CADMUS

2020 Idaho Wattsmart Business Program Evaluation

FINAL REPORT

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Introduction

This 2020 report presents the major 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 Idaho Wattsmart Business Evaluation Dashboard,[1] which provides further information on project-level results, trends, and historical performance.

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

The 2020 program reported gross electricity savings of 16,991,503 kWh. RMP uses an outsourced delivery model for all demand-side management (DSM) services contracted with three program administrators—Cascade Energy and Resource Innovations—to implement all program offerings—for program year 2020.

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

The Cadmus team evaluated the following offerings:

- **Wattsmart Business (typical upgrades and custom analysis):** RMP offered customers prescriptive incentives (typical upgrades) for measures such as agricultural, compressed air, HVAC, lighting, motors, building shell, food service equipment, and irrigation. It also offered custom incentives (custom analysis) for verified first-year energy savings resulting from installation of qualifying capital equipment upgrades not covered by typical upgrade incentives or other Wattsmart Business program delivery offerings.
- **Lighting Instant Incentive (midstream).** Through this offering, RMP targeted the lighting maintenance market by offering customers instant point-of-purchase incentives on qualified LEDs, occupancy sensors, and retrofit kits purchased through a participating lighting distributor. Customers who purchased through a nonparticipating distributor did not receive an instant discount, but they could apply to RMP for incentives after the purchase.
- **Small Business Direct Install (SBDI):** RMP provided a free energy assessment, instant incentives, and turnkey installations for geotargeted, eligible, small business customers making 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 and through maintenance and management practices.

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

Capital improvements, if eligible, were incentivized through the other Wattsmart Business program offerings. In addition, through this offering, RMP offered year-long strategic energy management training to a cohort of water and wastewater customers.

Objectives

Table 1 lists the study objectives and the evaluation activities.

Table 1. Evaluation Objectives and Activities

Rocky Mountain Power Evaluation Objectives	Participant Surveys	Partial Participant Surveys	Trade Ally 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								✓

Methods

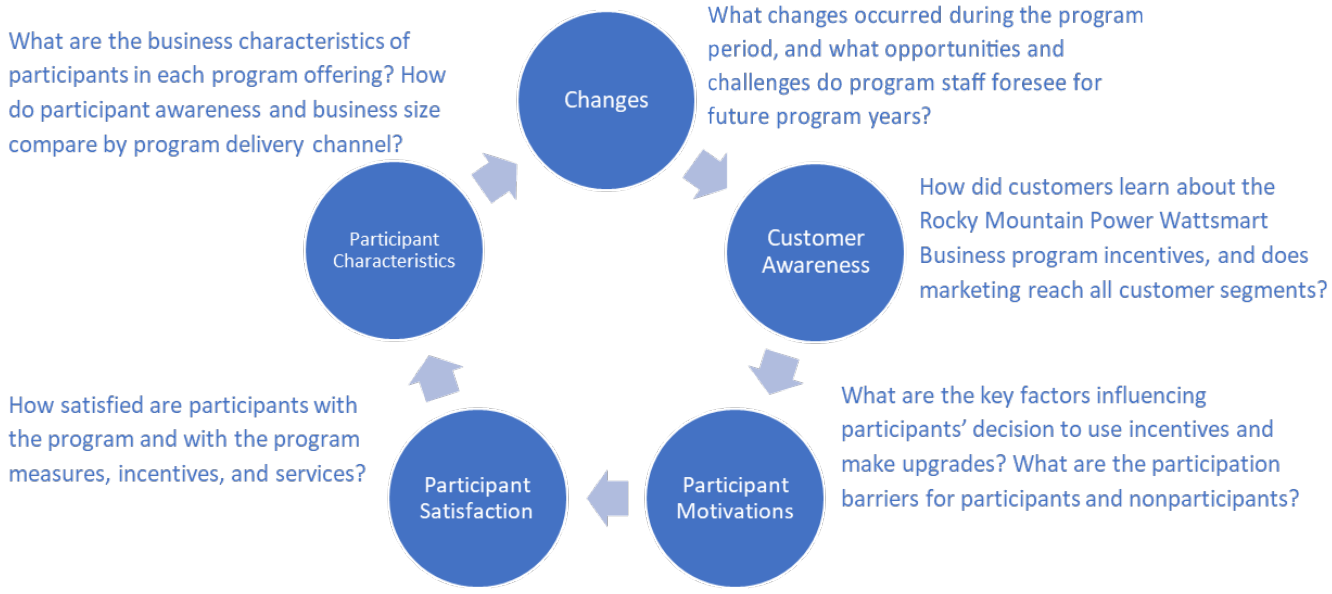
To evaluate energy impacts, the Cadmus team used desk reviews, phone verification and surveys to inform the engineering analyses, net-to-gross (NTG) analysis, and program cost-effectiveness analysis.

Table 2. Impact Steps to Determine Evaluated Gross and Net Savings

Savings Estimate	Step	Action
Evaluated Gross Savings	1	Tracking Database Review: Validate the accuracy of data in the participant database and verify that savings match annual reports
	2	Verification: Adjust savings based on actual installation rates
	3	Unit Energy Savings: Validate saving calculations (i.e., engineering review, analysis, meter data)
	4	Realization Rates: Extrapolate realization rates to the population, if applicable
Evaluated Net Savings	5	Attribution: Apply NTG adjustments

Figure 1 shows the research objectives addressed through the process evaluation. The process evaluation also relied on the participant surveys, as well as partial participant surveys, to assess program delivery and efficacy, bottlenecks, barriers, and opportunities for improvements. The Cadmus team administered participant surveys online and performed the partial participant telephone surveys.

Figure 1. Process Evaluation Research Areas and Questions



Evaluation Detailed Findings

Impact Evaluation

To determine gross savings, the Cadmus team conducted verification and engineering analyses on a sample of 2020 projects (see *Appendix A. Gross Engineering Analysis Methodology* for information on the impact evaluation methodology). To calculate net savings, the Cadmus team conducted a survey of participants to inform freeridership and spillover and a survey of nonparticipating businesses to inform nonparticipant spillover. Additional detail on project level results and across several years can be found in the Evaluation Dashboard.

Impact Analysis Sampling

Table 3 shows total projects, total projects sampled, sample distribution, associated energy savings, and the sample's percentage of the savings for the 2020 program year. Out of 431 unique projects, the Cadmus team evaluated 36 projects, which represents 35% of the 2020 program savings.

Table 3. Idaho 2020 Wattsmart Business Program Impact Sampling Summary

Strata	Unique Projects	Total Reported Savings (kWh) [a]	Unique Sampled Projects		Sample Reported Savings (kWh) [a]	Percent of Reported Savings Sampled
			Random	Selected		
Direct install	57	653,903	4	0	69,454	10.6%
Energy management	8	1,436,707	4	1	1,168,463	81.3%
Irrigation	158	5,078,261	4	0	67,158	1.3%
Lighting	81	3,946,435	4	0	97,026	2.5%
Midstream	82	744,688	4	2	353,522	47.5%
Motors	10	3,250,816	5	1	3,114,849	95.8%
Other	35	1,880,694	5	2	995,212	52.9%
Total	**431**	**16,991,503**	**30**	**6**	**5,865,683**	**34.5%**

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

Table 4 lists the evaluation findings, including number of projects, gross savings, precision, and net savings. Overall, the Wattsmart Business program achieved a 92.3% gross realization rate for the year, though some variability occurred between measure categories. The impact evaluation achieved 10.7% precision with 90% confidence overall. The Cadmus team calculated NTG of 91.6%, yielding evaluated net savings of 14,358,925 kWh. The *Measure Strata Findings* section describes specific details and findings per measure strata.

Table 4. 2020 Wattsmart Business Program Savings

Strata	Unique Projects	Reported Savings (kWh)[a]	Evaluated Gross Savings (kWh)[a]	Gross Realization Rate	Precision [b]	NTG	Evaluated Net Savings (kWh) [a]
Direct Install		653,903	674,667	103.2%	5.8%	104%	701,654
Energy Management	57	1,436,707	1,311,301	91.3%	11.2%	92%[c]	1,200,842
Irrigation	8	5,078,261	4,285,701	84.4%	34.5%	96%	4,114,272
Lighting	158	3,946,435	3,282,444	83.2%	17.3%	104%[d]	3,413,742
Midstream	81	744,688	840,179	112.8%	6.5%	63%	529,313
Motors	82	3,250,816	3,141,685	96.6%	0.4%	92%[c]	2,877,042
Other	10	1,880,694	2,143,747	114.0%	14.1%	71%	1,522,060
Total	35	**16,991,503**	**15,679,723**	**92.3%**	**10.7%**	**91.6%**	**14,358,925**

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

[b] The measure category precision is based on 80% confidence; the portfolio precision is based on 90% confidence.

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

[d] NTG is 104% due to an evaluated lighting strata freeridership estimate of 0% and the application of a 4% portfolio-level nonparticipant spillover estimate.

Measure Strata Findings

The following sections provide a high-level summary of the findings in each measure strata. For additional detailed information on each sampled project, visit the Evaluation Dashboard. PacifiCorp defines a measure as a specific measure type within a measure category. For example, one lighting project may have three different lighting measures, such as high-bay, linear LEDs, and wall sconces. Within each of these three measure types, there will be several unit counts. The Cadmus team mapped the measure categories within RMP's measure database to seven strata. Table 6 describes the measure mapping strategy. RMP did not report savings for the Energy Project Manager co-funding measure or the Wattsmart Business vendor promotion measure; however, they are listed as projects because they are counted as projects.

Table 5. Measure Mapping

Measure Category	Program Name	Evaluation Strata	Measures
Direct Install	Small Business Direct Install	Direct Install	57
Energy Management Recommissioning	Wattsmart Business	Energy Management	9
Agriculture	Wattsmart Business	Irrigation	300
Irrigation	Wattsmart Business		
Lighting	Wattsmart Business	Lighting	251
Lighting	Midstream Lighting	Midstream	82
Motors	Wattsmart Business	Motors	18
Additional Measures	Wattsmart Business	Other	75
Building Shell	Wattsmart Business		
Compressed Air	Wattsmart Business		
Energy Project Manager Co-Funding	Energy Project Manager		
Farm & Dairy	Wattsmart Business		
Food Service Equipment	Wattsmart Business		
HVAC	Wattsmart Business		
Refrigeration	Wattsmart Business		
Vendor Promotion	Wattsmart Business		
Total			**792**

Direct Install

During 2020, RMP provided incentives for 57 direct install measures and reported 653,903 kWh in energy savings, which accounted for 3.8% of all reported energy savings. The Cadmus team evaluated four sampled projects and extrapolated results to the population for a realization rate of 103.2% for the Direct Install stratum.

RMP reported savings for all sampled projects based on an internally developed Small Business Direct Install Calculator. The outputs from the calculators were provided to the evaluation team, but the internal calculations and some calculation inputs could not be verified. The Cadmus team calculated evaluated savings for the four sampled projects based on the project documentation and found higher savings for one project. Due to limited visibility in the reported calculations workbook, we were unable to determine a reason for the discrepancy. Three evaluated projects exhibited minimal discrepancies.

Energy Management

During 2020, RMP provided incentives for nine energy management measures among eight unique projects and reported 1,436,707 kWh in energy savings, which accounted for 8.5% of all reported energy savings. The Cadmus team evaluated five sampled projects and extrapolated results to the population for a realization rate of 91.3% for the energy management stratum. All energy management measures involved retro-commissioning the existing HVAC and central heating and cooling plant systems.

Four of the five sampled projects had minimal discrepancies. We found minor differences in control changes implemented at one facility that resulted in a minimal reduction in savings. For one project, the

team found the control measures implemented through the retro-commissioning project had been completely removed and the systems had been converted back to the original control strategies implemented prior to the project, which resulted in no realized energy savings. We interviewed the facility staff, reviewed the building automation system settings, and reviewed 12 months of utility data. The Cadmus team found this project's lack of success may have been due to miscommunication between the off-site staff engaged in retro-commissioning and the on-site staff managing the facility.

Irrigation

During 2020, RMP provided incentives for 300 Irrigation measures among 158 unique projects and reported 5,078,261 kWh in energy savings, which accounted for 29.9% of all reported energy savings. The Cadmus team evaluated four sampled projects and extrapolated results to the population for a realization rate of 84.4% for the irrigation stratum.

Three sampled projects realized energy savings close to the reported savings (realization rates of 100%, 100%, and 106%). One project realized 10% of reported savings. This project involved the installation of new sprinkler gaskets and pipe repairs to leaking sprinkler lines. We used the unit energy savings values for these measures from the Regional Technical Forum's irrigation hardware measure (v4.1, approved May 2018) and found lower savings per gasket and repair measures than was reported by RMP. RMP used savings from an earlier version of Regional Technical Forum's irrigation hardware measure (v3.3).

Lighting

During 2020, RMP provided incentives for 251 lighting measures among 81 unique projects. RMP reported 3,946,435 kWh in energy savings, which accounted for 23.2% of all reported program energy savings.

The Cadmus team evaluated four sampled projects and extrapolated results to the population for a realization rate of 83.2% for the lighting stratum. There were minimal discrepancies from two projects that realized 98% of reported energy savings. For a third project, we found the reported savings calculations did not accurately reflect the school building schedule and that the summer and seasonal holidays/breaks were not included in the lighting schedule. We evaluated savings based on the School K12 building type from the Regional Technical Forum, which resulted in reduced energy savings. For the fourth sampled project, there was a difference in baseline wattage determined by the manufacturer's published specifications, which also resulted in reduced energy savings.

Midstream Lighting

During 2020, RMP provided incentives for 82 Midstream measures. RMP reported 744,688 kWh in energy savings, which accounted for 4.4% of all reported program energy savings.

The Cadmus team evaluated six sampled projects and extrapolated results to the population for a realization rate of 112.8% for the midstream stratum. Realization rates for the six sampled projects ranged from 59% to 191%. For each of the sampled midstream projects, we calculated savings based on the Regional Technical Forum's midstream lighting measure and determined the baseline fixture wattage using the lumen equivalence method. RMP based reported energy savings calculations on

average hours of use across the entire midstream program. The differences between reported and evaluated hours of use were the primary reason for discrepancies in realization rates.

Motors

During 2020, RMP provided incentives for 18 motors measures among ten unique projects and reported 3,250,816 kWh in energy savings, which accounted for 19.1% of all reported energy savings. The Cadmus team evaluated six sampled projects and extrapolated results to the population for a realization rate of 96.6% for the motors stratum.

Three of the sampled projects involved electronically commutated motors (ECMs) that received program incentives. For each of these projects, the ECMs served HVAC applications and RMP reported savings as 2,895 kWh per year, per motor size (horsepower). A measure for ECMs serving HVAC applications does not exist within the Regional Technical Forum's measure database. Instead, the Cadmus team evaluated these projects using the baseline and ECM motor efficiencies defined from the Regional Technical Forum's display case evaporator fan motor retrofit measure. This measure provides efficiencies for various motor types and size that match the sampled project. We used the hours of use determined by HVAC application type in the Regional Technical Forum's variable speed drives measure. This measure provides data supporting expected hours of use for HVAC fans. We used these project-specific values to calculate evaluated savings, which resulted in realization rates of 72% to73% for the three sampled ECM projects. We found minimal discrepancies in the other three sampled projects (non-ECM).

Other

During 2020, RMP provided incentives for 75 measures among 35 unique projects in the "other" category and reported 1,943,799 kWh in energy savings, which accounted for 11.1% of all reported energy savings. The Cadmus team evaluated seven sampled projects and extrapolated results to the population for a realization rate of 114.0% for the "other" stratum. This stratum consists of the most varied project types among the seven strata. We sampled measures involving cool roofs, variable frequency drives, air compressors, refrigeration, controls, chillers, and packaged terminal air conditioner measures.

The Cadmus team found minimal discrepancies for four of the seven sampled projects. For one project involving a cool roof, we calculated savings based on the Oak Ridge National Laboratory's cool roof calculator and found greater savings than reported by RMP. RMP used deemed savings for cool roof projects. On another project, we found an arithmetic error. After replicating the calculations, we found greater energy savings were realized than reported. For the last sampled project, we found a large difference in realized energy savings. This project involved the installation of package terminal air conditioners. RMP reported deemed savings of 27 kWh per year, per ton of cooling capacity. We calculated evaluated savings based on the installed package terminal air conditioner efficiency and baseline code-compliant efficiency. This resulted in greater savings realized than reported savings based on the project-specific inputs.

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 analyses using self-reported responses from participating and nonparticipating business customers. The evaluation includes three NTG components:

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

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

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

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

Table 6 summarizes the NTG evaluation results, shown as NTG and evaluated gross savings by program-measure strata. The program achieved 91.6% NTG overall.

Table 6. 2020 Idaho Wattsmart Business NTG Results

Strata	Measure Responses (n)	Freeridership Ratio	Participant Spillover Ratio	NPSO	NTG	Evaluated Net Program Population Savings (kWh)
Direct Install	4	0%	0%	4%	104%	701,654
Energy Management	N/A	N/A	N/A	N/A	92%[c]	1,200,842
Irrigation	16	11%	3%	4%	96%	4,114,272
Lighting	3	0%	0%	4%	104%	3,413,742
Midstream	3	41%	0%	4%	63%	529,313
Motors	N/A	N/A	N/A	N/A	92%[c]	2,877,042
Other	5	33%	0%	4%	71%	1,522,060
Total	**31**	**13.6%** [b]	**1.1%** [b]	**4.0%**	**91.6%**	**14,358,925**

[a] Weighted by evaluated gross program savings.

[b] Weighted by evaluated gross program population savings.

[c] Applied the overall savings' weighted NTG for measures with survey respondents due to an insufficient number of survey respondents to inform the specific measure-strata estimate. The overall NTG estimate is the savings-weighted average of measure strata with survey respondents.

Process Evaluation Findings

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 RMP customers, and where there may be opportunities to strengthen or expand the program.

Process Sampling

The Cadmus team surveyed participants and partial participants and interviewed stakeholders for the 2020 evaluation, as shown in Table 7. Among the three participant groups surveyed, the response rates were 17% for typical upgrades and custom analysis, 14% for Small Business Direct Install, and 12% for lighting instant incentives.

Table 7. Idaho 2020 Wattsmart Business Program Process Activity Sampling

Program Name/Measure Category	Sampling Frame[a]	Target Completes	Achieved Completes
Typical Upgrades and Custom Analysis			
Additional Measures	1	Census	1
Agriculture	46		10
Compressed Air	1		1
Custom	19		4
Energy Management Retro-commissioning	1		1
Farm and Dairy	11		3
HVAC	2		1
Irrigation	36		4
Lighting (other than Small Business Direct Install or Lighting Instant Incentives)	44		4
Other [b]	9		0
Small Business Direct Install	28	Census	4
Lighting Instant Incentives	26	Census	3
Participant Subtotal	**224**	**Census**	**36** [c]
Partial Participants	**11**	**Census**	**2**
Stakeholder Interviews	**N/A**	**4**	**4**

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

[b] Other includes appliances, building shell, food service, food service equipment, motors, oil and gas, refrigeration measures.

[c] Total completes across all programs (Typical Upgrades/Custom Analysis, Small Business Direct Install, Lighting Instant Incentives).

Participant Experience

Surveys with participants in the Wattsmart Business program asked about their entry into the program, how they navigated identifying projects and submitting their applications, and their satisfaction with various aspects of the program.

Wattsmart Business Typical Upgrades and Custom Analysis

The Cadmus team surveyed 29 participants from nine measure categories. This included respondents who completed typical upgrades that were readily available through the program as well as respondents who completed custom incentives and worked with a certified vendor to address their needs. Table 8 shows the breakdown of respondents by measure category and incentive type.

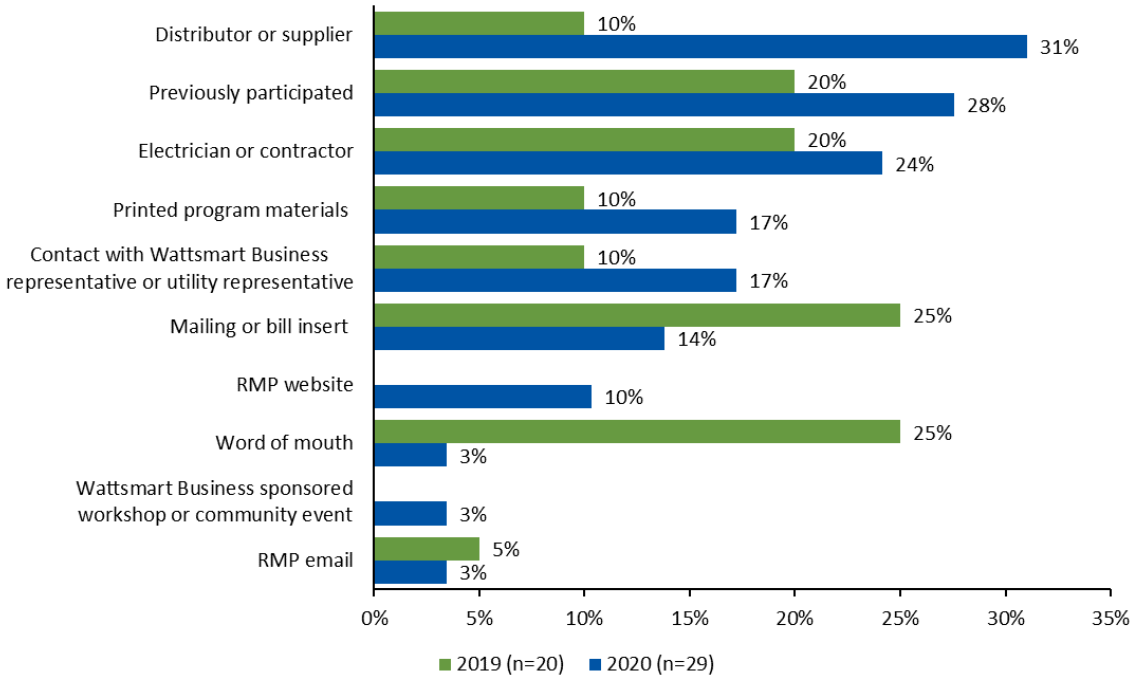
Table 8. 2020 Participant Survey Completes by Measure Category and Incentive Type

Measure Category	Typical Upgrades	Custom Analysis
Agriculture	9	1
Custom	0	4
Irrigation	2	2
Lighting	4	0
Farm and Dairy	3	0
Additional Measures	0	1
Compressed Air	0	1
Energy Management	0	1
HVAC	0	1
Total	**18**	**11**

Participant Experience

Respondents (n=29) reported that they most often learned about the incentives available for their project through the distributor or supplier where they buy their equipment (31%), through previous participation (28%), or through their electrician or contractor (24%). This differed from 2019 respondents identified a mailing or bill insert (25%) and word of mouth (25%) as the most common sources of awareness (n=20). Figure 2 shows the full results from 2019 and 2020 respondents.

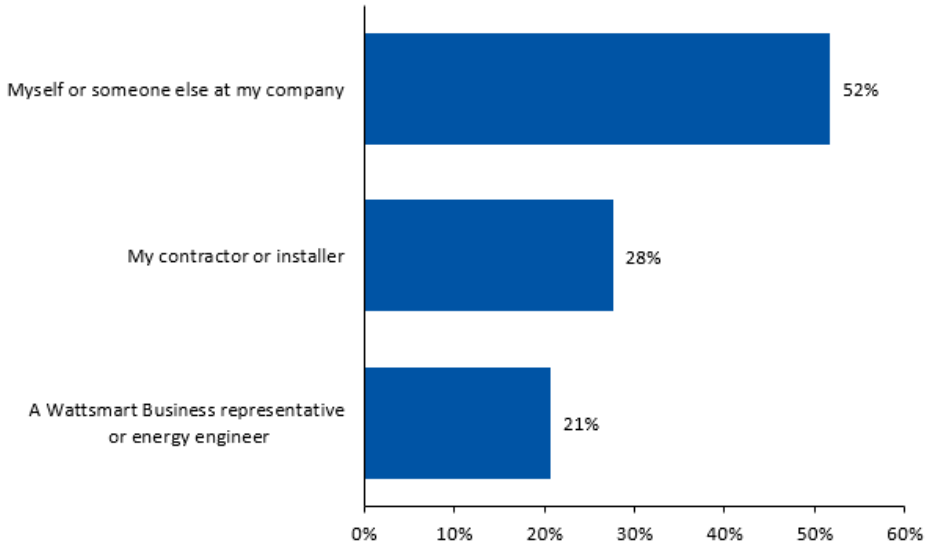
Figure 2. Awareness Sources



Source: RMP Wattsmart Business Program 2020-2021 Wattsmart Business Participant Survey QA4. Don't know and refused responses removed. (n=29).

Respondents reported, on average, that the incentive they received covered 24% of their project cost (n=29). Additionally, non-lighting respondents most often reported that they or someone else at their company filled out their application for the program while lighting respondents were most likely to have it filled out by their contractor or installer. Figure 3 shows the response breakdown by category.

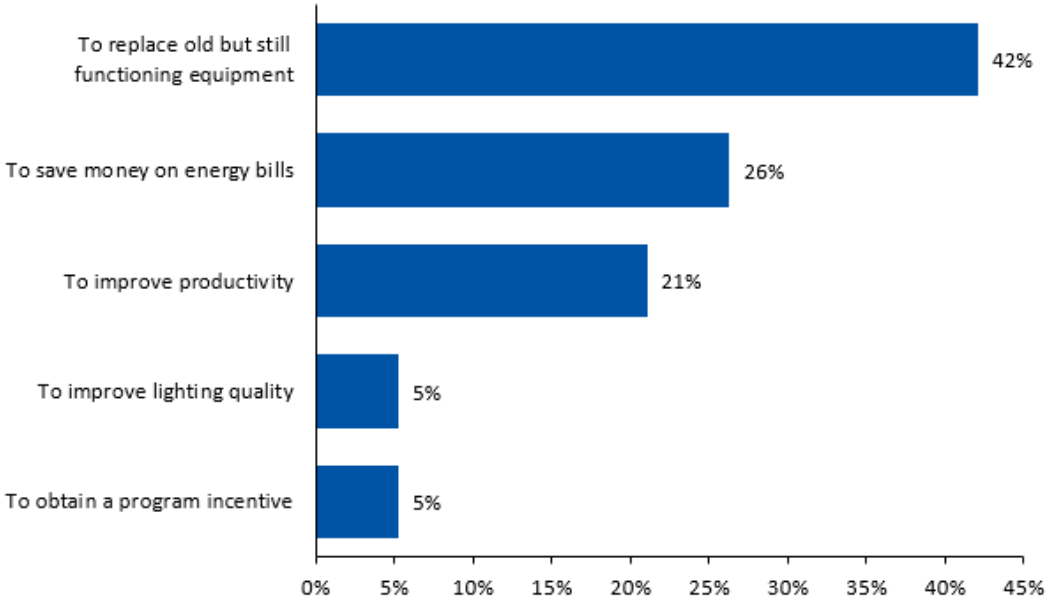
Figure 3. Who Completed the Application



Source: RMP Wattsmart Business Program 2020-2021 Wattsmart Business Participant Survey QB2. Don't know and refused responses removed. (n=29).

Beginning with the Q3 wave of surveys, the Cadmus team asked Wattsmart Business participants what the most important reason was for their company participating. As shown in Figure 4, the most important reason reported was to replace old but still functioning equipment (42%), followed by saving money on energy bills (26%), and improving productivity (21%).

Figure 4. Most Important Reason for Participation

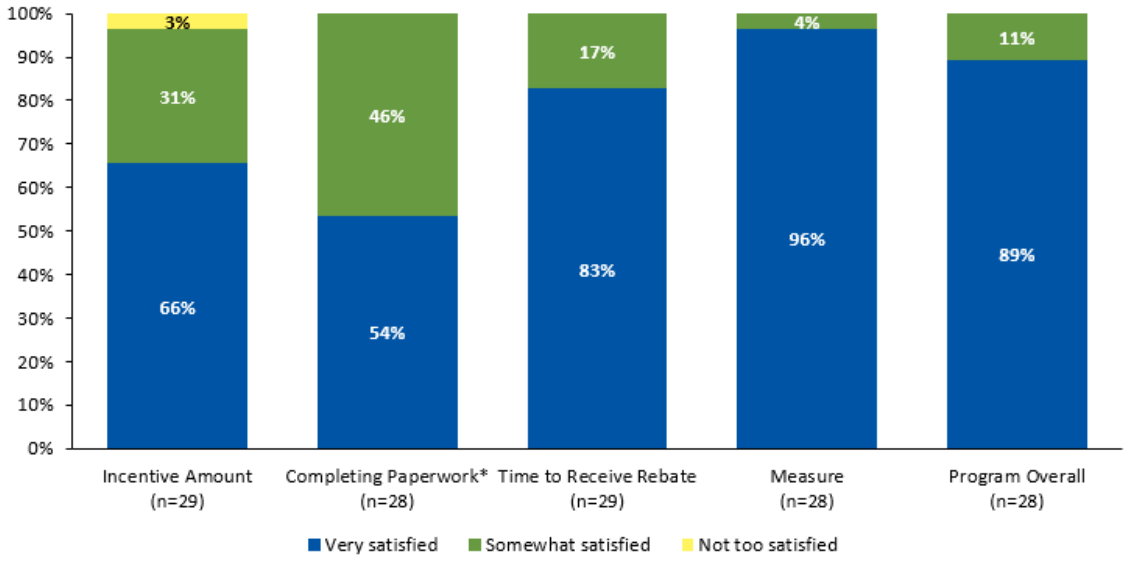


Source: RMP Wattsmart Business Program 2020-2021 Wattsmart Business Participant Survey QB1. Don't know and refused responses removed. (n=19).

Participant Satisfaction

As shown in Figure 5, 97% of participants were satisfied (either *very satisfied* or *somewhat satisfied*) with the amount of their incentive (n=29). These ratings were higher across the board than in the 2019 surveys where the incentive amount had a satisfaction rating of 94% (n=16) and the time to receive the rebate had a satisfaction rating of 93% (n=15). One hundred percent of participants were satisfied with the other aspects of the program they were asked about as well as the program overall. The overall satisfaction ratings were consistent with the 2019 survey responses.

Figure 5. Satisfaction with Program Components

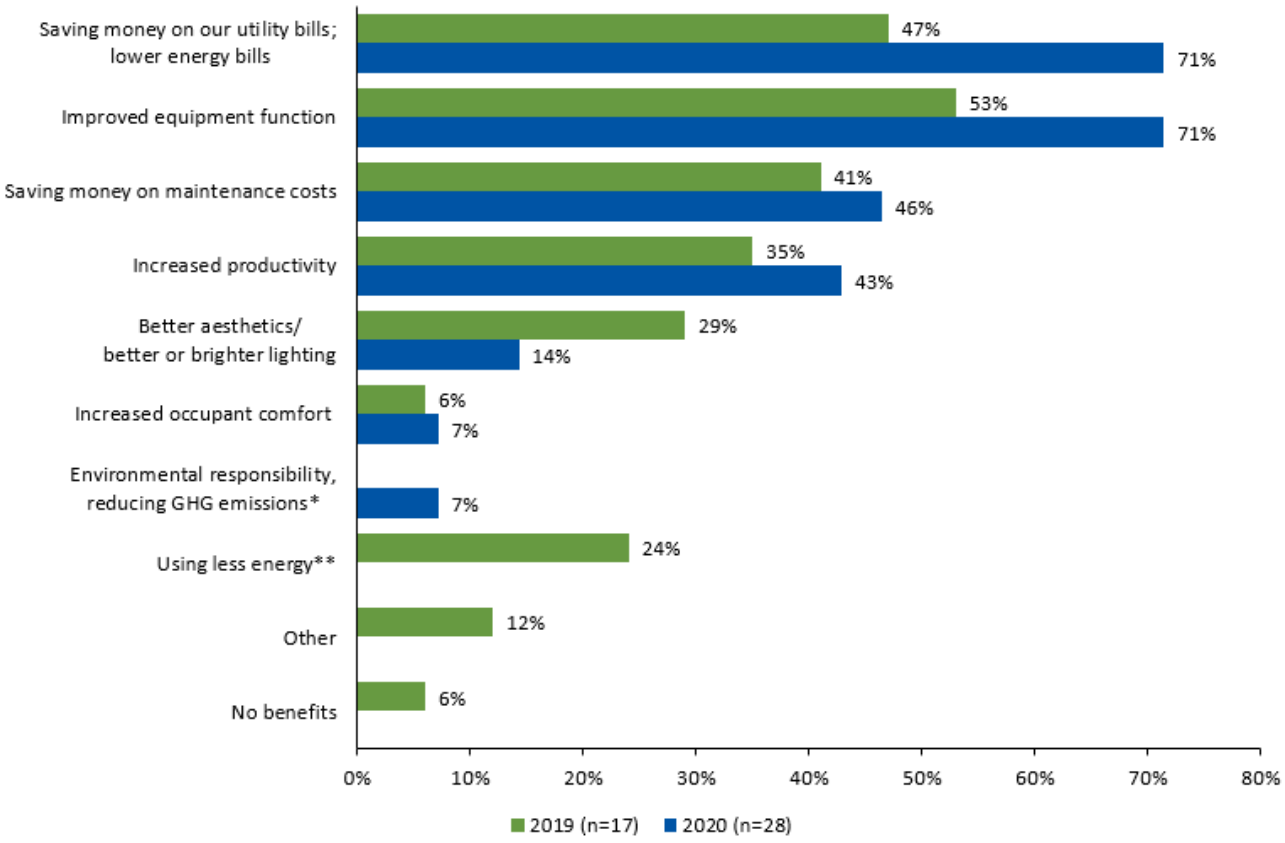


Source: RMP Wattsmart Business Program 2020-2021 Wattsmart Business Participant Survey QB3, QB5, QB8, QB13, QB16. Don't know and refused responses removed. *Question was asked on a scale using "easy" rather than "satisfied".

Project Benefits

Typical upgrades or custom analysis participants reported one or more benefits that their companies experienced from the project they completed. Most respondents said benefits included lower energy bills or improved equipment function. This was similar to the 2019 responses. As shown in Figure 6, participants also reported benefits such as saving money on maintenance costs, increased productivity, and better or brighter lighting among others. Across all 28 respondents, 86% reported some benefit from their project other than energy cost savings.

Figure 6. Project Benefits



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

Firmographics

Eighty-six percent of respondents said their companies own the facility where the improvements were made, while 11% said they lease the facility and 4% said they had a separate arrangement (n=28). Additionally, 64% of respondents said their companies employ 0 to 10 people, 22% said their companies employ between 11 to 25 or 26 to 50 people (11% each), 7% reported 101 to 200 people, and 4% of respondents reported 201 to 500 people or 500-plus people (n=28). Respondents also identified what type of fuel source their facilities use for space and water heating. For space heating, 62% of respondents said their facility uses gas, 23% said they use electric sources, and 15% said they use additional sources (n=26). For water heating, 58% of respondents said they use electric sources, 33% said they use gas, and 8% said they use additional sources (n=24).

Small Business Direct Install

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

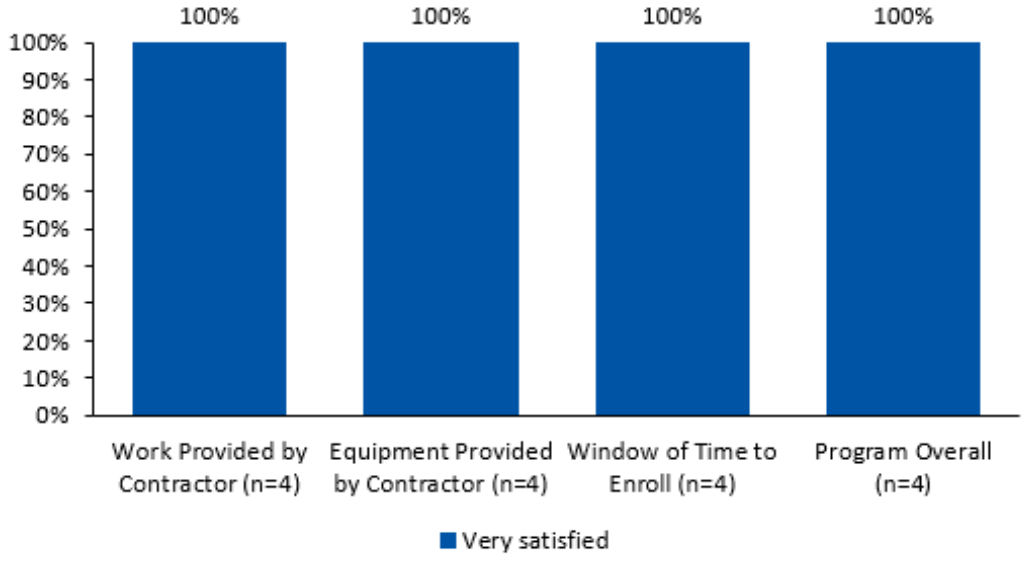
Participant Experience

Three respondents reported that they learned about the incentives available for their project through contact with a Wattsmart Business representative or a RMP representative, while one other respondent said they learned about the incentives through a RMP mailing or bill insert. Additionally, three respondents said the most important reason their companies decided to participate was to save money on energy bills, while the fourth respondent said it was to improve lighting quality. All respondents reported that they received a detailed project proposal with estimated incentive and energy bill saving amounts after their free energy assessment. Building on this, two respondents said that utility bill and energy savings information were the most influential pieces of the proposal to proceed with their project. Two other respondents said the most influential information was the project cost savings. One respondent said there was other lighting equipment they wanted to install that was not offered in their project proposal. This respondent said they upgraded half of their lighting through the initial project and wanted to complete their other half. They also said they asked their contractor about this during the project and the contractor mentioned other Wattsmart Business incentives that may have been available to them. The Cadmus team also asked respondents how their companies' interest in or ability to complete energy efficiency projects was impacted by the COVID-19 pandemic. Three respondents said it was not affected, and one respondent said their ability to complete the project was reduced in favor of other priorities and competing projects.

Participant Satisfaction

As shown in Figure 7, all participants were *very satisfied* with the work that was done by their contractor, the equipment they had installed, and the window of time they had to enroll in the program. Correspondingly, all four respondents were also *very satisfied* with the program overall.

Figure 7. Satisfaction with SBDI Program Components and Program Overall

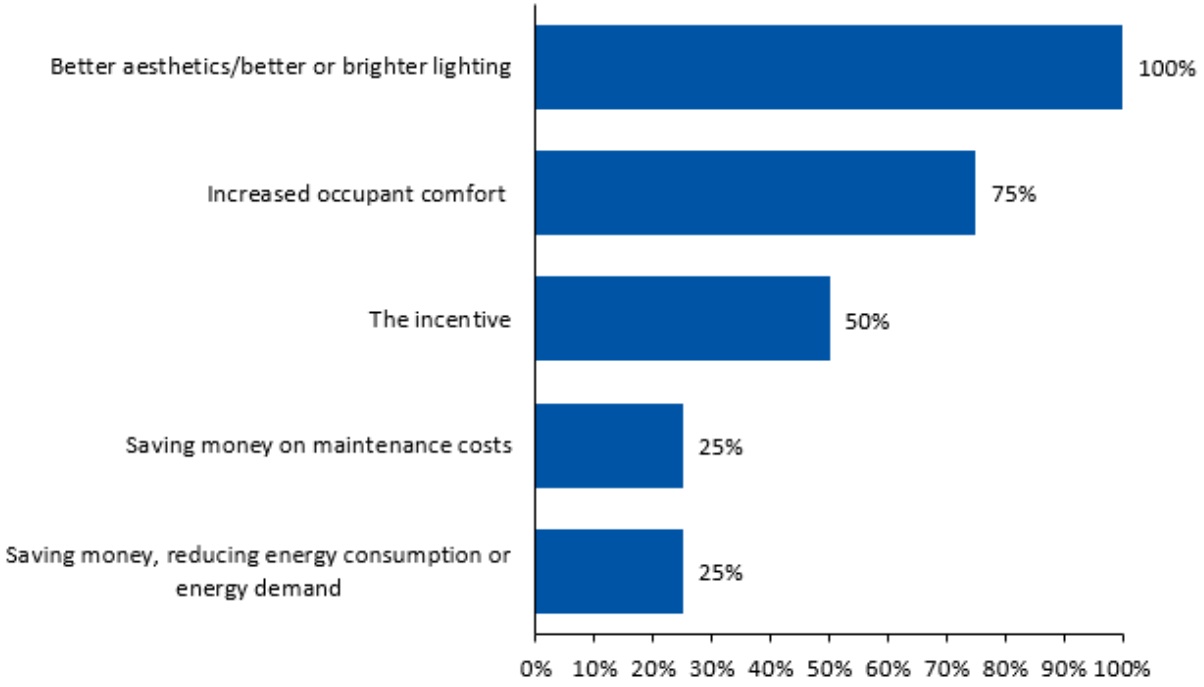


Source: RMP Wattsmart Business Program 2020-2021 SBDI Participant Survey QB7, QB9, QB16, QB21.

Project Benefits and Challenges

All Small Business Direct Install participants reported one or more benefits that their companies experienced due to the equipment they installed. All respondents said benefits included better aesthetics or brighter lighting. As shown in Figure 8, participants also reported other benefits such as increased occupant comfort, receiving the incentive, saving money on maintenance costs, and saving money and reducing energy consumption or energy demand. All four respondents said they did not encounter any challenges participating in the program. Additionally, all four respondents said they did not have any suggestions for improving the program offering.

Figure 8. Project Benefits



Source: RMP Wattsmart Business Program 2018-2019 SBDI Participant Survey QB17. (n=4)

Firmographics

Two respondents reported their companies were in the industrial sector, one said the public administration or government sector, and one other respondent said the agricultural sector. Three respondents said their companies own the facility where the improvements were made, while one respondent said they lease the facility. Additionally, three respondents said their companies employ between 1 and 10 people, while the fourth respondent said their company employs between 51 and 75 people. Respondents also identified what type of fuel source their facilities use for space and water heating. For space heating one respondent said their facility uses gas, one said they use a mixture of propane and electric sources, one other respondent said they use a mixture of gas and electric sources, the final respondent did not provide a response. For water heating, three respondents said they use electric sources and one respondent said they use propane.

Lighting Instant Incentives

The Cadmus team surveyed three lighting instant incentives participants.

Program Delivery

Two respondents learned about the program incentives from their contractor, distributor, or lighting supplier, while one other respondent learned about the program through a trade association or professional organization.

Two respondents purchased their equipment through a vendor they had worked with previously. When asked if they purchased from the vendor primarily because they offered the instant incentive, one respondent said yes, one said no, and one respondent was unsure. Two of the respondents said it was *very easy* to find a program discount on the equipment they wanted to purchase, and one respondent said it was *somewhat easy*. All three respondents said they were re-lamping an area of their facility as part of ongoing maintenance when they made their purchase.

One respondent said they were *very satisfied* with the amount of the incentive they received, while two respondents said they were *somewhat satisfied*. None of the respondents indicated that they encountered any challenges participating in the Instant Incentives program. Additionally, all three respondents said they were *very satisfied* with the Instant Incentives program overall and none had any recommendations to improve the program.

Firmographics

One respondent reported their company was in the professional services industry, one was in the food processing industry, and one was in the finance and insurance industry. All three respondents said their companies own the facility where the improvements were made. One respondent said their company employs 1 to 10 people, one said 11 to 25 people, and one other said 76 to 100 people. Two respondents said gas space heating was used at the facility where the improvements were made, while the other respondent said electric space heating was used. Additionally, one respondent said electric water heating is used at the facility, one said gas water heating is used, and one other respondent did not indicate the type of water heating that is used.

Partial Participant Experience

The Cadmus team received results from two partial participants: one who considered (or began) a project with a VRF system and one who considered (or began) a lighting retrofit.

Awareness

One respondent learned about the program through contact with a Wattsmart Business or RMP representative, and one learned through their electrician or contractor. Both respondents indicated their companies had received a Wattsmart Business program incentive in the past for lighting improvements. Additionally, one respondent said they were *somewhat likely* to request an incentive for a project in the next six months while the other respondent said they were *not too likely*. Both respondents said the best way for RMP to keep them informed about incentives for energy efficiency improvements were through utility mailings, emails, newsletters with bills, or bill inserts.

Motivation and Barriers

Both respondents reported that their companies' most important motivating factor when making decisions about energy-efficient upgrades was saving money on energy bills.

Both respondents reported that their companies did not complete the project they initiated through the Wattsmart Business program. One respondent said their company did not complete the project because they decided it was not worth the money to finish. The other respondent said their company did not complete the project because they ran out of funds to continue with it.

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. One respondent said their company was investing about the same amount as usual in building and equipment improvements, while the other respondent said their company was investing more than normal.

Satisfaction

One respondent reported being *very satisfied* with the program overall and the other was *somewhat satisfied*. When asked what RMP could do to improve their experiences with the program, both respondents said there was nothing.

Firmographics

One respondent was from a construction business, and the other respondent was from a professional service business. Both respondents said their companies own the facility their business is located in. One respondent said their company employs 1 to 10 people, while the other said their company employs 26 to 50 people. Neither respondent said they consider their company to face barriers as a result of the sex, race, primary language, nation or origin, or other characteristics of the company owners, employees, or customer base. Additionally, neither respondent said their company is owned by someone in a disadvantaged group. One respondent said their facility uses gas space heating, while the other said their facility uses propane space heating. Both respondents said their facilities use electric water heating.

Cost-Effectiveness Results

As shown in Table 9, the Wattsmart Business program proved cost-effective for the 2020 evaluation period from the Utility Cost Test (UCT) perspective with a benefit/cost (B/C) ratio of 1.65 and the Participant Cost Test (PCT) perspective with a B/C ratio of 2.50. It was not cost-effective according to the PacifiCorp Total Resource Cost (PTRC), Total Resource Cost (TRC), and Ratepayer Impact Measure (RIM) test perspectives. Please see *Appendix C. Cost-Effectiveness Methodology and Measure Category Results* for more information on cost-effectiveness.

Table 9. 2020 Evaluated Net Wattsmart Business Program Cost-Effectiveness Summary

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PacifiCorp Total Resource Cost Test (TRC + 10% conservation adder)	$0.0552	$7,165,389	$6,964,593	($200,796)	0.97
Total Resource Cost Test (TRC no adder)	$0.0552	$7,165,389	$6,331,449	($833,941)	0.88
Utility Cost Test (UCT)	$0.0296	$3,844,528	$6,331,449	$2,486,921	1.65
Ratepayer Impact Measure Test (RIM)		$14,921,429	$6,331,449	($8,589,980)	0.42
Participant Cost Test (PCT)		$5,622,049	$14,059,356	$8,437,307	2.50
Life Cycle Revenue Impacts ($/kWh)					$0.000358947
Discounted Participant Payback (years)					3.15

Conclusions and Recommendations

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

PacifiCorp realized 92% of reported energy savings.
The Cadmus team evaluated 36 projects and found 20 projects realized energy savings within 5% of the reported savings. Among evaluated projects that realized more savings than reported, reported energy savings varied between 1,742 kWh and 165,513 kWh, with an average reported energy savings of 61,447 kWh. Among sampled projects that realized less savings than reported, reported energy savings varied between 3,619 kWh and 2,988,839 kWh, with an average reported energy savings of 213,046 kWh. The two largest strata, lighting and irrigation, contributed the greatest impact towards a reduction in realized energy savings. Within those two strata, three sampled projects with an average reported savings of 19,588 kWh and an average realization rate of 48% drove program performance.

Implementation of the Wattsmart Business program and its various components resulted in high levels of satisfaction among participants and partial participants.
Custom Analysis and Typical Upgrades participants reported 100% satisfaction with nearly all aspects of the program, with the exception of the incentive (which received a 97% satisfaction rating). These ratings were higher across the board than in the previous round of surveys conducted in 2019, where the incentive amount had a satisfaction rating of 94% (n=16) and the time to receive the rebate had a satisfaction rating of 93% (n=15). Additionally, all four groups surveyed (custom and typical incentives, Small Business Direct Install, Instant Incentives, and partial participants) gave the program a 100% satisfaction rating overall, indicating the process worked well for them overall, despite some partial participants not completing projects. Theses overall satisfaction ratings were consistent with the 2019 survey responses.

Improving equipment and saving money on energy bills are key motivations to program participation for both participants and partial participants.
Across all three survey efforts in which the evaluation team assessed motivations for participating (Custom Analysis and Typical Upgrades, Small Business Direct Install, and partial participants), respondents identified replacing old but still functioning equipment or saving money on energy bills as their top two motivations for participating in the Wattsmart Business program. Among Custom Analysis and Typical Upgrades respondents 42% said their key motivation was to replace old but still functioning equipment and 26% said it was to save money on energy bills (n=19). Seventy-five percent of Small Business Direct Install respondents said their key motivation was to save money on energy bills (n=4). Both partial participants reported that their companies' most important motivating factor was saving money on energy bills (n=2).

The 2020 Idaho Wattsmart Business program failed to demonstrate cost-effectiveness, achieving a benefit-cost ratio of 0.97.
Under the PacifiCorp Total Resource Cost (PTRC) test perspective, the program generated nearly as many benefits ($6,964,593) as costs ($7,165,389), but ultimately fell short of producing positive net

benefits. The program's three largest measure strata—irrigation, lighting, and other—all generated negative net benefits, contributing to an overall PTRC benefit/cost ratio of less than 1.0. The program was cost-effective according to the Participant Cost Test and Utility Cost Test perspectives. This outcome is consistent with past years' results. In 2019, the Idaho Wattsmart Business program achieved a PTRC benefit/cost ratio of 0.94, and the previous two-year program cycle (2018-2019) achieved a combined PTRC benefit/cost ratio of 0.98. The program generated more net evaluated energy savings in 2020 but also incurred greater administrative, incentive, and incremental project costs, resulting in higher levels of both benefits and costs compared to past program years.

Appendix A. Gross Engineering Analysis Methodology

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

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

This section addresses reported gross evaluated savings. Reported gross savings are electricity savings (kWh) that Rocky Mountain Power (RMP) reported in its *Rocky Mountain Power Energy Efficiency and Peak Reduction Annual Reports* (annual reports).[2] Gross evaluated savings are the savings achieved after applying installation rates and realization rates from an engineering analysis sample of projects. 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 reported 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,)
	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 number of participants and reported savings matched annual reports.

Step 2: The team selected a sample of sites from the RMP program database and then stratified the distribution of measures among sampled sites, primarily by end-use type. The team used phone interviews and customer-provided photos and site documentation to verify measure installations.

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

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

Step 4: This step involved reviewing measure savings assumptions, equations, and inputs, which included conducting a billing analysis for selected measures. For complicated or custom measures, the team conducted an engineering analysis using the appropriate measurement and verification options in the International Performance Measurement and Verification Protocol.[3] The team used interviews and other operational data to determine hours of use or power consumption for metered equipment types. In some instances, customers provided trend data from their building management systems, which the team used to determine equipment load profiles, hours of use, and performance characteristics.

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

Project Review

The Cadmus team 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 team performed the following tasks for each site within the sample:

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

Engineering Analysis

In general, the Cadmus team referenced current measure workbooks and saving estimation methodologies from the Idaho Power Technical Reference Manual and the Regional Technical Forum.[4,5] 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.

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

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

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

Appendix B. Net-to-Gross Analysis Methodology

Net-to-gross (NTG) estimates are a critical part of demand-side management (DSM) program impact evaluations because they indicate the portions of gross energy savings that were influenced by and are attributable to DSM programs. The following sections describe the NTG methodology used by the Cadmus team for the Wattsmart Business program.

Overview

This section presents an overview of the Cadmus team's NTG methodology. To determine net savings, the team used a self-report approach and analyzed the collected 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.

Net-to-gross ratio = 100% – Freeridership Percentage + Participant Spillover Percentage + 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 interview presented respondents with a series of questions regarding their decision to install the equipment promoted by the program. The Cadmus team then scored the responses to these questions to determine the level of freeridership. A score of 1 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:

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

The initial freeridership score is then adjusted to account for the influence of prior program participation, which the respondent ranked on a scale of 1 to 5, with 5 being extremely important. Given Rocky Mountain Power's (RMP's) efforts to cross-promote its entire portfolio of energy efficiency programs, a respondent's prior participation in a RMP program may have been influential in the decision to participate in the current program. Ideally, this influence would be attributed to the prior program as spillover savings since that program was responsible for the influence. However, given the portfolio-level marketing approach that RMP implements, respondents are unlikely to be able to identify the prior program by name. Therefore, the Cadmus team attributed the savings credit to the current program. To calculate this credit, the team reviewed the respondents' rating of the influence of the prior program. If the respondent rated previous participation as a 4 or 5, the respondent's adjusted freeridership was reduced by either 50% or 75%, respectively.

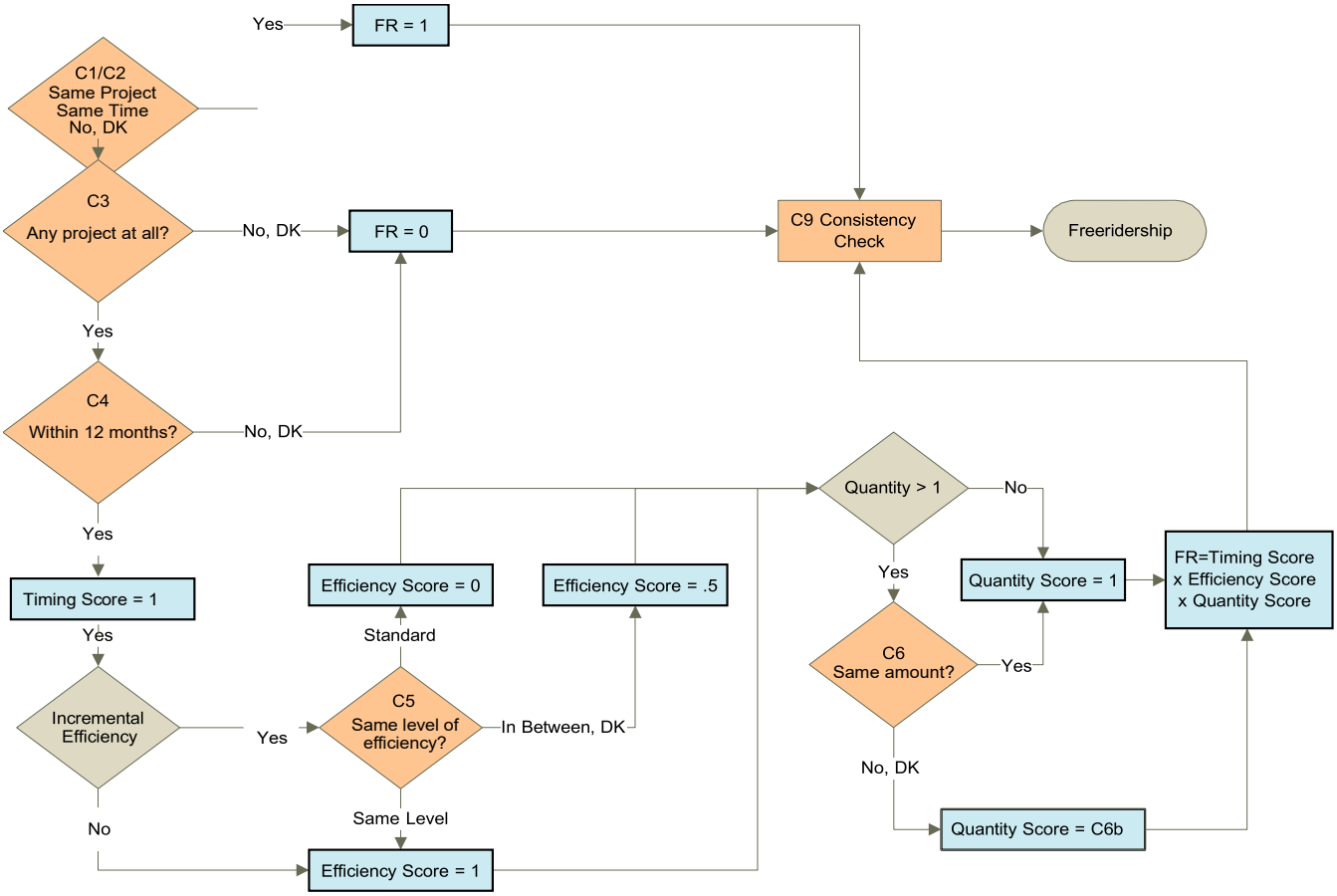
After adjusting the initial freeridership ratio for past program participation, a series of consistency check questions were reviewed. These questions asked about the influence of the program's interventions (e.g., financial incentives, technical assistance) and addressed the counter-factual (e.g., what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

Table B-1. Wattsmart Freeridership Calculation Approach

Question	Question Text	Scoring
C1	Without the program, meaning without either the technical assistance or the financial incentive, would you have still completed the exact same [MEASURE] project?	None; qualifying question
C2	Without the program, meaning without either the technical assistance or the financial incentive, would you have still installed the [MEASURE] at the same time?	If C2=yes and C1=yes then freeridership = 1
C3	Without the program, would you have installed any [MEASURE] equipment?	If C4=no, freeridership = 0
C4	Without the program, in terms of timing, when would you have installed the [MEASURE]?	If not within 12 months of original purchase date, freeridership = 0
C5	Relative to the energy efficiency of [MEASURE] installed through the program, how would you characterize the efficiency of equipment you would have installed without the program?	If high efficiency, efficiency score = 1 If between high efficiency and baseline, efficiency score = 0.5 If baseline efficiency, efficiency score = 0
C6	Would you have installed more, less, or the same amount of [MEASURE] without the program?	If same or more, quantity score = 1 If less, quantity score = percentage of equipment not installed
C9.6	On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, how important was each of the following factors in deciding which equipment to install: Previous participation with a Rocky Mountain Power program	If C9.6 = 5, reduce initial free-ridership by 75% If C9.6 = 4, reduce initial free-ridership by 50%
C9.2	On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, how important was each of the following factors in deciding which equipment to install: information provided by Rocky Mountain Power on energy saving opportunities	Consistency Check
C9.4	On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, how important was each of the following factors in deciding which equipment to install: The Rocky Mountain Power incentive or discount	Consistency Check
C8	In your own words, can you please describe what impact the program had on your decision to complete these energy efficiency improvements for [MEASURE]?	Considered if '4' or '5-extremely important' rating from C9.2 or C9.4 Initial freeridership score is reduced by 50% if C8 response merits an adjustment free-ridership by 50%

Figure B-1 shows the freeridership calculation approach.

Figure B-1. Freeridership Calculation Approach



Participant Spillover Estimation

Participant spillover occurs when a program influences participants to install additional energy-efficient equipment without a program incentive. The Cadmus team asked a sample of participants whether they completed any subsequent energy saving projects and whether they received an incentive for that project. The team also asked these respondents to rate the relative importance of the Wattsmart Business program (and incentives) on their decisions to pursue additional energy-efficient activities.

The analysis only included survey respondents who did the following:

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

The Cadmus team used evaluated program savings as a proxy to estimate the savings associated with "like" spillover projects. Like spillover is associated with equipment that is similar to the equipment

offered through the program. Table B-2 provides detailed scoring and descriptions of each like spillover question.

Table B-2. Wattsmart Participant Spillover Calculation Approach

Question	Question Text	Scoring
D8	Since participating in this program, have you purchased and installed any other energy efficiency improvements on your own without any assistance from a utility or other organization?	If no, potential spillover savings = 0
D9	What type of equipment did you install?	N/A
D10.# Series	Measure specific efficiency, capacity, fuel-type questions	If responses indicated non-program qualifying unit, potential spillover savings = 0
D10.b	How many did you purchase and install?	D10.b x program-evaluated per-unit savings = potential spillover savings
D11	Did you receive an incentive from Rocky Mountain Power or another organization for this equipment?	If yes, potential spillover savings = 0.
D14	On a scale from 1 to 5, with 1 being not important at all and 5 being extremely important, please rate how important your experience with the [UTILITY] [CATEGORY] program was in your decision to install [this/these] energy efficient product(s).	"5" rating results in potential spillover savings attributed to program.

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

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

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

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 Rocky Mountain Power (RMP).

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

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

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

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

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

Table B-3. Wattsmart NPSO Analysis Method

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

Appendix C. Cost-Effectiveness Methodology and Measure Strata Results

In assessing the Wattsmart Business program's cost-effectiveness, the Cadmus team analyzed program benefits and costs from five different perspectives, using Cadmus' DSM Portfolio Pro model.[6] The California Standard Practice Manual for assessing demand-side management (DSM) program cost-effectiveness describes the benefit/cost ratios for the following five tests:

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

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

Table C-2. 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-3 shows needed cost-effectiveness inputs for each year, all of which RMP provided to Cadmus for its analysis.

Table C-3. Wattsmart Selected Cost-Effectiveness Analysis Inputs

Input Description	2020
Discount Rate	6.92%
Commercial Line Loss	8.59%
Industrial Line Loss	6.69%
Irrigation Line Loss	9.05%
Commercial Retail Rate ($/kWh)	$0.0872
Industrial Retail Rate ($/kWh)	$0.0636
Irrigation Retail Rate ($/kWh)	$0.0907
Inflation/Escalation Rate	2.28%

The Wattsmart Business program benefits included energy savings and their associated avoided costs. For the cost-effectiveness analysis, the Cadmus team used this study's evaluated net energy savings (incorporating freeridership and spillover) and measure lives documented in the program's tracking data. Table C-4 shows cost-effectiveness inputs for each measure stratum in Idaho's Wattsmart Business program.

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

Input Description	Input Value
Average Measure Life (EUL) [a]	
Direct Install	15.9
Energy Management	3.0
Irrigation	10.2
Lighting	14.2
Midstream	12.0
Motors	15.0
Other	13.9
Evaluated Net Energy Savings (kWh/year) [b]	
Direct Install	701,654
Energy Management	1,200,842
Irrigation	4,114,272
Lighting	3,413,742
Midstream	529,313
Motors	2,877,042
Other	1,522,060
Total Utility Cost (including incentives) [c]	
Direct Install	$280,219
Energy Management	$183,197
Irrigation	$1,034,999
Lighting	$828,887
Midstream	$153,970
Motors	$788,332
Other	$574,924
Incentives	
Direct Install	$200,748
Energy Management	$28,734
Irrigation	$530,171
Lighting	$442,236
Midstream	$55,002
Motors	$418,262
Other	$323,205

[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.

Direct Install

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

Table C-5. 2020 Idaho Direct Install Cost-Effectiveness

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	$0.0215	$168,034	$393,649	$225,616	2.34
TRC	$0.0215	$168,034	$357,863	$189,829	2.13
UCT	$0.0394	$307,219	$357,863	$50,644	1.16
RIM		$1,020,308	$357,863	($662,445)	0.35
PCT		$66,916	$886,411	$819,495	13.25
Lifecycle Revenue Impacts ($/kWh)					$0.000019373
Discounted Participant Payback (years)					N/A

Energy Management

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

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

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	$0.0219	$72,140	$135,892	$63,752	1.88
TRC	$0.0219	$72,140	$123,538	$51,398	1.71
UCT	$0.0197	$64,772	$123,538	$58,766	1.91
RIM		$365,477	$123,538	($241,939)	0.34
PCT		$36,780	$357,099	$320,319	9.71
Lifecycle Revenue Impacts ($/kWh)					$0.000106080
Discounted Participant Payback (years)					0.08

Irrigation

As shown in Table C-7, the irrigation measure stratum proved cost-effective according to the UCT and PCT tests.

Table C-7. 2020 Idaho Irrigation Cost-Effectiveness

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	$0.0772	$2,495,960	$1,969,663	($526,297)	0.79
TRC	$0.0772	$2,495,960	$1,790,603	($705,357)	0.72
UCT	$0.0329	$1,062,909	$1,790,603	$727,694	1.68
RIM		$4,174,683	$1,790,603	($2,384,080)	0.43
PCT		$2,022,933	$3,771,602	$1,748,670	1.86
Lifecycle Revenue Impacts ($/kWh)					$0.000125144
Discounted Participant Payback (years)					4.22

Lighting

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

Table C-8. 2020 Idaho Lighting Cost-Effectiveness

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	$0.0648	$2,240,416	$1,739,805	($500,611)	0.78
TRC	$0.0648	$2,240,416	$1,581,641	($658,775)	0.71
UCT	$0.0264	$912,804	$1,581,641	$668,837	1.73
RIM		$4,050,976	$1,581,641	($2,469,334)	0.39
PCT		$1,718,787	$3,459,709	$1,740,923	2.01
Lifecycle Revenue Impacts ($/kWh)					$0.000084911
Discounted Participant Payback (years)					4.65

Midstream

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

Table C-9. 2020 Idaho Midstream Cost-Effectiveness

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	$0.0490	$234,701	$233,786	($916)	1.00
TRC	$0.0490	$234,701	$212,532	($22,169)	0.91
UCT	$0.0247	$118,235	$212,532	$94,298	1.80
RIM		$547,823	$212,532	($335,291)	0.39
PCT		$239,870	$736,889	$497,019	3.07
Lifecycle Revenue Impacts ($/kWh)					$0.000013959
Discounted Participant Payback (years)					4.31

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. 2020 Idaho Motors Cost-Effectiveness

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	$0.0297	$908,077	$1,641,152	$733,075	1.81
TRC	$0.0297	$908,077	$1,491,957	$583,879	1.64
UCT	$0.0282	$862,147	$1,491,957	$629,809	1.73
RIM		$2,943,307	$1,491,957	($1,451,350)	0.51
PCT		$468,417	$2,690,857	$2,222,439	5.74
Lifecycle Revenue Impacts ($/kWh)					$0.000045771
Discounted Participant Payback (years)					0.26

Other

As shown in Table C-11, the "other" measure stratum proved cost-effective according to the UCT and PCT tests.

Table C-11. 2020 Idaho Other Cost-Effectiveness

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	$0.0702	$1,082,099	$850,646	($231,453)	0.79
TRC	$0.0702	$1,082,099	$773,315	($308,784)	0.71
UCT	$0.0358	$552,480	$773,315	$220,834	1.40
RIM		$1,854,893	$773,315	($1,081,578)	0.42
PCT		$1,068,347	$2,156,789	$1,088,442	2.02
Lifecycle Revenue Impacts ($/kWh)					$0.000037175
Discounted Participant Payback (years)					6.74