CADMUS

PG&E Market Access Program Evaluation Report

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1. Executive Summary

On behalf of Pacific Gas and Electric (PG&E), Cadmus evaluated the Market Access Program (MAP). This executive summary describes the program, research objectives and tasks, as well as conclusions and recommendations. The remainder of the report provides detailed information by chapter and appendix:

- Chapter 2. Program Background
- Chapter 3. Program Implementation
- Chapter 4. Savings Evaluability
- Chapter 5. Cost-Effectiveness Assessment
- Appendix A. Methodology
- Appendix B. Legacy Programs for Comparison
- Appendix C. Evaluated and Reported Savings

1.1. Program Description

PG&E launched the MAP in June 2022 in response to the California Public Utilities Commission's (CPUC's) December 2021 Decision 21-12-011.[1] PG&E designed the MAP as an innovative and rapidly scalable commercial marketplace program, with the core mission of addressing peak and net peak energy demand while promoting grid reliability. The program's primary goal is to achieve significant demand savings during peak demand periods from 4 p.m. to 7 p.m. and net peak demand from 7 p.m. to 9 p.m. The design combines a pay-for-performance model with an aggregator marketplace, where qualified aggregators are incentivized to deliver energy efficiency and demand flexibility solutions. Two implementers oversee the recruitment of aggregators and maintain program integrity.

1.2. Research Objectives and Tasks

Based on discussions between PG&E and Cadmus, the MAP evaluation addressed seven research objectives.

[1] California Public Utilities Commission. December 2, 2021. Decision 21-12-011. *Energy Efficiency Actions to Enhance Summer 2022 and 2023 Electric Reliability*. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M429/K805/429805997.PDF (Decision 21-12-011)

Table 1 on the following page outlines these objectives, along with their corresponding tasks.

Table 1. Research Objects and Corresponding Tasks

Research Objectives	Materials Review	Data Review[a]	NMEC Analysis	Cost-Effectiveness Analysis	PG&E Interviews (n=2)	Implementer Interviews (n=2)	Aggregator Interviews (n=4)	Participant Interviews (n=2)
Document the launch and delivery of the MAP	X				X			
Determine the MAP's impact on energy efficiency program participation		X			X	X	X	X
Explore the MAP's impact on accelerated energy savings			X		X	X	X	X
Assess whether and to what extent additional savings were achieved by MAP					X	X	X	X
Examine if the necessary MAP data for an impact evaluation is being collected	X	X	X	X	X	X	X	X
Assess the extent of adherence by implementers to the Normalized Meter Energy Consumption (NMEC) measurement and verification (M&V) plan and CalTRACK methods for estimating savings and total system benefits	X	X	X		X	X	X	
Explore the impact of imposing project-based cost-effectiveness requirements	X	X		X	X	X		

[a] The review includes the participation and energy savings data for the MAP and legacy programs.

1.3. Conclusions and Recommendations

Research Objective 1: Document the Launch and Delivery of the MAP.

Conclusion 1: Although the MAP demonstrates several advantages to secure customer savings, compared to legacy programs,[2] a number of critical program elements require refinement to fully realize the program's potential. Interviewed PG&E staff members reported program benefits, such as empowering aggregators, offering program flexibility around project and measure eligibility, providing competitive incentive levels, and improving savings accuracy. Staff agreed that the MAP achieved two out of its three core principles: simplified project enrollment and flexible project implementation. However, the staff members were not in agreement if the program had achieved the third principle—scalable savings under the MAP. Staff noted that the NMEC rule does not allow the inclusion of industrial buildings and does not accommodate diverse building sizes and types. Additionally, staff reported remaining challenges for the MAP, particularly concerning the challenges with the requirement to use a population NMEC calculation methodology, and how the program's value is communicated to the market.

Research Objective 2: Determine the MAP's Impact on Energy Efficiency Participation.

Conclusion 2: Although the MAP provides a more streamlined and engaged participation process, compared to legacy programs, remaining challenges may limit aggregator and customer participation.

The interviewed aggregators and implementers agreed that the MAP simplified the application process and increased the speed of project delivery. They also praised the MAP's ability to generate significant value for aggregators and customers through its "financially attractive" incentives and methodology for calculating savings. During the first two years, these program elements contributed to increased participation in energy efficiency by attracting a higher proportion of retail projects—65% compared to 28% in legacy programs—demonstrating a stronger engagement with the retail sector. Additionally, the top five sectors[3] in the MAP accounted for 85% of all projects, compared to 78% in the legacy programs.

However, aggregators and implementers indicated that the incentive calculation design of the MAP has increased financial risk for participants and aggregators, potentially deterring some from participating. Aggregators also reported encountering obstacles in accessing customer usage data. Additionally, aggregators mentioned that timing issues during the project scoping phase hindered the ability of participants to close certain projects, particularly for larger organizations with long planning horizons, as they struggled to meet MAP's deadlines and faced uncertainty about program extensions and funding updates.

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[2] Legacy programs in the comparison include Commercial Calculated Incentives, Commercial Efficiency Program, Grocery Efficiency Program, and Hospitality Program, as detailed in Appendix B.

[3] The top five sectors in the MAP are retail non-food, retail-food, real estate, food service, and hospitality.

RECOMMENDATION

Optimize Timing and Project Scoping. Provide additional resources or support to aggregators during the project-scoping phase, such as setting clear timelines and milestones for each project stage to support larger organizations that often operate on a one-to-three-year planning horizon. Consider providing flexibility in project timelines to accommodate their longer planning and funding cycles.

Retain high incentives to offset the increased risk. As noted by implementers and aggregators, these incentives help mitigate the financial risks.

Research Objective 3: Explore the MAP's Impact on Accelerated Energy Savings.

Conclusion 3: The program flexibility capitalizes on aggregator expertise, incentivizes aggregator engagement, simplifies project submission, and fosters accelerated project investments that result in savings. PG&E staff reported the MAP successfully took a flexible project and measure eligibility approach. Specifically, the flexibility built into the program design encouraged projects and measure types that allowed aggregators to focus on projects based on their capacity and expertise. Another advantage of the MAP is that the program empowered aggregators to price projects with more flexibility than in legacy programs. By paying the aggregator, and not the customer, aggregators have full control over how to use the incentive. Additionally, compared with legacy programs, aggregators are required to submit fewer calculations to determine whether customers' projects are considered eligible under the MAP—all of which, according to PG&E staff, saves time and money for the implementer and aggregator teams. As a result, aggregator and implementer interviewees agreed that there are projects that likely would not have occurred if the MAP did not exist. Relatedly, one implementer mentioned the change in the definition of a project in the MAP compared to the custom program—allowed individual sites under one customer to be completed separately—thus, accelerating the approval process.[4] Finally, the increased speed of project delivery has resulted in several benefits. For example, one implementer commented that the time between aggregators selling a project to a customer and beginning installations has been "shorter in comparison to projects of the same type and size" that, prior to the MAP's existence, would have gone through a full custom review. In other words, implementers spend much less time waiting to receive notice to proceed or for notification that their funds have been reserved.

Research Objective 4: Assess Whether and to What Extent Additional Savings Were Achieved by MAP.

Conclusion 4: The MAP may have contributed to additional savings by enabling projects that are no longer operationally feasible under other commercial programs. PG&E staff, as well as aggregator and

[4] Custom program requires multiple sites to be treated as a single project, thus increasing influence rigor requirements (CPUC E-5115).

implementers, agreed that the MAP's provision of high financial incentives made lighting projects financially viable, particularly in cases where other programs no longer supported these measures. For example, lighting projects that were no longer feasible in the Commercial Custom program were able to proceed under the MAP. It is also important to note that while it is generally agreed there are additional savings for lighting projects, it is less clear for other non-lighting projects, especially those still eligible in other programs.

RECOMMENDATION

Investigate MAP's impact on savings beyond lighting projects. This could include a detailed analysis of participation trends, incentive structures, and eligibility criteria relative to legacy energy efficiency programs. Examining these factors can help PG&E better understand whether the MAP's incentives are diverting participation from other programs.

Research Objective 5: Examine if the Necessary MAP Data for an Impact Evaluation is Being Collected.

Conclusion 5: The current availability of the MAP data from implementers is insufficiently available for evaluators to reliably replicate impact results. Ultimately, the implementers provided insufficient code and data for Cadmus to replicate the reported site-level results. While both implementers provided the OpenEEmeter command line interface, there are several steps that must be taken before and after the command line interface to clean and process weather and billing data and to calculate savings from the regression model. Neither implementer provided the code used for processing raw data or calculating unadjusted savings. Additionally, while Implementer 2 provided documentation for the post-command line interface adjustments made to their savings upon request, they could not provide the code used to calculate the adjusted savings. The implementers also did not provide the model specifications used for approximating counterfactual energy usage for their sites in a format readable by OpenEEmeter methods. Because of this, Cadmus was unable to assess the statistical validity of their model specifications. Finally, while Implementer 1 and Implementer 2 provided sufficient data and documentation for Cadmus to calculate savings approximately equivalent to their reported unadjusted savings for the majority of sites, the data were not sufficient to evaluate savings for all sites of either implementer. The inconsistency of data and lack of sufficient documented code for both implementers was insufficient for Cadmus to reliably replicate reported impact results.

RECOMMENDATION

Create and document a standardized process for the MAP implementers to follow when reporting savings to ensure evaluators can examine and validate those savings. For example, PG&E could expand deliverable requirements for the MAP implementers by grounding them in evaluation requirements. PG&E could also require implementers to provide the data used to estimate statistical models for each site as a prerequisite to reporting savings. Additionally, when savings are reported, implementers could be required to provide a complete set of code which, using the data provided earlier, both estimates the statistical models and calculates savings equal to what the implementers are reporting. This will allow evaluators to ensure that the data used by implementers is statistically equivalent to PG&E's advanced

metering infrastructure (AMI) data and to confirm the statistical validity of the models used and post-modelling adjustments performed.

Research Objective 6: Assess the Extent of Adherence by Implementers to the NMEC M&V Plan and CalTRACK Methods for Estimating Savings and Total System Benefits.

Conclusion 6: Limited implementer data restricted the evaluators' ability to assess M&V plan and CalTRACK adherence when calculating savings. Cadmus was able to verify that the data used by both implementers to calculate estimated savings was sufficient for both PG&E's NMEC M&V plan and CalTRACK methods. Additionally, Cadmus could determine by desk review that both implementers used a valid method for processing raw data, selecting comparison groups, and adjusting savings based on those comparison groups. However, Cadmus could not directly confirm that the models the implementers used were compliant with CalTRACK methods due to the limited code and resulting files provided by the implementers.

Research Objective 7: Explore the Impact of Imposing Project-Based Cost-Effectiveness Requirements.

Conclusion 7: Limited implementer data restricted the evaluators' ability to complete the cost-effectiveness analysis for the MAP. Cadmus encountered several challenges when conducting the PG&E cost-effectiveness analysis. First, neither implementer had available California Energy Data and Reporting System (CEDARs) Cost Effectiveness Tool (CET) input files. Cadmus expected that CET input files would be available because the program used Total System Benefits (TSB) to calculate the MAP incentives, and TSB is one of many outputs from CEDARs CET. Although Implementer 2 used FLEXvalue and supplied FLEXvalue inputs, Implementer 2 did not have cost captured at the measure level, which is required to develop the CEDARs CET input files. Therefore, Cadmus could only conduct a cost-effectiveness analysis for projects implemented by Implementer 1.

RECOMMENDATION

Require documentation of measure-level cost data for each project. Requiring granular measure-level cost data will allow the generation of the input CET files needed to complete the cost-effectiveness analysis.

Conclusion 8: While the MAP was not required to or designed to achieve a Total Resource Cost (TRC) of 1.0 or greater in the 2022-2023 period, it outperformed legacy programs, and there is potential to enhance program cost-effectiveness through greater consideration of project criteria in future iterations.

The MAP's performance, ranging from 0.89 to 0.96 at the project level and an overall program result of 0.69, suggests potential for enhancement by refining project criteria in future iterations, despite there being no TRC benchmark requirement for this period. Although not being cost-effective, the MAP still

outperformed the legacy programs, including Commercial Calculated Incentives, Grocery Efficiency Program, and Hospitality Program, except for the Commercial Efficiency Program, in terms of cost-effectiveness.

RECOMMENDATION

Adjust project measures selection to avoid projects with criteria that typically achieve a lower TRC. Future iterations of similar programs may benefit from introducing additional scrutiny around a variety of combinations of criteria, including measure type, climate zone, technology, and others.

2. Program Background

This chapter discusses the MAP background, including program launch and structure and is based on findings from Cadmus' materials review and interviews with PG&E staff.

2.1. Program Background

CPUC's Decision 21-12-011, issued on December 2021, was developed in response to the governor's Proclamation of a State of Emergency (issued 7-30-2021) that ordered the CPUC to work with the state's load-serving entities to mitigate the risk of a shortfall of up to 3,500 megawatts during peak (4 p.m. to 9 p.m.) and net peak (7 p.m. to 9 p.m.) periods forecasted by summer 2022. Driven by urgent energy reliability issues, there was a need for the rapid implementation of the MAP to address immediate energy shortfalls.

Ordering Paragraph 1 (OP 1) of the Decision establishes a statewide, two-year maximum allocation of $150 million for the MAP Investor-Owned Utility Funding Shares for Market Transformation, from Decision 19-21-021 (12-05-2019). The Decision provides a 44.5% electric funding split for PG&E's service territory (including Marin Clean Energy [MCE]). Using this percentage results in an allocation of $66,750,000 for the MAP and MCE's Peak FLEXmarket program in PG&E's service territory.

To determine which programs to approve, the Decision stated the CPUC would prioritize those that focused on actions that could be immediately or very rapidly deployed to achieve peak and net peak demand savings. The CPUC also prioritized three areas for investor-owned utility focus: (1) programs that are already delivering savings, (2) infrastructure that is already in place to support additional projects, and (3) actions that are incremental to existing programs (i.e., additional projects to be funded or changed approaches compared to approved portfolios).

2.2. Program Launch

In response to CPUC's Decision 21-12-011, PG&E launched the MAP in February 2022. PG&E's initial MAP Advice Letter (PG&E AL 4572-G/6498-E filed 02-07-2022) requested $20 million to fund the MAP contracts in 2022 and $5 million to cover PG&E's administration and system development costs for the MAP in 2022 and 2023. PG&E filed two additional Advice Letters in 2023 to request budgets for the remainder of the program. The total budget amount allocated in PG&E territory is $66.75 million, with $6 million for MCE's MAP and $60.75 million for PG&E's.

The original Advice Letter stated PG&E's intent to issue a competitive solicitation for a third party to implement the program for program year (PY) 2023. Due to time constraints, and to minimize disruption to the ongoing program, PG&E elected to continue with its two implementers selected for PY 2022 through the end of the program in March 2024. Upon release of the CPUC Decision, PG&E had 60 days to respond via an Advice Letter with its implementation plan and supporting documents. PG&E's implementation plan (Version 1 filed June 2, 2022) clearly outlined its plan to implement the program and achieve program objectives.

The Advice Letter (4572-G/6498-E) also laid out a clear launch timeline with anticipated milestones. In this timeline, project enrollment was scheduled to begin in the period from June to September 2022. In our data review, Cadmus found that Implementer 2 released its first incentive reservation letter on June 28, 2022, and Implementer 1 released a letter on September 21, 2022, indicating that PG&E met the designated launch timeline.

2.3. Program Structure

The CPUC's Decision 21-12-011 gives utilities some flexibility in how to design and implement the MAP. PG&E designed the program with varying levels of responsibility for different stakeholders, as outlined below:

- **PG&E**: Oversees the MAP's progress and M&V efforts, defines project eligibility criteria, establishes performance compensation structures and levels, reviews savings estimates, and processes payments.
- **Implementers:** Recruit and contract with multiple qualified aggregators and support them directly with eligibility and prioritization analytics to identify high-value customers, track NMEC-verified impacts and pay aggregators quarterly.
- **Aggregators:** Recruit customers and install projects.

In the program documentation, PG&E clearly identified the program process flow, implementer and aggregator payment structures, customer incentive calculations, and savings calculations. The documentation also states that the program's target audience is nonresidential customers, with the potential to include residential customers if the project aligns with the MAP design.

The CPUC and PG&E both state that a key feature of the MAP is that customers may participate in other programs at the same time (i.e., crossover participation in energy efficiency and demand response programs). Because the MAP targets a different but related type of project than legacy energy efficiency programs, PG&E may be able to encourage customers to participate by offering a different set of incentives. Cadmus reviewed whether the MAP resulted in an expanded participant set compared to legacy programs (see Section 3.4).

PG&E established program requirements to promote incrementality of projects (i.e., not cannibalizing projects from legacy energy efficiency programs) but stated in the Advice Letter for its PY 2023 (PG&E AL 4681-G/6762-E filed 11-15-2022): "[PG&E] has still observed an impact on participation in traditional EE programs… which could compromise portfolio goal attainment." In the same Advice Letter, PG&E noted that unlike the energy efficiency programs, there would not be a customer participation impact on demand response programs. Cadmus discussed this with PG&E staff during the interviews and included those findings in Section 3.5.

3. Program Implementation

This chapter discusses the MAP implementation successes and barriers to program delivery and participation. It also provides insight into the MAP saving incrementality and ways to improve the program. These findings are informed by Cadmus' interviews with PG&E, implementation and aggregator staff, and participants, as well as a comparative analysis with legacy programs.

3.1. Program Successes

Cadmus explored program delivery and participation and identified several successes: simplified enrollment application, increased project flexibility, empowered aggregator, increased saving accuracy (delivery), streamlined participation, and increased value (participation).

Program Delivery

Simplification

According to PG&E staff, **the MAP was able to achieve simplified project enrollment, a core program principle.** A member of PG&E staff stated the program generally succeeded at simplifying the project enrollment process. Another PG&E staff member reflected, traditionally, programs that targeted similar customer types required pre-installation reviews before equipment could be purchased; however, the MAP's use of a population-level NMEC approach simplified the enrollment of projects in the program compared with a non-pop NMEC programs.

A member of PG&E staff shared another factor that contributed to the simplicity of the program was the automatic eligibility check feature that was implemented in the application process. Staff noted that this feature told participants whether their project was eligible immediately, which expedited the enrollment process by removing administrative processes associated with similar programs. Additionally, two PG&E staff members stated that the automated eligibility tool, implemented six months into the program, made the parameters for eligibility clear for aggregators. As a result of the eligibility tool, aggregators were able to receive project approval and begin installation more quickly than in legacy energy efficiency programs. The fact that aggregators did not have to submit a full project package and had to provide only calculations contributed to the rapid deployment of projects.

A PG&E staff member stated that the MAP has a more straightforward approach than legacy programs and is built "like a reward system" with larger incentives for more savings. Two members of PG&E staff also said that MAP's structure is simpler for aggregators to participate in because it is based off aggregators being able to pursue the highest savings possible to meet the program's savings goals. In addition, aggregators also reported that the clear and direct savings metrics were easier to grasp than in legacy programs.

Flexibility

PG&E staff reported **the MAP successfully implemented flexibility around project and measure eligibility.** The second core principle of the CPUC MAP order was to include flexibility around project and measure eligibility. A PG&E staff member stated that, by design, the program was flexible with fewer

restrictions than in legacy energy efficiency programs. The flexibility built into the program design encouraged projects and measure types that were compatible with each aggregator's experience. As an example, one aggregator said they worked solely on lighting measures because they did not have the capacity for HVAC; another aggregator worked almost exclusively on HVAC projects. The flexibility of the program allowed aggregators to be able to complete projects based on their capacity and expertise.

Related to program flexibility, PG&E staff said another advantage of the MAP is that the custom calculations allowed for a wider range of participants. One staff member said there was an interest in enrolling as many participants into the program as possible. Additionally, another staff member said there have been discussions about the inclusion of new sectors, like indoor agriculture, a recommendation that several aggregators also noted.

Aggregator Empowerment

An implementer stated that another advantage of the MAP is that **the program empowered aggregators to price projects with more flexibility than in other programs**. By paying the aggregator, and not the customer, aggregators have full control over how to use the incentive. An implementer stated this program design encouraged aggregators to use a business model that worked for them and made the program financially attractive. Relatedly, a member of PG&E staff stated the program made it easy for aggregators to meet customer needs and resolve issues during the M&V period by sharing results regularly with aggregators. The staff member stated this process allowed aggregators to track which of their projects were succeeding and which needed assistance, providing aggregators with the opportunity to resolve issues before the M&V period ended.

Improving Savings Accuracy

A PG&E staff member and an implementer noted **the advantage of employing an existing conditions baseline for the program, rather than the usual code or dual baseline, provides a higher and more accurate measure of savings achieved**. In non-NMEC programs, tools like the Modified Lighting Calculator (MLC) are applied to calculate savings with a code or Industry Standard Practice baseline, which significantly reduces savings achievement. Within NMEC programs the actual measurable savings achieved over the existing baseline is used.

Program Participations

Streamlined Participation

According to implementers, the **expanded market access can be, in part, attributed to the simplified application process including less rigid eligibility qualifications and documentation requirements** compared with legacy utility programs, which ultimately allow for a more streamlined and quicker participation process. As a result, as one aggregator reflected, they can "react quick enough to meet customers' needs for getting their projects in motion." One implementer shared that the qualification criteria were established to allow a varied set of project types. This implementer went on to explain that compared with legacy utility programs, aggregators are required to submit fewer calculations to determine whether customers' projects are considered eligible under the MAP—all of which, according to PG&E staff, saves time and money for the implementer and aggregator teams. The expansive nature

of the MAP's eligibility requirements is evidenced in one aggregator's explanation for their rating of 4 out of 5 for overall satisfaction with the MAP: "I can't think of any other utility program where we could do even 20 to 25% as many projects as we had enrolled in the MAP." One aggregator echoed these sentiments, explaining that the "very simplified" definitions of what does and does not qualify allow for multiple types of work to be combined into a single project. As a result, both aggregator and implementer interviewees agreed that **there are projects that likely would not have occurred if the MAP did not exist,** such as many types of lighting projects and some HVAC projects that would not have received as large of an incentive in other programs. Relatedly, one implementer mentioned the change in the definition of a project in the MAP compared to the custom program—the MAP allowed individual sites under one customer to be completed separately—thus, accelerating the approval process.

The increased speed of project delivery has resulted in several benefits. For instance, one implementer commented that the time between aggregators selling a project to a customer and beginning installations has been "shorter in comparison to projects of the same type and size" that, prior to the MAP's existence, would have gone through a full custom review. In other words, implementers spend much less time waiting to receive notice to proceed or for notification that their funds have been reserved. The speedier project submission flow is due in part to implementer efforts to make eligibility tools accessible to aggregators. One implementer reported developing a tool that provides instant eligibility results to aggregators, which helped streamline the application process.[5] This implementer added that being able to start tracking savings from the date that the project installation is completed allows projects to generate savings more quickly, while also allowing for flexibility with finalizing paperwork.[6]

Increased Participation Value

Implementers and aggregators praised the MAP's ability to generate significant value for aggregators and customers through its "financially attractive" incentives and methodology for calculating savings. As several aggregators reported, the MAP offers higher incentives than typical custom programs. One aggregator commented that the incentive level—which for instance, could reduce project cost by half—encouraged them to contact customers to revisit projects they were previously unsuccessful in selling and unable to move forward with. Another aggregator reported that the "value of the rebate was 400 to 500% higher than other [rebate programs.]" The program's design also allowed aggregators to capitalize on project incentives. To prove this point, an implementer commented that since the MAP pays aggregators rather than customers, aggregators have the agency to decide what to do with the incentive PG&E provides and how to price their services. This implementer noted that the freedom aggregators have in finding "business models that work for them" is enticing.

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[5] This finding is based on the interview, the eligibility tool was only mentioned by one implementer.

[6] Aggregators submit the required documentation and upon approval can proceed with the project and send any missing information to the implementer later.

3.2. Program Barriers

Cadmus explored program delivery and participation and identified several continued barriers: incentive calculation risk, and program value communication (delivery), including financial risk, data access difficulties, and timing constraints (participation).

Program Delivery

Risk with Incentive Calculation Methodology

While the incentive amount was cited as an advantage, the higher degree of risk and uncertainty associated with final savings values can be a disadvantage. An aggregator gave an example where one project failed to meet its savings goals, so the aggregator did not receive payment for the work. Relatedly, two aggregators said they had to wait a substantial amount of time to receive payments. Compared to other flex market programs, aggregators must wait about six months or longer to receive their first payment, with PG&E taking the full administrative fee (which some aggregators considered a high percentage at 37%) out of the first payment. Thus, an implementer summarized that aggregators must have a strong business plan to succeed in the MAP.

Program Value Communication

An implementer stated aggregators did not always grasp some concepts of the program, because savings and incentive calculations were different from those of other programs in the market. Thus, the implementer said it was **sometimes difficult to explain this program structure to some aggregators/customers to get them to agree to participate**. Relatedly, an implementer said the time-bound nature of the program led to uncertainty among aggregators about whether the incentives would still be available when a potential customer was ready to participate. An implementer said that aggregators had apprehensions about joining the program because of the emergency funding design. They cited that aggregators did not believe the program would have longevity due to the use of emergency funds.

Program Participation

Financial Risk

The financial risk for participants and aggregators mentioned above, driven by MAP's incentive calculation design, may discourage some from participating. Because aggregators and customers receive incentives based on actual savings, one implementer said that the financial risk that comes with developing a project that may generate lower-than-expected or even negative savings may deter some aggregators from participating. This implementer stated that, in their experience, some aggregators were unable to determine the appropriate business model to complete these types of projects and ultimately chose to avoid the risk altogether by not participating in the MAP. As an example, one aggregator explained that they themselves do not have the cash flow to offer up-front incentives to customers, which makes it difficult to close some deals. In their case, both parties must wait at least six months before receiving their first payment, unlike other aggregators who are able to offer an estimated incentive upfront. This aggregator hypothesized that the customer population of the MAP is

likely one "that can financially afford to complete larger projects…those with strong cash flow or who own/have a long-term lease on their facility." In response, this aggregator has focused their efforts on developing a customer pipeline with other utilities' flex market programs. According to this aggregator, these other flex market programs—such as the Bay Area Regional Energy Network Business FLEXmarket rebate program and MCE Commercial & Residential Efficiency Market programs—are set up to allow aggregators and customers to "get something up front, a better incentive, and lower administrative fee."

Data Access

Difficulties with data access, specifically customer usage data, proved to be a common barrier for aggregators. One aggregator worked with several customers who were "incredibly sensitive" about their data. This aggregator said that one of their largest potential customers refused to submit release forms to grant the aggregator access to their data, resulting in them not being able to participate. Another aggregator expressed interest in examining a customer's interval data to estimate potential savings more accurately but found that these data were difficult to obtain, as customers typically lack access to these data and thus must turn to the utility for assistance. The utility route often proved difficult for this aggregator, especially when working with medium-size and large organizations whose key contacts for facility upgrades tended to be disconnected from utility bill management. In addition to customer data challenges, both implementers and aggregators said that they occasionally experienced delays in receiving data from PG&E that they needed to calculate project-level savings. PG&E had delays in receiving adequate project level data to send complete data sets each month resulted in delays. One aggregator shared that this created delays in delivering results, which caused them to be several months behind in determining project performance. One aggregator noted that there have been instances where they have lost projects because they could not receive data in a timely manner to convince customers to move forward with a project.

Timing Constraints

Difficulties in timing occurred during the project scoping phase and hampered the ability to close some projects. One aggregator said it was difficult to identify projects that could be completed within the MAP's time constraints. This aggregator reported the issue was more frequent with larger organizations because they operate on a one-to-three-year planning horizon. By the time these organizations could commit funding to a project, MAP's time constraints might have prevented them from participating in the program. Uncertainty surrounding the program's extension and delays in receiving updates on the program's funding contributed to difficulties in this area.

Further, the **timing constraints aggregators faced for non-lighting projects resulted in a higher proportion of lighting-heavy projects**. Three aggregators, two implementers, and a PG&E staff member summarized that the deadline requirements for submitting applications to the MAP posed a major constraint for HVAC projects given the complex nature of estimating savings for these measures and lengthy equipment order and installation timelines that carried the risk of not installing the equipment prior to the funding deadline. One aggregator commented that the lead time on HVAC packaging for a unit replacement may range from six to nine months. Though the same aggregator noted that

refrigeration and HVAC had some traction among customers, they said that lighting projects could be completed much more quickly, with equipment typically arriving within three to four weeks of purchase. As an example, one aggregator stated that they stopped proposing projects involving VFDs because of the seasonality of savings, less certainty in savings compared with lighting projects, the lower effective useful life (EUL) of these measures, and associated lower return on investment, and the potential inability to install these measures prior to the deadline. Aggregators found more success with projects that had a high EUL and better return on investment, such as lighting.

3.3. Ways to improve

Interviewees shared several ways in which the MAP could possibly expand market impacts at both the project and customer levels.

Project Level

Increase the implementation timeframe for future iterations of the MAP. At the project level, there is a consensus across aggregators that the MAP can better serve the market by making HVAC, refrigeration, and variable-frequency drive (VFD) projects easier to implement. Specifically, an implementer reported that a longer program timeframe would be needed to increase the number of HVAC projects. This implementer noted that a longer timeframe would encourage a more diversified measure mix that could deliver a more holistic profile of demand savings. As a side benefit, another implementer noted that a longer program timeframe would also allow funding to be managed better.

Retain high incentives to offset the increased risk. Implementers and aggregators agreed on the importance of the MAP retaining high financial incentives. As one aggregator explained, higher incentives are warranted due to the high level of risk associated with participating in the MAP relative to legacy deemed or custom programs (e.g., the risk of not getting paid up front and the risk of submitting a project that ends up not saving energy and, thus, costs the aggregator money). Relatedly, aggregators and implementers reported needing to wait longer than with other programs for the incentive payment due to PG&E delays in delivering data and the administrative fee taken out of the first quarter's payment. This model makes it difficult for smaller aggregators to deliver projects as they cannot as easily absorb these payment risks and delays.

Improve program documentation update procedures. One implementer suggested having regular intervals for reviewing and updating requirements for program documentation and communicating those updates to aggregators. While this implementer has tried to provide as much context and information as possible to aggregators when answering aggregators' questions, more formalized communication would increase aggregators' confidence in the program.

Customer Level

Program stakeholders have differing opinions about if and how PG&E could expand the MAP's customer base. PG&E staff reported that because the eligible customer groups were already broad and comprised the types of customers that match the target audience, there was no need to expand eligibility for the MAP to more customers. However, aggregators proposed several ways to expand the MAP's customer

base—namely creating a more equitable business model to boost participation from small businesses, expanding eligibility criteria to include industrial facilities, and enhancing marketing efforts.

Create a more equitable model for small businesses. To better serve small businesses, one aggregator suggested tying eligibility requirements for small businesses to usage and offering better incentives than those currently available in the MAP, especially because small businesses' projects tend to carry more financial risk. This aggregator said that the current program was designed primarily with larger customers in mind and small businesses were "getting left behind," leaving potential savings in the market.

Expand eligibility parameters to new types of customers. One aggregator suggested developing an offering similar to the MAP exclusively for industrial facilities (or allowing these customers to participate in the next version of the MAP). Another aggregator suggested basing eligibility requirements on usage patterns rather than meter classification because some customers whose meters are not coded as commercial are, in fact, commercial entities based on their load shape. One aggregator gave the example of working with medical offices wanting to install LED lighting—instead of being considered automatically eligible, the aggregator needed to apply for an exception.

Enhance program marketing. One aggregator reflected that the MAP could benefit from PG&E publishing promotional marketing materials, such as program information guides, on the PG&E website. This aggregator reported that these types of efforts would lend validity to the program and potentially lead to more customer comfort with data sharing.

3.4. Program Participation Analysis

Cadmus reviewed program participation data from the MAP and legacy programs to analyze the types of customers reached by these programs.[7] Cadmus analyzed the data using several variables, including customer building type/sector, climate zone, and aggregator distribution. Given limitations in data consistency across programs, some variables required estimation while others were not available. Cadmus noted these instances.

Customer Building Type/Sector

The MAP is encouraging different types of customers to engage in energy efficiency than legacy energy efficiency programs do. As shown in Table 2, the types of customers participating in the MAP and legacy programs have several differences. First, when comparing the number of projects, the MAP is heavily weighted towards retail, which comprised 65% of projects. For the legacy programs, retail comprised only 28% of projects, while the food service (30%) and hospitality (14%) sectors also comprised a substantial share. This difference in distribution is also apparent when reviewing only the top five sectors per group: the top five sectors in the MAP accounted for 85% of all projects, while the top five sectors in the legacy programs accounted for 78% of all projects.

[7] Cadmus used data from the programs listed in ***Error! Reference source not found.*** from the time period of 2020 through 2023.

Savings in both kWh and kW also differed between the MAP and legacy programs. As evident in the comparison of projects, retail generated the largest share of savings for the MAP, while the hospitality and high-tech sectors were the most significant drivers of savings for the legacy programs. Across both the MAP and legacy programs, the top five sectors combined had a consistent share of total savings on both a kWh (69% vs. 71%) and kW (70% vs. 76%) basis for the MAP and legacy programs, respectively.

Table 2. Sector/Building Type Comparison between MAP and Legacy Programs

Sector/Building Type[a]	# Projects		kWh Savings		kW Savings	
	MAP	Legacy[b]	MAP	Legacy[b]	MAP	Legacy[b]
Retail - Food	30%	19%	23%	13%	25%	15%
Retail - non-Food	35%	9%	18%	9%	22%	11%
High Tech	1%	3%	13%	26%	10%	15%
Real Estate	7%	6%	7%	8%	7%	7%
Manufacturing/Industrial	2%	1%	8%	3%	6%	3%
Education	3%	2%	5%	1%	6%	0%
Hospitality	6%	14%	5%	16%	5%	28%
Agricultural	1%	3%	4%	1%	5%	1%
Storage - Conditioned	1%	-	6%	-	4%	-
Food Service	7%	30%	2%	2%	2%	1%
Government/Nonprofit	1%	1%	1%	6%	2%	5%
Healthcare	1%	2%	0%	6%	0%	6%
All Others	6%	9%	8%	10%	7%	8%

[a] The data provided by the two implementers did not have a consistent identifier for sector/building type, so Cadmus estimated this variable. For Implementer 2, Cadmus estimated the sector based on the customer name. For Implementer 1, Cadmus estimated the sector based on the building type and customer name.

[b] "Legacy programs" Includes the custom and NMEC programs listed in *Appendix B. Legacy Programs for Comparison.*

Climate Zone

The MAP projects and savings were more concentrated than legacy energy efficiency programs. In the MAP, projects and savings in four climate zones (3A, 4, 12, and 13) accounted for nearly 75% of both the number of projects and the total savings. In comparison, projects from the legacy programs were somewhat more distributed across climate zones, with the largest distribution difference in climate zones 3A, 12, and 13. The distribution of projects likely reflects the participating aggregators' territories, which may be different than those active in the legacy programs. Table 3 shows the distribution of projects by California climate zone for both the MAP and legacy commercial programs.

Table 3. California Climate Zone Comparison between MAP and Legacy Programs

CA Climate Zone	# Projects		kWh Savings		kW Savings	
	MAP	Legacy[a]	MAP	Legacy[a]	MAP	Legacy[a]
1	2%	2%	1%	0%	1%	0%
2	4%	8%	2%	5%	2%	5%
3A	18%	15%	17%	12%	17%	12%
3B	9%	10%	6%	14%	7%	13%
4	19%	14%	20%	32%	22%	29%
5	2%	3%	0%	2%	0%	2%
11	6%	8%	3%	4%	4%	5%
12	26%	15%	28%	18%	26%	20%
13	13%	12%	22%	13%	20%	12%
16	0%[b]	2%	0%[b]	0%	0%[b]	0%
N/A[c]	1%	11%	0%	0%	0%	0%

[b] "Legacy programs" include the Commercial Calculated Incentives and Hospitality programs from the 2020-2023 CEDARS claims data.[8] The savings values for legacy programs are claimed first year kWh/kW savings.

[b] There was one small project in climate zone 16 for the MAP; this project's share was rounded down to 0%.

[c] Climate zone not listed.

Aggregator Distribution

Through the two program implementers, a total of 28 aggregators have submitted projects.[9] **The two implementers had a relatively even split of active aggregators (15 for Implementer 1 and 16 for Implementer 2), but aggregators submitting through Implementer 2 accounted for a higher share of projects (80%), kWh savings (75%), and kW savings (74%)**. In the interviews, one aggregator stated that Implementer 2's processes and response times were better, which led them to put most of their projects through Implementer 2. In general, the aggregator populations are somewhat separate, with only three aggregators submitting projects through both program implementers. While small in number, these **three aggregators accounted for an outsized share of the projects (40%) and savings (32% kWh, 36% kW)**. When examining the distribution of aggregator savings, the top five aggregators by savings accounted for more than half of the program savings: 70% of total program kWh savings and 67% of total program kW savings. Unfortunately, comparable data for legacy programs on contractors was not available at the time of analysis; should the Cadmus team receive these data, they can conduct a comparative analysis.

3.5. Savings Incrementality

The MAP likely contributed additional savings by enabling projects that are no longer operationally feasible under other commercial programs. For instance, several aggregators mentioned that **lighting**

8 California Public Utilities Commission. 2024. California Energy Data and Reporting System (CEDARS) database. https://cedars.sound-data.com/.

9 Cadmus counted only aggregators who submitted at least one project through the MAP. One aggregator was listed as "Implementer 2 Financed: Taper Block 1," which Cadmus combined with Taper Solutions.

measures no longer qualified for most other programs; thus, lighting projects would not have happened were it not for the MAP. One aggregator said, "a lot of [our customers] stopped trying to participate in utility rebate programs when completing lighting projects" because of the lack of available incentives. One customer who completed a lighting retrofit said that the project was an "incredibly easy sell to internal decision-makers" because the cost of the upgrades was completely covered by the incentives received from the aggregator.

Most of the projects in MAP were not eligible in legacy programs. As one aggregator put it, many MAP projects would not have been eligible for legacy programs due to either equipment ineligibility or for large customers with multiple sites, the project definition change,[10] which would have presented a high barrier to entry. Even if said projects from larger customers with multiple sites had been submitted through a custom program, this aggregator said that the time for project approval would have been significantly longer. In a similar vein, this aggregator noted that custom programs have been experiencing a decline in participation over the past few years due to challenging documentation requirements. One implementer shared a similar sentiment, explaining, "There are rules inside of the custom rule book that are dampening participation with specific types of customers." Specifically, this implementer was referring to the definition of a project changing to include any site that that customer owns, which resulted in a "big set of customers choosing to not participate in any of the remaining programs."

While it is generally agreed there are additional savings for projects not eligible under other programs, such as lighting projects, the impact is less clear for other projects, particularly those still eligible for other programs.

[10] One implementer compared the change in the definition of a project in the MAP with the definition of a project in the custom program—the MAP allowed individual sites under one customer to be completed separately.

4. Savings Evaluability

This chapter discusses the MAP's evaluability for impact evaluation, informed by Cadmus' materials review and replicated savings analysis.

4.1. Impact Data and Materials Review

This section contains an overview of Cadmus' findings from the materials review, including the program summary, openEEmeter process summary, and program structure.

Program M&V Summary

PG&E's M&V plan states that MAP site savings will be measured using the population-level NMEC methodology.

Both MAP implementers reported that they employ scripts and functions based on the OpenEEmeter Python package to comply with the M&V plan.[11] Using OpenEEmeter to implement CalTRACK methods is a detailed, multistage process. However**, neither implementer provided Cadmus with the required complete set of codes they used to calculate savings.** While the implementers confirmed the toolkit they used to calculate savings, OpenEEmeter, they did not provide sufficient detail to Cadmus to replicate their reported savings.[12] As such, we attempted to use the data provided to employ publicly available OpenEEmeter methods and verify implementer savings, with limited success.

OpenEEmeter Process Summary

OpenEEmeter is an open-source toolkit that implements standardized procedures to calculate NMEC and savings according to the CalTRACK methods. It provides a suite of functions to assess avoided energy use and to collect and clean weather and billing data in a standardized process. Implementer 2 developed the initial iteration of this toolkit, which is currently maintained by LF Energy and a separate dedicated OpenEEmeter project team.

The OpenEEmeter toolkit requires two main inputs to calculate avoided energy use and savings for a site. The first input is a site address to locate nearby weather stations and determine if there is sufficient data for the baseline and evaluation periods. The second input is metered energy usage data that are sufficient to cover each site's baseline and evaluation periods without significant gaps.

After collecting the site address and metered energy usage data inputs for all sites, the implementer must write and document code that employs OpenEEmeter functions to verify the data are sufficient, estimate energy usage in the absence of any interventions, and calculate avoided energy usage. Note that the OpenEEmeter toolkit does not provide a streamlined process like a calculator. Instead, it provides a series of functions, which must be appropriately linked together with a variety of

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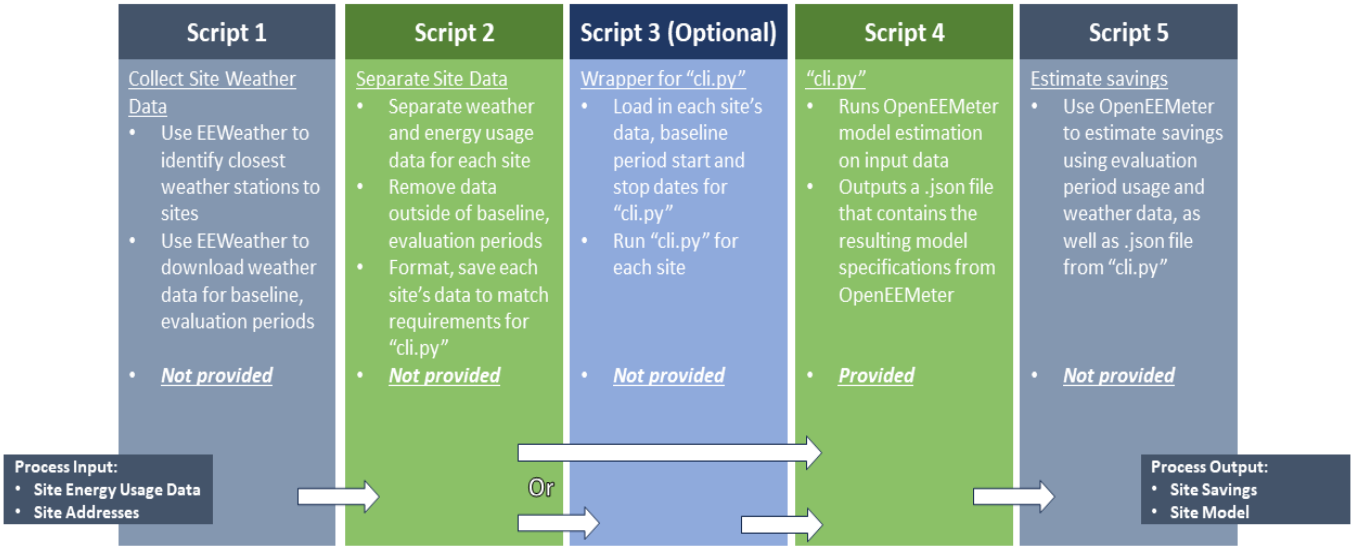
11 OpenEEmeter. Accessed March 20, 2024. https://www.caltrack.org/

12 Pacific Gas and Electric. 2022. *PG&E Market Access Program Measurement & Verification (M&V) Plan*. Pg. 32. https://cedars.sound-data.com/documents/download/2612/main/

considerations on the part of the programmer. Figure 1 shows a summary of the OpenEEmeter scripting process, as well as which scripts were and were not provided by the implementers to Cadmus.

Figure 1. OpenEEmeter Scripting



Program Structure

Cadmus examined the OpenEEmeter toolkit's documentation and identified the following steps to replicate the toolkit's application and calculate energy savings:

- **Collect Weather Data**
  - Using EEweather functions, a component of OpenEEmeter, convert each site's ZIP code into latitude and longitude coordinates that reference the ZIP code's centroid. Identify the closest weather station to each site's ZIP code centroid.
  - Alternatively, provide a list of weather stations associated with each site.
  - Provide identified weather stations and required date ranges to EEweather functions to download the weather station data from National Oceanic and Atmospheric Administration's Application Programming Interface.[13]

- **Clean Weather and Billing Data**
  - Use the specific format in OpenEEmeter's model estimation function to input billing data and weather data.

[13] OpenEEmeter EEweather Documentation. Accessed January 29, 2024. eeweather.stations — eeweather 0.3.23 documentation

- When using this method to calculate counterfactual energy usage in the absence of an intervention, perform the following data-cleaning steps:
  - Step 1. Remove any data outside of baseline and evaluation periods, including data covering measure installation.
  - Step 2. Format date and time of observations to correct object types.
  - Step 3. Rectify discrepancies caused by time zones and daylight savings.
  - Step 4. Convert temperature readings of weather data to Fahrenheit.
  - Step 5. Separate each site's billing and weather data into individual files.

- **Run Command Line Interface (CLI) scripts**
  - Use OpenEEmeter's CLI script to automate CalTRACK methods and estimate a site's counterfactual energy savings.[14, 15] This script compares various econometric models and selects the model that best fits the available baseline data and outputs a file detailing the model specification and descriptive statistics.

- **Calculate Savings**
  - Using additional OpenEEmeter functions, read the model output file from the CLI script to predict energy usage in the post-period, absent intervention.
  - Estimate total avoided energy usage as the difference between actual and predicted counterfactual usage for each site over all time periods.
  - Determine peak avoided energy usage as the difference between actual and predicted usage during peak time periods (typically from 4 p.m. to 9 p.m.).

With this process in mind, Cadmus reviewed the M&V data and code provided by the implementers. However, neither implementer provided Cadmus with any code beyond the publicly available OpenEEmeter CLI script. This code did not include data-cleaning steps, processing steps, or savings calculations for a site once a statistical model had been fit to data.

The implementers did not include any scripts or documentation detailing adjustments to data before or after estimating a statistical model. In addition, neither implementer provided the exact model specifications derived from the OpenEEmeter CLI script**. Because of these limitations, Cadmus was unable to fully assess the implementers' adherence to PG&E's MAP M&V plan or the statistical robustness of the models employed. However, we were able to assess whether the estimated savings reported by implementers were similar to replicated estimated results.**

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[14] CLI Basic Usage. Accessed January 29, 2024. Basic Usage — eemeter 3.1.1 documentation (openee.io)

[15] CLI Source Code. Accessed January 29, 2024. eemeter/eemeter/eemeter/utilities/cli.py at master · openeemeter/eemeter · GitHub

4.2. Replicated Savings Analysis

This section contains an overview of Cadmus' findings, informed by our review of the two MAP implementers' data and savings replicability analysis.

In total, Cadmus received sufficient data to calculate site unadjusted savings for 217 sites across both evaluated implementers. The Cadmus team found that, during the duration observed by available data, 43 sites received interventions which resulted in negative overall unadjusted savings. Additionally, **these results were overall consistent with the implementers' reported unadjusted savings**; the implementer data concurred that 42 of those 43 sites had negative unadjusted savings. **Despite these sites, both the implementers' and Cadmus's calculations indicate that the total savings for evaluated sites remained positive. However, the impact would doubtless be larger with improved site selection.**

These findings require some considerations. First, the Cadmus team did not receive sufficient data to calculate unadjusted savings for all sites. This means our findings may not be representative of sites that were enrolled in the program more recently. Additionally, the majority of sites Cadmus analyzed had been treated for under a year in the data available. Measure efficacy could potentially increase over time for some sites, meaning the interventions for sites with negative unadjusted savings could result in positive savings over a longer timeframe. Finally, adjusted savings for sites are conducted by comparing the site savings to an untreated comparison group's change in energy usage over time. It is also possible that despite the negative unadjusted savings for the sites in question following measure installation, the comparison group's energy usage increased even faster, resulting in positive adjusted savings for those sites.

Implementer 1 Data Summary

Cadmus received MAP site tracking data and weather station data from Implementer 1. Additionally, PG&E staff provided AMI data and the measure installation periods for MAP participant sites up to October 31, 2023. Table 4 shows the attrition table of data availability for Implementer 1's reported sites.

Table 4. Implementer 1 Data Availability

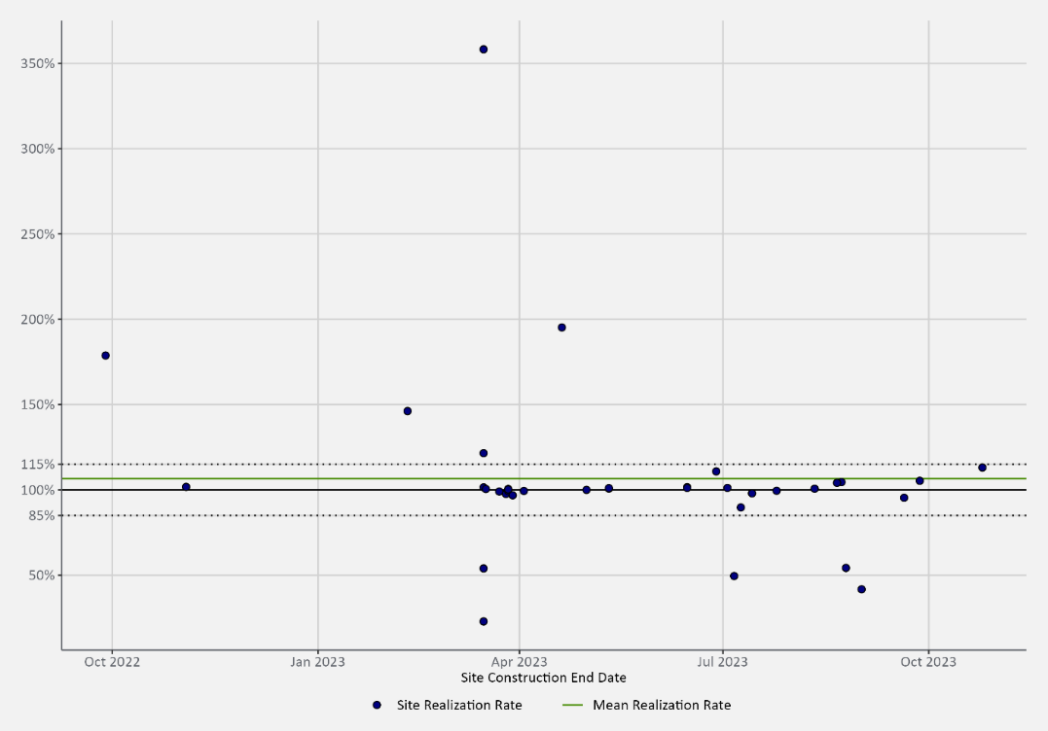
	Reason	Sites Remaining	Attrition
Step 1	Sites in Implementer 1 tracking file	103	N/A
Step 2	Construction complete by October 2023	43	57
Step 3	Site in PG&E AMI data	42	1
Step 4	Site in PG&E install data	41	1
Step 5	Site has weather data	41	0
Final	**Data Sufficient for OpenEEmeter**	**37**	**4**

Implementer 1 provided tracking data on 103 sites to Cadmus. We limited the scope of the evaluation to the 43 sites that completed measure installations before or during October 2023 when evaluability work began and the available AMI data ended. We then checked the data for completeness, ultimately finding that 37 of the 43 sites (86%) had sufficient data available for the OpenEEmeter process.

Implementer 1 Savings Replicability

Implementer 1 used PG&E's hourly AMI data to calculate avoided energy usage from site measures. Cadmus applied OpenEEmeter methods to PG&E's AMI data and attempted to replicate Implementer 1's savings, which resulted in the realization rates shown in Figure 2. Cadmus calculated savings for Implementer 1 sites and compared them to Implementer 1's savings for sites up to October 31, 2023, the final date that AMI data were available. To calculate realization rates, we divided the evaluated savings by reported savings. The mean realization rate across each of Implementer 1's sites was 106%. As seen in Figure 2, Cadmus' evaluated savings were within ±15% of the reported savings for the majority of Implementer 1's sites (73%).

Figure 2. Implementer 1 Site Realization Rates



Because Implementer 1 did not provide code for any adjustments to PG&E's AMI data made before providing the CLI script, or any adjustments made after the regression models calculated by the script, we were unable to diagnose the source of the discrepancies for the remaining sites. However, we did not observe a trend of over- or under-reported savings for Implementer 1's sites with realization rates outside of ±15% of evaluated savings. This suggests there are likely no systemic issues with Implementer 1's savings calculation methods. A full table of Cadmus's evaluated savings and Implementer 1's reported unadjusted savings prior to November 2023 is shown in *Appendix C. Evaluated and Reporting Savings* .

We also noticed differences in measure performance among sites where Cadmus' and Implementer 1's savings calculation methods aligned relatively closely.

Figure 3 shows an example of OpenEEmeter output for a site where the CalTRACK method modeling provides clear evidence of savings. Site 435190011, occupied by a hardware store, shows relatively close alignment in the evaluation period between predicted counterfactual energy usage (if no intervention had occurred) and observed energy usage on weekends (for example, September 2 and 3, 2023). However, during the weekdays there is a visible and substantial reduction in observed energy usage when compared to counterfactual usage. Cadmus calculated total savings were 100.7% of that reported by Implementer 1 before November 2023, suggesting minimal variance in methodology.

Figure 3. Implementer 1 Site 435190011

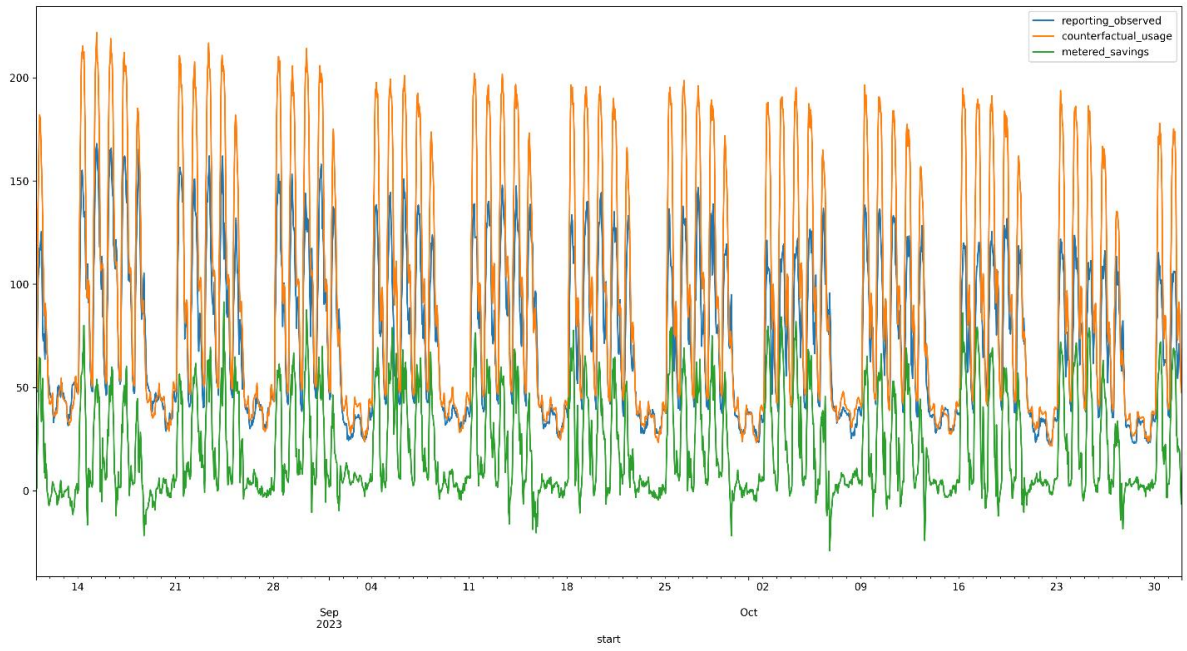
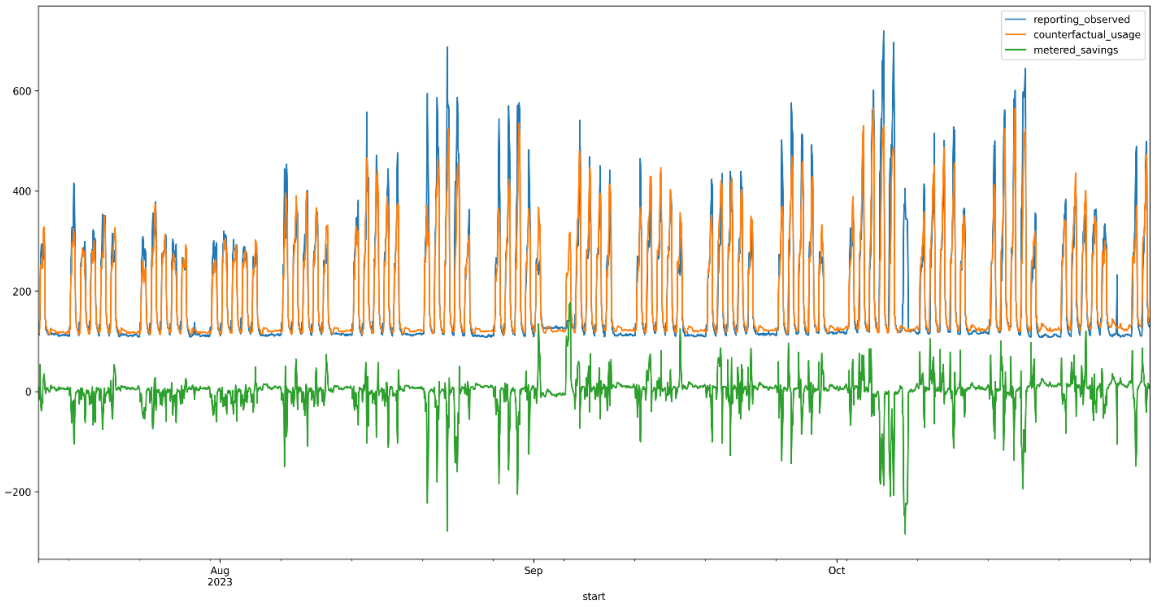


Figure 4 shows an example of a site where CalTRACK modeling identifies negative site savings. OpenEEmeter results for site 6499199345, occupied by a real estate firm, show that during most weekends, the site's energy use is less than the predicted counterfactual usage had no intervention occurred. However, during weekdays, the reported energy usage is substantially higher than the predicted counterfactual usage, outweighing weekend savings. Cadmus' evaluated savings closely align with the savings reported by Implementer 1 for this site, with a realization rate of 98%.

Figure 4. Implementer 1 Site 6499199345



Implementer 2 Data Summary

Cadmus received the MAP site tracking data and weather station data from Implementer 2. Implementer 2 also provided the AMI data they used for energy-saving calculations. Cadmus used Implementer 2's reported data to attempt to replicate their results. Table 5 shows a summary of data availability and attrition for Implementer 2's reported sites.

Table 5. Implementer 2 Data Availability

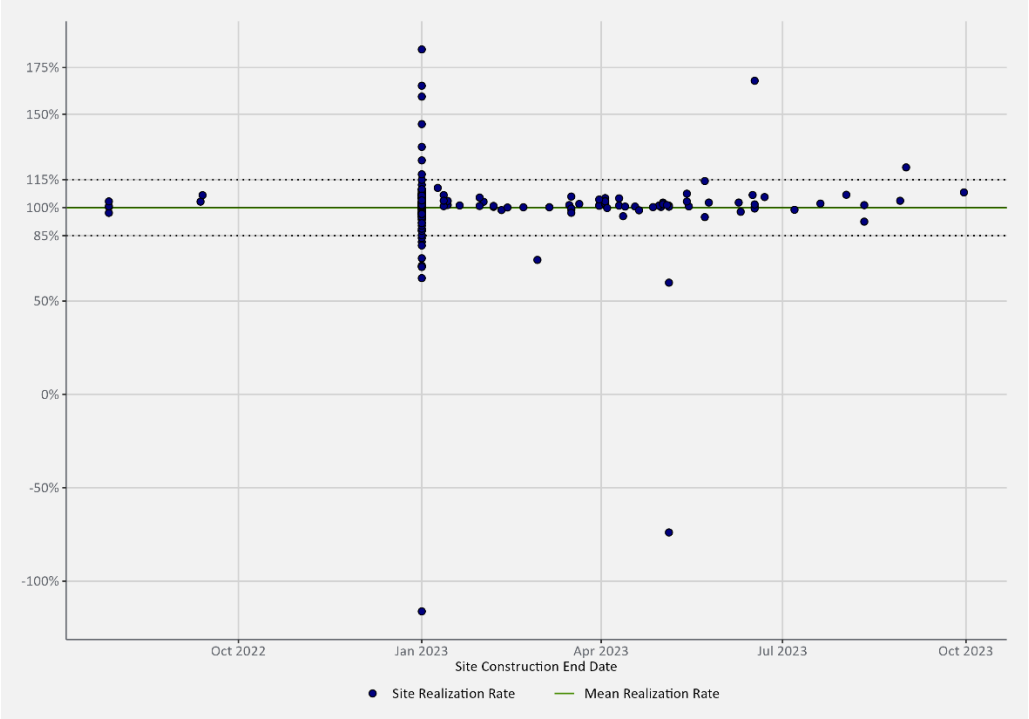
	Reason	Sites Remaining	Attrition
Step 1	In Implementer 2 tracking files	263	N/A
Step 2	Construction completed by October 2023	263	0
Step 3	Site in Implementer 2 AMI data	262	1
Final	**AMI data sufficient for OpenEEmeter**	**180**	**82**

Implementer 2 provided tracking data for 263 sites that completed measure installations before or during October 2023, when evaluability work began and the available AMI data ended. Cadmus checked data for completeness, ultimately finding that 180 of the 263 sites (68%) had sufficient data available for the OpenEEmeter process.

Implementer 2 Savings Replicability

Cadmus applied OpenEEmeter methods to the AMI data provided by Implementer 2 to attempt to replicate Implementer 2's savings, resulting in the realization rates shown in Figure 5.

Figure 5. Implementer 2 Site Realization Rates



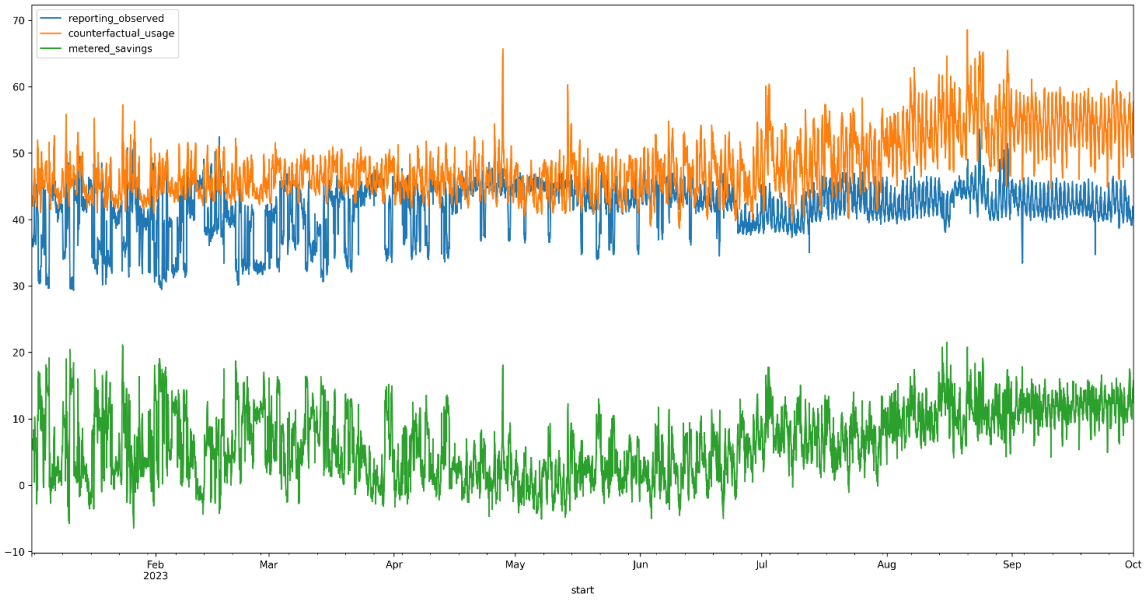
Cadmus calculated Implementer 2 site savings and contrasted these to reported unadjusted savings up to September 30, 2023, the final date that AMI data were available. To calculate realization rates, we divided the evaluated savings by reported savings. For Implementer 2's evaluable sites, the mean realization rate was 99.8%. Figure 5 shows that Cadmus' evaluated unadjusted savings were within ±15% of Implementer 2's reported unadjusted savings for most sites (88%). Implementer 2 did not provide regression files from the command line interface for their sites. Because of this, we were unable to determine the cause of discrepancies for the remaining sites. However, there was no consistent trend of over- or under-reported savings for Implementer 2's sites with reported savings further than ±15% of evaluated savings. This indicates Implementer 2's savings calculation methods result in consistent savings based on the AMI data provided to Cadmus. A full table of Cadmus's evaluated savings and Implementer 2's reported unadjusted savings prior to October 2023 is shown in *Appendix C. Evaluated and Reporting Savings*

Because Implementer 2 did not provide regression output files in a sufficient format for use in OpenEEmeter model and failed to supply the code for adjustments made to their savings, Cadmus cannot replicate their adjusted savings. However, upon request, Implementer 2 provided Cadmus with documentation on the process they used to adjust savings. The documentation included a description of the comparison group selection, comparison group data, and the overall method used to adjust savings based on the comparison group data. Cadmus found the approach described in this document to be reasonable and consistent with the comparison group-based adjustments laid out in PG&E's M&V plan.

Cadmus also identified differences in site performance for sites where our and Implementer 2's unadjusted savings aligned closely. For the example site shown in Figure 6, when using the

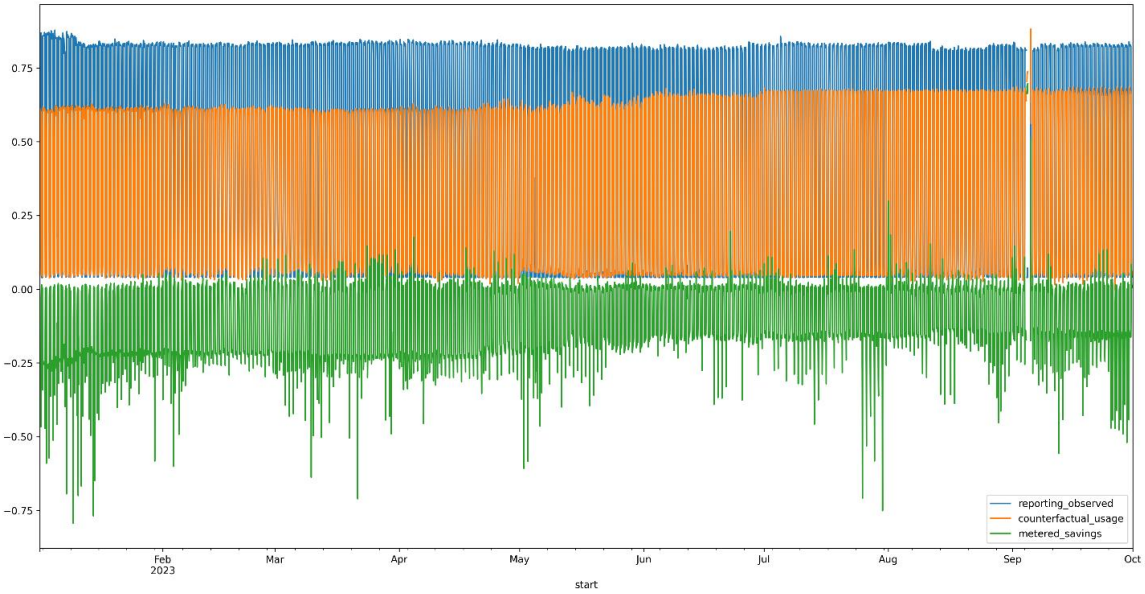
OpenEEmeter toolkit and Implementer 2's AMI data—during the evaluation period predicted counterfactual energy usage and in the absence of an intervention—was typically greater than the site's observed energy usage. This indicates for the majority of time periods, installed measures resulted in energy savings. According to the specified model, average savings diminished during the late spring and early summer 2023 but increased again toward fall 2023. Cadmus's evaluated unadjusted savings were very similar to Implementer 2's reported unadjusted savings for this site, which resulted in an overall realization rate of 102%.

Figure 6. Implementer 2 Site MAR104073



Another example site's model, shown in Figure 7, resulted in total counterfactual usage lower than metered savings across the evaluation period. There are some exceptions where the counterfactual energy usage is higher than actual usage. However, in aggregate, had no intervention occurred, the site would have been expected to consume less energy. This suggests that for the site in question, selected measures were ineffective in creating savings. As with the previous example, Cadmus's evaluated unadjusted savings closely match Implementer 2's reported unadjusted savings, with a realization rate of 99%.

Figure 7. Implementer 2 Site MAR104669



5. Cost-Effectiveness Assessment

This chapter discusses the MAP's cost-effectiveness analysis. These findings start with the MAP outputs and inputs from the CEDARS CET, followed by an examination of the highest and lowest TRC projects and a TBS breakdown, including a comparison to legacy programs.

5.1. MAP Cost-Effectiveness

The primary objective of the MAP is to generate demand savings during peak demand periods. However, payment were made based on TSB, which also encourages annual energy savings. To assess these savings, Cadmus conducted a cost-effectiveness analysis to provide another metric (in addition to kW reduction) to assess the MAP's performance and future compliance. This analysis seeks to evaluate the cost-effectiveness of MAP projects completed in 2022 and 2023—before the imposition of cost-effectiveness requirements—using the new TSB criteria, to project the future market potential for the MAP starting in 2024.

Table 6 shows the outputs for the three separate versions of analyses of Implementer 1 project data (A, B, and C).[16] Version A had original values as received from the implementer. Version B capped incentives, and version C additionally adjusted lighting EUL years.

Table 6. CET Analysis Results (Outputs)

Version	Year	TRC	TRC (no admin)	Total System Benefit	Budget	TRC Cost
A	2022	0.89	0.96	$117,819.23	$102,100.35	$132,221.82
B	2022	0.89	0.96	$117,819.23	$102,100.35	$132,221.82
C	2022	0.89	0.96	$117,819.23	$102,100.35	$132,221.82
A	2023	0.75	0.93	$16,491,686	$15,331,990	$21,881,663
B	2023	0.72	0.93	$16,491,686	$15,331,990	$22,898,355
C	2023	0.69	0.89	$15,776,612	$15,331,990	$22,898,355

Notes: Dollar amounts are rounded to the nearest dollar.

These CEDARS outputs in Table 6 align with the input budget values shown in Table 7.

[16] Most of the data provided by Implementer 1 to Cadmus were from 2023 programs, with some 2022 program data.

Table 7 Budget Breakdown (Inputs)

Version	Year	Budget	Total Rebates	DIActivity
A	2022	$102,100	$93,042	$9,059
B	2022	$102,100	$93,042	$9,059
C	2022	$102,100	$93,042	$9,059
A	2023	$15,331,990	$11,155,011	$4,176,978
B	2023	$15,331,990	$10,087,718	$5,244,272
C	2023	$15,331,990	$10,087,718	$5,244,272
Total		**$15,434,090**		

Notes: Dollar amounts are rounded to the nearest dollar. "DIActivity" represents Direct Implementation Activity costs, which are calculated as the difference between adjusted budget total incentive costs. Marketing and administrative costs were not disaggregated from the calculation.

Cadmus found that the three projects with the highest TRC, but still be low 1.0, consisted of indoor lighting and HVAC (Table 8).

Table 8. Highest TRC Projects

Version	Version and Year	Measure	TRC Ratio
C	2023	Interior Lighting	0.95
C	2023	Interior Lighting	0.87
C	2023	HVAC Retrofit	0.82

The three projects with the lowest TRC were all exterior lighting upgrades (Table 9).

Table 9. Lowest TRC Projects

Version	Version and Year	Measure	TRC Ratio
C	2023	Exterior Lighting	0.08
C	2023	Exterior Lighting	0.08
C	2023	Exterior Lighting	0.10

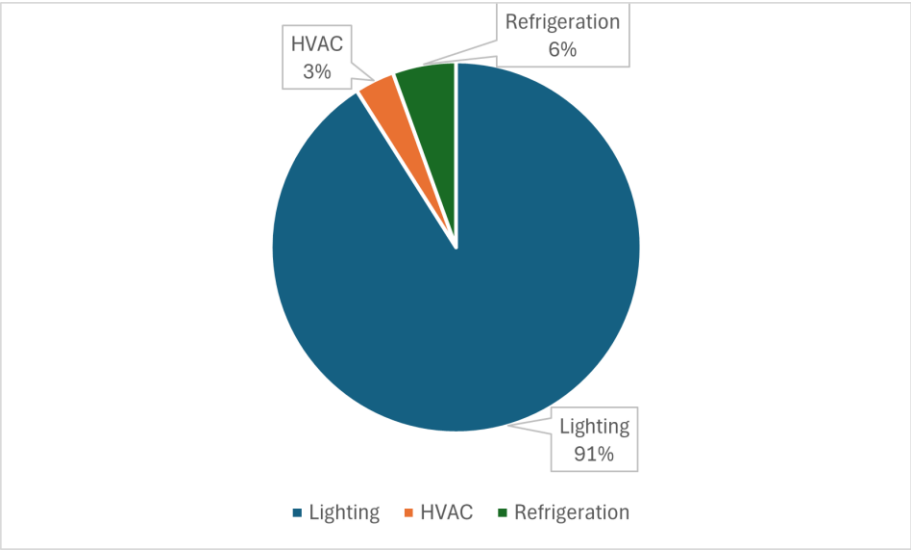
Although the program commonly included three measure groups: lighting, HVAC, and refrigeration, 91% of the achieved TSB was from lighting projects (Table 10). Furthermore, Cadmus estimated the lighting measure group to have the highest TRC at 0.94, which is marginally below the targeted 1.0.

Table 10 shows the TSB and TRC by measure category breakdown, the share of total TSB is visualized in Figure 8.

Table 10. TSB Breakdown

Version and Year	Measure Groups	TSB	Average TRC
2023C	Lighting	$14,294,636	0.94
2023C	HVAC	$545,290	0.53
2023C	Refrigeration	$871,271	0.26

Figure 8. Share of Total TSB



UPDATE: 7/24/2025

The cost-effectiveness analysis has been updated to reflect actual program financials, incorporating a total spend of $13,156,994.76 and actual incentives of $9,741,758.85 (see updated data in Appendix D). These updated figures, which replace the originally budged amounts, provide a more accurate assessment of program performance.

Using these values, Cadmus recalculated the TRC and TSB. The budget and incentive reduction is expected to have a mixed impact to the TRC. The TSB is not expected to change, but it is included since there have been numerous updates to the Avoided Cost Calculator, which is part of the CET results.

The updated analysis results are summarized in Table 11 below, which presents revised TRC Rations, TSB and Associated budgets for each scenario (A, B, and C):

Table 11. Updated CET Analysis Results (Outputs)

Version	Year	TRC	TRC (no admin)	Total System Benefit	Budget	TRC Cost
A	2022	0.84	0.96	$117,819	$97,527	$140,260
B	2022	0.84	0.96	$117,819	$97,527	$140,260
C	2022	0.84	0.96	$117,819	$97,527	$140,260
A	2023	0.78	0.94	$16,491,686	$13,059,467	$21,143,187
B	2023	0.76	0.94	$16,491,686	$13,059,467	$21,699,586
C	2023	0.73	0.90	$15,776,612	$13,059,467	$22,591,350

Notes: Dollar amounts are rounded to the nearest dollar.

These outputs align with the inputs shown in Table 12.

Table 12. Updated Budget Breakdown (Inputs)

Version	Year	Budget	Total Rebates	DIActivity
A	2022	$97,527	$80,581	$16,945

B	2022	$97,527	$80,581	$16,945
C	2022	$97,527	$80,581	$16,945
A	2023	$13,059,467	$9,661,177	$3,398,290
B	2023	$13,059,467	$9,041,468	$4,017,998
C	2023	$13,059,467	$9,041,468	$4,017,998
Total		**$13,156,994**		

Notes: Dollar amounts are rounded to the nearest dollar. "DIActivity" represents Direct Implementation Activity costs, which are calculated as the difference between adjusted budget total incentive costs. Marketing and administrative costs were not disaggregated from the calculation.

The updated cost effectiveness analysis resulted in a program TRC of 0.73 (up from the original 0.69).

5.2. Comparison to Legacy Programs

Cadmus worked closely with PG&E staff to understand the makeup of legacy programs relevant to the MAP cost-effectiveness analysis. The team ultimately identified the following four programs: Commercial Calculated Incentives, Commercial Efficiency program, Grocery Efficiency program, and Hospitality program. Lighting made up a substantial portion of the savings achieved for each of these legacy programs. Additionally, each program used some level of NMEC (site or population) to determine energy savings. Table 13 summarizes the TRC and TSB results by program and as compared to the MAP.

Table 13. Legacy Program TRC/TSB

Program	File – TSB	File – TRC	CLAIM – TSB[17]	CLAIM – TRC
Commercial Calculated Incentives	$15,789,120	0.59	$9,437,427	0.38
Commercial Efficiency Program	$21,752,823	1.38	$7,393,514	0.83
Grocery Efficiency Program	$11,198,585	1.49	$491,695	0.34
Hospitality Program	$4,248,628	0.66	$26,569,357	0.61
MAP	-	-	$15,776,612	0.69

As detailed in Table 13, the MAP generated nearly $16 million in TSB, second only to the Hospitality Program. **With a TRC of 0.69[18], the MAP shows moderate efficiency, being more efficient than the Hospitality Program (0.61) but less than the Commercial Efficiency Program (0.83).** Although the MAP is not fully cost-effective with TRC less than 1, it shows better cost-effectiveness compared to other legacy programs.

[17] Dollar amounts are rounded to the nearest dollar.

[18] In July 2025, the TRC was recalculated to be 0.73 considering actual spend and actual incentives.

Appendix A. Evaluation Methodology Details

Cadmus evaluated the Map by reviewing program materials and participation data, conducting in-depth interviews, and performing an NMEC and cost-effectiveness analysis. This appendix describes these methods and the associated timeline and deliverables.

A.1. Program Materials and Participation Data Review

Cadmus conducted a thorough review of available program materials. We focused specifically on the CPUC's MAP Decision 21-12-011 and the PG&E Advice Letters, but we also included other available materials as applicable. This review provided a foundational understanding of the program and informed the development of the stakeholder interview guides we used in Task 2 through Task 6. Additionally, we reviewed current and historical program participation data to understand the populations served by the MAP and they compare to PG&E's legacy energy efficiency programs. This review informed Task 3.

For Task 2, Cadmus reviewed the following materials to document the MAP's design and launch:

- The CPUC's Decision 21-12-011: Energy Efficiency Actions to Enhance Summer 2022 and 2023 Electric Reliability[19]
- PG&E's Advice Letter 4572-G/6498-E: Summer Reliability Market Access Program 2022-2023[20]
- The CPUC's Staff Disposition of PG&E's Advice Letter 4572-G/6498-E Regarding Summer Reliability Market Access Program 2022-2023[21]
- PG&E's Advice Letter GAS_4681-G/6763E: Summer Reliability Market Access Program 2023[22]
- PG&E's MAP Implementation Plan[23]
- PG&E's MAP M&V Plan[24]

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[19] The California Public Utilities Commission. December 2, 2021. Decision 21-12-011. *Energy Efficiency Actions to Enhance Summer 2022 and 2023 Electric Reliability*. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M429/K805/429805997.PDF (Decision 21-12-011)

[20] Pacific Gas and Electric. February 2, 2022. Advice Letter 4572-G/6498-E. *Summer Reliability Market Access Program 2022-2023*. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/energy-efficiency/market-access-program/pge-al-4572-g_6498-e.pdf

[21] The California Public Utilities Commission. March 24, 2022. Staff Disposition of PG&E's Advice Letter 4572-G/6498-E *Regarding Summer Reliability Market Access Program 2022-2023*.

[22] Pacific Gas and Electric. December 19, 2022. Advice Letter GAS_4681-G/6762E. *Summer Reliability Market Access Program 2023*. https://www.pge.com/tariffs/assets/pdf/adviceletter/ELEC_6762-E.pdf

[23] Pacific Gas and Electric. 2022. *PG&E Market Access Program Implementation Plan*. Version 1.0. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/energy-efficiency/market-access-program/implementation-plan/pge-implementation-plan_v1.pdf

- PG&E's Program Data: Implementer 1 Project Report[25]
- PG&E's Program Data: Implementer 2 Project-Level Data[26]

To review materials, Cadmus compiled a program summary, studied the background, examined the program structure, and documented implementation progress to date.

A.2. In-Depth Interviews

Cadmus conducted 10 one-hour in-depth interview sessions to capture qualitative information on the MAP to support evaluation activities in Task 2 through Task 6. Within each session, we engaged one to four individuals to minimize the time needed to gather input from key stakeholders. As shown in Table A-1, Cadmus completed these interview sessions with a variety of stakeholders.

Table A-1. Completed Interview Sessions

Stakeholder Type[27]	Number of Interview Sessions
PG&E Staff	2
Implementers	2
Aggregators	4
Participants[28]	2
Total	**10**

Because these stakeholders provided critical input across several tasks, Cadmus mapped the interview topics to each stakeholder group before creating the interview guides (Table A-2).

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[24] Pacific Gas and Electric. 2022. *PG&E Market Access Program Measurement & Verification (M&V) Plan*. https://cedars.sound-data.com/documents/download/2612/main/

[25] Implementer 1 MAP Project Report. Accessed December 7, 2023. Implementer 1ProjectReport.xlsx.

[26] Implementer 2 MAP Project-Level Data. Accessed December 7, 2023. 20231109_Implementer 2 MAP Project-Level Data.xlsx.

[27] CPUC staff interviews were excluded from the evaluation at the request of CPUC.

[28] Due to limited response rates, Cadmus completed two of the targeted six participant interviews. We discussed the usefulness of these interviews with PG&E and concluded that the cost for additional outreach and interviews would be better used for other evaluation activities.

Table A-2. Interview Topics by and Stakeholder Audience and Task

Task	Program Topics	Stakeholders			
		PG&E Staff	Implementers	Aggregators	Participants
2	Development Context	X			
4	Administrative processes	X	X	X	X
2	Design	X			
2	Delivery	X			
2, 3	Barriers	X	X	X	X
2, 3, 4	Performance	X	X	X	X
2, 4	Stakeholders	X			
4, 5	Process Improvement	X	X	X	
5	Savings Estimation	X	X	X	X
6	Cost-Effectiveness	X	X		

Following this mapping process, we drafted an interview guide for each interview session. We then scheduled the interview sessions with the stakeholders, working through PG&E.

Cadmus used experienced interviewers to conduct each 60-minute interview using the Microsoft Teams platform, recording a transcription of the interview when the interviewee gave consent. Following the completion of all interviews for a given task, we consolidated all notes and synthesized key findings. As shown in Table A-2, these findings informed the results of Task 2 through Task 6.

A.3. NMEC Analysis

Cadmus reviewed the following materials to document the evaluability of MAP impacts:

- PG&E's MAP Implementation Plan[29]
- PG&E's MAP M&V Plan[30]
- PG&E's Program Data: Implementer 1 Project Report[31]
- PG&E's Program Data: Implementer 2 Project-Level Data[32]
- PG&E's Program Data: Implementer 1's Site Modeling Files
- PG&E's Program Data: Implementer 2's Site Energy Usage Files
- PG&E's Program Data: Implementer 2's Comparison Group Energy Usage Files

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29 Pacific Gas and Electric. 2022. *PG&E Market Access Program Implementation Plan*. Version 1.0. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/energy-efficiency/market-access-program/implementation-plan/pge-implementation-plan_v1.pdf

30 Pacific Gas and Electric. 2022. *PG&E Market Access Program Measurement & Verification (M&V) Plan*. https://cedars.sound-data.com/documents/download/2612/main/

31 Implementer 1 MAP Project Report. Accessed November 8, 2023. Implementer 1ProjectReport.xlsx.

32 Implementer 2 MAP Project-Level Data. Accessed December 7, 2023. 20231109_Implementer 2 MAP Project-Level Data.xlsx.

- PG&E's Program Data: Implementer 2's Comparison Group Mapping Files
- PG&E's Program Data: Implementer 2's Temperature Data Files
- CalTRACK Methods: OpenEEmeter Toolkit Documentation[33]

To review materials, we requested data and documentation from implementers, studied the background, examined the program structure, and researched the methodology used by implementers. Next, we assessed whether sufficient data was available to conduct an impact analysis and verify or replicate the results used by implementers.

Review Raw Data and Software Code

Cadmus began the review by requesting the following data:

- Data used in the M&V, including project (customer) metered hourly electricity energy consumption data and weather data
- Software code used in estimating avoided energy use, weather-normalized savings, and total system benefits, as well as other supporting M&V documentation
- Modeling and reporting outputs including data summaries and visualizations, regression outputs, and reporting tables

In conducting the review, we assessed the completeness of the data in the following respects:

- Availability of AMI data for all sampled projects
- Complete consumption data for reporting and baseline periods
- All relevant variables included in a data set
- Tracking data sufficient for collecting weather data
- M&V documentation is provided
- Code to process raw data and calculate weather-normalized savings is provided

Cadmus also assessed whether the software code allows our team to trace the steps the implementers used to estimate the population NMEC savings.

Assess Adherence to PG&E MAP M&V Plan

In conjunction with the raw data and software code review, Cadmus assessed to what extent the data inputs, analysis methods, and outputs conform with the requirements of PG&E's M&V plan and the methods prescribed in CalTRACK. At the onset, we intended to review data sufficiency and sample selection, data preparation and cleaning, NMEC avoided energy use estimation, and reporting. We planned to develop a checklist of the M&V steps based on CalTRACK, compare it to the steps in the software code the implementers used to estimate population-level savings, flag any anomalies in the implementer's approach, and brought any issues to PG&E's attention. However, due to the incomplete

[33] CalTRACK OpenEEmeter Project Updates. Accessed March 20, 2024. CalTRACK - Project Updates

code and documentation we received, we instead performed a desk review on the following items for both implementers:

- Raw billing data used as input to the savings calculation process
- Sufficiency of site tracking data to collect weather data over baseline and evaluation periods using CalTRACK OpenEEmeter methods
- OpenEEmeter regression script used to estimate unadjusted savings
- Reported unadjusted savings over a portion of site evaluation periods
- Comparison group selection methods
- Documentation on comparison group-based adjustments
- Reported adjusted savings over a portion of site evaluation periods

Assess the Robustness of Statistical Models

Robustness concerns the sensitivity of the savings estimates to analyst choices about sample selection, data cleaning and preparation, model specification, and savings estimation. The NMEC methods in CalTRACK are highly prescriptive and incorporate best practices to ensure robustness, but some elements of the analysis related to sampling, comparison group selection, non-routine adjustments, and modeling are subjective. Cadmus initially planned to evaluate the sensitivity and robustness of the reported NMEC avoided energy use estimates from the following perspectives:

- **Sample selection:** We considered the following for sample selection: *Which projects for population-level NMEC models were included in the analysis? Were any projects excluded, and if so, why? Is there a substantial likelihood that having excluded these projects substantially affected the savings? Were the analysis periods (including the baseline and reporting periods) defined appropriately?* Rather than sampling, Cadmus requested data for all sites from both implementers. We developed an automated script to estimate regression models for all sites, so long as the sites had sufficient data for the OpenEEmeter process.
- **Non-routine adjustments:** It may be necessary to make non-routine adjustments to the baseline or reporting period consumption to account for site-specific non-routine events. We considered the following for non-routine adjustments: *Were non-routine adjustments applied to any sites? Were these adjustments justified and made appropriately? What effect did the non-routine adjustment likely have on the savings estimate, if any*? Neither implementer provided the Cadmus team with code showing any adjustments made to baseline or reporting period energy consumption.
- **Comparison group selection:** To control for time-varying consumption impacts unrelated to the program, we compared the population NMEC savings estimates to changes in consumption for the same period of a comparison group using a differences-in-differences approach. According to the MAP M&V plan, PG&E will provide the implementers with load profiles for the nonparticipant population. We considered the following for group selection: *Does the profile of the nonparticipant comparison population provide an accurate baseline for measuring the savings estimates? How does the use of a comparison group affect the accuracy of the savings*

estimates? Cadmus reviewed the comparison group source data used by Implementer 2, as well as documentation for the comparison group selection method, and determined it is compliant with PG&E's MAP M&V plan. Although Implementer 1 did not provide documentation, based on their adjusted savings, Implementer 1 appears to use a similar method to Implementer 2.

- **Modeling:** The MAP implementers applied CalTRACK regression methods to estimate the avoided energy consumption and weather-normalized savings. Cadmus initially intended to assess the model specifications with the following questions in mind: *Are the model specifications consistent with CalTRACK? If not, how do the models deviate? Do the econometric models omit any likely confounding variables? Are the savings estimates robust to model specification? How do the savings estimates depend on the econometric modeling of baseline consumption?* However, since neither implementer provided a complete set of output from the CalTRACK OpenEEmeter command line interface script they sent Cadmus, we were only able to review model predicted counterfactual consumption and residuals, rather than the actual econometric models. This limited our ability to assess implementer model robustness or adherence to CalTRACK regression methods.

Additionally, Cadmus initially planned to flag M&V steps that deviated from or were not covered by CalTRACK. This raised questions about the robustness or sensitivity of the avoided energy-use estimates. To evaluate the robustness of certain estimates, we planned to run the implementer code to replicate the reported results and then re-run the code after making one of the following adjustments:

- **Sample selection:** Including a project that was excluded or excluding a project that was included
- **Non-routine adjustment:** Removing or not applying a Non-Routine Adjustment applied by the implementer
- **Comparison group selection:** Modifying the makeup of the comparison group
- **Modeling:** Including additional control variables that were omitted or excluding control variables if there is not a sound rationale for their inclusion

However, neither implementer provided Cadmus with a complete set of code and data to replicate unadjusted or adjusted savings. Given this limitation, we focused on reviewing the validity of unadjusted savings by running our own CalTRACK-based models, using the command line interface script provided by implementers, on cleaned AMI data provided by PG&E and Implementer 2. Additionally, Cadmus conducted a desk review of the provided documentation to examine the handling of non-routine adjustments, comparison group selection, and modeling.

Replicate Implementer NMEC Savings Calculations

Cadmus strived to replicate the implementer's avoided energy consumption calculations for the projects. We aimed for an exact replication of the results. If achieving an exact replication is not feasible, we will assess whether the implementer's estimate falls within the confidence interval of our estimate.

Document Differences in Aggregator Methods

To ensure the MAP implementers apply consistent methods to estimate avoided energy use, we compared the aggregators' M&V approaches and flagged any substantive differences that could affect the savings estimation. We also considered how the differences could cause divergence in the estimated savings and suggested ways to harmonize the aggregator approaches.

A.4. Cost-Effectiveness Analysis

To assess the program's cost-effectiveness, Cadmus conducted a counterfactual compliance analysis. We started by collecting the available 2022-2023 program and project data. Using these data, we then created input files and ran them through the cost-effectiveness tool on the CEDARs website. We used these output files to characterize the program's measure composition and cost-effectiveness. Next, working closely with PG&E staff, we compared the MAP cost-effectiveness metrics to selected legacy PG&E energy efficiency programs with similar measure makeup. Through these two analyses, we categorized project and program levels, demand and energy savings, TSB, TRC, and other outputs of interest for future project consideration.

Cadmus used the TSB and TRC as the main metrics in this analysis. The CPUC mandated the TSB, in accordance with directive D.21-05-031, to be the primary metric that California investor-owned utilities and other program administrators use to determine cost-effectiveness, effective starting in 2024. However, because the TRC remains a relevant metric when developing and managing program performance, Cadmus also included it in this analysis. To determine the TSB and TRC metrics, we used the CEDARS CET tool. CEDARS is an online platform made by the CPUC to manage and store California Energy Efficiency program data. [34] The CET tool automates the process of conducting cost-effectiveness test calculations.

The TSB is the sum of a measure's avoided costs multiplied by the measure's net-to-gross ratio, as illustrated in the following calculation in CEDARS:

$$TSB = NTG\ Ratio(Sum\ of\ all\ benefits - Sum\ of\ increased\ \text{supply}\ costs)$$

The TRC is a ratio of the TSB divided by the TRC cost. The TRC costs include the total costs to the utility and incremental participation costs for customers, and the benefits include tax incentives and avoided supply costs. The TRC benefit/cost ratio is based on the present value of program benefits (primarily the avoided cost of capacity, generation, and transmission and distribution) relative to the total cost of program implementation and operation, as well as incremental customer costs. This is illustrated in the detailed equation from CEDARs below:

[34] Please visit CEDARS website for more information: Home - CEDARS (sound-data.com)

$$TRC = \frac{TSB}{TRC\ Cost}$$

Data Collection

Cadmus requested program data from PG&E's two implementers. To complete the cost-effectiveness analysis, it is necessary for the program data to contain measure-specific details, including climate zone, building type, EUL, and measure cost. Cadmus experienced some difficulty obtaining the necessary data, as measure cost was absent from Implementer 2's data. While we can reasonably estimate some missing variables, such as building type, measure cost is an essential component with no approximation. As such, Cadmus was unable to complete a cost-effectiveness analysis for programs implemented by Implementer 2. The following sections are specific to the data and analysis Cadmus conducted for programs implemented by Implementer 1.

Data Preparation

The program data received from Implementer 1 contained most of the required variables for the CET tool. Of the variables not explicitly stated, Cadmus generated approximations based on the available data and institutional knowledge. Table A-3 lists some of these variables and either what value they were set to or what data sources we used to generate their value.

Table A-3. CET Data Assumptions and Data Sources

Field	Value
Measure Impact Type	Custom NMEC Pop
Delivery Type	Downstream Custom
Net-to-gross Ratio	0.95
Field	**Data Source**
End Use Shape	End Use Shape/Measure Description
Tech Group	Measure Description
Tech Type	Measure Description
Use Category	Measure Description
Direct Implementation Activity	Total Program Budget – Total Incentive Cost

Cadmus calculated the CEDARS variable DIActivity, which is defined as the direct implementation activity costs, using the difference between the adjusted budget and the total incentive costs. We did not disaggregate marketing and administrative costs from the DIActivity because it did not impact the resulting TRC and TSB calculations. The adjusted budget is defined as the total program budget weighted accordingly for the year. The total program budget for Implementer 1 was $15,434,090. We derived the weights by taking the year's share of TSB over the sum of both years' TSB.

Finally, for measures grouped together in the raw data, we assumed certain variables were shared equally during the process of splitting the data into a line item per measure. For example, in the case of two measures originally grouped together, we assumed the impact was equally distributed across the

two measures when splitting the data. This assumption allowed us to properly format the data received by Implementer 1 for CEDARS.

Figure A-1 shows an example of pipe delimited data ready for CEDARS CET.

Figure A-1. Sample of CEDARS CET Input Data

CEInputID	PrgID	ClaimYearQuarter	Sector	DeliveryType	BldgType	E3ClimateZone	E3GasSavProfile	E3GasSector	E3MeaElecEn
1	AESC	2023Q2	Commercial	DnCust	Cnc	3A	Annual	Commercial	DEER:HVAC_Split-Package_AC	Non_Res	AR	1	HVAC Retrof
6	AESC	2023Q4	Commercial	DnCust	Dat	12	Annual	Commercial	3 = Commercial HVAC	Commercial	AR	1	TES Schedule Opt
7	AESC	2023Q4	Commercial	DnCust	Dat	12	Annual	Commercial	3 = Commercial HVAC	Commercial	AR	1	SAT RCx	Cust-NM
8	AESC	2023Q4	Commercial	DnCust	Dat	12	Annual	Commercial	3 = Commercial HVAC	Commercial	AR	1	waterside RCx	Cu
54	AESC	2023Q1	Commercial	DnCust	Gro	2	Annual	Commercial	DEER:HVAC_Split-Package_AC	Non_Res	AR	1	VFD install o
55	AESC	2023Q1	Commercial	DnCust	Gro	2	Annual	Commercial	DEER:HVAC_Split-Package_AC	Non_Res	AR	1	Air-Cooled C
58	AESC	2023Q2	Commercial	DnCust	Gro	3A	Annual	Commercial	DEER:HVAC_Chillers	Non_Res	AR	1	Add VFD	Cust-NMEC
59	AESC	2023Q2	Commercial	DnCust	Gro	3A	Annual	Commercial	DEER:HVAC_Chillers	Non_Res	AR	1	Floating Suction Strat
60	AESC	2023Q1	Commercial	DnCust	Gro	4	Annual	Commercial	DEER:HVAC_Split-Package_AC	Non_Res	AR	1	Add 10 hp VF
65	AESC	2023Q4	Commercial	DnCust	Htl	4	Annual	Commercial	DEER:HVAC_Split-Package_AC	Non_Res	AR	1	BRO - HVAC C
66	AESC	2023Q4	Commercial	DnCust	Htl	3A	Annual	Commercial	DEER:HVAC_Split-Package_AC	Non_Res	AR	1	BRO - HVAC
68	AESC	2023Q4	Commercial	DnCust	Htl	3A	Annual	Commercial	DEER:HVAC_Chillers	Non_Res	AR	1	Chiller Replacement	
69	AESC	2023Q4	Commercial	DnCust	OfL	3A	Annual	Commercial	DEER:HVAC_Chillers	Non_Res	AR	1	Chiller Replacement	
72	AESC	2023Q3	Commercial	DnCust	OfL	3A	Annual	Commercial	DEER:Indoor_CFL_Ltg	Non_Res	AR	1	HVAC RCx	Cust-NM
77	AESC	2023Q4	Commercial	DnCust	OfL	2	Annual	Commercial	3 = Commercial HVAC	Commercial	AR	1	Building HVAC RC

Cadmus completed three distinct versions of analyses. In the first version (A), we made no adjustments to the values received from the implementer. In the second version (B), we capped incentives at the measure cost and transferred the balance into DIActivity. In the third version (C), we built upon the version B and adjusted lighting EUL years, non-lighting measures had no adjustment to EUL years. The adjustment to lighting EUL years was based on the following formula:

$$EUL\,Years = \min\left(\frac{EUL\,Basis}{EFLH}, EUL\,Years\right)$$

The EUL basis was most commonly 50,000 hours, which we applied to all interior lighting measures implemented in 2022 and 2023.

Appendix B. Legacy Programs for Comparison

Cadmus used data from the programs listed in Table B-1 when comparing the MAP to legacy programs on building type and sector variables.

Table B-1. Legacy Programs for Comparison

Program Name	Source File	Notes
Commercial Calculated Incentives - Customized Incentive Program	Custom Programs for Comparison.csv	
Commercial Calculated Incentives - Customized New Construction	Custom Programs for Comparison.csv	
Commercial Calculated Incentives - Retro Commissioning (RCx)	Custom Programs for Comparison.csv	
Commercial Calculated Incentives - Whole Building	NMEC Programs for Comparison.csv	
Hospitality Program - Custom Direct Install	Custom Programs for Comparison.csv	
Hospitality Program - Customized Retrofit	Custom Programs for Comparison.csv	
Hospitality Program - Deemed Downstream	Custom Programs for Comparison.csv	
Hospitality Program - Direct Install	Custom Programs for Comparison.csv	
Hospitality Program - Retro-Commissioning	Custom Programs for Comparison.csv	
kW Engineering - CoolSave (Grocery - Whole Building)	NMEC Programs for Comparison.csv	Not included in the Climate Zone comparison, as these data were not available

Appendix C. Evaluated and Reporting Savings

Table C-1 shows Cadmus's evaluated savings and Implementer 1's unadjusted reported savings prior to November 1, 2023. Due to a lack of code used by Implementer 1, Cadmus was unable to verify Implementer 1's adjusted savings.

Table C-1. Implementer 1 Site Evaluated and Reported Savings

Site SAID	Evaluated Savings	Reported Savings	Site Realization Rate
2546624479	-14685.49	-8214.93	1.79
435190011	37922.23	37665.83	1.01
8237662130	1267.38	1203.39	1.05
5670201772	9417.91	17368.06	0.54
5846154669	3741.78	3713.74	1.01
2039570015	11628.54	11538.06	1.01
5251388452	6950.53	7119.94	0.98
5147572867	2497.79	2515.60	0.99
5461236619	11653.42	11536.71	1.01
8337009924	20551.51	20230.44	1.02
2004796816	7868.06	7524.68	1.05
9698392854	-20349.93	-19543.83	1.04
2855911005	138501.50	332036.26	0.42
630865049	6417.49	11898.47	0.54
5206952002	1279.15	5587.94	0.23
1919862467	17078.49	4767.63	3.58
5298523079	3174.23	2612.33	1.22
8051064115	3462.81	3412.59	1.01
8009397719	6340.25	3247.99	1.95
9419089954	1396.27	1463.96	0.95
7843127355	2096.52	1854.00	1.13
7917586185	61374.70	123992.50	0.49
4344605404	20847.85	20957.59	0.99
4344605300	29400.35	26525.59	1.11
6499199345	-5115.32	-5221.43	0.98
5014790074	59103.77	58797.54	1.01
9949499033	67753.12	67588.62	1.00
6544533828	57848.54	58217.94	0.99
9490304453	77179.48	77189.78	1.00
4520172400	16383.19	16301.76	1.00
136560772	49389.98	48546.81	1.02
1572791748	14253.08	9750.50	1.46
5195463814	8976.16	8875.40	1.01
9848855749	52051.06	58027.09	0.90
5941374814	29815.60	30108.08	0.99
3842474490	-411.87	-425.51	0.97
3079073538	14426.10	14265.95	1.01

Table C-2 shows Cadmus's evaluated savings and Implementer 2's unadjusted reported savings prior to October 1, 2023. Due to a lack of Implementer 2's code, Cadmus was unable to verify Implementer 2's adjusted savings. However, the documentation provided on Implementer 2's savings adjustment process appears reasonable and matches the adjustment protocol in PG&E's M&V plan for adjustments.

Table C-2. Implementer 2 Site Evaluated and Reported Savings

Site SAID	Evaluated Savings	Reported Savings	Site Realization Rate
MAR101821	92329.12	86571.46	1.07
MAR105711	-5724.1	-5708.49	1
MAR105710	3418.58	3518.54	0.97
MAR104225	132530.3	131561.6	1.01
MAR105714	17073.01	16525.46	1.03
MAR103092	-5397.77	-5666.82	0.95
MAR103080	17026.84	15963.48	1.07
MAR103071	1812.38	981.3	1.85
MAR103081	6325.38	6013.29	1.05
MAR103084	-1453.71	-1453.18	1
MAR103086	6739.34	6732.72	1
MAR103077	10748.02	9582.52	1.12
MAR102014	32663.55	31654.79	1.03
MAR103087	5792.32	5443.26	1.06
MAR103074	1331.88	1358.37	0.98
MAR103100	882.11	533.84	1.65
MAR103073	28629.19	28240.87	1.01
MAR102740	383257.9	372607.6	1.03
MAR103082	4095.54	3892.83	1.05
MAR103096	2309.37	2010.99	1.15
MAR103094	973.85	826.46	1.18
MAR103093	8243.56	8092.11	1.02
MAR103070	8284.02	8170.22	1.01
MAR103083	17226.52	17058.4	1.01
MAR107327	3228.16	2962.69	1.09
MAR102181	19240.99	18329.94	1.05
MAR107525	-13364.6	-15237	0.88
MAR105323	279323.9	275583.5	1.01
MAR103089	9756.04	9294.27	1.05
MAR103079	1597.74	1453.96	1.1
MAR104065	-23434.5	-23164.5	1.01
MAR104068	7410.22	7688.39	0.96
MAR104074	9285.25	9289.74	1
MAR104061	23881.75	23619.48	1.01
MAR104075	-11675.9	-10961.6	1.07
MAR103098	8825.5	8822.5	1
MAR110858	-239.61	-247.62	0.97
MAR110793	-53.97	-66.13	0.82
MAR110825	-4988.12	-4995.72	1
MAR107030	12412.45	12410.86	1
MAR103994	16425	15455.22	1.06
MAR104073	41989.24	41192.85	1.02
MAR104076	27327.2	26828.27	1.02
MAR103078	8200.81	8026.14	1.02
MAR104064	49164.94	48178.98	1.02
MAR102577	100871.6	100852.8	1

Site SAID	Evaluated Savings	Reported Savings	Site Realization Rate
MAR102806	172139.4	170528.5	1.01
MAR104071	25106.7	23220.39	1.08
MAR103191	73666.06	72635.81	1.01
MAR102216	53203.6	54558.71	0.98
MAR102212	41688.6	42077.33	0.99
MAR102214	54813.28	54044.01	1.01
MAR108549	34499.45	34221.88	1.01
MAR108548	38012.29	37451.25	1.01
MAR104852	48457.03	48194.19	1.01
MAR104672	-520.11	-511.1	1.02
MAR105646	-335.65	-337.78	0.99
MAR104673	256.69	244.87	1.05
MAR104683	577.97	566.22	1.02
MAR104677	-95.02	-138.9	0.68
MAR102814	136535.2	136165.7	1
MAR104678	-101.02	-120.67	0.84
MAR105645	-201.31	-208.28	0.97
MAR105644	83.66	63.14	1.33
MAR104658	636.16	676.34	0.94
MAR104067	22273.58	21928.37	1.02
MAR104688	14.85	10.26	1.45
MAR105319	195239.2	192549	1.01
MAR104684	-21.55	-20.39	1.06
MAR104657	977.45	1004.33	0.97
MAR104663	125.25	78.56	1.59
MAR105941	175259.5	173149.5	1.01
MAR104687	-1397.43	-1454.37	0.96
MAR103173	64006.17	64623.19	0.99
MAR105716	560.9	559.26	1
MAR104669	-675.65	-684.8	0.99
MAR104659	-70.44	-102.21	0.69
MAR104424	13596.19	15955.8	0.85
MAR104671	29.68	23.69	1.25
MAR104727	-9460.24	-9173.42	1.03
MAR104662	423.6	435.86	0.97
MAR105316	91953.83	88795.49	1.04
MAR104665	-78.54	-85.36	0.92
MAR104676	107.33	99.96	1.07
MAR104680	-326.06	-348.95	0.93
MAR105315	446.46	-384.13	-1.16
MAR104060	16679.83	15200.24	1.1
MAR104690	-688.23	-944.41	0.73
MAR105281	-0.54	-0.86	0.62
MAR103169	76147.96	74166.89	1.03
MAR106799	-13964.5	-13251.5	1.05
MAR102807	1429.66	1331.95	1.07
MAR105553	55544.89	55328.28	1
MAR104681	716.16	668.9	1.07
MAR104557	-25883	-29569.2	0.88
MAR104686	-230.31	-242.03	0.95
MAR102311	57971.48	57529.13	1.01
MAR104661	506.14	533.18	0.95
MAR102114	129627.7	117992.3	1.1
MAR102023	-29622.5	-41145.3	0.72

Site SAID	Evaluated Savings	Reported Savings	Site Realization Rate
MAR104689	-245.62	-254.53	0.97
MAR104679	-176.33	-198.78	0.89
MAR104667	147.94	144.33	1.02
MAR104668	-407.86	-422.26	0.97
MAR104666	-190.26	-184.29	1.03
MAR102021	-47433.4	-48072	0.99
MAR104670	362.1	359.54	1.01
MAR104664	-481.56	-471.66	1.02
MAR105722	584.18	577.67	1.01
MAR105314	18287.37	17437	1.05
MAR105715	10730.73	10418.72	1.03
MAR104423	8243.29	10342.98	0.8
MAR104692	3623.66	3556.33	1.02
MAR109077	11334.74	10624.3	1.07
MAR107756	14836.21	14307.87	1.04
MAR104675	-65.47	-72.48	0.9
MAR105512	37502.4	40921.47	0.92
MAR104685	1036.15	973.85	1.06
MAR104682	-4.64	-6.81	0.68
MAR105647	4133.53	4076.2	1.01
MAR104077	34988.17	33692.69	1.04
MAR103203	11847.09	11186.28	1.06
MAR105612	-41791.9	-45191.3	0.92
MAR106304	44134.59	39921.05	1.11
MAR105557	49337.8	49225.41	1
MAR105567	47386.09	46973.69	1.01
MAR106570	17445.88	17246.89	1.01
MAR105563	61269.5	60749.44	1.01
MAR102115	129006.6	126532.8	1.02
MAR105564	54104.74	54077.06	1
MAR103268	82873.12	82729.87	1
MAR105562	53358.96	53279.53	1
MAR105568	50521.5	50032.03	1.01
MAR105327	56757.3	55292.15	1.03
MAR105322	97784.74	93054.71	1.05
MAR105334	46473.94	44864.21	1.04
MAR105324	29820.33	31257.33	0.95
MAR105555	55392.87	55209.54	1
MAR105649	490.83	820.82	0.6
MAR108746	-60.81	82.22	-0.74
MAR110066	2063.25	2041.81	1.01
MAR105648	25064.32	24953.32	1
MAR105569	48672.69	48163.78	1.01
MAR106968	319.04	322.79	0.99
MAR106967	595.17	598.13	1
MAR106969	-96.02	-98.79	0.97
MAR105318	153231.6	150424.8	1.02
MAR105332	223442.8	218899.8	1.02
MAR105331	126836.9	122736.2	1.03
MAR105055	18428.57	18231.17	1.01
MAR106931	28339.37	28675.63	0.99
MAR105547	14024.02	12278.17	1.14
MAR102117	109756.2	106875.1	1.03
MAR106932	20428.24	19135.57	1.07

Site SAID	Evaluated Savings	Reported Savings	Site Realization Rate
MAR102707	36319.87	35367.48	1.03
MAR106469	36945.34	34972.19	1.06
MAR106575	10342.22	10284.94	1.01
MAR105548	14106.02	14861.62	0.95
MAR106936	-17762.4	-17137.8	1.04
MAR108944	13375.8	13200.5	1.01
MAR106933	53985.15	44420.44	1.22
MAR105326	45489.7	42339.64	1.07
MAR106937	49925.61	46720.47	1.07
MAR105321	154749.3	153777.5	1.01
MAR105320	86267.65	86052.2	1
MAR106572	3153.14	3022.55	1.04
MAR106571	8452.35	8404.3	1.01
MAR105381	62724.33	60742.07	1.03
MAR106573	26017.12	26077.97	1
MAR106899	109531.5	112038.7	0.98
MAR106935	98266.6	96180.42	1.02
MAR107200	776.5	718.02	1.08
MAR106576	2117.18	2148.31	0.99
MAR105325	113886.9	110932.2	1.03
MAR105328	82188.75	80714.83	1.02
MAR105116	73577.91	72592.79	1.01
MAR102412	1.64	0.98	1.68
MAR102278	13150.9	13104.8	1
MAR102410	10219.26	10267.55	1
MAR102411	17297.5	17006.15	1.02

Appendix D. Updated Reporting Savings (2022-2024)

Table Appendix D-1 presents the updated reported savings and program spending for programs managed by Implementer 1, while Table Appendix D-2 provides the updated reported values for programs managed by Implementer 2. The "Summer 2022–2024" columns show cumulative impacts from the start of the program through the end of each corresponding reporting period (September 30 of each year). The "Full Program To-Date Results" column includes the budget spanning June 1, 2022, through June 30, 2025.

Table D-1. Implementer 1 Reported Savings and Budgets

Metric	Summer 2022	Summer 2023	Summer 2024	Full Program To-Date Results
Enrollments				
Enrolled Aggregators	24	49	50	50
Completed Projects	0	1	36	127
Demand Savings				
Measured Summer Peak Savings (kW)	8.90	198.18	2,179.11	
Measured Summer Net Peak Savings (kW)	5.13	216.15	2,362.98	
Energy Savings				
Measured Summer Energy Savings (kWh)	51.82	557,500.16	5,285,271.90	17,881,887.17
Measured Summer Peak Energy Savings (kWh)	73.90	121,705.82	1,361,708.76	
Measured Summer Net Peak Energy Savings (kWh)	20.53	50,631.76	570,091.17	
TSB				
Total System Benefit ($)	$264.73	$838,671.33	$9,558,924.61	$19,176,249.06
Budget Utilization				
Program Budget ($)	$5,000,000.00	$14,000,000.00	$15,434,090.00	$15,434,090.00
Aggregator Payments ($)	$0.00	$582,699.73	$7,789,374.14	$9,741,758.85
Total Spending	$458,415.00	$2,238,339.88	$10,935,380.05	$13,156,994.76

Table D-2. Implementer 2 Reported Savings and Budgets

Metric	Summer 2022	Summer 2023	Summer 2024	Full Program To-Date Results
Enrollments				
Enrolled Aggregators	40	48	48	48
Completed Projects	0	3	209	286
Demand Savings				
Measured Summer Peak Savings (kW)	104.01	7,559.12	3,737.44	
Measured Summer Net Peak Savings (kW)	133.17	9,343.51	4,212.39	
Energy Savings				
Measured Summer Energy Savings	48,849.07	8,165,204.58	4,234,920.77	32,730,023.95

Metric	Summer 2022	Summer 2023	Summer 2024	Full Program To-Date Results
(kWh)				
Measured Summer Peak Energy Savings (kWh)	33,802.75	4,534,342.76	2,254,414.86	
Measured Summer Net Peak Energy Savings (kWh)	17,312.37	2,250,313.75	1,018,167.31	
TSB				
Total System Benefit ($)	$66,464.49	$10,071,502.24	$5,014,674.71	$35,584,836.73
Budget Utilization				
Program Budget ($)	$15,000,000.00	$9,000,000.00	$13,565,910.00	$37,565,910.00
Aggregator Payments ($)	$0.00	$4,182,195.42	$20,274,269.58	$24,004,500.65
Total Spending	$950,223.02	$9,072,753.26	$28,520,398.91	$33,272,306.69

Appendix E. Draft Report Public Comments and Responses

Table Appendix E-1 lists all public comments received on the draft report and PG&E's responses.

Table E-1. Draft Report Public Comments and Responses

Source	Section	Draft Report Comment	PG&E Response
Seaton M. Daly III on behalf of Green Rebates, LLC	Overarching	Dear Commissioners, I am writing on behalf of my client, Green Rebates, LLC, a State of Delaware limited liability company, in response to the July 2025 update of the PG&E Market Access Program ("MAP") Evaluation Report. I appreciate the Commission's continued efforts to evaluate and improve the MAP, which plays a critical role in advancing California's energy efficiency and reliability goals. However, I would like to highlight two areas of concern that disproportionately affect small business aggregators and propose recommendations to foster a more equitable and inclusive program structure. 1. Dispute Resolution and Determination Challenges The current MAP structure places significant authority in the hands of PG&E and its implementers to determine project eligibility, savings realization, and incentive disbursement. Small aggregators, who often lack the legal and administrative resources of larger firms, are especially vulnerable in these situations. The absence of a transparent, independent dispute resolution mechanism creates a power imbalance that can discourage participation and innovation. Recommendation: Establish a formal, transparent dispute resolution process for MAP participants, including a clear timeline, independent review panel, and appeal mechanism. 2. Financial Risk and Barriers to Entry The MAP's pay-for-performance model imposes substantial financial risk on aggregators—particularly those without the cash flow to front project costs or wait extended periods for incentive payments. This dynamic effectively excludes smaller, community-based aggregators and limits the diversity of participants in	PG&E appreciates the comments and recommendations. Based on on-going feedback and prior experiences, PG&E continues to seek ways to address issues and improve program design through its next iteration: the Measured Savings Program for Summer Reliability (MSSR). Thank you again for the feedback.

		the MAP. Recommendation: Introduce pre-payment or milestone-based payment options, create a financial assistance fund, and lower administrative fees for small aggregators. 3. Equity in Program Design The MAP has been more successful with larger customers and lighting-heavy projects, while small businesses and more complex measures have been left behind. Recommendation: Develop a small business-focused MAP track with simplified eligibility, higher incentives, and dedicated support. In conclusion, I urge the Commission to ensure that the next iteration of the MAP includes structural reforms that level the playing field for small business aggregators. By addressing the financial and procedural barriers identified in the evaluation report, the CPUC can help unlock the full potential of the MAP and ensure that its benefits are equitably distributed across California's diverse business landscape.	