



# 2020-2021 Washington Wattsmart Business Program Evaluation

**FINAL REPORT**

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## 1 Introduction

This report presents the 2020 and 2021 Washington Wattsmart Business program 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 Wattsmart Business Evaluation Dashboard,<sup>1</sup> which provides further information on project-level results, trends, and historical performance.

Through its Wattsmart Business program, Pacific Power offers services and incentives to help commercial, industrial, and agricultural/irrigation customers maximize the energy efficiency of their equipment and operations through midstream (distributors/suppliers) and downstream (customers) incentive mechanisms. Incentives are available for retrofit projects, new construction, and major renovation projects.

The 2020 and 2021 program reported gross electricity savings of 47,308,567 kWh. Pacific Power uses a mostly outsourced delivery model for all demand-side management (DSM) services and contracted with two program implementers—Cascade Energy and Resource Innovations—to implement all program offerings. Pacific Power communications staff manage the program website and are responsible for program advertising and assist with communications.

Pacific Power contracted the Cadmus team (comprising Cadmus and VuPoint Research) to conduct impact and process evaluations of the 2020 and 2021 Washington Wattsmart Business program. Per Pacific Power's request, we evaluated program effectiveness and reported results of the 2020 and 2021 evaluation findings.

The Cadmus team evaluated several offerings:

- ***Incentive List and Custom Analysis.*** For projects delivered through the trade allies and project managers, Pacific Power offers prescriptive incentives (Incentive List) for measures including appliances, building shell, compressed air, energy management, farm & dairy, food service equipment, HVAC irrigation, lighting, motors and irrigation. Pacific Power also offers custom incentives (Custom Analysis) for verified first-year energy savings resulting from the installation of qualifying capital equipment upgrades and energy management measures not covered by the Incentive List s or any other Wattsmart Business program delivery offering.
- ***Small Business Lighting Enhanced Incentives.*** During the 2020-2021 program years Pacific Power provided free facility assessments and enhanced incentives for small business customers who install qualifying LED lighting and lighting controls upgrades. A network of program-approved contractors performed the assessments and installed lighting upgrades.
- ***Midstream Lighting Instant Incentives.*** Pacific Power offers instant point-of-purchase incentives for qualifying LEDs, and retrofit kits purchased from a participating lighting distributor.

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

Customers (including those purchasing from nonparticipating suppliers) can apply for incentives after making the purchase.

## 1.1 Objectives

Table 1 lists the study objectives and the evaluation activities.

**Table 1. Evaluation Objectives and Activities**

Pacific Power Evaluation Objectives	Participant Survey	Partial Participant Survey	Nonparticipant Surveys	Trade Ally Interviews	Desk Review	Phone Verification	Cost-Effectiveness Analysis	Reporting
Document and measure program effects	✓	✓		✓	✓	✓		
Verify installation and savings	✓				✓	✓		
Evaluate the program 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								✓

## 1.2 Methods

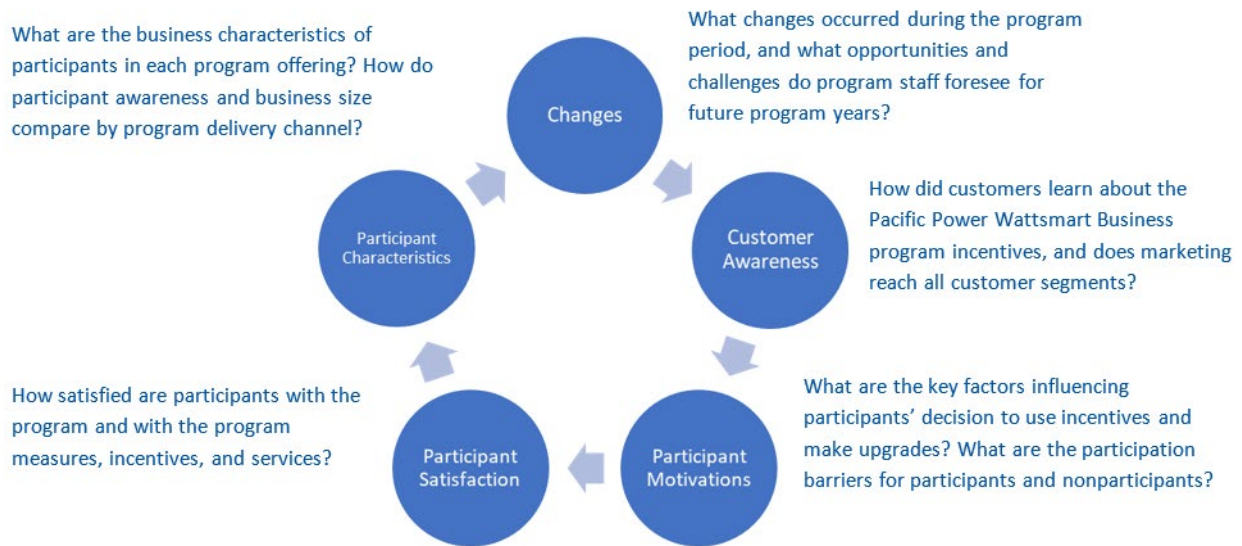
To evaluate energy impacts, the Cadmus team used desk reviews and surveys to inform the engineering analyses and program cost-effectiveness analysis. Table 2 summarizes these activities.

**Table 2. Impact Steps to Determine Evaluated Gross 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 (through engineering review, analysis, and meter data)
	4	Realization Rates: Extrapolate realization rates to the population

Figure 1 shows the research objectives addressed through the process evaluation. The Cadmus team also relied on online participant surveys, telephone partial participant surveys, 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 Detailed Findings

This chapter provides detailed findings from the Cadmus team’s impact and process evaluation of the Washington Wattsmart Business program.

### 1.3 Impact Evaluation

To determine gross savings, the Cadmus team conducted verification and engineering analyses on a sample of 2020 and 2021 projects (see *Appendix A* for information on the impact evaluation methodology).<sup>2</sup> Additional detail on project-level results across several years can be found in the Evaluation Dashboard.

#### 1.3.1 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 and 2021 program years. Out of 639 unique projects, the Cadmus team evaluated 100 projects that represented 25% of the 2020 and 2021 program savings.

<sup>2</sup> When offering measures utilizing UES (Unit Energy Savings) values, Pacific Power is required utilize UES savings values from UES measures offered through the Regional Technical Forum where available. Cadmus evaluates all measures, deemed or custom, with site specific inputs where possible and with results that may or may not match the RTF values.



**Table 3. 2020-2021 Washington 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	20	3,868,285	8	2	2,610,393	67.5%
Energy Management	29	4,812,453	8	4	3,213,315	66.8%
HVAC	37	1,266,567	10	2	794,358	62.7%
Irrigation	49	1,683,134	8	2	492,782	29.3%
Lighting	221	20,554,718	12	0	593,469	2.9%
Midstream	76	848,088	10	1	241,244	28.4%
Other	49	1,888,998	10	3	1,027,863	54.4%
Refrigeration	40	9,858,422	9	1	2,826,401	28.7%
Small Business Lighting	118	2,527,902	10	0	250,471	9.9%
<b>Total<sup>a</sup></b>	<b>639</b>	<b>47,308,567</b>	<b>85</b>	<b>15</b>	<b>12,050,295</b>	<b>25.5%</b>

<sup>a</sup> Totals in tables may not sum due to rounding.

Table 4 lists the evaluation findings, including number of projects, gross savings, and precision for the 2020 and 2021 program period. Overall, the Wattsmart Business program achieved a 101.1% gross realization rate in 2020 and 2021, though some variability occurred between measure categories. The impact evaluation achieved  $\pm 2.4\%$  precision with 90% confidence overall. The *Measure Strata Findings* section describes specific details and findings per measure strata.

**Table 4. 2020-2021 Washington Wattsmart Business Program Savings**

Strata	Projects	Reported Savings (kWh)	Evaluated Gross Savings (kWh)	Gross Realization Rate	Precision
Compressed Air	20	3,868,285	3,803,695	98.3%	$\pm 1.3\%$
Energy Management	29	4,812,453	4,817,966	100.1%	$\pm 0.2\%$
HVAC	37	1,266,567	1,117,175	88.2%	$\pm 5.4\%$
Irrigation	49	1,683,134	1,761,767	104.7%	$\pm 3.7\%$
Lighting	221	20,554,718	21,131,562	102.8%	$\pm 4.3\%$
Midstream	76	848,088	967,486	114.1%	$\pm 16.4\%$
Other	49	1,888,998	1,578,918	83.6%	$\pm 11.5\%$
Refrigeration	40	9,858,422	9,855,363	100.0%	$\pm 0.1\%$
Small Business Lighting	118	2,527,902	2,780,527	110.0%	$\pm 5.0\%$
<b>Total<sup>a</sup></b>	<b>639</b>	<b>47,308,567</b>	<b>47,814,459</b>	<b>101.1%</b>	<b><math>\pm 2.4\%</math></b>

<sup>a</sup> Totals in tables may not sum due to rounding.

Table 5 and Table 6 show impact evaluation findings by program year for 2020 and 2021, respectively.

**Table 5. 2020 Wattsmart Business Program Savings**

Strata	Projects	Reported Savings (kWh)	Evaluated Gross Savings (kWh)	Realization Rate
Compressed Air	11	2,865,749	2,862,783	99.9%
Energy Management	15	2,912,284	2,912,284	100.0%
HVAC	16	858,145	814,523	94.9%
Irrigation	24	1,109,721	1,152,930	103.9%
Lighting	113	11,455,586	11,514,228	100.5%
Midstream	36	563,436	511,409	90.8%
Other	24	622,581	514,109	82.6%
Refrigeration	25	7,566,625	7,566,625	100.0%
Small Business Lighting	50	896,164	913,758	102.0%
<b>Total<sup>a</sup></b>	<b>314</b>	<b>28,850,291</b>	<b>28,762,649</b>	<b>99.7%</b>

<sup>a</sup> Totals may not sum due to rounding.

**Table 6. 2021 Wattsmart Business Program Savings**

Strata	Projects	Reported Savings (kWh)	Evaluated Gross Savings (kWh)	Realization Rate
Compressed Air	9	1,002,536	940,912	93.9%
Energy Management	14	1,900,169	1,905,682	100.3%
HVAC	21	408,422	302,652	74.1%
Irrigation	25	573,416	608,836	106.2%
Lighting	108	9,099,132	9,617,333	105.7%
Midstream	40	284,652	456,077	160.2%
Other	25	1,266,417	1,064,810	84.1%
Refrigeration	15	2,291,797	2,288,738	99.9%
Small Business Lighting	68	1,631,738	1,866,769	114.4%
<b>Total<sup>a</sup></b>	<b>325</b>	<b>18,458,276</b>	<b>19,051,810</b>	<b>103.2%</b>

<sup>a</sup> Totals may not sum due to rounding.

### 1.3.2 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. Pacific Power 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 lighting, 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 Pacific Power’s measure database to nine strata. Table 7 describes the measure mapping strategy.

**Table 7. Measure Mapping**

Evaluation Strata	Measure Category	Program Name
Compressed Air	Compressed Air	Wattsmart Business
Energy Management	Energy Management	Wattsmart Business
HVAC	HVAC	Wattsmart Business
Irrigation	Irrigation	Wattsmart Business
Lighting	Lighting	Wattsmart Business
Midstream		Midstream Lighting
		Wattsmart Business
Other	Additional Measures	Wattsmart Business
	Appliances	Wattsmart Business
	Building Shell	Wattsmart Business
	Farm and Dairy	Wattsmart Business
	Food Service Equipment	Wattsmart Business
	Motors	Wattsmart Business
Refrigeration	Refrigeration	Wattsmart Business
Small Business Lighting	Lighting	Small Business Lighting

**1.3.2.1 Compressed Air**

During the 2020 and 2021 program years, Pacific Power provided incentives for 20 compressed air projects and reported 3,868,285 kWh in energy savings, which accounted for 8.2% of all reported program energy savings. The Cadmus team evaluated 10 sampled projects and extrapolated results to the population for a realization rate of 98.3% for the compressed air stratum.

Seven of the 10 sampled projects realized 100% of reported savings. The Cadmus team typically evaluated projects based on the Regional Technical Forum’s (RTF) *Compressed Air Protocol v3.0*<sup>3</sup> and found the equipment specifications, performance, and energy savings to be appropriately documented and justified. Using the RTF methodology, evaluated energy savings were lower for two projects and higher for one project. For each of these three projects, the equipment specifications and load profile inputs from the evaluation matched reported values.

**1.3.2.2 Energy Management**

During the 2020 and 2021 program years, Pacific Power provided incentives for 29 energy management projects and reported 4,812,453 kWh in energy savings, which accounted for 10.2% of all reported energy savings. The Cadmus team evaluated 12 sampled projects and extrapolated results to the population for a realization rate of 100.1% for the energy management stratum.

The sampled projects involved three strategic energy management projects, six recommissioning projects, and three compressed air leak repairs. The Cadmus team found no discrepancies for 11 of 12 sampled projects. Pacific Power’s implementers followed best practices for documenting baseline performance, post-implementation performance, and calculating savings among measures. For strategic

<sup>3</sup> Regional Technical Forum. May 26, 2022. *Compressed Air Standard Protocol v3.0*. <https://rtf.nwcouncil.org/standard-protocol/compressed-air/>

energy management projects where utility bill analysis is the prime savings analysis method, the implementers use statistical model tests to validate energy model performance. For one compressed air leak repairs project, the Cadmus team evaluated savings based on the Uniform Method Project's *Compressed Air Protocol* and found higher savings than reported.

### 1.3.2.3 HVAC

During the 2020 and 2021 program years, Pacific Power provided incentives for 37 HVAC projects and reported 1,266,567 kWh in energy savings, which accounted for 2.7% of all reported energy savings. The Cadmus team evaluated 12 sampled projects and extrapolated results to the population for a realization rate of 88.2% for the HVAC stratum.

Seven of the 12 projects realized energy savings within 11% of reported. Three projects that involved incentivized variable frequency drives (VFDs) serving HVAC pumps and fans realized energy savings of 41%, 44%, and 48%. The Cadmus team evaluated these projects based on the RTF's *Variable Speed Drive* protocol<sup>4</sup> and found lower energy savings than reported when using the end-use load profiles of the equipment controlled by the VFD controlled motors. Two projects involving heat pumps and a chiller were evaluated with 41% and 49% of reported energy savings. For one of these projects, the incentivized chiller efficiency was lower than baseline. For the other project, the incentivized heat pump was incorrectly calculated as a packaged system. The installed equipment was a split-system heat pump, which requires a more efficient baseline and resulted in lower energy savings. Due to the relatively low energy savings of the VFD and heat pump projects, the overall realization rate for the HVAC stratum was not greatly impacted.

### 1.3.2.4 Irrigation

During the 2020 and 2021 program years, Pacific Power provided incentives for 49 irrigation projects and reported 1,683,134 kWh in energy savings, which accounted for 3.6% of all reported energy savings. The Cadmus team evaluated 10 sampled projects and extrapolated results to the population, for a realization rate of 104.7% for the irrigation stratum.

Eight of the 10 sampled projects involved the installation of VFDs on irrigation pumps. These projects were well-documented and followed best practices for calculating savings. Seven of the eight irrigation pump VFD projects realized energy savings within 5% of reported. The Cadmus team evaluated two projects that involved incentivized irrigation hardware based on the RTF's *Irrigation Hardware* measure (v4.1, approved May 2018) and found greater savings than reported (with 240% and 136% realization rates).

### 1.3.2.5 Lighting

During the 2020 and 2021 program years, Pacific Power provided incentives for 221 lighting projects and reported 20,554,718 kWh in energy savings, which accounted for 43.4% of all reported program energy

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<sup>4</sup> Regional Technical Forum. April 18, 2022. *Variable Speed Drive v2.0*.  
<https://rtf.nwcouncil.org/measure/variable-speed-drives/>

savings. The Cadmus team evaluated 12 sampled projects and extrapolated results to the population for a realization rate of 102.8% for the lighting stratum.

Pacific Power uses a prescriptive lighting calculator tool for lighting projects. For most projects, the supporting documentation matched the lighting tool inputs. Hours of use, existing lighting equipment, and building type are all collected directly from customers. The Cadmus team calculated first year electric energy savings for projects based on the methodology outlined in the RTF's *Non-Residential Lighting Retrofits* standard protocol. The Cadmus team's evaluated savings did not match Pacific Power's reported savings for eight of the 12 sampled projects. While evaluated savings were typically within 10% of report savings, differences may be due to the use of an HVAC interaction factor. However, because lighting calculations were not accessible, we were unable to determine the precise source of discrepancy between reported and evaluated savings.

### 1.3.2.6 Midstream

During the 2020 and 2021 program years, Pacific Power provided incentives for 76 midstream projects and reported 848,088 kWh in energy savings, which accounted for 1.8% of all reported program energy savings. The Cadmus team evaluated 11 sampled projects and extrapolated results to the population for a realization rate of 114.1% for the midstream stratum.

Realization rates for sampled projects ranged from 36% to 271%. For each of the sampled midstream projects, we calculated savings based on the RTF's *Midstream Lighting* measure, selected the baseline fixture wattage using the incentivized manufacturer's recommended baseline (or the lumen equivalence method if the manufacturer did not provide a recommendation), and determined the hours of use based on the facility type from the application and from the RTF's *Non-Residential Lighting Retrofits* standard protocol. Because Pacific Power used deemed values and assumptions by lighting measure type, variations in realization rates should be expected.

### 1.3.2.7 Other

During the 2020 and 2021 program years, Pacific Power provided incentives for 49 projects in the "other" stratum and reported 1,888,998 kWh in energy savings, which accounted for 4.0% of all reported energy savings. The Cadmus team evaluated 13 sampled projects and extrapolated results to the population for a realization rate of 83.6% for the "other" stratum.

The largest three sampled projects were hand-selected and realized 100% of reported energy savings. The remaining sampled projects crossed a wide variety of project types including green motor rewinds, chillers, cool roofs, ENERGY STAR equipment VFDs, and custom projects. As expected, projects that use custom calculations with backup trend data and site visit reports realized energy savings close to reported savings. Projects that used deemed savings values and/or limited project-specific inputs exhibited the greatest variety in realization rates.

### 1.3.2.8 Refrigeration

During the 2020 and 2021 program years, Pacific Power provided incentives for 40 refrigeration projects and reported 9,858,442 kWh in energy savings, which accounted for 20.8% of all reported program

energy savings. The Cadmus team evaluated 10 sampled projects and extrapolated results to the population for a realization rate of 100.0% for the refrigeration stratum.

Pacific Power's implementer used custom calculations for all sampled projects. For eight of the projects, the implementer used trend data and spot measurements to document baseline and post-implementation performance. In all cases, the performance was appropriately documented and calculation methodologies followed sound engineering practice. For two fast acting door projects, trend data was not collected to verify performance, but the calculation inputs were appropriate and reasonable.

### *1.3.2.9 Small Business Lighting*

During the 2020 and 2021 program years, Pacific Power provided incentives for 118 small business lighting measures and reported 2,527,902 kWh in energy savings, which accounted for 5.3% of all reported energy savings. The Cadmus team evaluated 10 sampled projects and extrapolated results to the population for a realization rate of 110.0% for the small business lighting stratum.

Pacific Power uses a prescriptive small business lighting calculator tool for customers who participated in the small business lighting stratum. Similar to the traditional lighting projects, the supporting documentation matched the lighting tool inputs, but the Cadmus team's evaluated savings were typically higher than reported savings for most projects. Due to limited accessible in the reported calculations workbook, we were unable to determine a reason for the discrepancy.

## *1.4 Process Evaluation*

The Cadmus team used primary data collected 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.

### *1.4.1 Process Sampling*

The Cadmus team surveyed participants and partial participants and interviewed trade allies and nonparticipants for the 2020 and 2021 evaluation, as shown in Table 8. Among the participant groups surveyed, the response rates were 13% for the Incentive List and Custom Analysis, 32% for Small Business Enhanced Incentives, 1% for Midstream Lighting Instant Incentives, and 31% for trade allies. 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 8. 2020-2021 Washington Wattsmart Business Program Process Activity Sampling**

Program Name/Measure Category	Sampling Frame <sup>a</sup>	Target Completes	Achieved Completes
<b>Incentive List and Custom Analysis</b>			
Additional Measure	5	Census	1
Agriculture	0		0
Compressed Air	15		1
Custom	4		0
Energy Management Retro-Commissioning	16		2
Farm and Dairy	1		0
HVAC	19		4
Irrigation	37		8
Lighting	170		16
Other <sup>b</sup>	40		7
<b>Total Incentive List and Custom Analysis</b>	<b>307</b>		<b>Census</b>
<b>Small Business Enhanced Incentives</b>	<b>31</b>	<b>Census</b>	<b>10</b>
<b>Midstream Lighting Instant Incentives</b>	<b>20</b>	<b>Census</b>	<b>2</b>
<b>Trade Allies</b>	<b>29</b>	<b>9</b>	<b>9</b>
<b>Total Participants</b>	<b>387</b>	<b>Census</b>	<b>60 <sup>c</sup></b>
<b>Partial Participants</b>	<b>24</b>	<b>Census</b>	<b>6</b>
<b>Nonparticipants</b>	<b>8,174</b>	<b>Census</b>	<b>197</b>

<sup>a</sup> The sampling frame was based on the number of unique customers with contact information (after removing duplicates).

<sup>b</sup> “Other” includes appliances, building shell, food service, food service equipment, motors, oil and gas, and refrigeration measures.

<sup>c</sup> This represents total completes across all program offerings (Incentive List and Custom Analysis, Small Business Enhanced Incentives, and Midstream Lighting Instant Incentives).

### 1.4.2 Participant Experience

Participants in the Wattsmart Business program answered survey questions about their entry into the program, how they navigated identifying projects and submitting their applications, and their satisfaction with various program aspects. Survey respondents included Typical Upgrades and Custom Analysis participants (n=39), Small Business Enhanced Incentives participants (n=10), Midstream Lighting Instant Incentives participants (n=2), and trade allies (n=9).

#### 1.4.2.1 Incentive List and Custom Analysis

The Cadmus team surveyed 39 Incentive List and Custom Analysis participants representing 10 measure categories. This included respondents who completed Incentive List upgrades as well as respondents who completed custom projects and worked with a certified vendor. Table 9 shows the breakdown of respondents by measure category and incentive type.

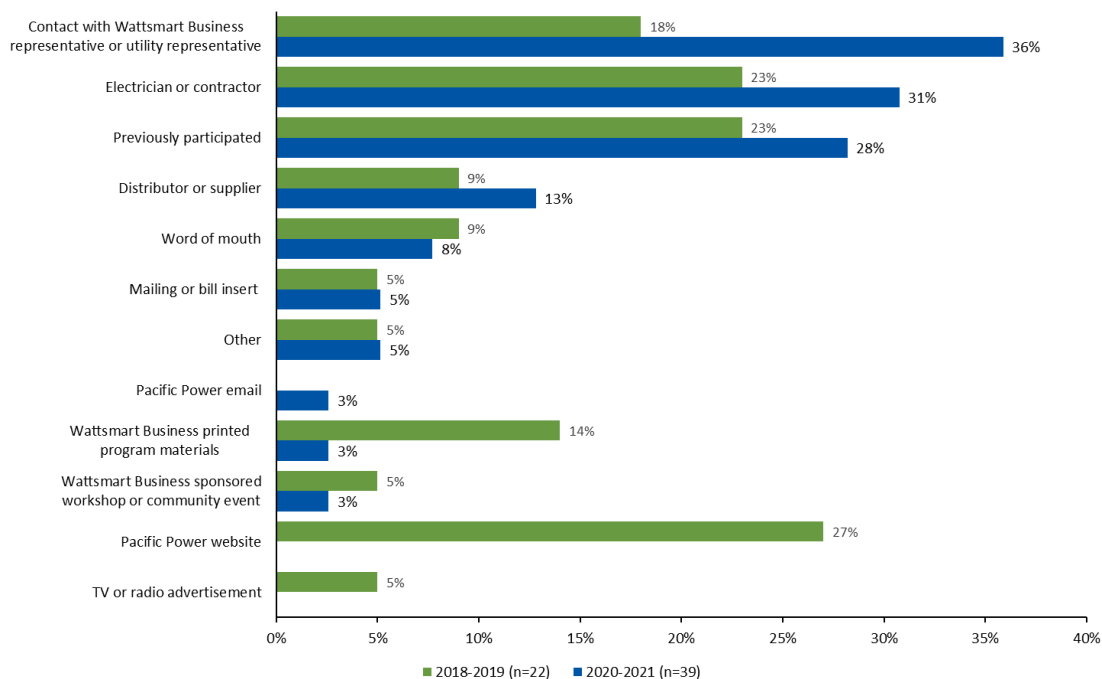
**Table 9. 2020-2021 Incentive List and Custom Analysis Participant Survey Completes by Measure Category and Incentive Type**

Measure Category	Incentive List	Custom Analysis	Total
Additional Measure	1	0	1
Building Shell	1	0	1
Compressed Air	1	0	1
Energy Management	1	1	2
Food Service Equipment	3	0	3
HVAC	4	0	4
Irrigation	8	0	8
Lighting	16	0	16
Oil and Gas	2	0	2
Refrigeration	0	1	1
<b>Total</b>	<b>37</b>	<b>2</b>	<b>39</b>

**Participant Experience**

Respondents (n=39) reported that they most often learned about the Wattsmart Business program incentives through contact with a Wattsmart Business representative or utility representative (36%), through their electrician or contractor (31%), or through previous participation (28%). This differs somewhat from the 2018 and 2019 results, in which respondents most frequently learned about the available incentives through the Pacific Power website (27%), followed by their electrician or contractor (23%) and through previous participation (23%; n=22). Figure 2 shows the full results from 2018 and 2019 and 2020 and 2021 respondents.

**Figure 2. Incentive List and Custom Analysis Awareness Sources**



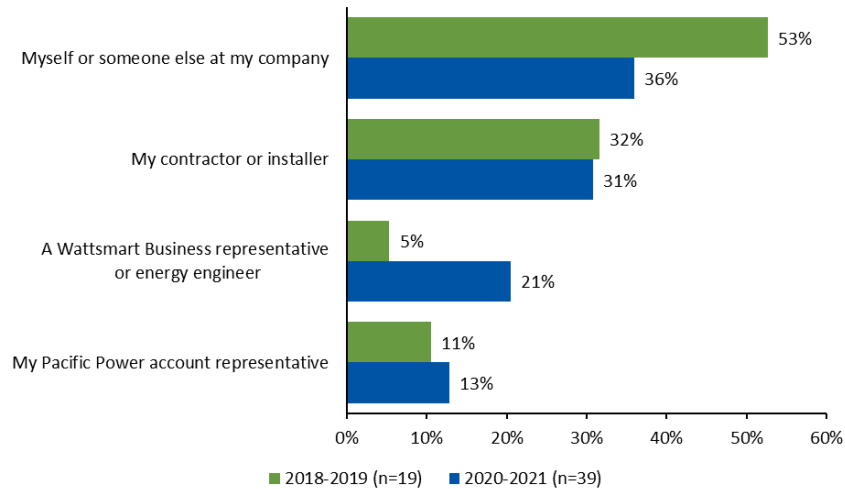
Source: Pacific Power 2020-2021 Wattsmart Business Program Participant Survey Question A3. Multiple responses allowed. Don't know and refused responses removed.



The 2020 and 2021 respondents reported that, on average, the incentive they received covered 29% of their project cost (n=38), which is higher than the 2018 and 2019 response average of 20% (n=17).

Additionally, as shown in in Figure 3, respondents most commonly reported that they or someone else at their company filled out their application, which is similar to responses in 2018 and 2019.

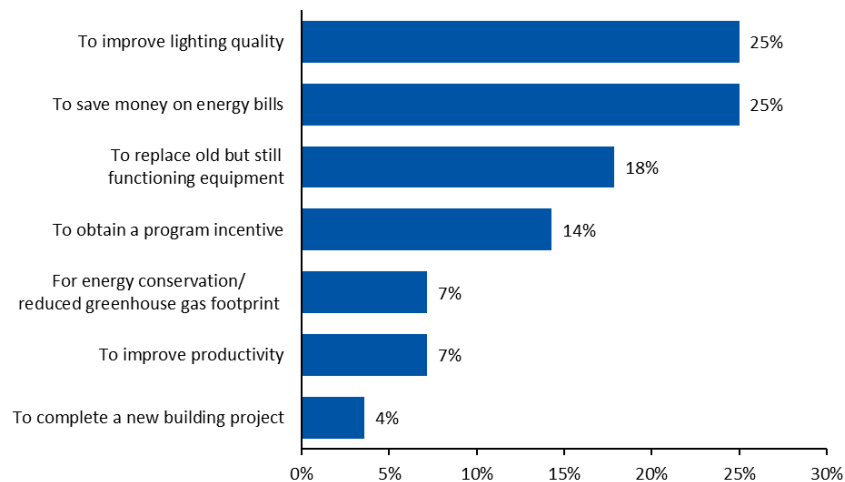
**Figure 3. Who Completed the Incentive List and Custom Analysis Application**



Source: Pacific Power 2020-2021 Wattsmart Business Program Participant Survey Question B1. Don't know and refused responses removed.

The Cadmus team asked Wattsmart Business respondents what the most important reason was for their company participating in the program. As shown in Figure 4, respondents reported that the most important reasons for participating were to improve lighting quality (25%) and to save money on energy bills (25%; n=28).

**Figure 4. Most Important Reason for Incentive List and Custom Analysis Participation**

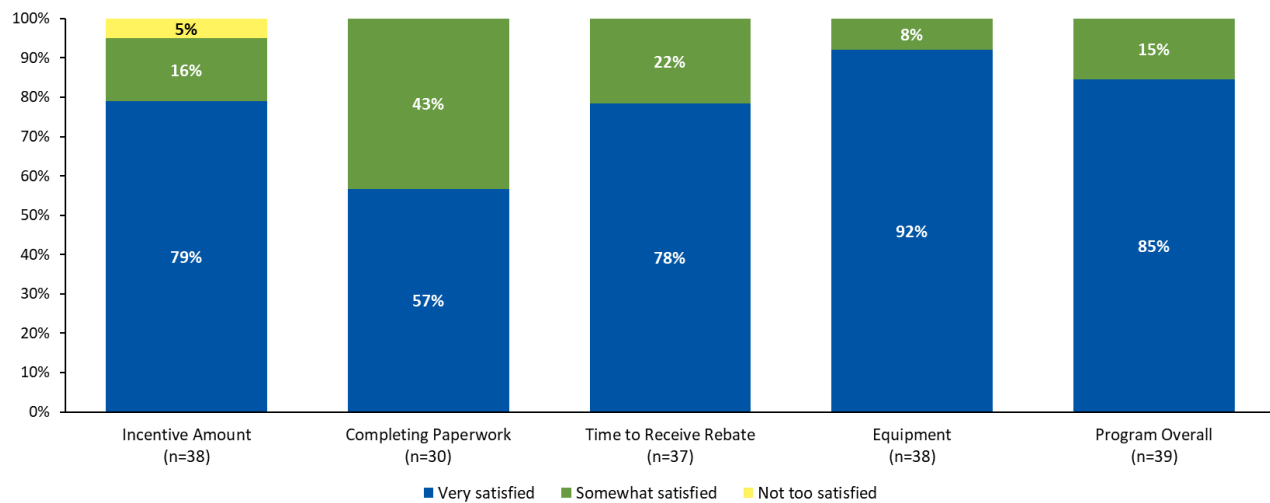


Source: Pacific Power 2020-2021 Wattsmart Business Program Participant Survey Question B1. Don't know and refused responses removed (n=28).

**Participant Satisfaction**

As shown in Figure 5, 95% of respondents rated themselves as satisfied (either *very satisfied* or *somewhat satisfied*) with their incentive amount (n=38), which is slightly lower than the 100% of the 2018 and 2019 survey respondents (n=17). All of the 2020 and 2021 respondents were also highly satisfied with the other aspects of the program, including the ease of completing the paperwork, the time it took to receive the rebate, the equipment, and the program overall. This overall program satisfaction rating in 2020 and 2021 is similar to the rating in 2018 and 2019, when 94% respondents rated their paperwork as either *very easy* or *somewhat easy* to complete and 100% were satisfied with the remaining program aspects (n=17).

**Figure 5. Satisfaction with Incentive List and Custom Analysis Program Components**

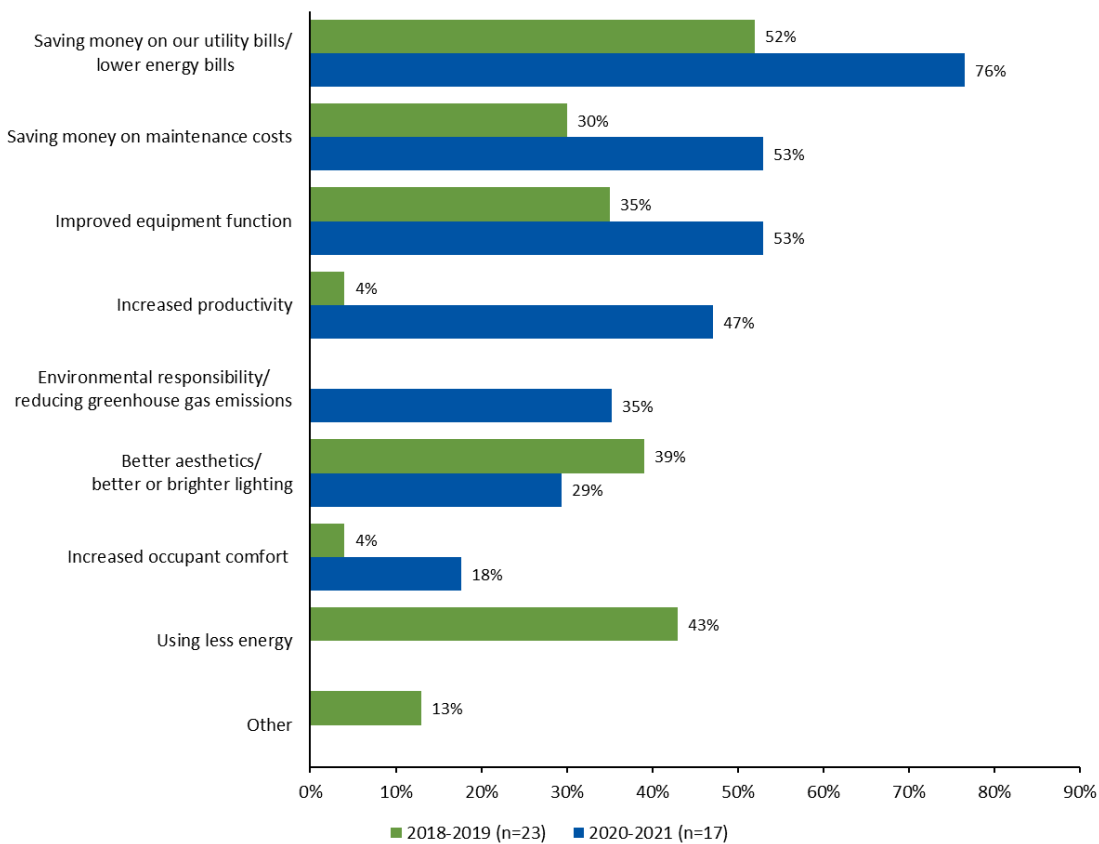


Source: Pacific Power 2020-2021 Wattsmart Business Program Participant Survey Questions B3, B5, B8, B13, and B16. Don't know and refused responses removed. Note that completing paperwork was asked on a scale from *very easy* to *not at all easy*.

**Project Benefits**

Incentive List and Custom Analysis participants reported one or more benefits that their companies experienced from the project they completed. Most 2020 and 2021 respondents said benefits included saving money on utility bills (76%; n=17), similar to the 2018 and 2019 responses (52%; n=23). As shown in Figure 6, 2020 and 2021 respondents also reported benefits such as saving money on maintenance costs, improved equipment function, and increased productivity.

**Figure 6. Incentive List Custom Analysis Project Benefits**



Source: Pacific Power 2020-2021 Wattsmart Business Program Participant Survey Question B14. Multiple responses allowed. Don't know and refused responses removed. Note that "environmental responsibility, reducing greenhouse gas emissions" was only a response option in the 2020 and 2021 survey, while "using less energy" was only a response option in the 2018 and 2019 survey.

**Firmographics**

Ninety-seven percent of respondents said their company owns the facility where the improvements were made, while 3% said they rent the facility (n=37). Additionally, 30% of respondents said their company employs one to 10 people, 9% said 11 to 25 people, 12% said 26 to 50 people, 24% said 51 to 100 people, 12% said 101 to 200 people, 9% said 201 to 500 people, and 3% said their company employs more than 500 people (n=33).

Respondents also identified the type of fuel source their facility uses for space and water heating. For space heating, 50% of respondents said their facility uses natural gas, 39% said they use electric sources, and 11% said they use another source (n=38). For water heating, 32% of respondents said they use natural gas sources, 65% said they use electric, and 3% said they use another source (n=37).

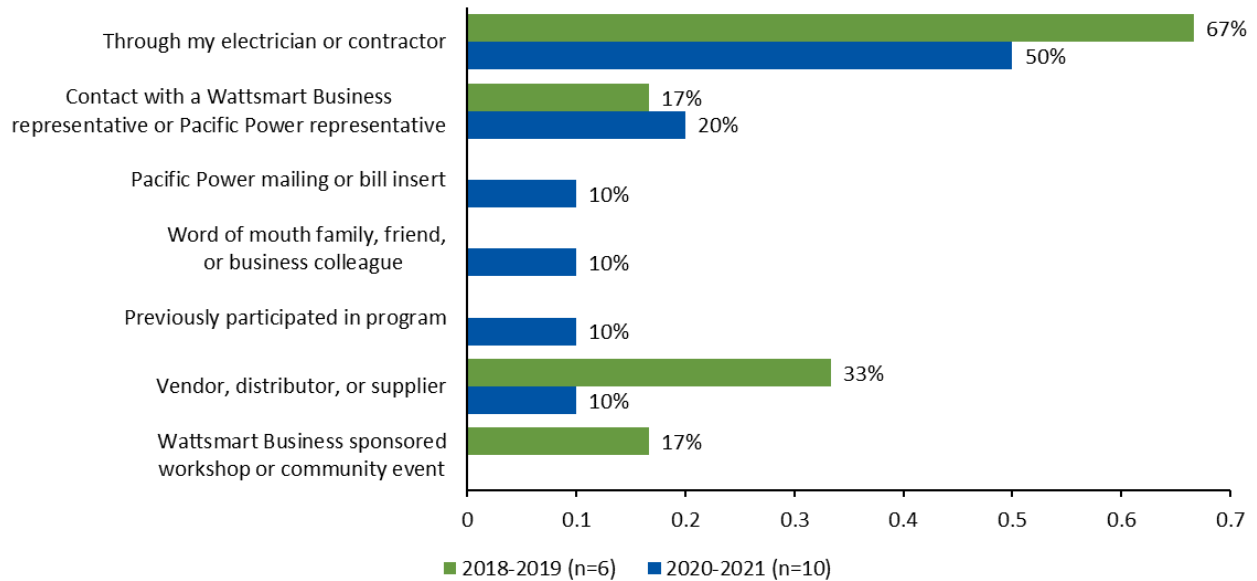
**1.4.2.2 Small Business Enhanced Incentives**

The Cadmus team surveyed 10 customers who participated in the Small Business Enhanced Incentives program offering.

**Participant Experience**

As shown in Figure 7, the most common source of awareness reported by respondents was through their electrician or contractor (50%; n=10), similar to the 67% of 2018 and 2019 respondents who provided this answer (n=6).

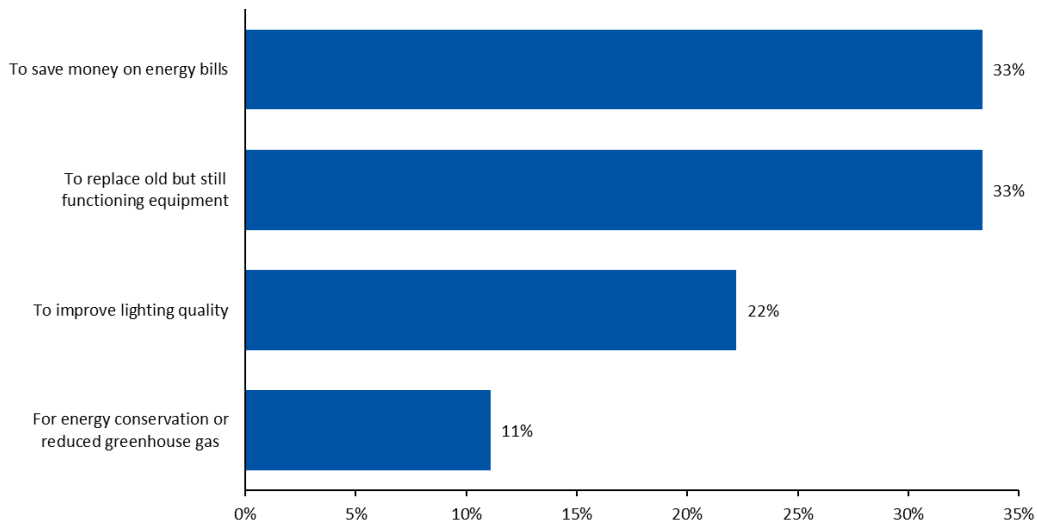
**Figure 7. Small Business Enhanced Incentives Awareness Sources**



Source: 2020-2021 Pacific Power Wattsmart Business Program Small Business Enhanced Incentives Participant Survey Question B1. Multiple responses allowed. Don't know and refused responses removed.

Furthermore, 33% of 2020 and 2021 respondents indicated that the most important reason their company decided to participate in the program was to save money on energy bills and 33% indicated it was to replace old but still functioning equipment, followed by to improve lighting quality (22%) and conserve energy (11%; n=10), as shown in Figure 8. In 2018 and 2019, three of five respondents indicated that reducing their energy usage and greenhouse gas footprint was the most significant factor in their decision-making.

**Figure 8. Most Important Reason for Small Business Enhanced Incentives Participation**



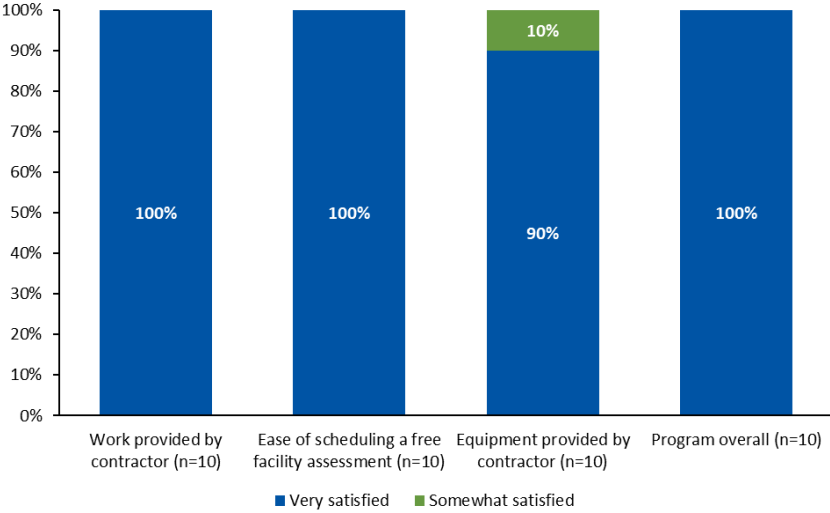
Source: 2020-2021 Pacific Power Wattsmart Business Program Small Business Enhanced Incentives Participant Survey Question B2. Don't know and refused responses removed (n=10).

All of the Small Business Enhanced Incentives respondents said they had received a project proposal with estimates of their incentive or discount and utility bill savings after their free energy assessment (n=10). When asked what information in the project proposal was the most influential in their company's decision to proceed with their project, 50% said the information about saving money on energy bills, while 50% said saving money on project costs (n=10).

**Participant Satisfaction**

As shown in Figure 9, all respondents rated themselves as either *very satisfied* or *somewhat satisfied* with the work provided by their contractor, the equipment they had installed, and the program overall. Correspondingly, all 10 respondents also rated scheduling the free facility assessment as *very easy*. These satisfaction ratings are similar to what was recorded in 2018 and 2019, when all the respondents rated themselves as satisfied with the program aspects and the program overall (n=8).

**Figure 9. Small Business Enhanced Incentives Satisfaction with Wattsmart Business Program Components and Program Overall**

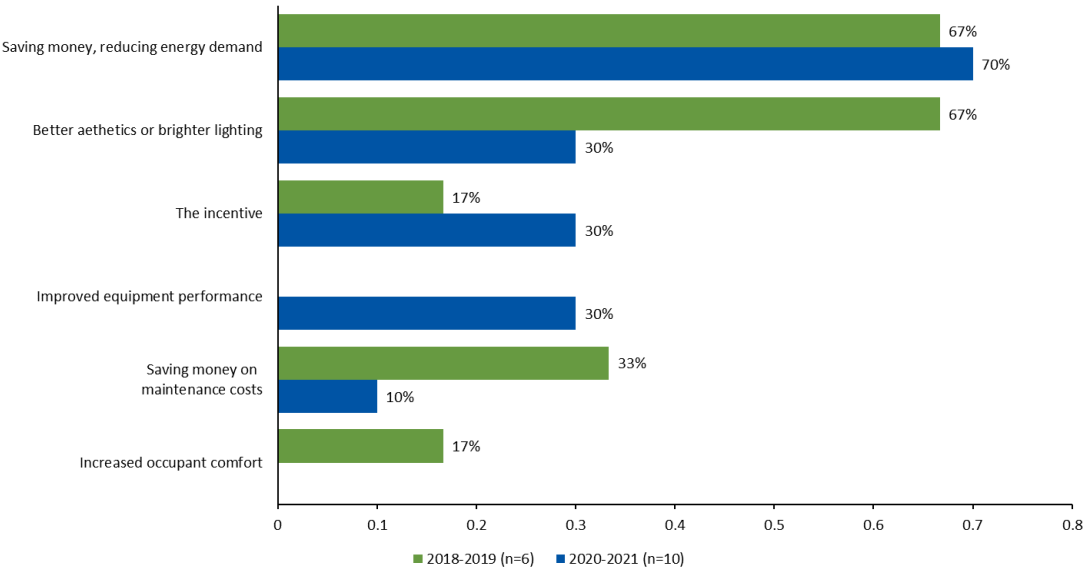


Source: Pacific Power 2020-2021 Wattsmart Business Program Participant Survey Questions B3, B7, B9, and B21. Note that the “ease of scheduling a free facility assessment” was asked on a scale from *very easy* to *not at all easy*.

**Project Benefits and Challenges**

All respondents reported one or more benefits that their companies experienced due to the equipment they installed. As shown in Figure 10, most respondents said the benefits included saving money and reducing energy demand (70%; n=10). Similarly, in 2018 and 2019, saving money and reducing energy demand was most commonly reported as a benefit, along with better aesthetics (67% each; n=6).

**Figure 10. Small Business Enhanced Incentives Project Benefits**



Source: Pacific Power 2020-2021 Wattsmart Business Program Participant Survey Question B17. Multiple responses allowed.

## **Firmographics**

Seven of the ten respondents said their company owns the facility where the improvements were made, while the remaining three respondent said they lease the facility (n=10). Additionally, four respondents said their company employs between 1 and 10 people, while two respondents said they have between 11 and 25 people, two have between 26 and 50 people, and one has between 76 and 100 people (n=9).

Respondents also identified the types of fuel sources their facility uses for space and water heating. For space heating, four respondents said their facility uses natural gas, five said they use electric, and one said they use another source. For water heating, three respondents said they use natural gas, while the other seven respondents said they use electric.

### *1.4.2.3 Midstream Lighting Instant Incentives*

The Cadmus team completed surveys with two Midstream Lighting Instant Incentives participants about their source of program awareness, their program experience, and their program satisfaction. These respondents received an incentive at the point of purchase through a qualified, participating distributor.

## **Program Delivery**

When asked, both respondents reported that their organization learned about the incentives available for the equipment purchased through their contractor, distributor, or supplier where they purchased their equipment. This was similar to 2018 and 2019 results where respondents also reported having learned about available incentives through either the contractor, distributor, or supplier where they purchase equipment, or through contact with a Wattsmart Business or utility representative. In 2020 and 2021, both respondents also reported purchasing their equipment through a vendor they had worked with previously. Furthermore, both said they purchased from the vendor primarily because of the instant incentive.

## **Program Experience**

Both respondents also rated it as *very easy* to find a program discount for the equipment they wanted to purchase, consistent with the ratings from both 2018 and 2019 respondents. In terms of their project, both 2020 and 2021 respondents purchased lamps to replace burned out lamps. When asked about the incentive levels, both respondents rated themselves as *very satisfied* with their incentive amount—this matches the ratings provided by 2018 and 2019 respondents.

Neither respondent experienced any challenges while participating in the program.

## **Participant Satisfaction**

When asked for recommendations to improve the program, neither respondent provided suggestions. Both respondents rated themselves as *very satisfied* with the Midstream Lighting Instant Incentives program offering overall—these match the ratings reported by the two respondents in 2018 and 2019.

## **Firmographics**

One respondent said their company owns the facility where the improvements were made, while the other respondent said their company leases the facility. One respondent said their company employs 1 to 10 people and the other respondent said 26 to 50 people. Respondents also identified the types of

fuel sources their facility uses for space and water heating. One respondent said their facility uses natural gas space heating, while one respondent's facility uses electric space heating. Both respondents said their facility uses electric water heating.

#### *1.4.2.4 Trade Allies*

The Cadmus team interviewed nine trade allies about their program experience including program awareness, the program's impact on their business, their awareness of the small business efforts, their overall program satisfaction, and general company firmographics.

#### **Program Experience**

The responding trade allies provided a variety of responses for how their company first learned about the Wattsmart Business program:

- Two were initially contacted by a Wattsmart Business representative
- Two were hired to manage lighting projects and learned about the program through the Wattsmart Business website when looking for rebates and incentives for their customers
- Two were not sure how their company learned about the program, and one said their company was already participating in the program when they were hired
- The remaining three respondents did not describe how their company first learned about the Wattsmart Business program

Furthermore, the Cadmus team asked trade allies why their company chose to become an approved vendor for the Wattsmart Business program. Three of nine trade allies chose to become an approved Wattsmart vendor because the incentives offered are very attractive, especially for small businesses.

We also asked the trade allies what percentage of their company's jobs included the Wattsmart Business incentive: three said approximately 2%, one said 33%, one said 50%, and one said more than 50%. Two respondents did not provide a percentage, but said that it was a very low amount, while one respondent did not know. Respondents provided a variety of responses when asked how participation in the Wattsmart Business program has affected their business:

- Three said their participation in the program helped attract more clients
- Three said the incentives have been beneficial in increasing sells
- One said the program has had a very positive impact
- One said they have experienced sales growth and the program has helped them build relationships with clients
- One said the program helps their professionalism and credibility

Additionally, all nine respondents confirmed that the program fits well with their sales models.

When asked if there were any barriers to working with the Wattsmart Business program, two said the incentive values are low and not always engaging to customers, one said the paperwork for the Small Business Enhanced Incentives program offering was hard to learn, and one wanted to compare programs by being provided with a workbook. When asked if there were any products they thought



would be a good fit for the program that are not currently eligible, one respondent said solar panels and another said surge protectors (while the remaining seven did not have a suggestion).

The Cadmus team asked trade allies about their awareness of the scorecards<sup>5</sup> for approved vendors or of any additional material provided to trade allies. One respondent said they were familiar with the scorecards, but do not use them often, while the remaining respondents reported not being familiar with the scorecards and said they do not interact with the materials provided by program staff.

## Satisfaction

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

- Provide more marketing materials, including more materials to provide to customers and to increase awareness among distributors
- Have a Wattsmart representative interact with the customers to present different approaches and provide more information
- List the approved vendors on the Wattsmart website

Overall, all trade ally respondents said that Pacific Power is responsive to their needs and provides them with the information and support they need to be successful.

## Firmographics

Two trade allies primarily serve commercial, industrial and residential customers. Six mainly serve commercial customers but have industrial customers at times, while one trade ally only served commercial customers. Five trade allies serve the Walla Walla and the surrounding areas, while the other four serve Yakima and the surrounding areas. Six respondents said their company had less than 10 employees in 2021, while three had between 10 and 18 employees.

### 1.4.3 Partial Participant Experience

The Cadmus team obtained survey results from six partial participants regarding program awareness, motivations for and barriers to energy efficiency upgrades, satisfaction, and general firmographics. For the purposes of this report a partial participant is defined as a customer who considered (or began) a general energy efficiency upgrade project but not complete the project or receive a program incentive.

#### 1.4.3.1 Awareness

Although the partial participants did not receive an incentive, the Cadmus team asked respondents how their organization learned about the incentives available. The respondents reported a variety of ways they learned about the incentives (n=6; multiple responses allowed):

- Three learned through contact with Wattsmart Business representative or utility representative
- One learned through a mailing or bill insert

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<sup>5</sup> Pacific Power introduced scorecards to approved vendors to help them keep track of their projects.

- One learned from their electrician or contractor
- One learned through previous participation or receiving an incentive
- One learned through word of mouth

Half the respondents (three of six) said their company had received a Wattsmart Business program incentive in the past, while the other three respondent's companies had not. Additionally, one respondent rated themselves as *very likely* to request an incentive for a project in the next six months, while one respondent rated themselves as *somewhat likely* and four respondents rated themselves as *not too likely*.

### 1.4.3.2 Motivation and Barriers

Five respondents reported that their company's most important motivating factor when making decisions about energy-efficient upgrades was saving money on energy bills, while the other respondent said their company is motivated by improving the lighting quality.

One respondent reported that their company did complete the project they initiated through the Wattsmart Business program, but said they did not receive the incentive because the project did not qualify. The other five respondents said they did not complete the project due to costs or funding (one did not have the equipment to complete the installation and one said they had not started the project).

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. Three respondents said their companies now invest less in building and equipment improvements, two said their companies made no significant changes due to COVID-19, and one said their company now invests more than they had pre-pandemic.

### 1.4.3.3 Satisfaction

Four of five respondents rated themselves as *very satisfied* with the program overall and one rated themselves as *somewhat satisfied*. When asked if there is anything that Pacific Power could have done to improve their overall experience with the Wattsmart Business program, only one respondent had a recommendation: to provide better and more communication.

### 1.4.3.4 Firmographics

Half the respondents (three of six) said their company owns the facility, while the other three said their company does not own the facility. One respondent said their company employs 1 to 10 people, two said 201 to 500 people, and one said more than 500 people (n=4). Respondents also identified the types of fuel sources their facility uses for space and water heating. Five respondents said their facility uses electric space heating while one respondent's facility uses another source. Two respondents said their facility uses natural gas water heating, three use electric water heating, and one uses another source.

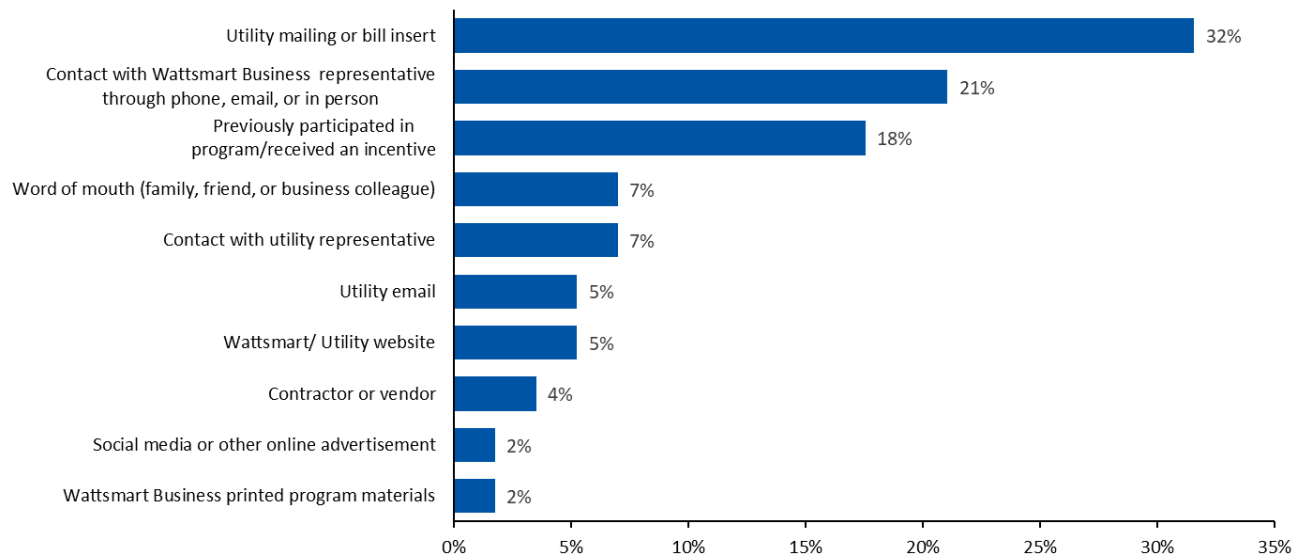
## 1.4.4 Nonparticipant Experience

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

1.4.4.1 Awareness

Prior to the interview, 36% of respondents said they were aware of the Wattsmart Business program offerings (n=197), while 64% of the nonparticipants were unaware of the program. Of those who were aware, 32% (n=57) said they learned about the program through utility mailing or bill inserts, as shown in Figure 11.

Figure 11. Nonparticipants' Awareness Source



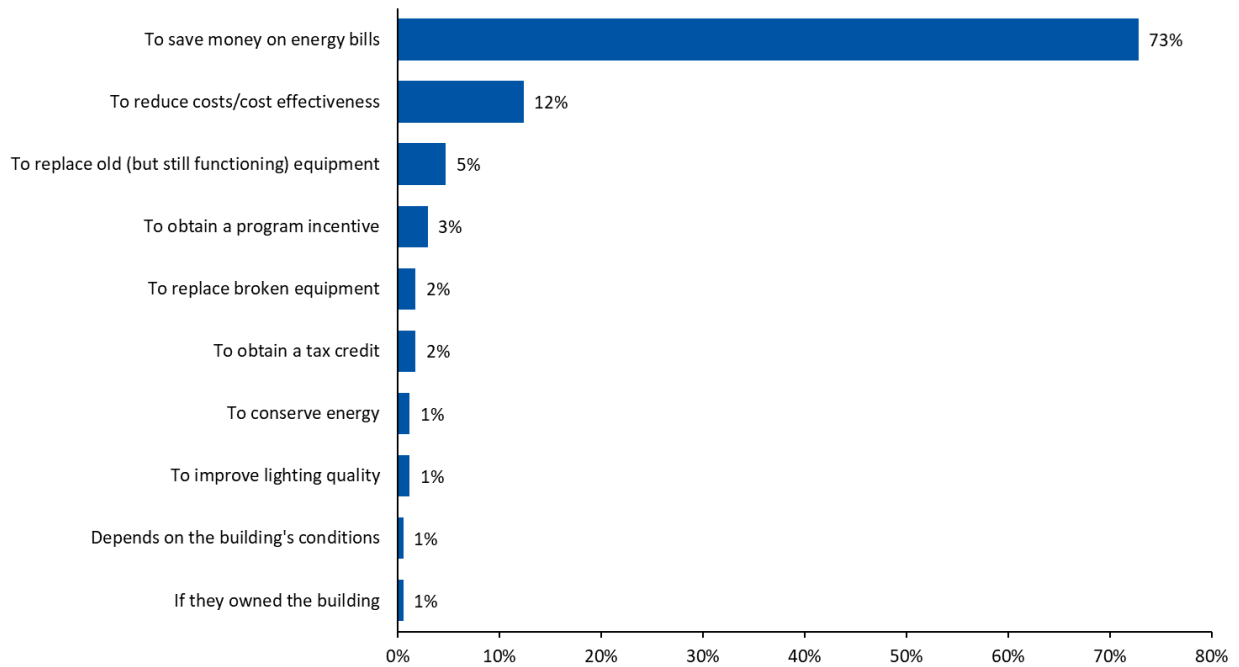
Source: Pacific Power 2020-2021 Wattsmart Business Program Nonparticipant Survey Question C3 (n=57).

Furthermore, of the nonparticipants who were aware of the Wattsmart Business program offerings, 28% (n=64) said their companies had received a Wattsmart Business program incentive in the past. Additionally, 24% of the respondents rated themselves as either *very likely* or *somewhat likely* to request a program incentive in the future (n=69).

1.4.4.2 Motivation and Barriers

As shown in Figure 12, 73% of respondents said the most important factor to motivate their company to make energy-efficient upgrades was to save money on energy bills (n=169).

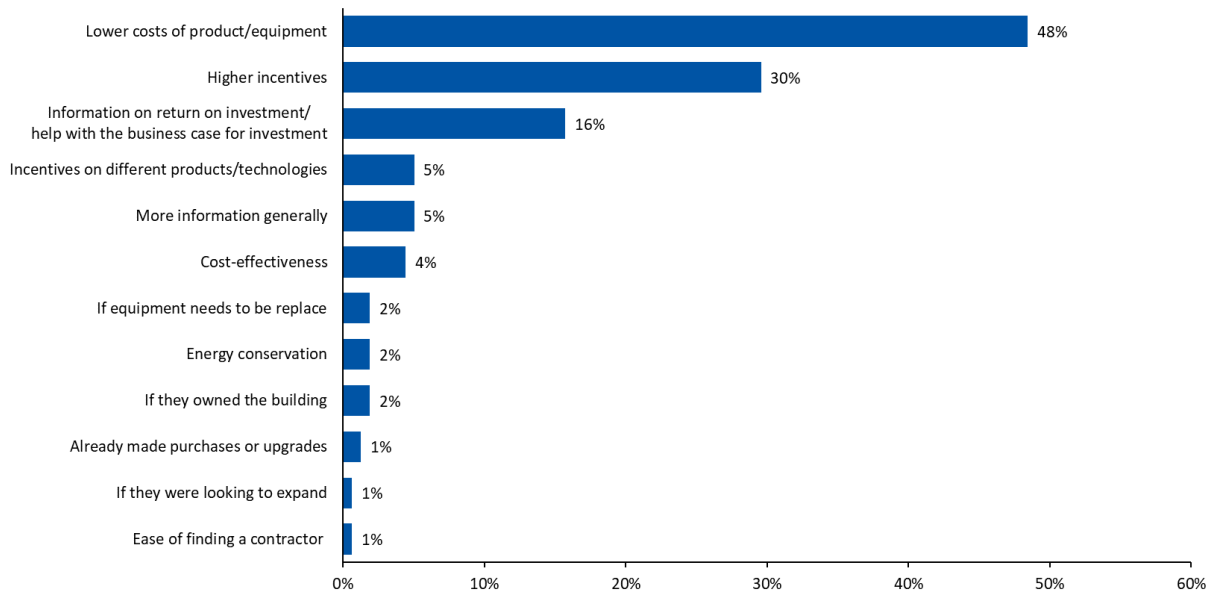
**Figure 12. Nonparticipants' Most Motivating Reasons to Make Energy-Efficient Upgrades**



Source: Pacific Power 2020-2021 Wattsmart Business Program Nonparticipant Survey Question D1 (n=169).

The respondents also shared what would motivate their business to make more energy-efficient purchases or upgrades to their current equipment: 48% said a lower cost for products or equipment and 30% said higher incentives (n=169; Figure 13). Those who said they would like to see incentives for different products or technologies mentioned lighting, solar, and compressors refrigeration (n=6).

**Figure 13. Nonparticipants' Most Motivating Reasons to Make More Energy-Efficient Purchases or Upgrades**



Source: Pacific Power 2020-2021 Wattsmart Business Program Nonparticipant Survey Question D9 (n=159).

Fifty-six percent of the respondents said they did not participate in Wattsmart Business in the past two years because they do not know enough about the program (n=186). Other responses included not understanding what equipment or measures are available, not having the resources for initial investment, not having enough time to participate, not being sure how much the savings will be, not seeing the benefits, having already participated in the past, and not owning the building.

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. Fifty-eight percent said their company is investing about the same amount as before the pandemic (n=197), while 33% said their company is now investing less and 8% said their company is now investing more.

#### *1.4.4.3 Firmographics*

Sixty-seven percent of the respondents said their company employs 1 to 10 people, while 17% said their company employs 11 to 25 people, 6% said 26 to 50 people, and 10% have 51 or more people.

## 2 Cost-Effectiveness

As shown in Table 10, the Wattsmart Business program proved cost-effective for the 2020 and 2021 evaluation period from the perspectives of the PacifiCorp Total Resource Cost (PTRC) test, with a benefit/cost ratio of 2.75, as well as from the Total Resource Cost (TRC) test (with a benefit/cost ratio of 2.50), the Utility Cost Test (UCT; with a benefit/cost ratio of 3.36), and the Participant Cost Test (PCT; with a benefit/cost ratio of 4.09). The program was not cost-effective according to the Ratepayer Impact Measure (RIM) test perspective. Table 11 and Table 12 show the cost-effectiveness test results individually for the 2020 and 2021 program years. Please see *Appendix B* for more information on cost-effectiveness.

**Table 10. 2020-2021 Wattsmart Business Program Evaluated Cost-Effectiveness Summary**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PacifiCorp Total Resource Cost Test (TRC + 10% conservation adder)	\$0.0376	\$15,637,583	\$42,959,043	\$27,321,461	2.75
Total Resource Cost Test (TRC no adder)	\$0.0376	\$15,637,583	\$39,053,676	\$23,416,093	2.50
Utility Cost Test (UCT)	\$0.0282	\$11,626,275	\$39,053,676	\$27,427,401	3.36
Ratepayer Impact Measure Test (RIM)	--	\$44,845,238	\$39,053,676	(\$5,791,562)	0.87
Participant Cost Test (PCT)	--	\$9,444,788	\$38,652,444	\$29,207,655	4.09
Life-Cycle Revenue Impacts (\$/kWh)					\$0.0000731793
Discounted Participant Payback (years)					1.05

**Table 11. 2020 Wattsmart Business Program Evaluated Cost-Effectiveness Summary**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PacifiCorp Total Resource Cost Test (TRC + 10% conservation adder)	\$0.0323	\$8,464,908	\$24,399,182	\$15,934,274	2.88
Total Resource Cost Test (TRC no adder)	\$0.0323	\$8,464,908	\$22,181,075	\$13,716,167	2.62
Utility Cost Test (UCT)	\$0.0221	\$5,776,207	\$22,181,075	\$16,404,867	3.84
Ratepayer Impact Measure Test (RIM)	--	\$26,039,674	\$22,181,075	(\$3,858,600)	0.85
Participant Cost Test (PCT)	--	\$5,402,851	\$22,977,618	\$17,574,767	4.25
Life-Cycle Revenue Impacts (\$/kWh)					\$0.000090450
Discounted Participant Payback (years)					1.18

**Table 12. 2021 Wattsmart Business Program Evaluated Cost-Effectiveness Summary**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PacifiCorp Total Resource Cost Test (TRC + 10% conservation adder)	\$0.0445	\$7,172,675	\$18,559,861	\$11,387,186	2.59
Total Resource Cost Test (TRC no adder)	\$0.0445	\$7,172,675	\$16,872,601	\$9,699,926	2.35
Utility Cost Test (UCT)	\$0.0363	\$5,850,068	\$16,872,601	\$11,022,534	2.88
Ratepayer Impact Measure Test (RIM)	--	\$18,805,564	\$16,872,601	(\$1,932,962)	0.90
Participant Cost Test (PCT)	--	\$4,041,937	\$15,674,826	\$11,632,889	3.88
Life-Cycle Revenue Impacts (\$/kWh)					\$0.000050475
Discounted Participant Payback (years)					0.87

### 3 Conclusions and Recommendations

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

**The Wattsmart Business program realized 101.1% of reported gross energy savings.** Of 100 projects the Cadmus team evaluated, 72 realized energy savings within 10% of the reported savings. Midstream Lighting Instant Incentives projects realized the greatest energy savings relative to reported savings (with realization rates between 72% and 271%), while measures classified as "Other" realized the lowest savings relative to reported savings (with realization rates between 32% and 131%).

HVAC measures realized the second lowest savings relative to reported savings. Three of the HVAC projects that realized energy savings of 41%, 44%, and 48% involved incentivized VFDs serving HVAC pumps and fans. The Cadmus team evaluated these projects based on the RTF's *Variable Speed Drive* protocol and found lower energy savings than reported when using the end-use load profiles of the equipment controlled by the VFD controlled motors.

**Recommendation:** Update the VFD reported savings to match the methodology and/or deemed savings values outlined in the RTF's *Variable Speed Drive* protocol.

**Although the Wattsmart Business program reaches customers through a variety of sources, there are still opportunities to expand customer awareness.** Thirty-six percent of the Incentive List and Custom Analysis respondents learned about the program offerings through contact with a Wattsmart Business or utility representative, while 31% learned through their electrician or contractor (n=39). Similarly, 50% of the Small Business Enhanced Incentives respondents learned about the program through their electrician or contractor and 20% learned through contact with a Wattsmart Business or utility representative (n=10). Finally, both Midstream Lighting Instant Incentives participants learned about the incentives through their contractor, distributor, or supplier. However, 64% (n=197) of the nonparticipants were unaware of the program at the time of the interview. Of the 36% (n=57) who were aware of the program, 32% learned about the programs through a utility mailing or bill inserts.

**Recommendation:** Explore methods to expand outreach to unengaged and unaware customers such as targeted bill inserts and utility mailing and developing program champion contractors and or distributors to become program advocates within their companies and to their customers.

**The Wattsmart Business program successfully meets customer expectations.** Participants continue to be satisfied with the Wattsmart Business program incentive amounts, paperwork, time to receive the rebate, and measures. All of the Incentive List and Custom Analysis respondents were satisfied with the program overall and with program aspects, with the exception of the incentive amount (95% of the respondents were satisfied). Additionally, 100% of the Small Business Enhanced Incentives respondents were satisfied with the overall program, with the work provided by the contractor, and with the equipment provided. The two Midstream Lighting Instant Incentives respondents also reported being satisfied with the program overall. Correspondingly, all nine trade allies were satisfied with the program overall.



**Customers continue to be motivated to make energy-efficient upgrades in order to save money, specifically on energy bills.** Incentive List and Custom Analysis respondents said that saving money on energy bills (25%) or improving lighting quality (25%) were the most important reason for program participation (n=28). In addition, Small Business Enhanced Incentives respondents said that saving money on energy bills (33%) or replacing old but still functioning equipment (33%) were the most important reasons for their program participation (n=10).

Furthermore, five of the six partial respondents reported that their company's most important motivating factor when making decisions about energy-efficient upgrades was saving money on energy bills, while one said improving lighting quality. Lastly, of nonparticipating respondents, 73% said that saving money on energy bills was the most motivating reason to make energy-efficient upgrades, followed by reducing costs (n=169).

**The Wattsmart Business program proved cost-effective according to all test perspectives except the RIM test for the 2020 and 2021 evaluation period.** All measure strata were cost-effective from the PTRC and TRC test perspectives for the 2020 and 2021 evaluation period. The program generated more than \$27.3 million in net benefits during the evaluation period according to the PTRC test.

## Appendix A. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*.<sup>6</sup> Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**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 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

**Step 1:** To verify the accuracy of data in the participant database, the Cadmus team reviewed the program tracking database to ensure that the number of participants and reported savings matched annual reports.

**Step 2:** The team selected a sample of sites from the Pacific Power program database and 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 some instances, contacted customers to verify the installation, specifications, and operations of incented measures.

**Step 4:** The Cadmus team reviewed 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

<sup>6</sup> These reports are available online: <https://www.pacificorp.com/environment/demand-side-management.html>

from the *International Performance Measurement and Verification Protocol*.<sup>7</sup> The team used interviews and other operational data to determine hours of use and power consumption for metered equipment types. In some instances, Cadmus utilized trend data from the customer's building management systems to determine equipment load profiles, hours of use, and performance characteristics.

## Project Review

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

The team performed several tasks for each site within the sample:

- Reviewed the reported documentation to verify that 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 data necessary for each site's savings analysis
- Where applicable, conducted a phone interview with facility personnel to gather information such as equipment types replaced and hours of operation

## Engineering Analysis

In general, Cadmus referenced current measure workbooks and saving estimation methodologies from the Idaho Power Technical Reference Manual (TRM) and the RTF.<sup>8,9</sup> The Idaho Power TRM was updated in 2018 and relies on sources such as the Northwest Power and Conservation Council (NWPPCC), Northwest Energy Efficiency Alliance (NEEA), the Database for Energy Efficiency Resources (DEER), the Energy Trust of Oregon, the Bonneville Power Administration (BPA), third-party consultants, and other regional utilities.

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<sup>7</sup> Efficiency Valuation Organization. January 2012. *International Performance Measurement and Verification Protocol, Concepts and Options for Determining Energy and Water Savings, Volume 1*. p. 25. EVO 10000 – 1:2012. <http://www.evo-world.org/>

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

<sup>9</sup> Regional Technical Forum. "UES Measures." Accessed January 2021. <https://rtf.nwcouncil.org/measures>

## Appendix B. Cost-Effectiveness Methodology and Measure

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

- Customer interviews
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- Site-level billing analysis

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Strata Results

### Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

In assessing the Wattsmart Business program's cost-effectiveness, the Cadmus team analyzed program

## Appendix B. Gross Engineering Analysis Methodology

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

benefits and costs from five different perspectives. The *California Standard Practice Manual* for

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

assessing DSM program cost-effectiveness describes the benefit/cost ratios for the five tests:

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



- The **PacifiCorp Total Resource Cost (PTRC) test** examines program benefits and costs from

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Pacific Power and Pacific Power customers' perspectives (combined). On the benefit side, it

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

includes avoided energy costs, capacity costs, and line losses, plus a 10% adder to reflect non-

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

quantified benefits. On the cost side, it includes costs incurred by both the utility and

## Appendix B. Gross Engineering Analysis Methodology

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

participants.

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

- The **Total Resource Cost (TRC) test** also examines program benefits and costs from Pacific

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

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Power and Pacific Power customers' perspectives (combined). On the benefit side, it includes

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

avoided energy costs, capacity costs, and line losses. On the cost side, it includes costs incurred

## Appendix B. Gross Engineering Analysis Methodology

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



by both the utility and participants.

## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

- The **Utility Cost Test (UCT)** examines program benefits and costs solely from Pacific Power's

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

perspective. The benefits include avoided energy, avoided capacity costs, and avoided line

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

losses. Costs include program administration, implementation, and incentive costs associated

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### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

with program funding.

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

- The **Ratepayer Impact Measure (RIM) test** examines program benefits and costs from the

## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

perspective of all ratepayers (participants and nonparticipants), who may experience rate

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

increases due to decreased kilowatt-hour sales. The benefits include avoided energy costs,

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



avoided capacity costs, and avoided line losses. Costs include all Pacific Power program costs

## Appendix B. Gross Engineering Analysis Methodology

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

and decreased revenues.

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Because the RIM test measures program impacts on customers' rates, most energy efficiency

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

programs do not pass the RIM test. Although energy efficiency programs reduce energy delivery

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

costs, they also reduce energy sales. As a result, average rates per energy unit may increase. A

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM benefit/cost ratio greater than 1.0 indicates that rates—as well as costs—will fall due to the

## Appendix B. Gross Engineering Analysis Methodology

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

program. Typically, this only happens for demand response programs or programs targeting the

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

highest marginal cost hours (when marginal costs exceed rates).

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



- From the **Participant Cost Test (PCT)** perspective, program benefits include bill reductions and

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

incentives received. Costs include the measure incremental cost (compared to the baseline

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

measures), plus installation costs incurred by the customer.

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Table B-1 summarizes the five tests' components.

## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Table B-1. Wattsmart Benefits and Costs Included in Various Cost-Effectiveness Tests

### Appendix B. Gross Engineering Analysis Methodology

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### Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings

Test	Benefits	Costs
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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC	Present value of avoided energy and capacity costs, <sup>a</sup> with	Program administrative and marketing costs and costs
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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	a 10% adder for non-quantified benefits	incurred by participants
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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



TRC	Present value of avoided energy and capacity costs <sup>a</sup>	Program administrative and marketing costs and costs
-----	---	--

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

		incurred by participants
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	Present value of avoided energy and capacity costs <sup>a</sup>	Program administrative, marketing, and incentive costs
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	Present value of avoided energy and capacity costs <sup>a</sup>	Program administrative, marketing, and incentive costs
-----	---	--

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

		plus the present value of decreased revenues
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	Present value of bill savings and incentives received	Incremental measure and installation costs
-----	---	--

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

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<sup>a</sup> These tests include avoided line losses.

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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

- Customer interviews
- Engineering analysis
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This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Table B-2 shows needed cost-effectiveness inputs for each year, all of which Pacific Power provided to

## Appendix B. Gross Engineering Analysis Methodology

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### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

the Cadmus team for analysis.

## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-2. Washington Wattsmart Business Program Selected Cost-Effectiveness Analysis Inputs**

#### Appendix B. Gross Engineering Analysis Methodology

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discount Rate	6.92%
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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Commercial Line Loss	7.60%
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## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Industrial Line Loss	6.82%
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Irrigation Line Loss	7.68%
----------------------	-------

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Commercial Retail Rate (\$/kWh)	\$0.0809
---------------------------------	----------

## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Industrial Retail Rate (\$/kWh)	\$0.0666
---------------------------------	----------

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Irrigation Retail Rate (\$/kWh)	\$0.0890
---------------------------------	----------

## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Inflation/Escalation Rate	2.28%
---------------------------	-------

## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

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- Engineering analysis
- Site-level billing analysis

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Table B-3 shows the cost-effectiveness inputs used for determining results.

## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-3. Washington Wattsmart Business End-Use Category Cost-Effectiveness Inputs**

## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Input Description	2020	2021	Total
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## Appendix B. Gross Engineering Analysis Methodology

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Compressed Air	14.7	14.4	14.6
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Energy Management	3.0	3.0	3.0
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

HVAC	14.4	13.9	14.3
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Irrigation	11.9	11.0	11.6
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Lighting	10.1	10.8	10.4
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Midstream	7.9	8.3	8.1
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Other	14.7	14.6	14.6
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Refrigeration	15.4	15.1	15.3
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Small Business Lighting	11.2	11.4	11.3
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## Appendix B. Gross Engineering Analysis Methodology

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Evaluated Gross Energy Savings (kWh)<sup>a</sup>

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Compressed Air	2,862,783	940,912	3,803,695
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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Energy Management	2,912,284	1,905,682	4,817,966
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

HVAC	814,523	302,652	1,117,175
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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Irrigation	1,152,930	608,836	1,761,766
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Lighting	11,514,228	9,617,333	21,131,561
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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Midstream	696,736	456,077	1,152,813
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Other	514,109	1,064,810	1,578,919
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Refrigeration	7,566,625	2,288,738	9,855,363
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Small Business Lighting	913,758	1,866,769	2,780,527
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Compressed Air	\$580,014	\$309,071	\$889,085
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Energy Management	\$137,029	\$169,034	\$306,063
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

HVAC	\$279,370	\$155,989	\$435,359
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## Appendix B. Gross Engineering Analysis Methodology

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Irrigation	\$281,350	\$228,629	\$509,979
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Lighting	\$2,110,608	\$2,834,775	\$4,945,383
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Midstream	\$113,782	\$102,022	\$215,804
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Other	\$160,459	\$452,075	\$612,534
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- Site-level billing analysis

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Refrigeration	\$1,792,996	\$767,763	\$2,560,759
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Small Business Lighting	\$320,599	\$830,710	\$1,151,309
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## Appendix B. Gross Engineering Analysis Methodology

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This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Compressed Air	\$205,583	\$122,240	\$327,823
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Energy Management	\$58,246	\$46,463	\$104,709
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

HVAC	\$141,705	\$69,786	\$211,491
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Irrigation	\$138,204	\$99,311	\$237,515
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Lighting	\$1,042,244	\$1,300,278	\$2,342,522
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Midstream	\$63,099	\$40,426	\$103,525
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Other	\$93,339	\$241,272	\$334,611
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Refrigeration	\$743,572	\$276,180	\$1,019,752
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Small Business Lighting	\$228,158	\$523,375	\$751,533
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



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<sup>a</sup> Evaluated savings reflect impacts at the customer meter.

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Compressed Air

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

As shown in Table B-4, Table B-5, and Table B-6, the compressed air equipment measure stratum proved

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

cost-effective in 2020, 2021, and the combined 2020 and 2021 period according to all test perspectives

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

except the RIM test.

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-4. 2020-2021 Washington Compressed Air Equipment Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0313	\$1,238,309	\$4,091,139	\$2,852,830	3.30
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0313	\$1,238,309	\$3,719,217	\$2,480,909	3.00
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0226	\$889,085	\$3,719,217	\$2,830,132	4.18
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$3,837,915	\$3,719,217	(\$118,698)	0.97
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$677,047	\$3,276,653	\$2,599,606	4.84
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.0000012881
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-5. 2020 Washington Compressed Air Equipment Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0281	\$856,792	\$2,983,551	\$2,126,759	3.48
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0281	\$856,792	\$2,712,319	\$1,855,527	3.17
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0190	\$580,014	\$2,712,319	\$2,132,305	4.68
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$2,797,545	\$2,712,319	(\$85,226)	0.97
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



PCT	--	\$482,362	\$2,423,114	\$1,940,752	5.02
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000001525
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-6. 2021 Washington Compressed Air Equipment Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0400	\$381,517	\$1,107,588	\$726,071	2.90
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



TRC	\$0.0400	\$381,517	\$1,006,898	\$625,382	2.64
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0324	\$309,071	\$1,006,898	\$697,827	3.26
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$1,040,370	\$1,006,898	(\$33,472)	0.97
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$194,685	\$853,539	\$658,854	4.38
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.00000650
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## *Energy Management*

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



As shown in Table B-7, Table B-8, and Table B-9, the energy management measure stratum proved cost-

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

effective in 2020, 2021, and the combined 2020 and 2021 period according to all test perspectives

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

except the RIM test.

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-7. 2020-2021 Washington Energy Management Cost-Effectiveness**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0268	\$327,959	\$1,354,401	\$1,026,441	4.13
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0268	\$327,959	\$1,231,274	\$903,314	3.75
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



UCT	\$0.0254	\$306,063	\$1,231,274	\$925,210	4.02
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$1,382,666	\$1,231,274	(\$151,392)	0.89
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$126,605	\$1,181,311	\$1,054,706	9.33
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.0000157616
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-8. 2020 Washington Energy Management Cost-Effectiveness**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0192	\$153,556	\$627,762	\$474,206	4.09
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0192	\$153,556	\$570,693	\$417,137	3.72
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0172	\$137,029	\$570,693	\$433,664	4.16
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$783,526	\$570,693	(\$212,833)	0.73
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$74,773	\$704,743	\$629,970	9.43
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000051072
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-9. 2021 Washington Energy Management Cost-Effectiveness**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0334	\$174,403	\$726,639	\$552,235	4.17
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0334	\$174,403	\$660,581	\$486,177	3.79
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0324	\$169,034	\$660,581	\$491,546	3.91
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$599,140	\$660,581	\$61,441	1.10
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



PCT	--	\$51,832	\$476,568	\$424,736	9.19
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	(\$0.000014744)
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## HVAC

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

As shown in Table B-10, Table B-11, and Table B-12, the HVAC measure stratum proved cost-effective

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

according to all test perspectives in 2020, 2021, and the combined 2020 and 2021 period.

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-10. 2020-2021 Washington HVAC Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

- Customer interviews
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This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0720	\$784,072	\$1,607,977	\$823,905	2.05
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0720	\$784,072	\$1,461,798	\$677,726	1.86
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0393	\$435,359	\$1,461,798	\$1,026,439	3.36
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$1,405,684	\$1,461,798	\$56,115	1.04
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$560,205	\$1,181,816	\$621,612	2.11
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	(\$0.000003985)
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

- Customer interviews
- Engineering analysis
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This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-11. 2020 Washington HVAC Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0538	\$443,663	\$1,096,944	\$653,281	2.47
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0538	\$443,663	\$997,222	\$553,559	2.25
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0339	\$279,370	\$997,222	\$717,852	3.57
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



RIM	--	\$989,937	\$997,222	\$7,286	1.01
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$305,998	\$852,272	\$546,274	2.79
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	(\$0.000000142)
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-12. 2021 Washington HVAC Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



PTRC (TRC + 10% Conservation Adder)	\$0.1110	\$340,409	\$511,033	\$170,624	1.50
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.1110	\$340,409	\$464,576	\$124,167	1.36
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0509	\$155,989	\$464,576	\$308,587	2.98
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$415,747	\$464,576	\$48,829	1.12
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$254,207	\$329,544	\$75,338	1.30
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	(\$0.000000949)
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



## Irrigation

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

As shown in Table B-13, Table B-14, and Table B-15, the irrigation measure stratum proved cost-

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

effective in 2020, 2021, and the combined 2020 and 2021 period according to all test perspectives

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

except the RIM test.

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Table B-13. 2020-2021 Washington Irrigation Cost-Effectiveness

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0549	\$826,970	\$1,907,254	\$1,080,284	2.31
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



TRC	\$0.0549	\$826,970	\$1,733,868	\$906,897	2.10
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0340	\$509,979	\$1,733,868	\$1,223,889	3.40
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$1,934,839	\$1,733,868	(\$200,972)	0.90
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$554,507	\$1,662,376	\$1,107,869	3.00
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.0000027872
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-14. 2020 Washington Irrigation Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0445	\$464,173	\$1,140,619	\$676,446	2.46
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0445	\$464,173	\$1,036,927	\$572,753	2.23
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0270	\$281,350	\$1,036,927	\$755,577	3.69
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$1,229,222	\$1,036,927	(\$192,296)	0.84
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$321,028	\$1,086,077	\$765,049	3.38
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000004508
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Discounted Participant Payback (years)	1.82
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-15. 2021 Washington Irrigation Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0704	\$362,797	\$766,635	\$403,838	2.11
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0704	\$362,797	\$696,941	\$334,144	1.92
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0444	\$228,629	\$696,941	\$468,312	3.05
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



RIM	--	\$705,617	\$696,941	(\$8,676)	0.99
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$233,479	\$576,299	\$342,820	2.47
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000000227
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Lighting

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

As shown in Table B-16, Table B-17, and Table B-18, the lighting measure stratum proved cost-effective

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

in 2020, 2021, and the combined 2020 and 2021 period according to all test perspectives except the RIM

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



test.

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-16. 2020-2021 Washington Lighting Cost-Effectiveness**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0406	\$6,926,278	\$17,609,887	\$10,683,609	2.54
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0406	\$6,926,278	\$16,008,988	\$9,082,710	2.31
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0292	\$4,945,383	\$16,008,988	\$11,063,605	3.24
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$18,974,902	\$16,008,988	(\$2,965,914)	0.84
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



PCT	--	\$4,323,417	\$16,372,041	\$12,048,624	3.79
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.0000414276
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-17. 2020 Washington Lighting Cost-Effectiveness**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0368	\$3,332,595	\$8,512,976	\$5,180,381	2.55
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



TRC	\$0.0368	\$3,332,595	\$7,739,069	\$4,406,474	2.32
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0233	\$2,110,608	\$7,739,069	\$5,628,461	3.67
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$9,634,831	\$7,739,069	(\$1,895,762)	0.80
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$2,264,231	\$8,566,467	\$6,302,236	3.78
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000055835
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-18. 2021 Washington Lighting Cost-Effectiveness**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0441	\$3,593,683	\$9,096,911	\$5,503,228	2.53
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0441	\$3,593,683	\$8,269,919	\$4,676,236	2.30
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0348	\$2,834,775	\$8,269,919	\$5,435,144	2.92
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$9,340,071	\$8,269,919	(\$1,070,152)	0.89
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$2,059,186	\$7,805,574	\$5,746,388	3.79
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000027945
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Discounted Participant Payback (years)	1.00
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Midstream

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

As shown in Table B-16, Table B-17, and Table B-18, the midstream measure stratum proved cost-

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

effective in 2020, 2021, and the combined 2020 and 2021 period according to all test perspectives

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

except the RIM test.

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-19. 2020-2021 Washington Midstream Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0468	\$353,625	\$769,012	\$415,386	2.17
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0468	\$353,625	\$699,102	\$345,476	1.98
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0293	\$215,804	\$699,102	\$483,298	3.24
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$835,807	\$699,102	(\$136,705)	0.84
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$241,346	\$723,528	\$482,182	3.00
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.0000027978
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discounted Participant Payback (years)	1.52
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-20. 2020 Washington Midstream Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0465	\$212,512	\$403,855	\$191,342	1.90
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0465	\$212,512	\$367,141	\$154,628	1.73
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0249	\$113,782	\$367,141	\$253,359	3.23
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$485,226	\$367,141	(\$118,085)	0.76
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



PCT	--	\$161,829	\$434,543	\$272,714	2.69
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000004663
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discounted Participant Payback (years)	1.81
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-21. 2021 Washington Midstream Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0472	\$141,113	\$365,157	\$224,044	2.59
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



TRC	\$0.0472	\$141,113	\$331,961	\$190,848	2.35
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0341	\$102,022	\$331,961	\$229,939	3.25
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$350,581	\$331,961	(\$18,620)	0.95
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$79,517	\$288,985	\$209,468	3.63
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000000735
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Other

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



As shown in Table B-22, Table B-23, and Table B-24, the “other” measure stratum proved cost-effective

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

in 2020, 2021, and the combined 2020 and 2021 period according to all test perspectives except the RIM

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

test.

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-22. 2020-2021 Washington Other Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0543	\$911,807	\$1,784,520	\$872,714	1.96
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0543	\$911,807	\$1,622,292	\$710,485	1.78
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



UCT	\$0.0367	\$612,534	\$1,622,292	\$1,009,758	2.65
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$1,960,766	\$1,622,292	(\$338,474)	0.83
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$633,885	\$1,682,844	\$1,048,960	2.65
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.0000035267
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-23. 2020 Washington Other Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0551	\$301,055	\$534,824	\$233,769	1.78
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0551	\$301,055	\$486,204	\$185,149	1.61
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0293	\$160,459	\$486,204	\$325,745	3.03
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$585,842	\$486,204	(\$99,638)	0.83
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$233,936	\$518,723	\$284,787	2.22
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000001783
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discounted Participant Payback (years)	3.79
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-24. 2021 Washington Other Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0539	\$610,752	\$1,249,696	\$638,945	2.05
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0539	\$610,752	\$1,136,088	\$525,336	1.86
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0399	\$452,075	\$1,136,088	\$684,013	2.51
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$1,374,924	\$1,136,088	(\$238,836)	0.83
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



PCT	--	\$399,949	\$1,164,121	\$764,173	2.91
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000004273
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discounted Participant Payback (years)	1.89
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Refrigeration

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

As shown in Table B-25, Table B-26, and Table B-27, the refrigeration measure stratum proved cost-

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

effective according to all test perspectives except the RIM test in 2020, 2021, and the combined 2020

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

and 2021 period.

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



**Table B-25. 2020-2021 Washington Refrigeration Cost-Effectiveness**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0317	\$3,301,777	\$11,276,294	\$7,974,518	3.42
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0317	\$3,301,777	\$10,251,177	\$6,949,400	3.10
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0247	\$2,560,759	\$10,251,177	\$7,690,418	4.00
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$11,404,217	\$10,251,177	(\$1,153,041)	0.90
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$1,760,770	\$9,863,209	\$8,102,441	5.60
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Life-Cycle Revenue Impacts (\$/kWh)	\$0.0000136976
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discounted Participant Payback (years)	0.93
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-26. 2020 Washington Refrigeration Cost-Effectiveness**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0295	\$2,373,032	\$8,362,056	\$5,989,024	3.52
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0295	\$2,373,032	\$7,601,869	\$5,228,837	3.20
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



UCT	\$0.0223	\$1,792,996	\$7,601,869	\$5,808,873	4.24
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$8,569,643	\$7,601,869	(\$967,775)	0.89
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$1,323,608	\$7,520,219	\$6,196,612	5.68
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000017316
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discounted Participant Payback (years)	0.95
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-27. 2021 Washington Refrigeration Cost-Effectiveness**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0381	\$928,745	\$2,914,238	\$1,985,494	3.14
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0381	\$928,745	\$2,649,308	\$1,720,563	2.85
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0315	\$767,763	\$2,649,308	\$1,881,545	3.45
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$2,834,574	\$2,649,308	(\$185,266)	0.93
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$437,162	\$2,342,990	\$1,905,829	5.36
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000003315
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discounted Participant Payback (years)	0.86
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## *Small Business Lighting*

### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

As shown in Table B-28, Table B-29, and Table B-30, the small business lighting measure stratum proved

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

cost-effective according to all test perspectives except the RIM test in 2020, 2021, and the combined

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

2020 and 2021 period.

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

### **Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-28. 2020-2021 Washington Small Business Lighting Cost-Effectiveness**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



PTRC (TRC + 10% Conservation Adder)	\$0.0410	\$966,786	\$2,558,559	\$1,591,773	2.65
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0410	\$966,786	\$2,325,962	\$1,359,177	2.41
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## Appendix B. Gross Engineering Analysis Methodology

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This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0494	\$1,151,309	\$2,325,962	\$1,174,653	2.02
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM		\$3,108,442	\$2,325,962	(\$782,479)	0.75
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT		\$567,009	\$2,708,666	\$2,141,656	4.78
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.0000112908
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discounted Participant Payback (years)	N/A
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



**Table B-29. 2020 Washington Small Business Lighting Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0423	\$327,529	\$736,595	\$409,066	2.25
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0423	\$327,529	\$669,631	\$342,103	2.04
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

UCT	\$0.0414	\$320,599	\$669,631	\$349,032	2.09
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$963,902	\$669,631	(\$294,270)	0.69
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$235,087	\$871,461	\$636,373	3.71
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



Life-Cycle Revenue Impacts (\$/kWh)	\$0.000007684
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discounted Participant Payback (years)

0.09

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

**Table B-30. 2021 Washington Small Business Lighting Cost-Effectiveness**

#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Cost-Effectiveness Test	Levelized	Costs	Benefits	Net Benefits	Benefit/Cost
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

	\$/kWh				Ratio
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PTRC (TRC + 10% Conservation Adder)	\$0.0405	\$639,257	\$1,821,964	\$1,182,707	2.85
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

TRC	\$0.0405	\$639,257	\$1,656,331	\$1,017,074	2.59
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**



UCT	\$0.0526	\$830,710	\$1,656,331	\$825,621	1.99
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

RIM	--	\$2,144,540	\$1,656,331	(\$488,209)	0.77
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

PCT	--	\$331,922	\$1,837,205	\$1,505,283	5.54
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Life-Cycle Revenue Impacts (\$/kWh)	\$0.000012749
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#### Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

Discounted Participant Payback (years)	N/A
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## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

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- Site-level billing analysis

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

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- Customer interviews
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To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1.

**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**

## Appendix B. Gross Engineering Analysis Methodology

The Cadmus team conducted several activities for the Wattsmart Business program impact evaluation:

- Customer interviews
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- Site-level billing analysis

This appendix addresses gross evaluated savings. Pacific Power reported gross electricity savings (kilowatt-hours) in its *Pacific Power Energy Efficiency and Peak Reduction Annual Reports*. Gross evaluated savings are the savings achieved after applying installation and realization rates from an engineering analysis of a sample of projects.

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**Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings**