of respondents in 2020 (n=100). These challenges primarily related to receiving incorrect estimates from their contractors, the time it took to install and receive rebates, and communication. Additionally, 8% of respondents offered suggestions for improving the program offering (n=34). These suggestions included providing more program information, making sure the contractors are knowledgeable about the program, having one point of contact, and providing better communication.

Firmographics

Fifty-two percent of respondents said their company owns the facility where the improvements were made, while 48% said they lease the facility (n=31). Additionally, 63% of respondents said their company employs 1 to 10 people, 33% said between 11 and 25 people, and 3% said 26 to 50 people (n=30). Respondents also identified what type of fuel source their facility uses for space and water heating. For space heating, 84% of respondents said their facility uses natural gas, 6% said they use electric sources, and 10% said they use additional sources (n=31). For water heating, 53% of respondents said they use natural gas, 43% of respondents said they use electric sources, and 3% said they use additional sources (n=30).

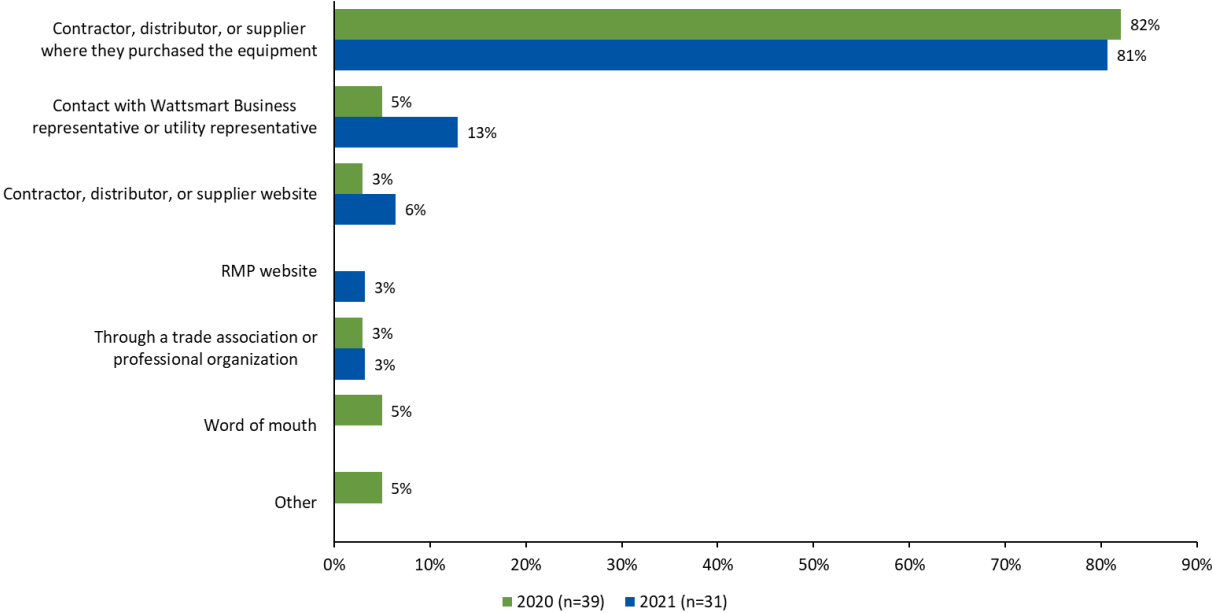
Lighting Instant Incentives

The Cadmus team surveyed 30 Lighting Instant Incentives participants to ask about their program experience and firmographic information.

Program Delivery

Figure 11 shows where participants learned about the Lighting Instant Incentives program. The majority, 81%, reported learning about the program incentives from their contractor, distributor, or lighting supplier (n=31), which is similar to the 2020 responses (82%, n=39). Other sources of awareness included contact with Wattsmart Business representative or RMP representative (13%); the contractor, distributor, or supplier website (6%); the RMP website (3%); or through a trade association or professional organization (3%).

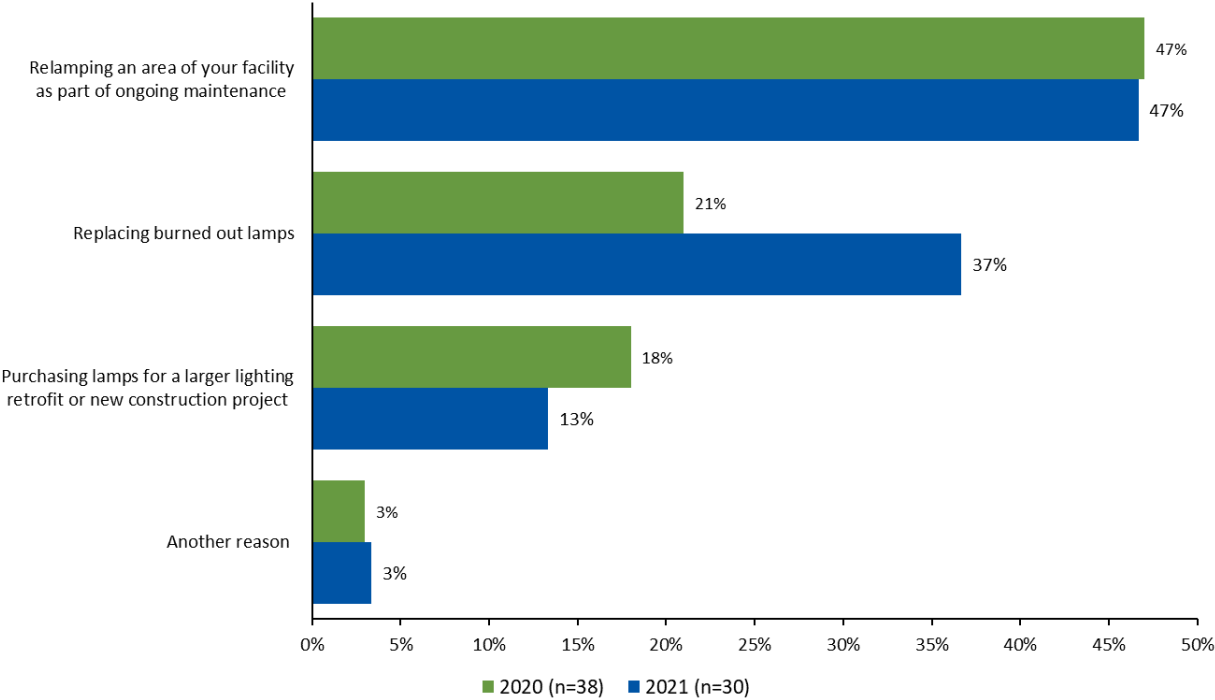
Figure 11. Sources of Lighting Instant Incentives Awareness



Source: 2020-2021 RMP Wattsmart Business Program SBDI Participant Survey Question B1. Multiple answers allowed. Don't know and refused responses removed.

All respondents said they purchased their equipment through a vendor they had worked with previously (n=29). When asked if they purchased from the vendor primarily because they offered the instant incentive, 59% of respondents said yes and 41% said no (n=22). Figure 12 shows the response breakdown of each participant's reason for purchasing their equipment.

Figure 12. Reason for Purchasing Lighting Instant Incentives Equipment

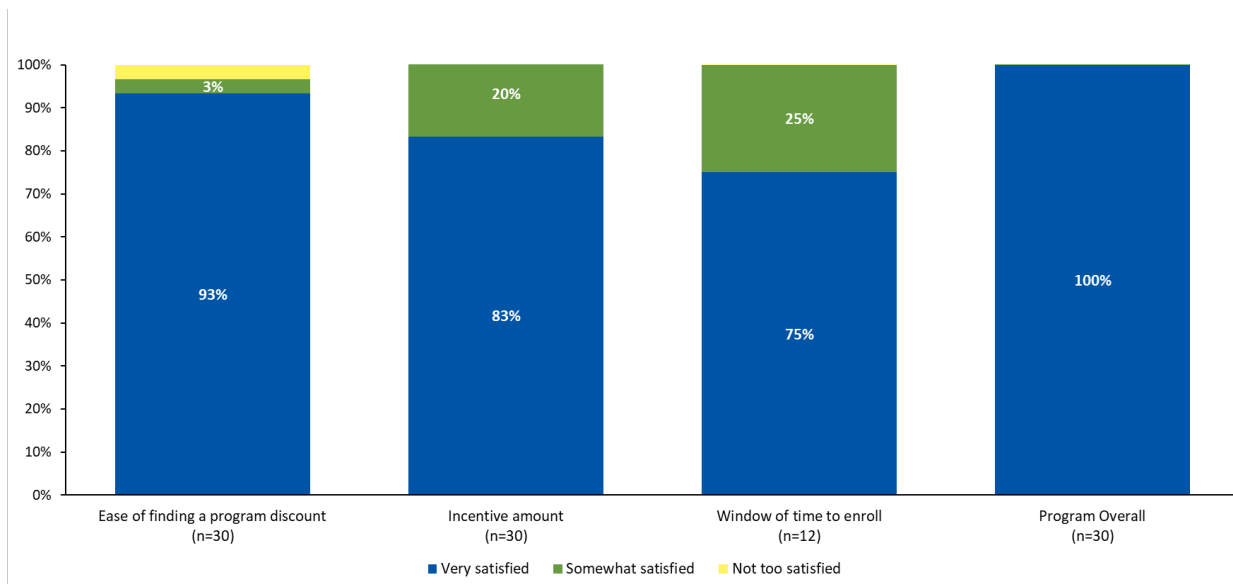


Source: 2020-2021 RMP Wattsmart Business Program Lighting Instant Incentives Participant Survey Question B6. Multiple answers allowed. Don't know and refused responses removed.

The Lighting Instant Incentives participants rated how easy it was to find the rebates and their satisfaction with different program aspects and the program overall. Ninety-six percent of respondents rated that finding the rebates they were looking for was either *very easy* or *somewhat easy*. In addition, 100% of respondents rated themselves as either *very satisfied* or *somewhat satisfied* with the amount of the incentive they received (n=30), the timeframe to enroll (n=12), and the program overall (n=30).

Only one respondent encountered challenges with participating in the program, citing difficulties with sending in the information to get the program incentive because their billing address was at a different location. Overall, these satisfaction ratings were slightly higher than the 2020 ratings, when 100% of respondents were either *very satisfied* or *somewhat satisfied* with the incentive amount received and 97% were *very satisfied* or *somewhat satisfied* with the Lighting Instant Incentives program offering overall.

Figure 13. Satisfaction with Lighting Instant Incentives Program Components and Program Overall



Source: 2021 RMP Wattsmart Business Program Lighting Instant Incentives Participant Survey Questions B7, B9, B16, and B21. Ease of findings a program discount was asked on a scale of *very easy* to *not at all easy*.

None of the respondents provided a recommendation to improve the Lighting Instant Incentives program offering.

Firmographics

Seventy-nine percent of respondents said their company owns the facility where the improvements were made, while 13% said they lease the facility and 8% manage the property (n=24). Additionally, 27% of respondents said their company employs 1 to 10 people, 15% said between 11 and 25 people, 4% said 26 to 50 people, 4% said 51 to 75 people, 11% said 76 to 100 people, 4% said 101 to 200 people, 8% said 201 to 500 people, and 27% said more than 500 people (n=26). Respondents also identified what type of fuel source their facility uses for space and water heating. For space heating, 78% of respondents said their facility uses natural gas, 19% said they use electric sources, and 4% said they use additional sources (n=27). For water heating, 75% of respondents said they use natural gas and 25% said they use electric sources (n=28).

Trade Allies

The Cadmus team interviewed seven trade allies about their program experience including program awareness, the program’s impact on their business, their overall program satisfaction, and general company firmographics.

Trade Ally Experience

Trade allies provided a variety of ways their company first learned about the Wattsmart Business program:

- Four respondents said their company was already participating in the program before they started working there.
- One respondent said they started participating 20 years ago and were automatically participating due to the lighting upgrades they were completing.
- One respondent said they had engaged with different RPM incentives.
- One respondent said they had previously worked at a company that participated in the program, and continued with the program when they started a separate company.

Five of the seven trade allies said they chose to become an approved Wattsmart vendor because they wanted to offer the incentives to their customers, while one respondent became an approved Wattsmart vendor to help their customers by providing extra promotional material, and the final respondent said they always wanted to be an approved Wattsmart vendor.

When asked what percentage of the jobs their company completed in 2021 were also part of the program, one trade ally said 80%, three respondents said between 30% to 50%, and three respondents said between 10% and 20%. Despite this range of impact, all respondents said that their participation in the Wattsmart Business program has positively affected their businesses. Specifically, one respondent said it has been beneficial to be able to show a customer their savings. Another respondent said the Wattsmart Business program is sometimes the factor that helps a customer decide to complete the project due to the equipment being provided at a lower cost.

When asked how well the current incentives motivate customers to complete the upgrades, two respondents said that the impact of the incentive depends on the incentive level for each upgrade. For example, one respondents specifically indicated that the incentive for a variable refrigerant flow has little impact. Another trade ally described that some incentives are not very impactful, but have a huge role in encouraging project completion for other program offerings, such as SBDI. The remaining five respondents said that the current incentives encourage participation.

When asked if there were any barriers to working with the Wattsmart Business program, two trade allies reported no barriers while four trade allies described different barriers they have experienced:

- One respondent said that Wattsmart Business participation is takes a lot of time to complete the paperwork, which requires someone to be receptive and knowledgeable about the program.
- One respondent said that market changes have been a barrier, as the incentives have not kept up with the increased cost of materials and hardware. This respondent would like the incentive amounts to increase as the material costs continue to rise.
- One respondent said that large customers already have advanced controls, which keeps them from participating. Additionally, this trade ally further explained that the requirement for customers to be a part of the program at the design phase for new construction can be challenging.

- One respondent reported communication as a barrier, saying that as of 2020 they have not received as many emails keeping them informed, such as when the vendor portal changed.

The Cadmus team also asked trade allies about their awareness of the scorecards for approved vendors or of any other additional material provided to trade allies. Although six respondents said they do interact with the materials provided by program staff; these six respondents also said they did not interact much with the scorecards. Three respondents provided additional detail on their perspective regarding the scorecards:

- One respondent described the scorecards as helpful in providing a baseline level of satisfaction and covering broad detail.
- One respondent said the scorecards allow them to reach out to particular customers.
- One respondent said customers do not receive enough information regarding the functions of the scorecard.

Although the online application portal was introduced, all seven trade allies reported that they submit paperwork through the program staff.

When asked what products that are not currently eligible might be a good fit for the program, two respondents mentioned variable refrigerant flow, while the remaining five respondents could not think of any products that should be added or areas of expansion.

Satisfaction

When asked for their overall satisfaction with the Wattsmart Business program, all seven respondents rated themselves as *satisfied*. Respondents also provided several recommendations to improve the participation process for customers and vendors:

- Provide consistency with the incentive amounts.
- Provide more information on how the small businesses can be efficient and generate better leads.
- Provide marketing materials for end users, specifically small businesses.
- Provide financing through power bills.
- Provide more and higher rebates.
- Provide consistent communication.

Overall, six of seven respondents said that RMP is responsive to their needs and provides them with the information and support they need to be successful.

Firmographics

Five of the seven interviewed trade allies are from certified controls companies (with three lightings companies and two HVAC companies). The other two trade allies are from certified lighting businesses. Five trade allies primarily serve commercial customers, one serves both commercial and residential customers, and one serves commercial, residential, and industrial customers. Two respondents serve Utah RMP areas, while five respondents serve either Wyoming or Idaho RMP areas. Two respondents

said their companies staffed fewer than 10 employees in 2021, while three had 10 to 40 employees, one had between 50 and 60 employees, and one had about 350 employees.

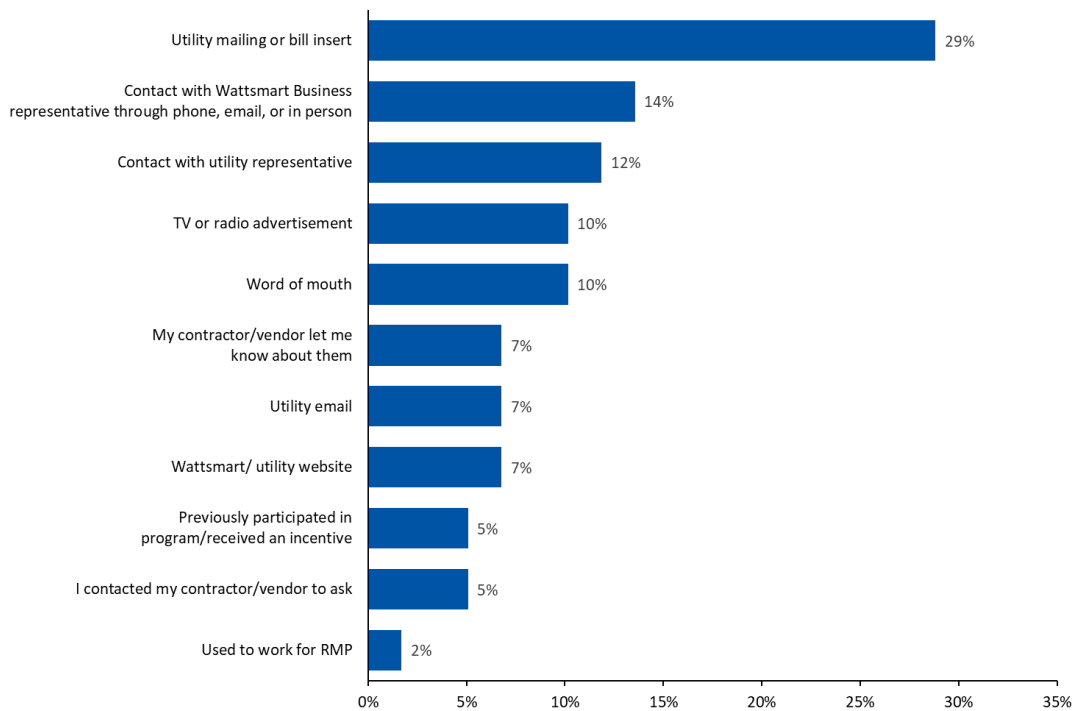
Nonparticipant Experience

The Cadmus team interviewed 197 nonparticipants to learn about their program awareness, motivation and barriers to energy efficiency upgrades, and general firmographics.

Awareness

Prior to the interview, 37% of respondents said they were aware of the Wattsmart Business program offerings (n=197). Of those who were aware, 29% (n=59) said they learned about the program through a utility mailing or bill insert (Figure 14).

Figure 14. Wattsmart Business Program Awareness Source (Nonparticipants)



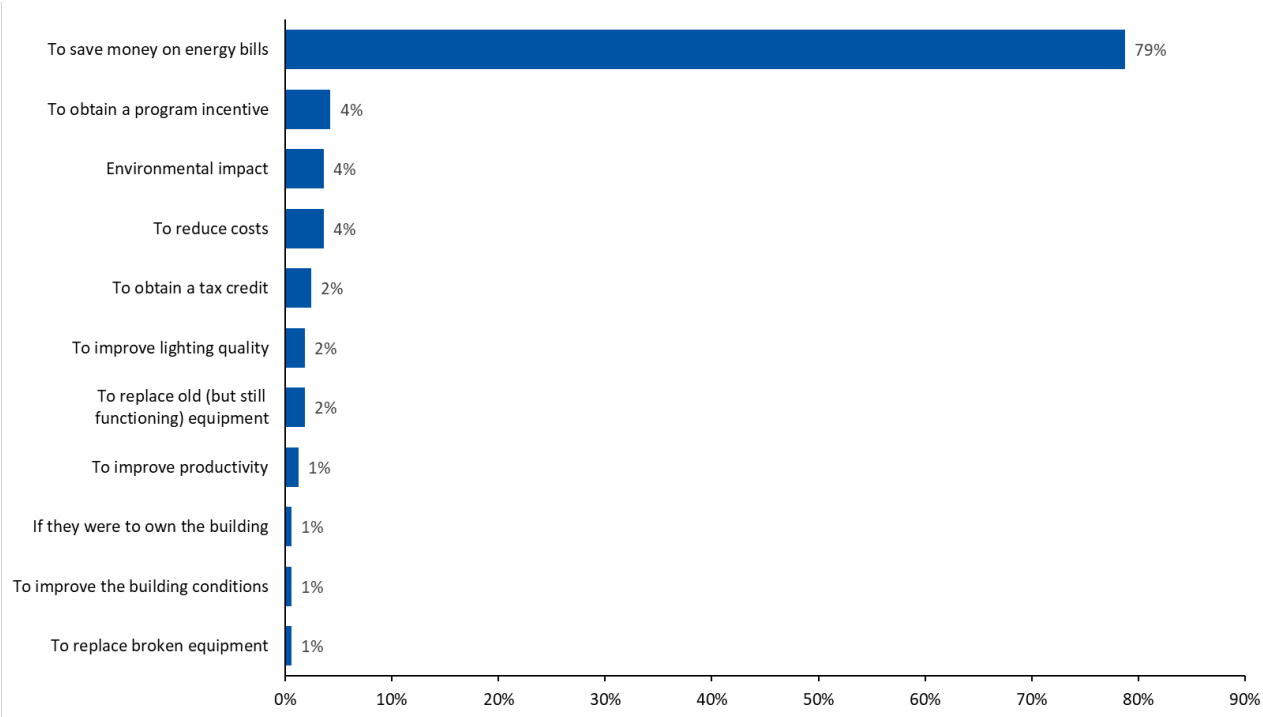
Source: 2021 RPM Wattsmart Business Program Nonparticipant Survey Question C3. Multiple answers allowed (n=59).

Of respondents who were aware of the Wattsmart Business program (n=68), 21% said they had participated previously and 33% said they were either *very likely* or *somewhat likely* to request a program incentive in the future (n=72). However, more than half of respondents (58%) said they did not participate in Wattsmart Business in the past two years because they do not know enough about the program (n=184).

Motivation and Barriers

As shown in Figure 15, 79% of respondents said the most important factor to motivate their company to make energy-efficient upgrades is to save money on energy bills (n=165).

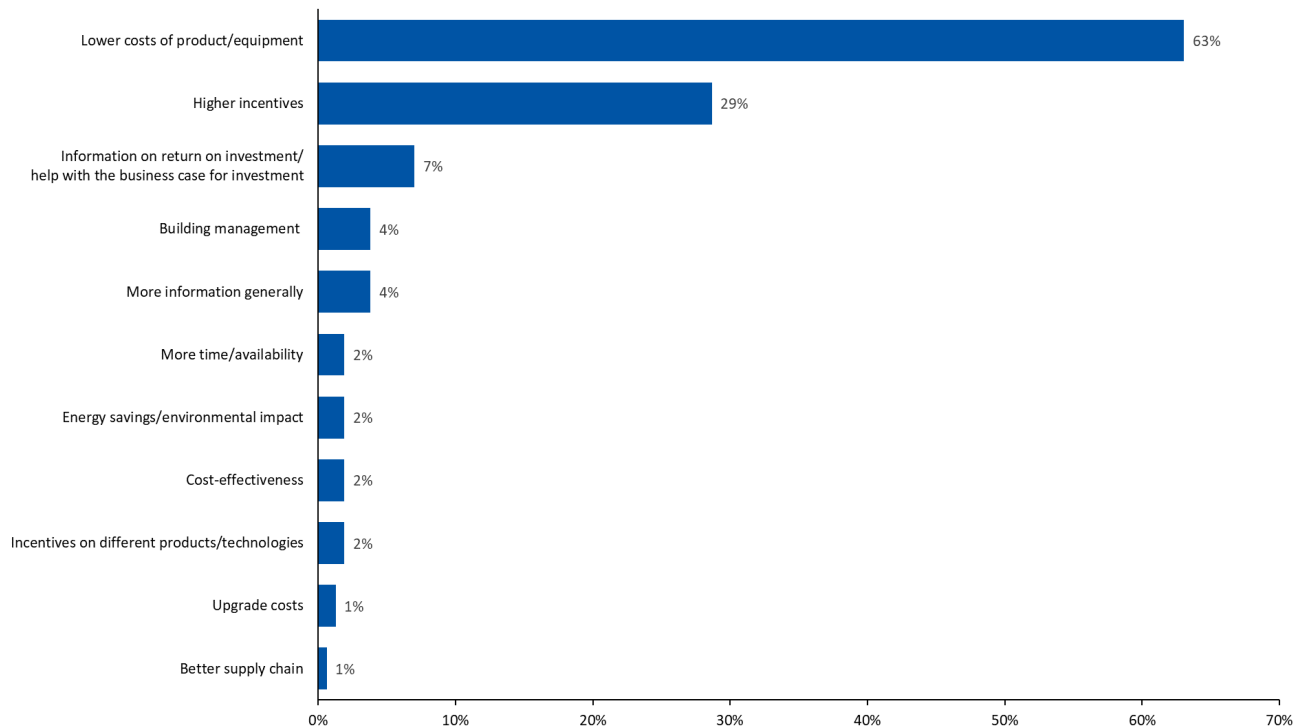
Figure 15. Most Motivating Reasons to Make Energy-Efficient Upgrades (Nonparticipants)



Source: 2021 RMP Wattsmart Business Program Nonparticipant Survey Question D1. Multiple answers allowed (n=165).

As shown in Figure 16, when asked what would motivate their business to make *more* energy-efficient purchases or upgrades, respondents most often cited ways to make upgrades more affordable such as lowering the cost of equipment or increasing incentives.

Figure 16. Most Motivating Reasons to Make More Energy-Efficient Purchases or Upgrades (Nonparticipants)



Source: 2021 RMP Wattsmart Business Program Nonparticipant Survey Question D9. Multiple answers allowed (n=157).

The Cadmus team also asked respondents about how the COVID-19 pandemic and related economic impacts had affected their companies’ investments in building and equipment improvements (n=178):

- Fifty-nine percent said their company is investing about the **same** amount in building and equipment improvements as before the pandemic.
- Thirty-one percent said their company is now investing **less** in building and equipment improvements.
- Nine percent said their company is now investing **more** in buildings and equipment improvements.

Firmographics

Fifty-nine percent of the respondents said their company employs 1 to 10 people, while 20% said 11 to 25 people, 8% said 26 to 50 people, 7% said 51 to 100 people, and 7% said 101 or more people (n=181). Respondents also identified what type of fuel source their facility uses for space and water heating. For space heating, 69% of respondents said their facility uses natural gas, 23% said they use electric sources, and 8% said they use additional sources (n=171). For water heating, 65% of respondents said they use natural gas, 30% said they use electric sources, and 5% said they use additional sources (n=163).

Cost-Effectiveness Results

As shown in Table 9, the Wattsmart Business program proved cost-effective for the 2021 evaluation period from the PacifiCorp Utility Cost Test perspective, with a benefit/cost ratio of 1.16, and from the Participant Cost Test perspective, with a benefit/cost ratio of 2.46. It was also cost-effective according to the PacifiCorp Total Resource Cost, Total Resource Cost, but not the Ratepayer Impact Measure (RIM) test perspective. Please see *Appendix C* for more information on cost-effectiveness.

Table 9. 2021 Utah Wattsmart Business Program Evaluated Net Cost-Effectiveness Summary

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PacifiCorp Total Resource Cost Test (TRC + 10% Conservation Adder)	\$0.0515	\$63,100,436	\$72,902,889	\$9,802,453	1.16
Total Resource Cost Test (TRC No Adder)	\$0.0515	\$63,100,436	\$66,275,354	\$3,174,918	1.05
Utility Cost Test	\$0.0284	\$34,766,566	\$66,275,354	\$31,508,788	1.91
Ratepayer Impact Measure Test		\$132,053,942	\$66,275,354	(\$65,778,589)	0.50
Participant Cost Test		\$56,621,217	\$139,430,236	\$82,809,020	2.46
Life-Cycle Revenue Impacts (\$/kWh)					\$0.000209951
Discounted Participant Payback (years)					3.70

Conclusions and Recommendations

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

In 2021, RMP realized lower energy savings than reported for the newly introduced ARC measure.

RMP reported savings for these projects using its in-house ARC Excel workbook. The Cadmus team evaluated these projects based on the “Advanced Rooftop Control” measure from the RTF, using the AHU system configuration, facility hours of operation, and primary fuel type. The team found the ARC projects to realize 45%, 64%, 67%, and 95% of reported savings based on the RTF energy-savings calculation methodology.

Recommendation: Consider determining savings for ARC measures based on the RTF’s “Advanced Rooftop Control” measure or include additional documentation and visibility into RMP’s in-house ARC Excel workbook to justify the reported savings methodology.

Irrigation hardware and green motor rewind measures continue to realize lower energy savings than reported.

RMP uses deemed savings values for all irrigation hardware measures, but savings do not align with the RTF’s “Irrigation Hardware Workbook v4.1” (approved in May 2018), which the Cadmus team used to evaluate savings. The RTF comprehensively reviewed irrigation measures in 2013, 2016, 2018, and 2021 and revised energy savings calculations and qualified measures based on their findings. Based on these updates, three hardware measures that are still incentivized by RMP (pressure regulators, drop tubes, and goosenecks) no longer realize energy savings when compared to the prior version of the RTF “Irrigation Hardware Workbook.” Three sampled projects involved green motor rewind projects and were evaluated to realize 74% to 77% of reported energy savings. RMP uses deemed saving values for green motor rewind measures, but savings do not align with the RTF’s “Green Motor Rewind v3.1” measure (approved in December 2017).

Recommendation: Consider removing irrigation hardware measures that no longer realize savings (based on the RTF’s “Irrigation Hardware Workbook v4.1”) from the irrigation incentive list and update deemed savings values for qualified irrigation hardware measures to match the RTF values. Update deemed savings values for green motor rewind measures to match the RTF’s “Green Motor Rewind v3.1” measure.

Wattsmart Business was successfully implemented and participants were satisfied with the program; however, there are still opportunities to expand awareness.

Typical upgrades and custom analysis participants reported 100% satisfaction with all aspects of the program, except the ease of completing paperwork (93%, n=27). Additionally, three of the participant groups (typical upgrades and custom analysis, Small Business Direct Install, and Lighting Instant Incentives) and trade allies gave the program a 100% satisfaction rating overall.

However, there were notable differences in how respondents learned about the program.

Nonparticipant respondents who were aware of the Wattsmart Business program offerings most commonly reported learning about the program and its offerings through a mailing or bill insert, while

participants most commonly learned about the program through contact with a distributor, supplier, electrician, contractor, or program representative. In addition, more than half of non-participants respondents (58%) said they did not participate in Wattsmart Business in the past two years because they do not know enough about the program (n=184).

Customers continue to be motivated to participate in programs to saving money on energy bills, replace equipment, and reduce their greenhouse gas footprint. The 2021 typical upgrades and custom analysis and SBDI respondents identified saving money on energy bills as their top motivation for participating in the Wattsmart Business program, which is consistent with the motivating factors reported in 2020. Among typical upgrades and custom analysis respondents, 41% said their key motivation was to save money on energy bills, followed by reducing their greenhouse gas footprint (21%, n=34). Thirty-four percent of the SBDI respondents reported saving money on energy bills as the most important reason for participation, followed by replacing old but still functioning equipment (22%, n=32).

Saving money on energy bills is the key, but only, motivating factor for energy efficient upgrades. Typical upgrades and custom analysis respondents most commonly reported lower energy bills (66%), followed by environmental responsibility (37%; n=35) as the primary benefits of making energy efficiency upgrades. Seventy-percent of SBDI respondents reported that lower energy bills, followed by better lighting (65%) were key benefits (n=34). In addition, the nonparticipants reported that their companies' most important motivating factor to make energy efficient upgrades was saving money on energy bills.

The 2021 Utah Wattsmart Business program was cost-effective, achieving a PTRC benefit/cost ratio of 1.16. Under the PTRC test perspective, the program generated more benefits (\$72,902,889) than costs (\$63,100,436), producing positive net benefits. The program was also cost-effective according to the TRC, PCT, and UCT perspectives. In 2020, the Utah Wattsmart Business program achieved a PTRC benefit/cost ratio of 0.86. In 2019, the program achieved a PTRC benefit/cost ratio of 1.06, and in the 2018 and 2019 program cycle achieved a combined PTRC benefit/cost ratio of 1.18. The program generated more energy savings in 2021 than in 2020 and achieved greater overall benefits, while incurring similar administrative, incentive, and incremental project costs, resulting in higher levels of net benefits compared to past program years.

Appendix A. Gross Engineering Analysis Methodology

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

- Project review
- Engineering 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).⁷ 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.

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

⁷ These reports are available online: <https://www.pacificorp.com/environment/demand-side-management.html>

options in the IPMVP (p. 25). 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.

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.⁸ 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.

⁸ ADM Associates. October 15, 2018. *Technical Reference Manual 2.2*. Prepared for Idaho Power Company. <https://docs.idahopower.com/pdfs/EnergyEfficiency/Reports/2018TRM.pdf> 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.

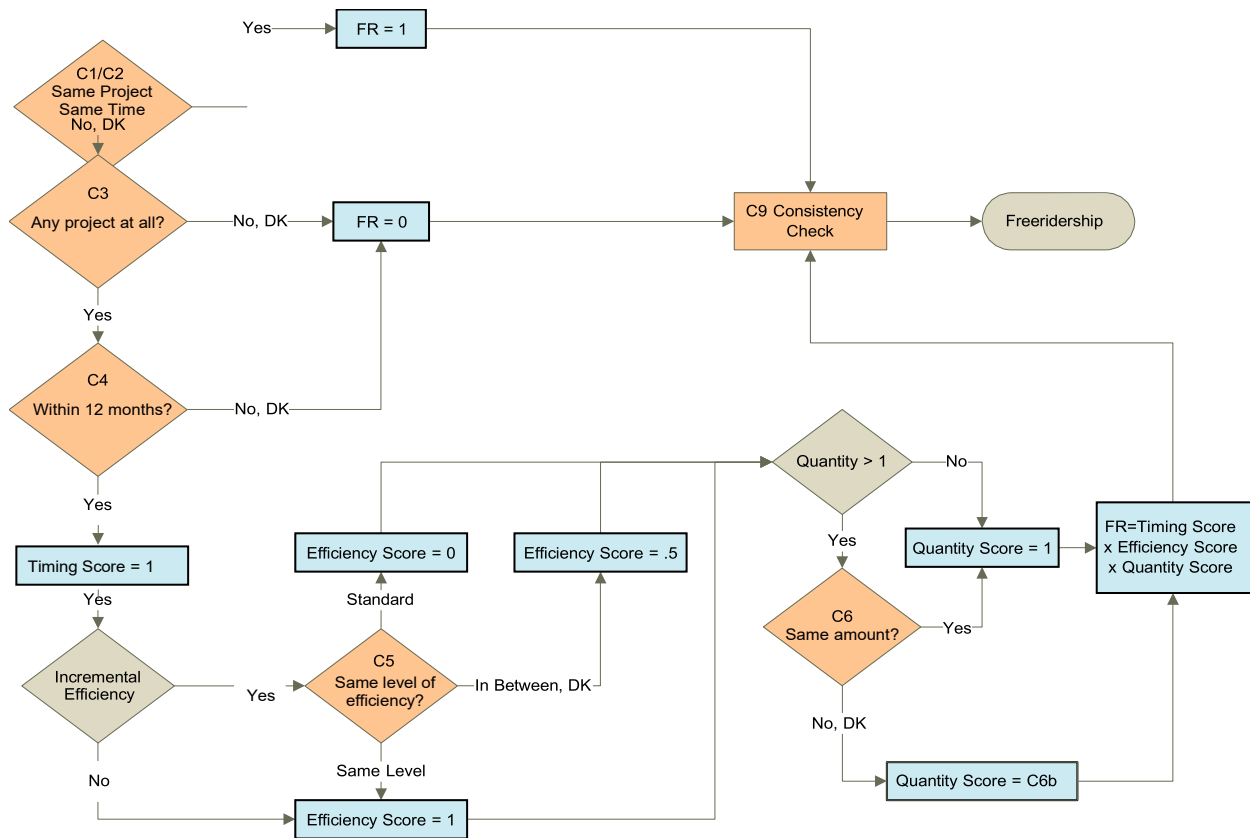
After adjusting the initial freeridership ratio for past program participation, a series of consistency check questions were reviewed. These questions asked about the influence of the program's interventions (e.g., financial incentives, technical assistance) and addressed the counter-factual (e.g., what 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 Adjusted freeridership score is reduced by 50% if C8 response merits an adjustment

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:

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

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 Nonparticipant Spillover 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.⁹ 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.

⁹ 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-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.

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

Table C-2. Wattsmart Selected Cost Analysis Inputs

Input Description	2021
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-3 shows cost-effectiveness inputs for each measure stratum in Utah’s Wattsmart Business program.

Table C-3. Utah Wattsmart Business Measure Stratum Cost-Effectiveness Inputs

Input Description	Input Value
Average Measure Life (EUL) ^a	
Compressed Air	13.3
Energy Management	3.6
HVAC	14.5
Irrigation	14.2
Lighting	14.4
Midstream	12.0
Motors	14.9
Small Business Lighting	13.4
Other	13.9
Evaluated Net Energy Savings (kWh/year) ^b	
Compressed Air	11,235,798
Energy Management	11,283,969
HVAC	10,581,206
Irrigation	1,360,042
Lighting	49,835,699
Midstream	18,222,408
Motors	3,421,344
Small Business Lighting	15,539,074
Other	6,097,834
Total Utility Cost (including incentives) ^c	
Compressed Air	\$2,497,703
Energy Management	\$1,717,404
HVAC	\$6,657,855
Irrigation	\$475,431
Lighting	\$12,583,417
Midstream	\$2,943,461
Motors	\$1,195,574
Small Business Lighting	\$4,531,634
Other	\$2,164,086
Incentives	
Compressed Air	\$1,169,411
Energy Management	\$1,256,710
HVAC	\$5,385,719
Irrigation	\$287,620
Lighting	\$7,320,449
Midstream	\$1,225,576
Motors	\$759,579
Small Business Lighting	\$1,549,183
Other	\$2,721,706

^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-4, the compressed air measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-4. 2021 Utah Compressed Air Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0302	\$3,258,717	\$7,397,392	\$4,138,676	2.27
TRC	\$0.0302	\$3,258,717	\$6,724,902	\$3,466,186	2.06
UCT	\$0.0232	\$2,497,703	\$6,724,902	\$4,227,199	2.69
RIM		\$9,526,059	\$6,724,902	(\$2,801,157)	0.71
PCT		\$1,930,424	\$8,197,766	\$6,267,343	4.25
Lifecycle Revenue Impacts (\$/kWh)					\$0.000009737
Discounted Participant Payback (years)					1.09

Energy Management

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

Table C-5. 2021 Utah Energy Management Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0311	\$1,254,125	\$2,565,647	\$1,311,522	2.05
TRC	\$0.0311	\$1,254,125	\$2,332,406	\$1,078,281	1.86
UCT	\$0.0426	\$1,717,404	\$2,332,406	\$615,002	1.36
RIM		\$4,606,054	\$2,332,406	(\$2,273,648)	0.51
PCT		\$484,579	\$6,071,127	\$5,586,548	12.53
Lifecycle Revenue Impacts (\$/kWh)					\$0.000033283
Discounted Participant Payback (years)					N/A

HVAC

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

Table C-6. 2021 Utah HVAC Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0989	\$10,596,726	\$7,084,650	(\$3,512,076)	0.67
TRC	\$0.0989	\$10,596,726	\$6,440,591	(\$4,156,135)	0.61
UCT	\$0.0621	\$6,657,855	\$6,440,591	(\$217,264)	0.97
RIM		\$15,904,842	\$6,440,591	(\$9,464,251)	0.40
PCT		\$15,232,895	\$28,503,186	\$13,270,291	1.87
Lifecycle Revenue Impacts (\$/kWh)					\$0.000030208
Discounted Participant Payback (years)					15.33

Irrigation

As shown in Table C-7, the irrigation measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-7. 2021 Utah Irrigation Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0531	\$732,207	\$1,045,938	\$313,731	1.43
TRC	\$0.0531	\$732,207	\$950,852	\$218,645	1.30
UCT	\$0.0345	\$475,431	\$950,852	\$475,422	2.00
RIM		\$1,548,045	\$950,852	(\$597,193)	0.61
PCT		\$654,443	\$1,819,926	\$1,165,483	2.78
Lifecycle Revenue Impacts (\$/kWh)					\$0.000001906
Discounted Participant Payback (years)					3.85

Lighting

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

Table C-8. 2021 Utah Lighting Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0582	\$29,386,753	\$29,309,978	(\$76,776)	1.00
TRC	\$0.0582	\$29,386,753	\$26,645,434	(\$2,741,319)	0.91
UCT	\$0.0249	\$12,583,417	\$26,645,434	\$14,062,017	2.12
RIM		\$55,425,121	\$26,645,434	(\$28,779,687)	0.48
PCT		\$23,794,308	\$49,322,120	\$25,527,812	2.07
Lifecycle Revenue Impacts (\$/kWh)					\$0.000091859
Discounted Participant Payback (years)					4.40

Midstream

As shown in Table C-9, the midstream measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-9. 2021 Utah Midstream Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0344	\$5,670,836	\$9,567,071	\$3,896,235	1.69
TRC	\$0.0344	\$5,670,836	\$8,697,337	\$3,026,501	1.53
UCT	\$0.0179	\$2,943,461	\$8,697,337	\$5,753,876	2.95
RIM		\$16,711,105	\$8,697,337	(\$8,013,769)	0.52
PCT		\$4,096,496	\$15,717,833	\$11,621,336	3.84
Lifecycle Revenue Impacts (\$/kWh)					\$0.000030554
Discounted Participant Payback (years)					1.99

Motors

As shown in Table C-10, the motors measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-10. 2021 Utah Motors Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0485	\$1,765,388	\$2,428,101	\$662,713	1.38
TRC	\$0.0485	\$1,765,388	\$2,207,364	\$441,977	1.25
UCT	\$0.0329	\$1,195,574	\$2,207,364	\$1,011,790	1.85
RIM		\$3,607,216	\$2,207,364	(\$1,399,852)	0.61
PCT		\$1,998,304	\$6,002,278	\$4,003,975	3.00
Lifecycle Revenue Impacts (\$/kWh)					\$0.000004127
Discounted Participant Payback (years)					6.06

Other

As shown in Table C-11, the “other” measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-11. 2021 Utah Other Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0580	\$9,128,191	\$10,079,664	\$951,472	1.10
TRC	\$0.0580	\$9,128,191	\$9,163,331	\$35,139	1.00
UCT	\$0.0288	\$4,531,634	\$9,163,331	\$4,631,696	2.02
RIM		\$17,532,373	\$9,163,331	(\$8,369,043)	0.52
PCT		\$7,772,868	\$17,008,233	\$9,235,365	2.19
Lifecycle Revenue Impacts (\$/kWh)					\$0.000026712
Discounted Participant Payback (years)					4.34

Small Business Lighting

As shown in Table C-12, the small business lighting measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-12. 2021 Utah Small Business Lighting Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0223	\$1,307,494	\$3,424,450	\$2,116,956	2.62
TRC	\$0.0223	\$1,307,494	\$3,113,136	\$1,805,642	2.38
UCT	\$0.0370	\$2,164,086	\$3,113,136	\$949,050	1.44
RIM		\$7,193,126	\$3,113,136	(\$4,079,990)	0.43
PCT		\$656,900	\$6,787,768	\$6,130,868	10.33
Lifecycle Revenue Impacts (\$/kWh)					\$0.000014183
Discounted Participant Payback (years)					N/A