



Opinion **Dynamics**

CALIFORNIA STATEWIDE MARKET ACCESS PROGRAMS

PROCESS EVALUATION REPORT DRAFT

MAY 16, 2024



CONTENTS

1. Executive Summary.....	5	4.4.2 Project Execution.....	41
1.1 Methodology.....	6	4.4.3 Experience with Aggregator	46
1.2 Summary of Results.....	6	4.4.4 MAP Awareness	48
1.2.1 Participation Overview	7	4.4.5 MAP Satisfaction	48
1.2.2 MAP Principles.....	8		
2. Introduction	14	5. Conclusions and Recommendations.....	51
2.1 Background	14	5.1 Overall Performance	51
2.2 Overview of Study	14	5.2 Flexibility	52
3. Methods.....	16	5.3 Simplification.....	53
3.1 Staff Implementer Interviews.....	16	5.4 Scale	54
3.2 Data and Materials Review	16	Appendix A. Aggregator Interview Instrument... 57	
3.3 Aggregator Interviews	16	In-depth interview Guide.....	57
3.4 Customer Survey.....	17	Appendix B. Survey Instruments	58
4. Results	20	Residential Survey.....	58
4.1 Overarching Design and Implementation		Non-Residential Survey.....	58
Assessment.....	20	eco+ Survey	58
4.1.1 Alignment with Program Theory	20	Appendix C. Survey Response Rates	59
4.1.2 Project Risks.....	22	Survey Response Rate Methodology	59
4.1.3 Program Differences	22	Response Rate Calculations.....	59
4.2 Participation Summary and		Appendix D. Supplemental Survey Data Tables	61
Characterization.....	25		
4.2.1 Aggregators.....	25		
4.2.2 Customers	28		
4.3 Aggregator Perspectives.....	33		
4.3.1 Program Enrollment and Support	34		
4.3.2 Customer Enrollment and Type of			
Projects	36		
4.3.3 Program Views.....	37		
4.3.4 Overall Assessment.....	40		
4.4 Customer Perspectives.....	40		
4.4.1 Project Recruitment	41		

TABLES & FIGURES

Table 1. Core Principles of MAP.....	5	Table 19. Top-Five Energy-Saving Measures Residential Respondents Wanted at the Time of MAP Participation	46
Table 2. Summary of Aggregators by PA and PA Participation Status	7	Table 20. Other Energy Saving Measures Non-Residential Respondents Wanted at the Time of MAP Participation	46
Table 3. MAP Process Evaluation Research Questions	15	Table 21. Delivery on Core Principles	51
Table 4. Aggregator Interview Sample Characteristics	17	Table 22. Survey Disposition Summary	59
Table 5. Survey Sample Summary	18	Table 23. Energy-Saving Measures eco+ Respondents Wanted at the Time of MAP Participation.....	61
Table 6. Survey Response Rates	19	Table 24. Energy-Saving Measures Residential Respondents Wanted at the Time of MAP Participation	61
Table 7. Comparison of MAP Implementation Components by PA.....	24	Table 25. Energy-Saving Measures Non-Residential Respondents Wanted at the Time of MAP Participation	62
Table 8. Summary of Aggregators by Statewide Participation Status	25	Figure 1. MAP Customers Served through Aggregators (2022 – 2023)	7
Table 9. Summary of Aggregators by PA and PA Participation Status	26	Figure 2. Residential Participant Demographic Characteristics	30
Table 10. Mix of Residential Customer Energy-Saving Solutions.....	27	Figure 3. eco+ Participant Demographic Characteristics	30
Table 11. Mix of Non-Residential Customer Energy-Saving Solutions	27	Figure 4. Non-Residential Participant Firmographic Characteristics	31
Table 12. Number of MAP Participants by Participant Type	29	Figure 5. Participation in Another Energy-Saving Program in the Last Five Years.....	31
Table 13. Residential Respondent Participation in Other Energy-Saving Programs	33	Figure 6. Entities Offering Respondents' Other Energy-Saving Programs	32
Table 14. Non-Residential Respondent Participation in Other Energy-Saving Programs	33	Figure 7. Residential and Non-Residential Respondent Initial Contact with Aggregator	41
Table 15. Perspectives of Aggregators across Implementers	34	Figure 8. Residential and Non-Residential Respondents' Involvement in Program Processes ...	42
Table 16. Other Energy-Saving Recommendations for Residential Respondents	43	Figure 9. Ease of Completing Paperwork and Documentation.....	42
Table 17. Other Energy Saving Recommendations for Non-Residential Respondents	44		
Table 18. Top Five Energy-Saving Measures eco+ Respondents Wanted at the Time of MAP Participation	45		

Figure 10. Residential and Non-Residential Respondents Who Received Aggregator Recommendations.....	43
Figure 11. Interest in Other Energy-Saving Upgrades	45
Figure 12. Respondents' Satisfaction with Aggregator	47
Figure 13. Willingness to Recommend the MAP Aggregator to Others.....	47

Figure 14. Residential and Non-Residential Respondent Awareness of MAP	48
Figure 15. Participant Satisfaction with MAP	49
Figure 16. Willingness to Recommend MAPs to Others	49
Figure 17. Willingness to Participate in a Similar Program in the Future	50

I. EXECUTIVE SUMMARY




This report presents findings from a process evaluation of the statewide Market Access Program (MAP) covering 2022 and 2023 program activities. The California Public Utilities Commission (CPUC) oversees MAP, established through Decision (D.) 21-12-011 on December 8, 2021. This Decision approved several initiatives designed to address summer reliability issues and served as a response to Governor Newsom’s July 2021 Emergency Proclamation.

D. 21-12-011 authorized up to \$185 million in incremental energy efficiency (EE) funding for program years 2022 and 2023. Four program administrators (PAs) utilized this funding, and each created their own program (Pacific Gas and Electric [PG&E], Marin Clean Energy [MCE], Southern California Edison [SCE], and San Diego Gas and Electric [SDG&E]).

All four programs share a fundamental design. The MAPs use a pay-per-performance structure where qualified vendors or contractors, called aggregators, identify and complete EE projects for an aggregated group of customers. Implementers¹ are paid incentives based on the project’s Total System Benefit (TSB),² measured at the meter using a population-level Normalized Metered Energy Consumption (pop-NMEC) approach.³ The program specifically addresses grid constraints by offering a “kicker” (i.e., additional incentive) for savings achieved during “peak” (4:00 p.m.–9:00 p.m.) and “net peak” (7:00 p.m.–9:00 p.m.) hours from June through September. Implementers then pass on the incentives to the aggregators who completed MAP projects. As a way to minimize risk to ratepayers, the Decision also states that the overall spending for each of the programs, including any administrative costs, must not exceed the measured TSB.

There are three core principles as part of the shared design, described in Table 1.

Table 1. Core Principles of MAP

Icon	Core Principle	Description
	Flexibility	The programs do not offer a prescriptive set of qualifying measures. Instead, aggregators may determine the correct solutions for their customers. This flexibility theoretically enables aggregators to freely design optimal solutions that appropriately balance individual customer’s specific needs with the program’s energy savings, demand reduction, and decarbonization goals.
	Simplification	Compared to traditional prescriptive programs, the MAPs reduce technical and administrative burdens on aggregators and customers by streamlining project approval, customer enrollment, savings measurement (i.e., using pop-NMEC), and incentive payment. This simplification theoretically reduces barriers to entry.
	Scale	The program is available to any aggregator who signs an Aggregator Agreement and meets qualification requirements. This market approach provides access to a growing number of aggregators, theoretically supporting competition and vendor diversity, thus spurring new and innovative solutions.

¹ For purposes of this report, we define lead implementers as third-party vendors that provided aggregator support and end-to-end program implementation services. If no third party was used and the PA implemented the program themselves, we use the term “implementer.” MCE and PG&E used lead implementers, while SCE and SDG&E were implementers. Aggregators are defined as vendors who generate energy savings for an aggregated group of customers.

² TSB is a metric used in California as of 2024 which expresses the economic value of an energy efficiency program. TSB incorporates the lifecycle energy, capacity, and GHG benefits of a program and marks a transition away from goals based on kilowatt-hours, kilowatts, and therms savings. “Measured TSB” is based on actual verified savings at the meter.

³ A pop-NMEC approach is one in which energy savings determinations are made for a portfolio of projects based on energy usage data observed at the meter, before and after the project is installed.

The study objectives for the MAP process evaluation were to:

- Characterize participation to date;
- Assess how well program design and implementation delivered on the core innovative principles of flexibility, simplification, and scale; and
- Assess program improvement opportunities.

1.1 METHODOLOGY

To address the study objectives, Opinion Dynamics conducted four separate but related research tasks:

- **Task 1. Staff Implementer Interviews:** We conducted seven semi-structured interviews with the four PAs and the two lead implementers for PG&E and MCE. These interviews focused on understanding program successes and challenges to date, key differences between programs, evaluation priorities, and data available.
- **Task 2. Data and Materials Review:** We requested program tracking data (customer and aggregator information including contact details and projects completed) and any documentation on program design and outreach that is not publicly available. We reviewed the data and materials to fully understand the program design, characterize participation, and develop data collection instruments and samples.
- **Task 3. Aggregator Interviews:** We conducted 32 structured in-depth interviews with 22 participating, 16 near participating, and 2 non-participating aggregators.⁴ We focused our questions on experience with programs, recruitment strategies, and customer solutions employed. We also asked about barriers to participation and opportunities to make the MAPs more attractive.
- **Task 4. Customer Survey:** We conducted online surveys with MAP participants. These included residential (n=199) and nonresidential (n=25) customers, as well as a segment of MCE, PG&E, and SDG&E residential customers who participated in MAP through ecobee's eco+ Thermostat Optimization program (eco+®). This program enabled participating customers to balance their homes' desired comfort with saving energy by configuring their pre-installed thermostats' settings (n=85).⁵ The survey questions focused on customers' experience with their aggregator and program processes and overall program satisfaction.

More details on the methodology can be found in Section 3.

1.2 SUMMARY OF RESULTS

In this section, we first summarize MAP participation and satisfaction of aggregators and customers. Then we present conclusions and recommendations based on each core MAP principle.

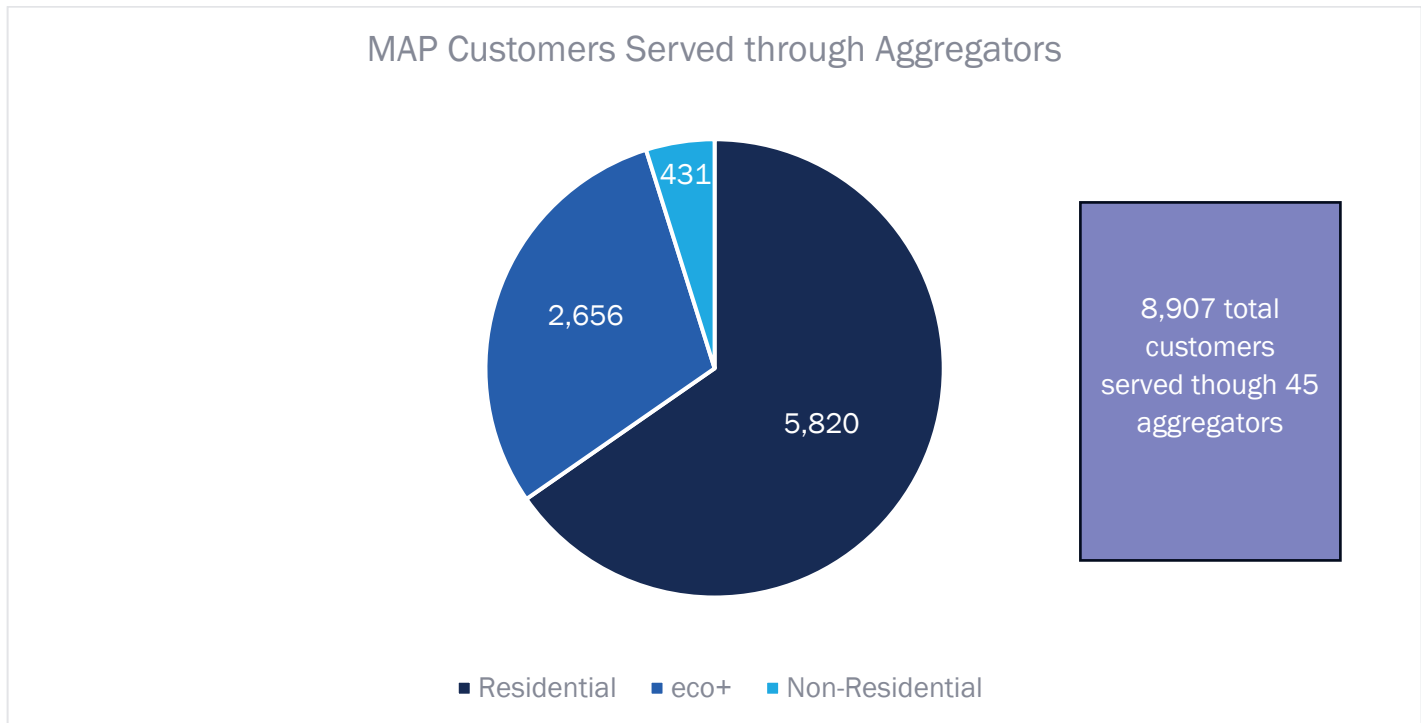
⁴ The unique count is different from the sum of each status because an aggregator could have more than one participation status if they worked across PA territories.

⁵ All product or company names that may be mentioned in this publication are tradenames, trademarks, or registered trademarks of their respective owners.

1.2.1 PARTICIPATION OVERVIEW

During the program years (2022-2023), the MAPs served almost 9,000 customers⁶ across the state of California through 45 participating aggregators (Figure 1). Data from the program staff interviews, aggregator interviews, and customer surveys suggest that overall, the program is well-liked, as indicated by high levels of satisfaction. Furthermore, it appears that market acceptance for the pay-for-performance model exists.

Figure 1. MAP Customers Served through Aggregators (2022 – 2023)



Interviewed aggregators and surveyed customers were highly satisfied with the MAP and willing to participate in a similar program in the future. Specifically, 98% of residential and 92% of non-residential respondents were either completely or somewhat satisfied with MAP and 96% of residential and 88% of non-residential respondents indicated they would recommend the program to others. All surveyed respondents indicated a high willingness to participate in a similar program in the future (residential (96%), non-residential (88%), and eco+ (87%)).

Table 2 shows the number of aggregators by PA and implementer and PA participation status. Some aggregators signed up to participate with more than one PA or implementer. Out of 168 aggregators, 45 participated by completing at least one project and 16 participated with more than one PA (i.e., completed projects in two or more PA territories).

Table 2. Summary of Aggregators by PA and PA Participation Status

PA	Implementer	PA Aggregator Participation Status			Aggregator Total by PA
		Participant ^a	Near Participant ^b	Non-Participant ^c	
MCE	Recurve	2	4	12	18
PG&E	AESC	15	36	0	51

⁶ The number of customers is derived from the number of unique contacts by name, service address, and email or phone number for residential and eco+ customers and the unique combination of business name or contact name, email or phone number, and business address for non-residential customers

PA	Implementer	PA Aggregator Participation Status			Aggregator Total by PA
		Participant ^a	Near Participant ^b	Non-Participant ^c	
	Recurve	16	25	0	41
SCE	SCE	21	72	0	93
SDG&E	SDG&E	13	7	4	24
Aggregator Total by Participation Status^d		45	109	14	168

^a We define participant aggregators as aggregators that signed up with PAs and completed at least one MAP project.

^b Near participant aggregators are aggregators that signed up with PAs but did not complete any MAP projects.

^c Non-participant aggregators are aggregators that were recruited for MAP but did not sign up to be MAP aggregators.

^d Totals by participation status represent the unique number of aggregators and may not equal the sum of the individual counts in this table.

Sources: Aggregator contact lists provided by MCE, PG&E, SCE, and SDG&E

According to information gathered through in-depth interviews, most aggregators were small businesses in terms of staffing and revenue:

- Just over two-thirds (69%) of the interviewed aggregators were smaller companies with between 2 and 30 employees
 - Large companies with 1,000 or more employees accounted for 22% of interviewed aggregators
 - Medium companies with 50 to 250 employees accounted for 9% of interviewed aggregators
- Aggregators mainly reported having established companies, with an average time in business of 15 years and a median of 9 years
- Most interviewed aggregators reported having existing relationships with the PAs

The majority (93%) of the 45 participating aggregators served non-residential customers, while 7% served residential customers, according to the program tracking data.

1.2.2 MAP PRINCIPLES

The following subsections dive deeper into each of the three core MAP principles. The pay-for-performance model and NMEC approach theoretically offer the flexibility and simplification articulated in the program theory. However, we found that this is not always the case in practice. Key barriers to fully achieving the MAP's principles were the short ramp-up time from program concept to program start, limited program years (2022–2023), and individual differences in program design.

FLEXIBILITY



The core principle of flexibility allows for aggregators to determine the correct solutions for their customers, as the MAPs do not offer a prescriptive set of qualifying measures. This theoretically enables aggregators to freely design optimal solutions that appropriately balance individual customer-specific needs with the program's energy savings, demand reduction, and decarbonization goals.

Overall Assessment: Limited

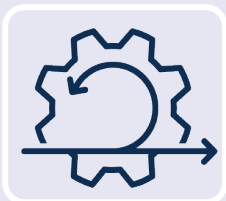
Conclusion 1: Measures not offered through traditional programs are still in demand in the market. Interviewed PAs and aggregators noted that the MAPs enabled aggregators to implement energy-saving measures that they would not have

been able to through traditional EE programs, such as lighting measures. All aggregators shared the belief that MAP's flexibility on the equipment selections and the fact that savings were "at the meter", provided opportunities for savings. This included bringing in more locations from multi-location customers, adding controls, and specifying high-efficiency equipment for lighting. Aggregators believe these options would not be possible through traditional prescriptive rebate programs.

Furthermore, according to D.21.12-011, cost-effectiveness threshold requirements were waived for the 2022 and 2023 program years, as it was an emergency program. As such, the program operated on a stand-alone basis, separate from the EE portfolios. Moving forward, MAP will become part of the PA's EE portfolios and will be subject to cost-effectiveness requirements, per D.23.06-055. It is unknown at this time how removing the cost-effectiveness exemption may impact program design in future years.

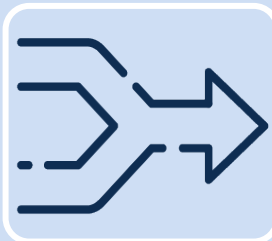
Conclusion 2: The urgency around MAP implementation, combined with the intentional flexibility provided to aggregators, translated into aggregators pursuing projects that could be implemented quickly and easily. While this is an example of MAP flexibility, it contributed to generally homogenous projects that left some customer needs unmet, particularly in the residential sector. Information gathered through program staff interviews suggests that because MAPs came about as a response to the Governor's State of Emergency proclamation, the rush to launch MAPs, implement energy-saving solutions, and achieve energy savings influenced the solutions offered to non-residential and residential customers. This is because solutions had to be quick and easy to install. Across all PAs, five distinct categories of solutions were offered to residential customers and six distinct categories to non-residential customers. Specifically, residential solutions offered included an exhaust or whole house fan, a variable-frequency drive (VFD) motor for their HVAC system, LED lighting, a pool pump, or eco+ thermostat optimization. Non-residential solutions offered were LED lighting (including fixtures); HVAC upgrades; refrigeration upgrades; behavior, retro-commissioning, and operational optimization (BRO) measures; chillers; and energy management systems.

These aggregators installed, on average, two energy-savings solutions for residential customers and one for non-residential customers. For some customers, the lack of solution offerings may have resulted in unmet needs, especially in the residential sector, as 36% of the residential survey respondents who were involved in discussing scope with their aggregators indicated that there were other energy-saving upgrades that they wanted to have done that were not included in the MAP project. While we do not know why these solutions were not included, the top residential measures desired were weatherization measures (18%), followed by high-efficiency heating and/or cooling equipment.



- **Recommendation 2:** Future recruitment efforts should include a concerted effort to identify and enroll aggregators positioned to pursue different types of projects. Additionally, PAs should consider highlighting the non-prescriptive nature of the program in recruitment efforts, which is seen as a benefit.

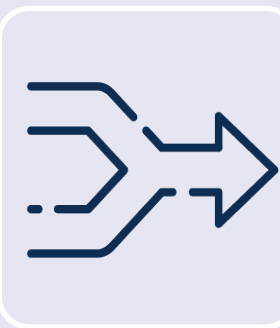
SIMPLIFICATION



The core principle of simplification means that compared to traditional prescriptive programs, the MAPs reduce technical and administrative burdens to aggregators and customers by streamlining project approval, customer enrollment, savings measurement (i.e., using pop-NMEC), and incentive payment. This theoretically reduces barriers to entry.

Overall Assessment: PA Dependent

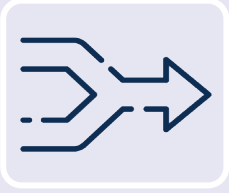
Conclusion 3: Overall, MAP successfully streamlined participation and incentive payments for aggregators and customers, but differences in individual MAP designs have created some challenges. The majority of survey respondents involved with paperwork and documentation reported that they found the process somewhat or extremely easy to complete (residential (98%), non-residential (95%)). Interviewed aggregators also noted the ease of participating as compared to traditional or custom⁷ programs. On the other hand, although MAP funding was available statewide, and many consider it a “statewide” program, the PAs implemented their programs differently. Differing processes and customer eligibility requirements across the PAs created barriers to participation and frustration among some aggregators. For aggregators working in SCE territory, this was due to the more stringent eligibility requirements and more rigorous technical review and pre-approval process compared to the other PAs. Additionally, MCE and SDG&E provided upfront incentive payments while PG&E and SCE did not, making it more difficult for aggregators with limited financial capital to participate. Moving forward, each PA will run its own distinct MAP program following the current CPUC solicitation process.



- **Recommendation 3a:** MAPs should follow a uniform design. While slight variation may be necessary due to operational differences across the PAs, at a minimum, eligibility requirements and offering an upfront incentive payment should be consistent.
- **Recommendation 3b:** PAs should consider using some of the same data portals and processes statewide. This will create a more streamlined and consistent process for implementers, aggregators, customers, and evaluators.

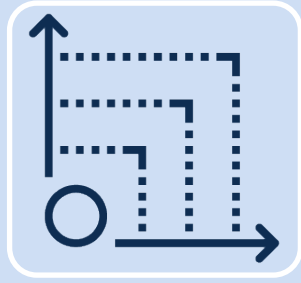
Conclusion 4: Not all sites are suitable for savings measurement using pop-NMEC, but they may have high energy savings that can be achieved at peak hours, thus reducing grid strain. A few aggregators reported that in cases where a comparison group was not identifiable to estimate savings, projects were disqualified, thus creating a barrier to participation. This mainly applied to customers with large campuses (e.g., movie studios) or specialized industrial processes. The NMEC rulebook identifies the use of comparison groups as one way to help determine energy savings, accounting for exogenous factors that impact energy usage across the population.

⁷ Customer programs “are site-specific energy efficiency projects. Custom Projects require unique calculations for each project, as they do not rely on fixed DEER or workpaper values.” <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/custom-projects-review>



- **Recommendation 4:** When traditional comparison groups are not available, consider using other approaches, such as synthetic controls.

SCALE



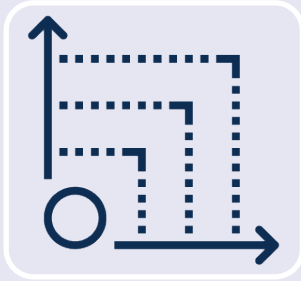
The core principle of scale means that the program is available to any aggregator who signs an Aggregator Agreement and meets qualification requirements. This market approach provides access to a growing number of aggregators, theoretically supporting competition and vendor diversity, thus spurring new and innovative solutions.

Overall Assessment: Limited

Conclusion 5: Potential for scale exists if program design and incentives remain attractive to aggregators. At this time, there is limited evidence of competition and vendor diversity, and new and innovative solutions have not arisen yet but this could be due to limited time in the marketplace so far. Scale is difficult to achieve with nascent programs, and MAPs will need to assess how their lists of participating aggregators will change over the coming years and set key performance indicators to track growth. In 2022 and 2023, at least 168 aggregators were recruited statewide to participate in MAP.⁸ Forty-five aggregators participated in MAP (27%), while 109 signed up but did not complete any projects (near participants, 65%) and 14 were recruited but did not sign up (non-participants, 8%). Two aggregators served MCE territory, 31 served PG&E territory, 21 served SCE territory, and 13 served SDG&E territory. Most interviewed aggregators reported having existing relationships with the PAs and being in business for 15 years, on average. The majority (93%) of the 45 participating aggregators served non-residential customers, while 7% served residential customers.

Most interviewed aggregators agreed that, in many cases, MAP created an opportunity to accelerate individual projects and allowed aggregators to expand projects. This was related to the relatively high level of financial incentives. Additionally, several aggregators mentioned that offering a higher percentage for the first or second incentive payments would make it more attractive for cash-strapped smaller businesses to participate. In terms of scale, this indicates that a longer running program cycle with an incentive structure that is more front-loaded may encourage a wider range of aggregators and projects.

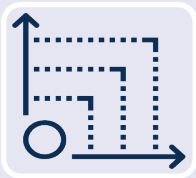
⁸ There may be more than 168 aggregators recruited for MAP because program staff noted that they only kept track of aggregators who expressed interest in participating at the time of recruitment. As such, aggregators who did not respond to PA outreach and/or recruitment efforts may not have been documented and may not be accounted for in this study.



- **Recommendation 5a:** PAs should develop key performance indicators to measure new or diverse vendor procurement. In doing so, the term “diverse” should also be defined.
- **Recommendation 5b:** PAs should consider paying a larger portion of the incentive upfront rather than all equal payments, similar to MCE or SDG&E, to attract smaller and/or more diverse aggregators.
- **Recommendation 5c:** The PAs should consider holding workshops targeted at new aggregators. Additionally, support for onboarding and training of new aggregators will be needed to ensure MAP reaches its intended scale and impact.

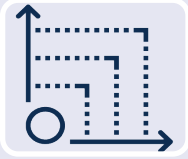
Workshops should also be held for the full network, which would provide opportunities for cooperative knowledge sharing. These workshops could address some knowledge, skills, and abilities that aggregators need to fully achieve the core principles of MAP (i.e., training or resources that could help ensure aggregators explore their customers’ needs).

Conclusion 6: Some aggregators participate across multiple PA territories, which, if encouraged, could help the continued expansion of the program; however, differences in program design could prevent gains. Out of 168 participating, near, and non-participating aggregators, 16 participated in more than one PA territory. This demonstrates the MAP’s potential to scale because not only did the program allow multiple aggregators to sign up, but it also allowed multiple aggregators to sign up with one or more PAs and implementers and offer energy-saving solutions to customers in multiple and overlapping jurisdictions across the state. However, PAs do not currently have access to aggregator contact lists from other PAs, which limits potential outreach to already interested aggregators. Additionally, aggregators working with multiple PAs reported the most barriers working with SCE. These included more stringent eligibility requirements compared to other PAs and difficulties with program communication and processes. These barriers could impact the ability to scale effectively within SCE territory.



- **Recommendation 6:** PAs could consider data-sharing practices that would allow for aggregator participation contact data (including near and non-participants) to be shared across the PAs in an effort to increase participation and help scale the program.

Conclusion 7: MAP may be more feasible to scale for the non-residential sector, given that it is easier to achieve detectable savings at the meter. Interviewed aggregators discussed less risk and larger payouts with this sector. PAs reported that finding aggregators for the residential sector was challenging because for detectable savings to be achieved and for the program to be worth their investment of time, resources, and funds, aggregators would need to recruit large numbers of residential customers to participate. This proved difficult given the rush to launch the MAPs to achieve energy savings. However, there may be additional opportunities in the residential sector that leverage existing networks of customers such as original equipment manufacturers (OEMs) specializing in efficient or demand-reducing products such as heat pump water heaters or electric vehicle chargers. Similar to ecobee, other OEMs may be able to have widespread participation across multiple PA territories, which results in large energy savings in the aggregate and low-risk.



- **Recommendation 7:** PAs should consider recruiting additional OEMs as aggregators to increase aggregator and customer participation.

The rest of the report is organized as follows:

- Section 2 serves as the introduction and provides background about MAP and an overview of the study;
- Section 3 outlines our methods;
- Section 4 details our findings; and
- Section 5 provides conclusions and recommendations.

2. INTRODUCTION

2.1 BACKGROUND

On July 30, 2021, the Governor of California issued a Proclamation of a State of Emergency in response to the significant and accelerating impacts of climate change in California. The Governor called out an anticipated 3.5-gigawatt energy supply shortage during peak periods in 2021 that would grow larger in coming years. The Proclamation stated, among other things, that the entities responsible for California’s electric system—the California Public Utilities Commission (CPUC or Commission), California Independent System Operator, and California Energy Commission—should take actions to mitigate the risk of capacity shortages in the short term while additional clean energy resources (e.g., storage and renewable generation capacity) are installed longer-term. In response to the Proclamation, the Commission issued Decision (D.) 21-12-011 on December 8, 2021, which authorized up to \$185 million in incremental EE funding for program years 2022 and 2023. The largest allocation was \$150 million statewide for a new Market Access Program (MAP) funded for 2022 and 2023. Subsequently, the CPUC issued D. 23-02-002, which extended the MAP project installation deadline to March 31, 2024, to provide additional time for aggregators to complete projects.

Four Program Administrators (PAs) used this funding to offer a MAP in 2022 and 2023:

- Marin Clean Energy (MCE) Residential Efficiency Market Program
- Pacific Gas and Electric (PG&E) Market Access Program
- Southern California Edison (SCE) Summer Reliability Program
- San Diego Gas and Electric (SDG&E) Summer Reliability Market Access Program

All four programs share a fundamental design. The MAPs use a pay-per-performance structure where qualified aggregators identify and complete EE projects. Aggregators are paid incentives based on the project’s Total System Benefit (TSB), measured at the meter using a population-level Normalized Metered Energy Consumption (pop-NMEC) approach. The program specifically addresses grid constraints by offering a “kicker” (i.e., additional incentive) for savings achieved during “peak” (4:00 p.m.–9:00 p.m.) and “net peak” (4:00 p.m.–7:00 p.m.) hours from June through September.

All four programs also differ in aspects of their program design, which we detail in Section 4.1.3.

2.2 OVERVIEW OF STUDY

The CPUC selected Opinion Dynamics to conduct a process evaluation covering 2022 and 2023 program activities across the four PAs. The purpose of the evaluation centered around three main objectives: characterizing participation to date; assessing how well program design and implementation delivered on the core innovative principles of flexibility, simplification, and scale; and identifying whether there are opportunities to improve the programs to increase participation and peak reduction in the future.

The evaluation sought to answer the research questions detailed in Table 3, which are organized to align with each subsection in Section 4. To address the study’s objectives and answer the research questions, the Opinion Dynamics’ evaluation team employed a mixed-methods research approach that leveraged existing data sources and collected new primary data.

Table 3. MAP Process Evaluation Research Questions

Research Questions
Overarching Design and Implementation Assessment
<ul style="list-style-type: none"> ▪ What have been the key successes, challenges, and lessons learned in the first two years of program delivery from the perspective of PAs, lead implementers, and aggregators? ▪ Are there any adjustments to program design or implementation processes that PAs and lead implementers suggest would support the longer-term success of the programs? ▪ How do the MAPs vary in design, and what implications do those differences have regarding resonating with the market and delivering on the innovative program theory?
Participation Characterization
<ul style="list-style-type: none"> ▪ How many aggregators and how many customers participated in 2022 and 2023? What is the mixture of customer solutions (i.e., technologies, measures, or energy management approaches) provided? ▪ How many aggregators signed up for MAPs but ultimately did not complete projects (“near participants”)? ▪ What are the characteristics of participating aggregators? How many are relatively small versus large companies in terms of staffing and revenue? How many are new versus relatively established companies in terms of years in business? ▪ What are the household, home, and business characteristics of participating customers? What proportion of customers participated in PA programs prior to MAP?
Aggregator Perspectives
<ul style="list-style-type: none"> ▪ What attracted participating aggregators to the MAPs? What concerns or risks did aggregators weigh when deciding whether to participate? What feedback do they have on the initial sign-up and qualification process? ▪ What strategies do participating aggregators use to market and recruit customers? Is there an ideal type of customer that aggregators try to recruit (e.g., residential or commercial; market-rate or low-income households)? What opportunities and barriers does the MAP design create for identifying and recruiting projects? What feedback do aggregators have on the marketing, customer targeting, performance analytics, and other support provided by the PAs and lead implementers? ▪ What feedback do participating aggregators have on project implementation processes, such as customer eligibility, project approval, and incentive payment? Do they feel these processes are sufficiently streamlined to reduce barriers to entry? How does their experience with MAPs compare to their experiences, if any, with prescriptive PA programs? Were they able to unlock any savings they previously could not capture through traditional EE programs? ▪ What types of customer solutions are participating aggregators able to implement through MAPs that they are typically unable to implement through prescriptive programs? What customer solutions do participating aggregators use to specifically target peak and net peak period savings? How, if at all, does MAP design or the pop-NMEC approach inhibit providing optimal solutions for their customers’ needs? ▪ What barriers to completing projects do near-participant aggregators experience? Was there anything about the MAP design, requirements, or implementation processes that did not meet their expectations? ▪ What are the barriers to entry for non-participating aggregators? How aware and interested are non-participating aggregators? Do they perceive MAP to be a good fit for their services; why or why not? How could the MAP design be more attractive and less risky for non-participating aggregators?
Customer Perspectives
<ul style="list-style-type: none"> ▪ What feedback do participating customers have on their experience working with their aggregator? To what extent were they involved in program processes (e.g., paperwork), and what is their feedback on those experiences? ▪ How prescriptive were the aggregators in the options they gave customers? Did customers feel they had reasonable flexibility to include additional components to the projects to meet all their needs? Are there any energy or non-energy (e.g., health & safety, cosmetic) upgrade desires or needs that the aggregator did not or could not provide? ▪ Would customers participate again if they had the opportunity? Based on their experiences, would they recommend the program to others?

3. METHODS

We employed a mixed-methods research approach that leveraged existing data sources and collected new primary data through in-depth interviews and surveys. The following sub-sections detail these methods.

3.1 STAFF IMPLEMENTER INTERVIEWS

We conducted seven semi-structured (i.e., discussion-oriented) interviews with the PAs and their lead implementers. The purpose of these interviews was to,

- Discuss MAP performance and key successes and challenges from the perspective of PAs and lead implementers;
- Clarify design and implementation details;
- Determine the data available to support the evaluation; and
- Collect feedback on evaluation priorities.

We interviewed staff from the four PAs: PG&E, MCE, SDG&E, and SCE. Additionally, we interviewed staff from Alternative Energy Systems Consulting, Inc. (AESC), the lead implementer of the PG&E program, and Recurve, the lead implementer for the MCE and PG&E programs. SCE and SDG&E did not work with lead implementers.

3.2 DATA AND MATERIALS REVIEW

Opinion Dynamics submitted a request for data and materials to support the process evaluation tasks. We received and reviewed the following types of data and materials:

- Documentation related to program design and implementation;
- Program tracking databases;
- Contact lists for participating aggregators and customers; and
- Any data sources (e.g., recruitment lists) that contain non-participating aggregator contacts.

3.3 AGGREGATOR INTERVIEWS

We interviewed 32 aggregators across California who served residential and commercial customers. For this evaluation, aggregators were defined as **participants** if they completed at least one project, **near participants** if they signed up but did not complete a project,⁹ and **non-participants** if they expressed interest but did not complete the sign-up process. Technically, an aggregator could have more than one participation status, as there were aggregators who could be a participant with one PA and a non-participant with another PA. Table 4 summarizes the aggregator interview sample characteristics below by PA participation status.

⁹ To sign up, aggregators completed a PA-specific participation agreement and submitted required documentation. In addition to completing the participation agreement, these aggregators also agreed to PA-specific Terms and Conditions (T&Cs) but did not submit any projects.

Table 4. Aggregator Interview Sample Characteristics

PA Participation Status	Interview Sample	% of Aggregator Population
Participants	22	48%
Near-Participants	16	13%
Non-Participants	2	13%
Total Aggregators (unique)^a	32	19%

^a The unique count for total aggregators differs from the sum of each status because an aggregator could have more than one participation status if they worked across PA territories.

Note: See Table 8 for more information on the aggregator population.

The interviews took approximately 45–60 minutes, and we offered a \$100 incentive to thank aggregators for their time. Interviews were recorded for analysis purposes. The overarching purpose of these interviews was to,

- Gather aggregator feedback on MAP design and implementation, including:
 - The sign-up process;
 - Communications and support from lead implementers and PAs;
 - Project approval processes; and
 - Incentive calculation and payment.
- Explore participating aggregator’s customer targeting, marketing, recruitment, and project scoping strategies.
- Explore why non- or near-participating aggregators have not signed up or completed projects.
- Compare the MAP’s benefits and drawbacks to traditional prescriptive programs.

3.4 CUSTOMER SURVEY

The evaluation team surveyed PA residential and non-residential customers who completed MAP projects through aggregators. We fielded three web surveys, each focusing on a specific group of customers: residential customers who enrolled in eco+ (eco+), residential customers who did not participate in eco+ (residential), and non-residential customers (non-residential).¹⁰ We conducted three surveys because PA staff interviews revealed that customers’ MAP experiences varied across the three participant groups (i.e., eco+, residential, and non-residential). While survey questions were similar, language differed slightly across the three surveys; we also excluded several inapplicable questions from the eco+ survey.¹¹ Appendix B contains the three participant surveys.

The surveys aimed to:

- Understand the end-user experience with MAPs, including their interactions with the aggregator;
- Identify how the MAP design creates opportunities or barriers for completing projects and meeting their needs;
- Examine customer satisfaction with their overall experience; and,
- Collect key demographics and firmographics to characterize participating customers.

¹⁰ The evaluation team fielded the three surveys in March and early April 2024. Specifically, we fielded the eco+ survey from March 21 to March 27, 2024, the residential survey from March 21 to March 29, 2024, and the non-residential survey from March 25 to April 3, 2024.

¹¹ For instance, because all eco+ MAP customers were contacted by the aggregator (ecobee) to invite them to enroll in eco+, the eco+ survey did not include a question about the customer’s first contact with their aggregator.

The evaluation team used a census approach (i.e., attempting to contact all participants with contact information) for all three surveys to maximize survey responses. Table 5 summarizes the population, sample, and survey completes along with details about exclusions from the sample, which were due to duplicate contacts and non-residential projects without any project information or participant contact information.

Table 5. Survey Sample Summary

PA	Population			Sample		Survey Completes		
	Count Unique Participant	Percent of Subtotal	Percent of Population Total	Count Unique Participant	Percent of Population	Count Unique Participant	Percent of Sample	Percent of Population
ecobee®^a								
PG&E	1,814	68%	20%	1,804	99%	54	3%	3%
SDG&E	732	28%	8%	732	100%	27	4%	4%
MCE	120	5%	1%	120	100%	4	3%	3%
SCE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Subtotal	2,656^b	100%	30%	2,656	100%	85	3%	3%
Residential^c								
PG&E	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
SDG&E	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
MCE	1	0.02%	0%	1	100%	0	0%	0%
SCE	5,819	100%	65%	5,674	98%	199	4%	3%
Subtotal	5,820	100%	65%	5,675	98%	199	4%	3%
Non-Residential^d								
PG&E	213	49%	2%	80	38%	13	16%	6%
SDG&E	71	16%	1%	42	59%	8	19%	11%
SCE	147	34%	2%	16	11%	4	25%	3%
MCE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Subtotal	431	100%	5%	138	32%	25	18%	6%
Overall Total	8,907^b		100%	8,469	95%	309	4%	3%

^a The total number of eco+ participant sites (N = 2,656) is based on unique contact, and service address. Ten records based on PA, contact information and service addresses were duplicates due to being listed as participants through both PG&E and MCE. We excluded these ten duplicate records from the subtotal and overall total to ensure that the ecobee population and sample was unique based on contact email and/or phone number. This resulted in a total population and sample counts of 2,656.

^b The subtotal may be less than the sum of the participant counts by PA because there are 10 participants who were in both PG&E and MCE participant lists. Duplicates due to this were excluded from the subtotal.

^c The total number of unique residential participants is 5,820 based on unique service addresses. The evaluation team excluded 145 duplicate records from the sample, which resulted in a sample of 5,675 for the residential participant survey.

^d The total number of unique participant sites among non-residential participants is 431; however, projects without contact information (n=69) and projects without project information (n=3) were excluded from the sample. The evaluation team also excluded 221 duplicate records based on contact information and randomly selected the facility/property to ask about in the survey.

Sources: Program tracking data from MCE, PG&E, SCE, and SDG&E

All sampled participants received one initial email invitation and two email reminders. The evaluation team also followed up with unresponsive non-residential customers by phone at least two times to help increase the number of respondents to the non-residential survey. Upon completion of the surveys, the evaluation team offered incentives of \$20 for residential customers (including eco+) and \$40 for non-residential customers to thank them for their time.

Table 6 shows the response rates for the eco+, residential, and non-residential surveys, as well as the overall response rate. Appendix C details the dispositions for each survey and the methodology for the response rate calculation.¹²

Table 6. Survey Response Rates

Survey	Response Rate
eco+	4%
Residential	4%
Non-Residential	20%
Overall	4%

Note: The evaluation team used the American Association for Public Opinion Research (AAPOR) Response Rate 3 (RR3).

¹² Dispositions are the results for each potential response to a survey, these could include survey bounce-backs, ineligible respondents, or respondents who may end the survey prior to completion. Each of these dispositions are used to calculate response rates for surveys.

4. RESULTS

4.1 OVERARCHING DESIGN AND IMPLEMENTATION ASSESSMENT

We assessed the design and implementation of the MAPs through document review and interviews with PA staff and implementers. In this section, we discuss PA and implementer feedback and key design differences.

4.1.1 ALIGNMENT WITH PROGRAM THEORY

The four MAPs offered through PG&E, SDG&E, SCE, and MCE share a common program theory based on three core principles: flexibility, simplification, and scale.



Flexibility: The programs do not offer a prescriptive set of qualifying measures. Instead, aggregators may determine the correct solutions for their customers. This theoretically enables aggregators to freely design optimal solutions that appropriately balance individual customer's specific needs with the program's energy savings, demand reduction, and decarbonization goals.

Interviews with program staff and implementers highlighted that the projects were aggregator-driven. Each participating aggregator could design their own programs or business models and market to customers accordingly. Since general rules of traditional EE programs do not apply to MAP, it gave aggregators the flexibility to offer participants a wide variety of energy-saving solutions, provided that the measures saved energy, complied with the law, met California's building code, and were supplemental to energy-saving solutions offered through each of the PAs' existing EE programs.

Through the MAPs, aggregators implemented energy-saving solutions that PA EE programs may no longer offer; however, they did not push the needle on new technologies or solutions offerings. While the MAPs did not prescribe specific energy-saving solutions, program staff indicated that they did not observe any new types of technologies or energy-saving solutions offered through the MAPs. PAs, however, noted that the MAPs enabled aggregators to implement necessary energy-saving measures that they would not have been able to implement through traditional EE programs. For instance, lighting technologies previously included in EE programs but no longer offered through EE programs were still viable energy-saving measures among non-residential and residential MAP participants.

In addition to lighting, measures aggregators implemented through the MAPs for non-residential participants included HVAC equipment, energy management systems (EMS), chillers, and refrigeration measures. MCE, PG&E, and SDG&E residential customers participated through ecobee's eco+ Thermostat Optimization program, which enabled participating customers to balance their homes' desired comfort with saving energy by configuring their pre-installed thermostats' settings.¹³ SCE residential customers received either LED lighting, efficient condenser motors for HVAC, and/or whole-house fans. SCE did not have any participants through ecobee because SCE has a similar program as ecobee's eco+ Smart Optimization program, and, according to aggregator feedback, SCE would not allow bulk enrollment of participants.

Insights from the program staff interviews also suggest that the short turnaround time between launching and achieving energy savings affected the MAPs' intended flexibility. As MAPs came about in response to the Governor's State of Emergency proclamation, there was an urgency to launch MAPs, implement energy-saving solutions, and achieve energy savings. This urgency influenced the variety of solutions offered to non-residential and, more so, to residential

¹³ ecobee. *Eco+ Thermostat Optimization Pilot Report*, November 2020, prepared by Demand Side Analytics, https://assets.ctfassets.net/a3qyhfznts9y/730mnWiAPRKsoJMACqiBkD/e5b9032cb24a0ddedbc636703c1698de/eco_FINAL_Executive_Summary.pdf.

customers because solutions to be offered and implemented also had to be quick and easy to install. As such, while the program aimed to be flexible, the short turnaround times between launching and achieving energy savings affected the MAPs' intended flexibility.

In addition to the flexibility in energy-saving solutions, the MAPs also allowed aggregators to recruit and market to customers based on their own marketing and recruitment strategies. While one PA offered free cobranded materials, most aggregators serving that PA did not make use of them and conducted their own marketing and outreach activities (see Section 4.1.3). Further, the MAPs enabled aggregators to contact and recruit the same customers even in areas where service territories overlap, such as PG&E and MCE's service territories.



Simplification: Compared to traditional prescriptive programs, the MAPs reduce technical and administrative burdens to aggregators and customers by streamlining project approval, customer enrollment, savings measurement (i.e., using pop-NMEC), and incentive payment. This simplification theoretically reduces barriers to entry.

Interviews with program staff and implementers highlighted that MAPs allowed them to launch projects, achieve savings quickly, and provide energy-saving results early. The less rigid rules on eligible energy-saving solutions that could be implemented through the MAPs contributed to the relatively simplified process of participating in the program for aggregators as well as residential and non-residential customers.

Program staff indicated that the MAPs' participation processes are simpler and more streamlined than traditional energy-saving programs. For instance, most PAs (MCE, PG&E, and SDG&E) did not require projects to be pre-approved prior to installation/implementation. Before implementation, reviews focused on reviewing customer and project details to verify and assess customer eligibility, estimate project savings, project cost and incentives, and estimate TSB. More rigorous and detailed project reviews occurred after the implementation of energy-saving solutions, prior to paying out incentives to aggregators.

While there were no rigorous project reviews upfront when MAPs started, one PA (SCE) reported that around June 2023, they needed to establish a review and pre-approval process for non-residential projects before implementation of measures. SCE deemed this necessary because some aggregators installed measures before the projects were reviewed. SCE established an upfront review and pre-approval process to reduce risk; however, aggregators found SCE's MAP more complicated than other PAs' MAPs. SCE reported that the pre-approval process may have caused delays for some aggregators. They have also acknowledged that this process may become a barrier for both aggregators and customers to participate. Therefore, SCE noted that they may revisit this process for future program years to make it more feasible for all parties involved.

The meter-based measurement and verification (M&V) of savings or NMEC used to determine energy savings achieved by the MAPs has also contributed to the more simplified process of assessing program savings and paying out incentives. NMEC has allowed PAs to track and measure savings quickly and provide quarterly payments to aggregators. Despite this, at least one PA noted that using pop-NMEC can be more statistically challenging than using site-level NMEC for certain types of non-residential customers like indoor agricultural companies and facilities because it requires having comparison groups, which is difficult for agricultural facilities. Apart from this, PAs noted no other challenges with NMEC and have found that using NMEC to measure savings is helpful for a program like MAP that requires quick turnaround times from the start of projects to project completion and incentive payouts.



Scale: The program is available to any aggregator who signs an Aggregator Agreement and meets qualification requirements. This market approach provides access to a growing number of aggregators, theoretically supporting competition and vendor diversity, thus spurring new and innovative solutions.

Program and implementer staff interviews indicated challenges with scaling MAPs, especially within two years. Program staff and implementers highlighted that the MAPs allowed various aggregators to participate. However, program staff did not report seeing competition, increased vendor diversity, or new technologies. As such, no new and innovative solutions were spurred, as program theory suggested.

Residential MAPs faced challenges with aggregator recruitment while non-residential MAPs did not. PAs reported that finding aggregators for the residential sector was challenging because they would need to recruit large numbers of residential customers to participate in order to achieve significant savings and for the program to be worth their investment of time, resources, and funds. Given the rush to launch the MAPs to achieve energy savings, this proved difficult. At least one PA noted that MAPs targeting residential customers would have been easier to scale with ample time to recruit aggregators and customers to participate.

4.1.2 PROJECT RISKS

There are inherent cost-effectiveness risks to a program that is highly flexible and simplified in terms of project approval. However, these risks are mitigated by only paying for the measured TSB and peak period savings achieved, shifting the onus onto aggregators for identifying and completing only high-performing projects.

Program staff noted that because MAP incentives were based on a pay-per-performance structure in which incentive amounts were determined by measured TSB, PAs and aggregators shared an interest in program success. However, PAs did not shoulder as much risk as the aggregators. PAs noted that risk falls more on the aggregators, whether they received upfront payments or not, because aggregators had to shoulder most or all project costs upfront. While PAs performed project reviews before project implementation, there was some uncertainty as to whether all completed projects would pass the final technical review and approval process at the end of the project. Further, since MAP projects were not subject to the same rules as projects within the EE portfolio, such as cost-effectiveness, project costs could be much higher relative to the TSB, which may affect incentive amounts as savings may or may not be large enough. As such, aggregators had to be more accountable and make sure that savings forecasts were accurate, energy-saving solutions worked, and projects were implemented properly.

Program staff indicated that residential projects posed more risk for aggregators because of the high potential upfront costs and low savings achieved by residential projects. On the other hand, non-residential projects posed less risk due to the higher savings that could be achieved.

4.1.3 PROGRAM DIFFERENCES









While the overarching concept is similar, the four programs are not identical (see summary of differences in Table 7). They differ in at least the following ways based on publicly available materials and interviews with PA staff and implementors:

- MCE and PG&E worked with third-party “lead implementers” (i.e., third-party vendors that provide aggregator support and end-to-end program implementation services), whereas SDG&E and SCE implemented their programs in-house.
 - While SCE led the implementation of the Summer Reliability Program, SCE reached out to AESC and Energy Solutions to help with marketing and recruitment of Trade Professionals (i.e., aggregators)¹⁴ that served commercial customers. In addition, kW Engineering and Demand Side Analytics supported SCE in conducting technical and engineering reviews of projects.

¹⁴ MCE, PG&E, and SDG&E used the term aggregator while SCE used the term “Trade Professional”

- While the Mendota Group represented SDG&E and led the implementation of SDG&E’s Summer Reliability Market Access Program, Demand Side Analytics worked with the Mendota Group to develop and implement SDG&E’s MAP and MAP platform. Both implementers acted as part of SDG&E rather than third-party implementers such as AESC and Recurve.
- The programs had different target markets. MCE’s program targeted residential customers. PG&E and SCE targeted residential and commercial customers, while SDG&E targeted residential, commercial, industrial, agricultural, and public sector customers.
- PAs differed in their marketing to their customers. PG&E and SDG&E conducted some customer-targeted marketing of their MAPs. At the same time, MCE offered aggregators free co-branded materials, and SCE did not conduct direct-to-customer marketing, allowing aggregators to conduct their own marketing and outreach toward customers.
- Incentive payment schedules also differed between PAs. MCE provided partial upfront payments of 20% of the forecasted project incentive payments to aggregators at the beginning of projects. In comparison, SDG&E provided 40% upfront payments. These upfront payments were debited from the final incentive payments. PG&E and SCE did not offer upfront payments.
 - In addition to partial upfront payments, aggregators who served PG&E and MCE also received regular payments to cover “market management costs,” such as ongoing administrative overhead and marketing, which were deducted from project incentive payments.
- All PAs conducted technical or engineering reviews after projects were completed, prior to final approval and payment of incentives; however, they differed in pre-project implementation review.
 - MCE did not require any upfront engineering review and pre-approval before project implementation but checked applications or enrollment submissions for eligibility and completion prior to official enrollment into their program.
 - PG&E and SDG&E conducted pre-project implementation reviews of customer and project details (including load shapes) and estimated savings. However, they conducted upfront reviews with less rigor than the technical or engineering reviews and project approval processes conducted after projects have been completed.
 - SCE, on the other hand, established a more rigorous technical review and pre-approval process upfront to help mitigate risk for both SCE and the aggregators. Program staff noted that SCE wanted to establish a precise project intake process upfront. For instance, SCE requested aggregators break down technology by type instead of providing deemed load shape. These risk mitigation strategies also increased SCE’s pre-project implementation review process timeframe compared to other PAs’ upfront project review timeframes, ultimately limiting their program's flexibility. It also made the participation process more complex for participating aggregators, which goes against MAP’s relatively simplified program participation process.

Table 7. Comparison of MAP Implementation Components by PA

Program Components	 Residential Efficiency Market Program	 Market Access Program	 Summer Reliability Program	 Summer Reliability Market Access Program
Lead Implementer	<ul style="list-style-type: none"> Recurve 	<ul style="list-style-type: none"> Recurve Alternative Energy Systems Consulting, Inc. (AESC) 	<ul style="list-style-type: none"> SCE^a 	<ul style="list-style-type: none"> SDG&E
Target Customer	<ul style="list-style-type: none"> Residential 	<ul style="list-style-type: none"> Residential Commercial 	<ul style="list-style-type: none"> Residential Commercial 	<ul style="list-style-type: none"> Residential Commercial Industrial Agricultural Public
Marketing, Outreach, and Education (ME&O)	<ul style="list-style-type: none"> Recurve promoted and recruited aggregators MCE offered free co-branded materials to aggregators MCE logo approval required Aggregators conducted direct-to-customer ME&O 	<ul style="list-style-type: none"> Recurve and AESC recruited aggregators Aggregators conducted direct-to-customer ME&O PG&E conducted marketing to some extent 	<ul style="list-style-type: none"> SCE recruited aggregators Marketing conducted by AESC and Energy Solutions toward aggregators Aggregators conducted direct-to-customer ME&O 	<ul style="list-style-type: none"> SDG&E recruited aggregators SDG&E conducted presentations and outreach events Aggregators conducted direct-to-customer ME&O
Pre-project Engineering / Technical Review or Pre-approval				
Post- project Engineering / Technical Review and Final Approval				
Quality Assurance	<ul style="list-style-type: none"> Did not require pre or post on-site audits May conduct on-site inspections for quality assurance on a random sample of projects to confirm projects were implemented 	<ul style="list-style-type: none"> Third-party quality assurance is conducted by the lead implementer upon project intake and post-project implementation, during the M&V period, or both 	<ul style="list-style-type: none"> SCE reserved the right to selectively inspect completed projects prior to processing incentive payments 	<ul style="list-style-type: none"> SDG&E verified installation for each project Compared planned projects with actual completed projects Inspected completed projects
Incentive Payment Schedule	<ul style="list-style-type: none"> Offered upfront payments of up to 20% of the forecasted incentive payment one month after project enrollment Quarterly incentive payments 	<ul style="list-style-type: none"> Incentives were paid quarterly after completion of projects and assessment of savings 	<ul style="list-style-type: none"> Did not provide incentive payments upfront and paid after projects were completed and approved Issued three payments every 60 to 90 days 	<ul style="list-style-type: none"> Offered upfront payments of up to 40% of the forecasted incentive payment but not more than 50% of the project cost Quarterly post-installation payments

^a SCE implemented its MAP but worked with other companies on various MAP components of the Summer Reliability Program. For instance, SCE contacted AESC and Energy Solutions to perform marketing and outreach for their commercial MAP to recruit Trade Professionals. SCE also worked with kW Engineering to conduct project technical reviews and demand side analytics.
 Sources: PA Program Implementation Plans and Program Staff Interviews

4.2 PARTICIPATION SUMMARY AND CHARACTERIZATION

This section summarizes participating aggregators and customers by PA and implementers, as well as energy-saving solutions completed through MAP. We also provide information to help characterize aggregators and residential and non-residential customers.

4.2.1 AGGREGATORS

NUMBER OF AGGREGATORS

In 2022 and 2023, at least 168 aggregators were recruited statewide to participate in MAP.¹⁵ As described in Section 3.3, an aggregator could have more than one participation status, as aggregators could be a participant with one PA and a non-participant with another PA. To better understand participation status statewide and not double count aggregators, we calculated counts based on “statewide participation status” (Table 8, see table notes). As such, if the aggregator was a participant for one PA and a near-participant for another PA, their statewide participation status would identify them as a participant since they completed at least one project for at least one PA.

Many aggregators showed interest in MAP but failed to follow through and complete a project. As shown in Table 8, of the 168 aggregators, about a quarter participated in MAP by signing up for the program and completing at least one energy-saving project for at least one PA, while about two-thirds signed up for MAP but did not complete any projects. A small number of aggregators expressed interest in MAP but did not sign up for MAP and, therefore, did not complete any projects.

Table 8. Summary of Aggregators by Statewide Participation Status

Statewide Participation Status	Number of Aggregators	Percent (n=168)
Participant ^a	45	27%
Near Participant ^b	109	65%
Non-Participant ^{c, d}	14	8%
Total	168	100%

^a We define participant aggregators as aggregators that signed up with PAs and completed at least one MAP project.

^b Near participant aggregators are aggregators that signed up with PAs but did not complete any MAP projects.

^c Non-participant aggregators are aggregators that were recruited for MAP but did not sign up to be MAP aggregators.

^d The actual number of non-participating aggregators is unknown because most PAs and implementers only kept track of aggregators who responded to their outreach or recruitment efforts.

Table 9 shows the number of aggregators by PA and implementer and PA participation status. Some aggregators signed up to participate with more than one PA or implementer. Out of 168 aggregators, 16 participated with more than one PA (i.e., completed projects in two or more PA territories). This demonstrates the scalability of the program as it allowed multiple aggregators to sign up with one or more PAs or implementers and offer energy-saving solutions to customers in multiple and overlapping jurisdictions across the state.

¹⁵ There may be more than 168 aggregators recruited for MAP because program staff noted that they only kept track of aggregators who expressed interest in participating at the time of recruitment. As such, aggregators who did not respond to PA outreach and/or recruitment efforts may not have been documented and may not be accounted for in this study.

Table 9. Summary of Aggregators by PA and PA Participation Status

PA	Implementer	PA Participation Status			Total by PA
		Participant ^a	Near Participant ^b	Non-Participant ^c	
MCE	Recurve	2	4	12	18
PG&E	AESC	15	36	0	51
	Recurve	16	25	0	41
SCE	SCE	21	72	0	93
SDG&E	SDG&E	13	7	4	24
Total by Participation Status^d		45	109	14	168

^a We define participant aggregators as aggregators that signed up with PAs and completed at least one MAP project.

^b Near participant aggregators are aggregators that signed up with PAs but did not complete any MAP projects.

^c Non-participant aggregators are aggregators that were recruited for MAP but did not sign up to be MAP aggregators.

^d Totals by participation status represent the unique number of aggregators and may not equal the sum of the individual counts in this table.

Sources: Aggregator contact lists provided by MCE, PG&E, SCE, and SDG&E

AGGREGATOR CHARACTERISTICS

According to information gathered through in-depth interviews, most aggregators were small businesses in terms of staffing and revenue. Just over two-thirds (69%) of the interviewed aggregators were smaller companies with between 2 and 30 employees. Large companies with 1,000 or more employees accounted for 22% of aggregators, and the remaining 9% were companies with between 50 and 250 employees.

Interviewed aggregators also mainly reported having established companies, with an average time in business of 15 years and a median of 9 years.

A review of program tracking data indicated that the majority (93%) of the 45 participating aggregators served non-residential customers, while 7% served residential customers. This is reflected in the number of aggregators that completed interviews with the evaluation team. Nearly all (save for two) of the aggregators that completed interviews with the evaluation team served commercial and industrial customers as part of their business model. These aggregators provided general consulting on customer energy use and EE options, managed project planning and development, or both.

A minority of interviewed aggregators focused on residential customers (n = 2, one participant and one non-participant). Both focused on heating and air conditioning measures. Program staff interviews revealed that the number of aggregators who served residential customers was limited due to relatively lower energy savings and incentives that could be achieved from residential projects compared to non-residential projects. The short turnaround times needed by the MAP to complete projects and realize energy savings also affected the recruitment of aggregators for residential customers.

MIX OF CUSTOMER SOLUTIONS OFFERED

Despite the limited number of aggregators who served residential customers, the three residential aggregators implemented 8,460 residential projects as part of MAP in 2022 and 2023 (Table 10). Residential participants who received actual measures through MAP received an average of two different energy-saving solutions within their project. More than two-thirds (68%) of residential customers received an exhaust/whole house fan, a VFD motor for their HVAC system, LED lighting, or any combination of these measures, while one residential customer received a pool pump. About one-third of residential customers participated through ecobee's eco+ Thermostat Optimization program in which customers who have pre-installed ecobee thermostats could configure their devices' settings (e.g., humidity settings,

Smart Home & Away features, Schedule Assistant), turn some features on or off, select their time-of-use (TOU) rate, and enroll in their utilities' demand response programs.¹⁶

Table 10. Mix of Residential Customer Energy-Saving Solutions

PA	Energy-Saving Solution	Number of Projects ^a	Percent of Projects (n=8,460)
SCE	Exhaust fan/whole house fan	4,471	53%
	HVAC motor	3,694	44%
	LED lighting	667	8%
	SCE Total	5,793	68%
MCE	Pool pump	1	<1%
	eco+ Thermostat Optimization	120	1%
	MCE Total	121	1%
PG&E	eco+ Thermostat Optimization	1,814	21%
	PG&E Total	1,814	21%
SDG&E	eco+ Thermostat Optimization	732	9%
	SDG&E Total	732	9%
Total Residential Projects		8,460	100%

^a Totals represent the unique number of completed projects based on unique service addresses and may not equal the sum of the individual counts in this table. Projects could include one or more energy-saving solutions.

Sources: Program tracking databases provided by MCE, PG&E, SCE, and SDG&E

On the other hand, non-residential customers received a relatively more diverse mix of energy-saving solutions from various MAP aggregators who worked with PG&E, SCE, or SDG&E (Table 11).¹⁷ Aggregators installed LED lighting and HVAC equipment in non-residential properties and facilities across all three jurisdictions. Other energy-saving solutions installed included refrigeration equipment, chillers, and EMS. Some non-residential PG&E customers also received BRO measures through MAP.¹⁸ While aggregators offered a relatively more diverse set of energy-saving solutions to non-residential customers, non-residential customers received an average of one energy-saving solution type. Information gathered through program staff interviews suggests that the rush to launch and complete projects and realize savings also influenced the types of solutions offered to customers.

Table 11. Mix of Non-Residential Customer Energy-Saving Solutions

PA	Energy-Saving Solution	Number of Projects ^a	Percent of Projects (n=743)
PG&E	LED lighting (including fixtures)	414	56%
	HVAC upgrades (including motors, retrofits, maintenance, and controls)	71	10%

¹⁶ ecobee. *Eco+ Thermostat Optimization Pilot Report*, November 2020, prepared by Demand Side Analytics, https://assets.ctfassets.net/a3qyhfznts9y/730mnWiAPRKsoJMACqiBkD/e5b9032cb24a0ddedbc636703c1698de/eco_FINAL_Executive_Summary.pdf.

¹⁷ MCE also offers a MAP-like non-residential program; however, that program is not funded by the Decision and, as such, is not included in this evaluation.

¹⁸ BRO measures are behavior-based measures that teach customers how to reduce energy use through activities like reports or competitions. (Source: Krause, David. *CPUC Sets Energy-Efficiency Goals, Will Rely on Behavioral Changes*. California Energy Markets, September 24, 2021. https://www.newsdata.com/california_energy_markets/regulation_status/cpuc-sets-energy-efficiency-goals-will-rely-on-behavioral-changes/article_36cb0304-1d73-11ec-866b-1f0dd45fc384.html)

PA	Energy-Saving Solution	Number of Projects ^a	Percent of Projects (n=743)
	Refrigeration upgrades	19	3%
	BRO measures	7	1%
	Chillers	6	1%
	PG&E Total	517	70%
SCE	LED lighting (including fixtures)	104	14%
	EMS/EMS controls	47	6%
	Unknown ^b	3	<1%
	SCE Total	154	21%
SDG&E	LED lighting (including fixtures)	47	6%
	HVAC upgrades (including motors, retrofits, maintenance, and controls)	22	3%
	Refrigeration upgrades	11	1%
	EMS/EMS controls	10	1%
	Chillers	4	1%
	SDG&E Total	72	10%
Total Non-Residential Projects		743	100%

^a Totals represent the unique number of completed projects (based on project numbers) and may not equal the sum of the individual counts in this table. Projects could include one or more energy-saving solutions.

^b Three projects did not have any energy-saving equipment information.

Sources: Program tracking databases provided by PG&E, SCE, and SDG&E

4.2.2 CUSTOMERS

NUMBER OF PARTICIPATING CUSTOMERS

In 2022 and 2023, 8,907 unique customers participated in MAP across California (Table 12). Nearly two-thirds, or 65%, were SCE residential customers who received at least one type or a combination of energy-saving measures. In comparison, 30% of the 8,907 unique customers were residential customers in PG&E, SDG&E, and MCE territories signed up with ecobee's eco+ Thermostat Optimization program. Non-residential customers in PG&E, SDG&E, and SCE territories comprised 5% of the total MAP participants.

The unique customer counts align with insights from the interviews conducted with program staff, implementers, and aggregators. Residential customers had lower potential energy savings compared to their non-residential counterparts. As such, more residential customers needed to participate to achieve savings.

Table 12. Number of MAP Participants by Participant Type

PA	Number of Unique Participants ^a	Percent of Total ^b	Percent of Overall Total
Residential			
PG&E	N.A.	N.A.	N.A.
SDG&E	N.A.	N.A.	N.A.
SCE	5,819	100%	65%
MCE	1	<1%	<1%
Residential Total	5,820	100%	65%
eco+			
PG&E	1,814	68%	20%
SDG&E	732	28%	8%
MCE	120	5%	1%
SCE	N.A.	N.A.	N.A.
eco+ Total	2,656^c	100%	30%
Non-Residential			
PG&E	213	49%	2%
MCE	147	34%	2%
SDG&E	71	16%	1%
SCE	N.A.	N.A.	N.A.
Non-Residential Total	431	100%	5%
Overall Total	8,907^d		100%

^a The number of participants is derived from the number of unique contacts by name, service address, and email or phone number for residential (including eco+) customers and the unique combination of business name or contact name, email or phone number, and business address for non-residential customers.

^b The denominators for these percentages are the participant type (i.e., residential total, eco+ total, non-residential total) level totals.

^c The total sum for eco+ does not equal the sum of the individual PAs, as 10 duplicate records were identified. Although these customers were served by both PG&E and MCE, we count them as one unique participant.

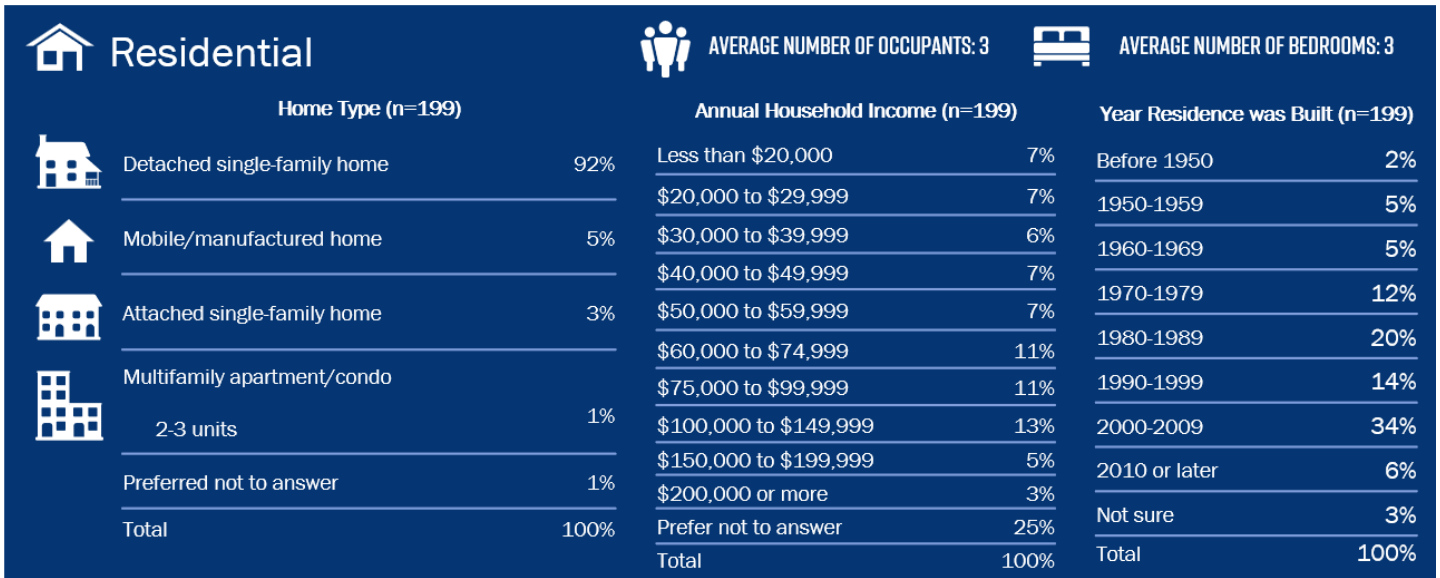
^d The overall total does not equal the sum of the participants by PA due to 10 duplicate records being excluded from the overall total.

CUSTOMER CHARACTERISTICS

The evaluation team collected demographic and firmographic information through the three participant surveys fielded for this study. We summarize the household and business characteristics of residential (including eco+) and non-residential survey respondents in this section.

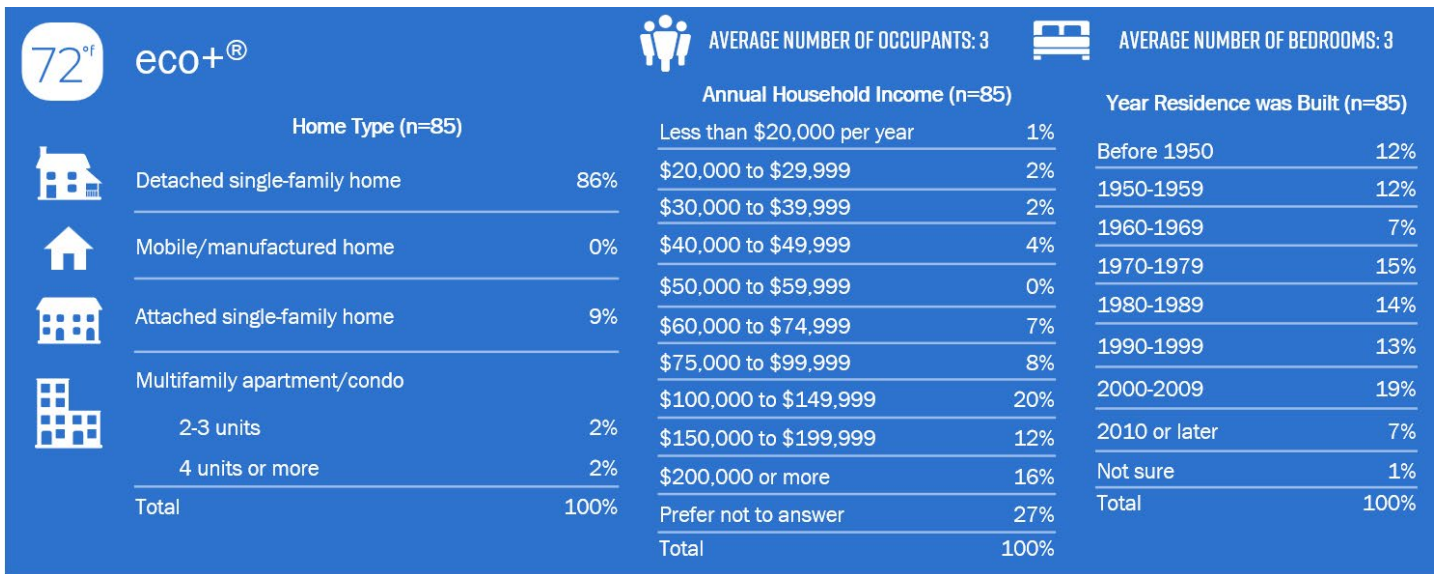
As shown in Figure 2, the majority (92%) of residential survey respondents lived in detached single-family homes with an average of three bedrooms and three occupants all year round. Most homes were built prior to 2010, 34% of which were built between 2000 and 2009. More than two-fifths, or 43%, of residential respondents had an annual household income of \$60,000 or higher. Nearly one-third (27%) of residential participants had an annual household income of \$50,000 or less. While MAP eligibility is independent of customer income level, there may be an opportunity to recruit income-qualified customers or customers in disadvantaged communities (DACs), implement more energy-saving solutions, and achieve more energy savings.

Figure 2. Residential Participant Demographic Characteristics



Similar to residential survey respondents, most eco+ survey respondents lived in detached single-family homes with an average of three bedrooms and three occupants (Figure 3). Two-thirds (63%) had annual household incomes of at least \$60,000. Most homes with ecobee thermostats were built between 1970 and 2009.

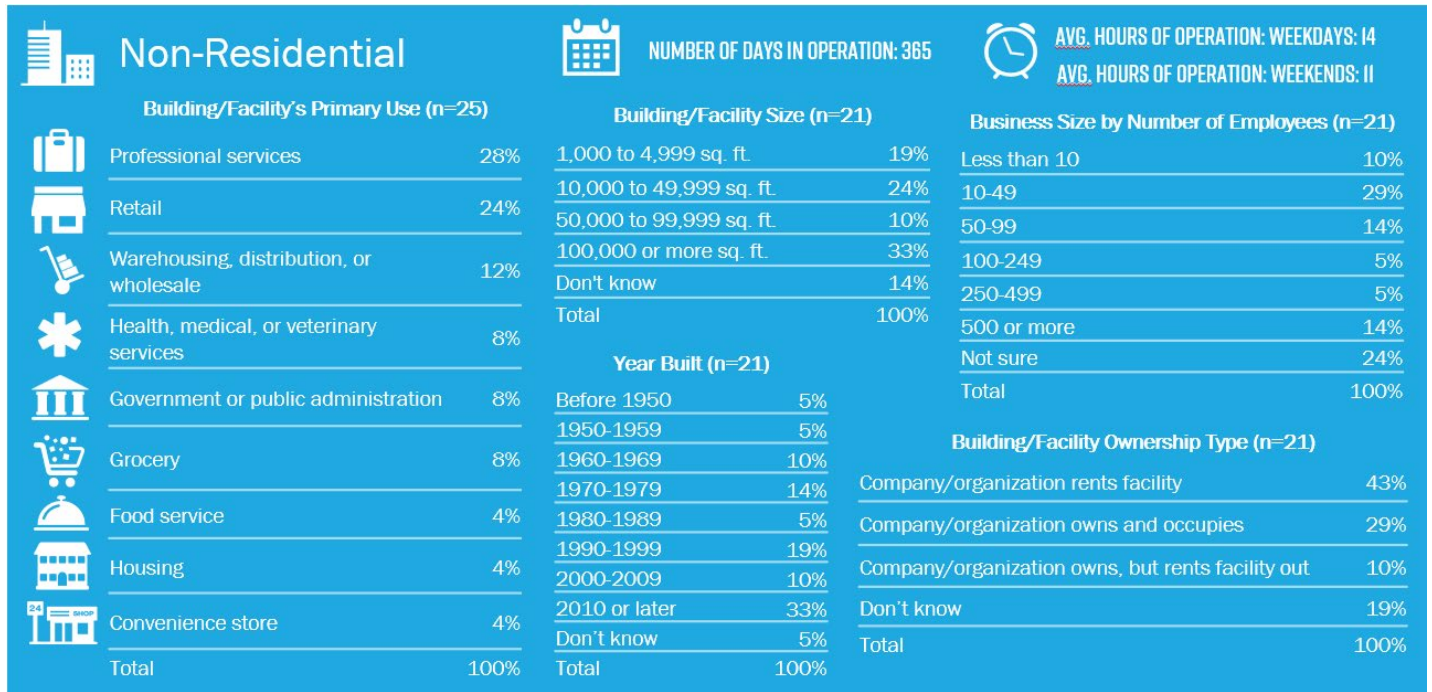
Figure 3. eco+ Participant Demographic Characteristics



The top primary uses of non-residential respondents' buildings or facilities were professional services (28%), retail (24%), and warehousing, distribution, or wholesale (12%) (Figure 4). Across all building and facility use types, it was most common to have 10–49 employees (29%). Almost two-thirds (62%) of non-residential respondents reported that their buildings or facilities were built in 1990 or later.

Non-residential respondents reported that their buildings or facilities are operational all year round and operate an average of 14 hours on weekdays and 11 hours on weekends. The long operating hours indicate that non-residential respondents can likely help address grid constraints during peak and net peak hours, as they are mostly outside standard business hours.

Figure 4. Non-Residential Participant Firmographic Characteristics

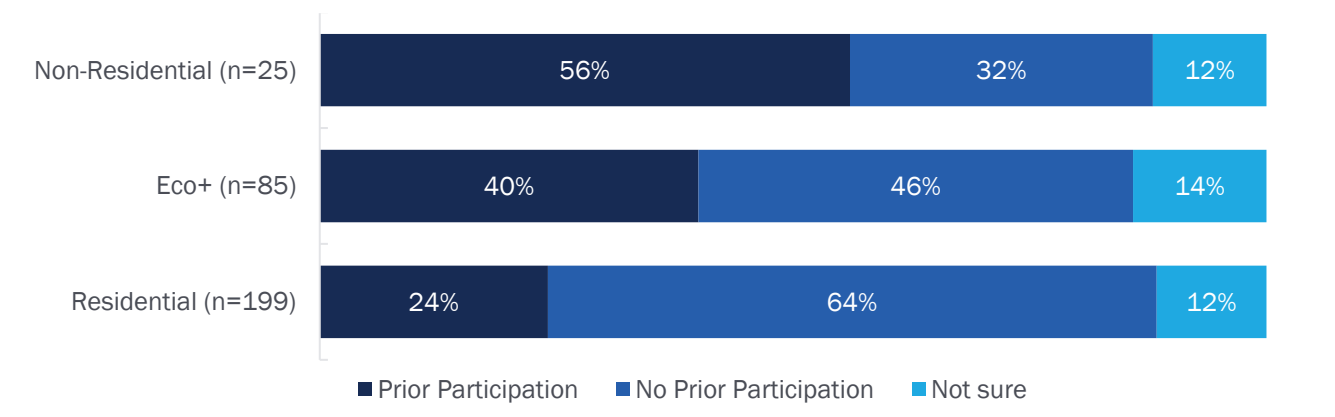


PARTICIPATION IN OTHER ENERGY-SAVING PROGRAMS

We asked survey respondents whether they had previously participated in energy-saving programs other than MAP in the last five years (Figure 5).

Past participation was common for non-residential but less so for residential or eco+ respondents. Most non-residential respondents (56%) indicated having participated in another program. However, the majority of residential respondents (64%) had not. Among eco+ respondents, 46% reported no prior participation in another energy-saving program.

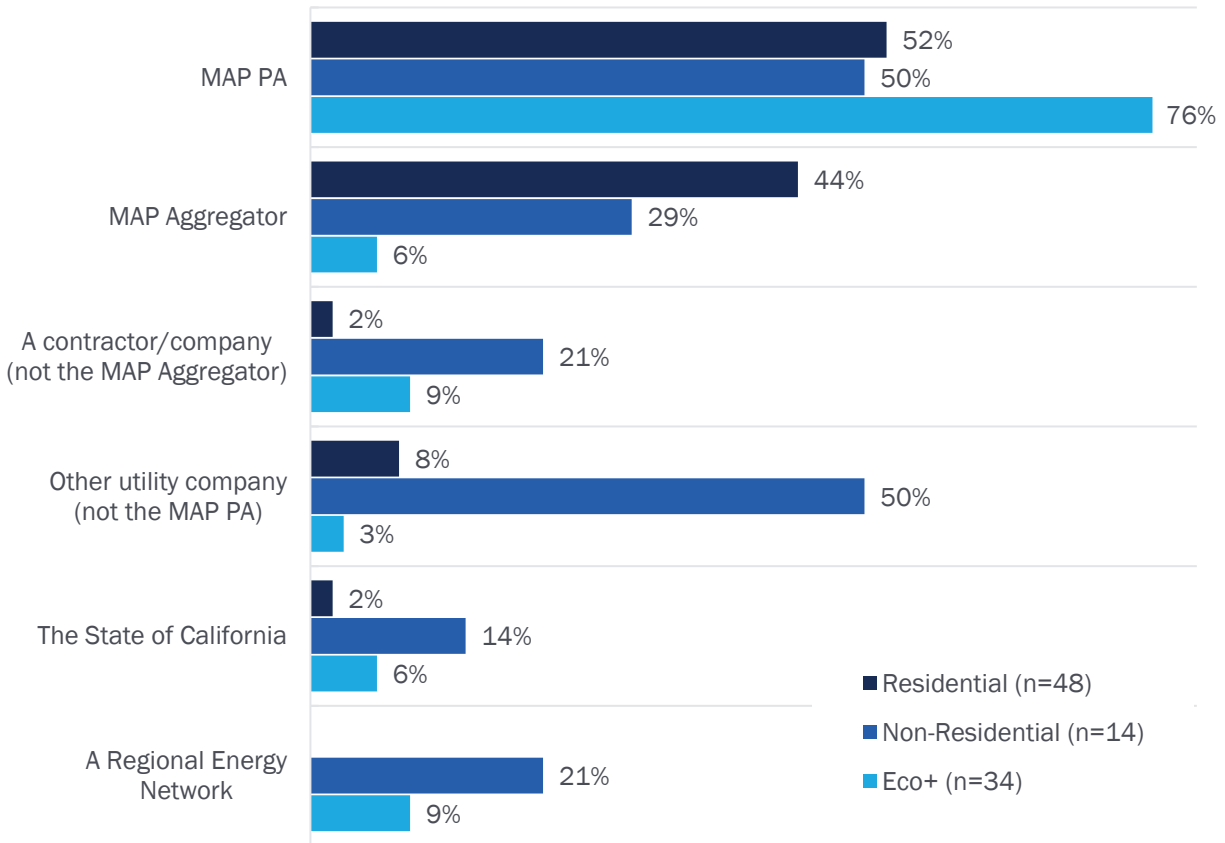
Figure 5. Participation in Another Energy-Saving Program in the Last Five Years



We asked respondents who had experience with another energy-saving program to identify who offered the program(s) in which they previously participated. The majority of respondents who received this question reported having participated in a program offered by the same PA involved in their MAP project, indicating familiarity and past programmatic experience with their PA. Approximately half of residential and non-residential respondents and over three-quarters of eco+ respondents indicated they participated in an energy-saving program through the same PA

involved in their MAP project (Figure 6). Among residential and non-residential respondents, prior program experience with their MAP aggregator was also common, with 44% and 29% selecting this option. However, this was rare among eco+ respondents, as 6% selected this answer.

Figure 6. Entities Offering Respondents' Other Energy-Saving Programs



Note: Six percent of residential respondents selected “other,” and 13% said they don’t recall the entity that offered the energy-saving program they participated in before MAP. Additionally, 15% of the eco+ respondents selected “other.”

We also asked residential and non-residential respondents to name or describe the programs in which they participated.¹⁹ The majority of residential respondents did not recall the program name. For those who did, the most common type of energy-saving program listed among residential participants involved replacing or upgrading a thermostat. Other energy-saving programs residential respondents reported participating in included residential direct install programs, demand response programs, and HVAC-related programs. Table 13 presents the complete list of other energy-saving programs in which residential respondents reported participating.

¹⁹ To streamline, the evaluation team conducted a shorter survey among eco+ participants and only asked essential questions, omitting questions of lower priority.

Table 13. Residential Respondent Participation in Other Energy-Saving Programs

Name/Description of Other Program	Percent of Respondents (n=48) ^a
Programs that replace or upgrade thermostat	17%
SCE Residential Direct Install Program	10%
Demand response programs	8%
HVAC programs	8%
Residential Weatherization Program	6%
SCE Energy Savings Assistance Program	6%
Residential Landscape Irrigation Tune-up Program	2%
Does not recall program name/details	48%

^a Total does not sum to 100% because respondents may have mentioned more than one program in their open-ended responses.

Similarly, the majority of non-residential respondents who reported prior involvement in other energy-saving programs did not recall the program name or details. For those who did, the listings were all one-offs, meaning there was no program or description of the type of program mentioned more than once (Table 14).

Table 14. Non-Residential Respondent Participation in Other Energy-Saving Programs

Name/Description of Other Program	Percent of Respondents (n=14) ^a
A program that provides LED lighting	7%
CleanPowerSF	7%
Comfortably CA	7%
Commercial Energy Efficiency Program (CEEP) by SCE	7%
Retro-Commissioning	7%
WattSmart by Rocky Mountain Power	7%
Does not recall program name/details	64%

^a Total does not sum to 100% because respondents may have mentioned more than one program in their open responses.

4.3 AGGREGATOR PERSPECTIVES

We assessed key successes, challenges, and lessons learned in the first two years of program delivery through aggregator in-depth interviews. More specifically, these interviews aimed to gather aggregator feedback on MAP design and implementation, including the sign-up process, communications and support from lead implementers and PAs, project approval processes, and incentive calculation and payment. For participants, we explored their customer targeting, marketing, recruitment, and project scoping strategies. Particularly for non-participants and near-participants, we explored why they have not signed up or completed projects. Finally, we asked aggregators to compare the MAPs' benefits and drawbacks to traditional prescriptive programs.

We interviewed 32 aggregators. Most aggregators were involved in multiple programs. As a result, the 32 aggregators we interviewed represent 70 perspectives (Table 15). Having the same aggregator discuss multiple implementers allows for more robust and reliable qualitative data.

Table 15. Perspectives of Aggregators across Implementers

Implementer	Aggregators
AESC	18
MCE(Recurve)	6
Recurve	14
SCE	19
SDG&E	13
Total	70

The following sections discuss the aggregator interview findings by topic area.

4.3.1 PROGRAM ENROLLMENT AND SUPPORT

We asked aggregators about their experiences with the enrollment process. All “participant” and “near participant” aggregators were very satisfied with the ease of the enrollment process. They noted less paperwork than other EE programs and enrolling as an aggregator was streamlined across all implementers.

Reasons for not enrolling in MAP varied. For the two non-participant aggregators who did not enroll, one non-participant aggregator noted that the program did not fit their business model. They registered at first to learn more about the program. However, after learning more, they decided it was not a good fit for their cannabis-focused business, which was mostly centered in the Northeast. Although they had CA contacts, they were not based in CA and decided not to proceed. Another non-participant aggregator who tried to enroll with MCE reported a lack of responsiveness and a need for more information as a reason for not enrolling:

"We were interested and had questions, but I couldn't get anyone to call me back." Aggregator Interviewee

This non-participating aggregator felt the forms and structure looked too complicated upfront and became discouraged without the additional information at the right time.

We asked aggregators about the program support provided by implementers. Aggregators working with AESC, Recurve, and SDG&E were generally satisfied with the support, while all those working with SCE reported lower satisfaction levels. We asked specifically about the following areas of support:

- Marketing** – Interviewed aggregators reported that the PAs listed aggregators on their program website but provided no other marketing support to identify and recruit customers. The majority of aggregators we spoke with targeted particular industries or building types as part of their normal business model, so they did not require marketing support from MAP. These aggregators already had their own customers or networks for outreach.

Some of the smaller aggregators needed marketing support, especially since they saw a lot of untapped opportunities. They reported asking for additional support but not receiving it. A couple of aggregators mentioned

that a letter from the PAs would have provided credibility to the customers during initial outreach, but this letter was not a critical factor in signing projects. One aggregator noted the following:

"It would be really nice if there was more marketing support because there's so much opportunity." Aggregator Interviewee

- **Eligibility** – Each implementer had its own eligibility criteria and process to verify eligibility. The varying criteria for eligibility created some confusion at the beginning of the program, but generally, aggregators were satisfied with the process. One aggregator noted the ease of the eligibility process through Recurve, while another aggregator highlighted room for improvement with SCE's project eligibility and savings estimation approval process:

"In just 30 seconds I can check a site and check if its eligible for the customer, which is a very nice support item." Aggregator Interviewee

"When it comes to [So Cal] Edison, there has been an immense amount of inconsistency and inaccuracy." Aggregator Interviewee

- **Forecasting energy savings** – All implementers provided tools to the aggregators to estimate energy savings. All aggregators appreciated this support and utilized these tools when they did not have in-house expertise in this area. AESC, Recurve, and SDG&E provided online tools, whereas SCE used an offline Excel tool. More specifically, SCE provided an Excel workbook for calculations and required that aggregators complete the workbook and submit it in addition to entering results into an online form. Aggregators who were established lighting contractors, EE consulting firms, or energy service companies typically generated calculations in-house and then provided these to implementers in the requested format. These firms reported understanding the risks involved in MAP, especially those related to forecasting energy savings, as one aggregator noted:

"I don't have control over the building. If my customer decides to change their business plan on us, my last quarter of energy savings goes down the drain." Aggregator Interviewee

- **Forecasting incentives** – The four implementers provided tools to aggregators to estimate incentive payments. All aggregators understood that these were estimates and that the actual incentives were based on performance. Aggregators that were broader energy consultants (versus equipment contractors) calculated their incentives using their risk tolerances before discussing them with customers. One aggregator noted that the act of forecasting was beneficial, while another commented on the uncertainty involved:

“Forecasting incentives was a huge help” Aggregator Interviewee

“They [SCE] say they can't tell us exactly, but they give like an example of what someone else got.” Aggregator Interviewee

- **Calculating actual energy savings** – MAP was designed to calculate savings based on meter data. While the program did this, the level of support for sharing actual energy savings varied among implementers. Aggregators expressed that Recurve provided the most accessibility and transparency in the savings calculations. Aggregators could access their project’s energy savings online monthly. This allowed aggregators to review their projects and troubleshoot with the customer if necessary. Aggregators noted that SCE’s technical support firm for MAP, kW Engineering, provided good support for the calculations; however, aggregators could not access customer data. Instead, SCE provided these data via email. One aggregator that worked with multiple implementers commented on their experience of these differences:

“So with PG&E [AESC and Recurve], we're getting monthly updates on the status of our projects. With SCE... we essentially got three trimesters of reports in one email at the end of the year.” Aggregator Interviewee

- **Incentive Payments** - All aggregators understood why the incentive payments were staggered and accepted the inherent performance risk that came with it. Several mentioned that offering a higher percentage for the first or second payment would make it more attractive for cash-strapped smaller businesses to participate. In general, aggregators preferred larger initial payments to lower amounts and some indicated that SDG&E’s incentive payments had the right balance (SDG&E had the highest upfront payment). Regarding cash flow concerns, the aggregators working with SCE mentioned that their contracts stipulated payment within 90 days for each true-up period, but in their experience, payments often took 100 days or more. When discussing SCE, one aggregator exclaimed,

“I still don't know what incentive either one of our two projects is going to qualify for. I saw some numbers that make it nice, but I don't know what I'm going to get because it's still in flux... and that's after a year!” Aggregator Interviewee

In sum, program support varied by the implementer, with higher levels of support from AESC, Recurve, and SDG&E and lower levels of support from SCE. The most commonly cited issues were the lack of program rule transparency, the inability to answer policy questions, and slow processing turnaround at all project phases.

4.3.2 CUSTOMER ENROLLMENT AND TYPE OF PROJECTS

Many aggregators served certain customer types or business types before the MAP and continued to focus on these customers during the program. For example, an aggregator may focus on certain building types (e.g., hotels, casual or fast-food restaurants, medical buildings, large office buildings, or parking lots and structures) or customer types (e.g., schools, government buildings, retail, or office).

When prompted about the ideal customer for MAP, all aggregators noted that the ideal customer used energy during peak or allowed projects to scale (e.g., large buildings or multiple locations of small buildings). A few aggregators noted that customers who cannot get traditional financing, such as indoor cannabis agriculture or small businesses, are also ideal customers for MAP since it provides opportunities they may not have otherwise.

The majority of MAP non-residential projects completed by interviewed aggregators were lighting measures. Aggregators reported several reasons for this:

- Lighting was their focus area. Aggregators were primarily lighting project developers or lighting contractors (in our sample, a few HVAC and refrigeration projects were completed, but this was not the majority).
- Lighting may be the most straightforward end-uses to audit, specify, forecast, procure, install, and measure.
- For most applications, the lighting savings calculation has less uncertainty than other end uses, such as HVAC. In addition, HVAC projects have higher capital costs and more uncertainty in operating hours. This uncertainty creates greater forecasting risk (and therefore financial risk) for aggregators and customers, requiring more up-front capital outlay from customers. In addition, HVAC projects often require permitting, which creates longer project timelines.
 - A few aggregators noted that lighting and HVAC savings uncertainty for office buildings is higher now due to low occupancy rates and volatile utilization rates caused by remote work and return-to-office policies.

One residential aggregator enrolled customers through a bulk enrollment approach, with MCE, PG&E, and SDG&E but this aggregator was unable to participate in SCE due to stricter program requirements and similar pre-existing offerings.

4.3.3 PROGRAM VIEWS

In general, interviewed aggregators liked MAP and reported high levels of satisfaction with the program overall. This was due to the ease of enrollment, timely determination of customer eligibility, the quick turnaround time to receive feedback on proposed projects (approval or questions), and the ability to track the project approval process and energy savings. Overall, at a conceptual level, all aggregators expressed that the MAP was well-designed. One aggregator shared that the program design helped them engage the market:

**"The program design has been super effective in terms of our ability to engage the market."
Aggregator Interviewee**

All aggregators noted that their customers, non-residential and residential, easily understood the program concept and appreciated receiving financial incentives based on their savings as measured at the meter. Some aggregators noted that customers also liked that incentive levels were set relative to their time-differentiated value of reducing stress on the electric grid (peak, near-peak, and off-peak).

The next two subsections further outline the opportunities that made MAP an attractive program and any barriers to fully participating in MAP, as reported by aggregators.

PROGRAM OPPORTUNITIES

One main program opportunity discussed by aggregators was the financial benefit for aggregators and customers. Some aggregators considered the program lucrative. They described how, even after the implementer and aggregator cut of the incentive, customers still had enough to cover the full cost of the project.

The incentive level, based on total system benefits, made the program very attractive for all project types. For lighting projects in particular, this created a low-cost or non-cost project for customers in most cases. In addition, aggregators found that explaining how energy savings determined project incentive rates and that the value of those savings was based on reducing stress on the grid (peak and net peak in particular) made intuitive sense to customers.

Most aggregators agreed that MAP created an opportunity to accelerate projects and allowed aggregators to expand projects in many cases. This was related to the relatively high level of financial incentives. Additionally, the limited program duration accelerated some projects because some aggregators believed that the high financial incentives were a limited opportunity and they needed to act quickly.

All of the interviewed non-residential aggregators noted that because MAP rewarded total building savings rather than certain types of equipment, they could broaden the project scope and achieve deeper savings by installing the highest efficiency equipment rather than “higher” efficiency equipment. In addition, they were able to optimize customer solutions by adding equipment such as controls and sensors that might not be considered under “deemed” savings rebate programs.

All aggregators believed that MAP’s flexibility in equipment selections and that savings were “at the meter,” rather than an average deemed value, provided opportunities to expand projects and realize deeper savings. This included bringing in more locations from multi-location customers, adding controls, and specifying high-efficiency equipment for lighting and HVAC projects. Aggregators felt these options would not be possible through traditional prescriptive rebate programs as those programs pay a certain percentage of equipment cost and restrict the types of equipment that can be installed.

The use of NMEC to determine savings streamlined the project approval process. It also provided tangible proof to customers that energy and bill savings were occurring. This contrasts with prescriptive (aka deemed) programs, where savings for particular equipment are based on averages and adjusted for attribution, and custom programs with long project lead times that require pre- and post-inspections and a lengthy process for determining forecast savings.

When data were available promptly, aggregators used this information to monitor projects and modify where needed. One large aggregator put it this way:

Aggregators’ Positive Perspectives on Energy Savings and Incentives

"The energy savings that we're delivering are a lot higher value than historically with other efficiency programs."

"Having to be responsible for the performance really changes the game in a good way."

"I really like that we're actually getting rewarded on the value the projects are delivering to the grid."

"MAP is a much more beneficial method of targeting incentives than the average downstream rebate program."

“There's incentive for us to go back and get it corrected because that ultimately affects the incentive that gets calculated at the end of the M&V period.” Aggregator Interviewee

Lastly, one aggregator pointed out that MAP created the opportunity to participate because load shifting is not technically EE nor demand response. They mentioned that MAP was the first program to specifically recognize and value a fully automated approach customized to specific time-of-use rates. This contrasts with behavioral programs where customers must continuously monitor and modify their behavior.

PROGRAM BARRIERS

Most of the program barriers stemmed from design and implementation differences between PAs; these barriers existed for both near and participating aggregators. One program design element of MAP is that the individual PAs and their associated implementers could have different rules and processes. This program design element created challenges and frustration for some aggregators, especially those with multiple sites for the same customer across PA territories, such as franchises. This required duplicating processes for projects with the same customer and building type.

Differing customer eligibility requirements also created barriers to participation. SCE's eligibility requirements were more stringent than those of other implementers. In some cases, aggregators had to inform customers that identical projects were viable under one implementer but not another. For example, SDG&E required at least one year of data after system installation for customers with existing solar installations to qualify for MAP. SCE customers with solar did not qualify regardless of how long the system had been installed or if it was working.

The majority of aggregators working with SCE reported barriers around program communication, which created project delays. They also noted that communicating directly with SCE was difficult. Several aggregators noted that SCE had four different program managers throughout the program. These staffing changes created communication issues with aggregators, the inability to answer MAP-specific questions, and, overall, caused delays during all phases of their projects.

Interviewed aggregators also described barriers related to project funding. More specifically, some aggregators described that, at times, the changing availability of project funds (predominantly with Recurve) created delays or canceled projects in progress.²⁰ In one respect, this reflects the efficiency of the project approval process and funding allocation. However, for aggregators, this uncertainty created challenges for projects.

Another barrier to program participation for a few aggregators was the reliance on population NMEC versus site-specific data. There were two distinct issues described, one around incentives and another around comparison groups:

- In a few cases, aggregators had difficulty explaining to customers when incentives were less than expected. Even though the customer's savings (as measured at the meter) were similar to the original forecast savings, the incentive amount was reduced given population-level NMEC calculations. Per the population-level NMEC definition, results are calculated across a group of sites (population), not the site-level. This is not a design flaw but does indicate an area where more up-front education for the aggregator could be warranted.

²⁰ Program staff interview data indicates this may be in reference to the budget reservation process in which AESC and Recurve needed to reserve funding from PG&E. It may have appeared as though the implementer ran out of funding when, in reality, they needed to reserve more.

- A few aggregators reported that projects were disqualified if a comparison group could not be identified to estimate savings, thus creating a barrier to participation. This mainly applied to customers with large campuses (e.g., movie studios) or specialized industrial processes.

Finally, the bulk upload processing created a barrier for one aggregator to expand their program. This is because they did not know which projects were rejected and why. This aggregator noted that MCE and SDG&E provided counts of customers approved and not eligible, along with reasons for non-eligibility, but did not identify individual customers. This approach created a barrier to determining which customers to follow up with for potential resubmission or to reject fully.²¹

4.3.4 OVERALL ASSESSMENT

In general, aggregators were enthusiastic about the MAP design. Most aggregators preferred the MAP approach to those of traditional prescriptive/deemed rebate programs and custom programs. Most aggregators expressed that the flexibility in choosing equipment, incentives based on measured—not estimated—savings, and the basic program structure allowed them to offer better customer solutions than prescriptive programs. Many also appreciated the streamlined measurement approach to savings over what they consider to be an overly cumbersome custom program process.

Most, if not all, aggregators understood MAP was a new program, and as such, there would be opportunities for improvement along the way. All participant and near-participant aggregators expressed an interest to continue participation if and when the program is relaunched. One aggregator summed up the general perspective about the program in the future:

“Keep MAP the same as possible, don't make the influence [attribution] too difficult, and don't cut the incentive amounts too much, and MAP will be a successful program.” Aggregator Interviewee

Many aggregators stated that their initial concern about participating in the program was the financial risk involved if savings did not materialize as forecast. However, once they had participated in the full project process and understood the program mechanics, these concerns were alleviated.

4.4 CUSTOMER PERSPECTIVES

The evaluation team conducted web surveys among residential, non-residential, and eco+ customers who completed MAP projects through participating aggregators. As detailed in Section 3.4, our survey research aimed to understand the end-user experience with MAPs better, how the MAP design created opportunities or barriers for completing projects and meeting their needs, and whether they were satisfied with their overall experience.

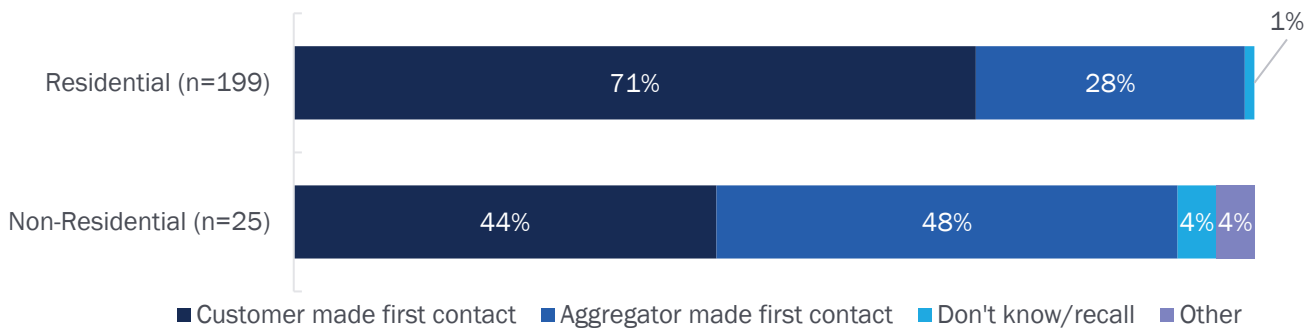
We discuss the results of the residential, non-residential, and eco+ surveys in the following sections.

²¹ All implementers requested service agreement IDs on the application forms. This aggregator could not provide individual “S.A. ID” numbers. The S.A. ID incorporates the meter number, read schedule, and tariff among other items. This is different than the customer account number which identifies a particular customer for billing purposes.

4.4.1 PROJECT RECRUITMENT

According to the program’s design, aggregators are responsible for customer targeting, marketing, and outreach (see Section 4.1). We asked residential and non-residential respondents about their initial contact with their aggregator to understand how this aspect of MAP design translates into customer recruitment experiences (Figure 7).²² The majority of residential (71%) and a sizeable portion of non-residential (44%) survey respondents reported that they contacted their aggregator first. While data limitations prevent us from ascertaining how these respondents may have first learned about the contractor or received their contact information, this data suggests that the aggregators likely had some marketing materials in the field and were able to build upon word-of-mouth referrals.

Figure 7. Residential and Non-Residential Respondent Initial Contact with Aggregator



4.4.2 PROJECT EXECUTION

We asked survey respondents about project execution to understand their involvement in project processes, additional projects aggregators recommended to respondents, energy-saving upgrades respondents wanted at the time of their MAP project that were not included, and project cost. These topics provide insight into MAP processes, customer experiences, and how the core MAP principles of simplification and flexibility translate into program implementation.

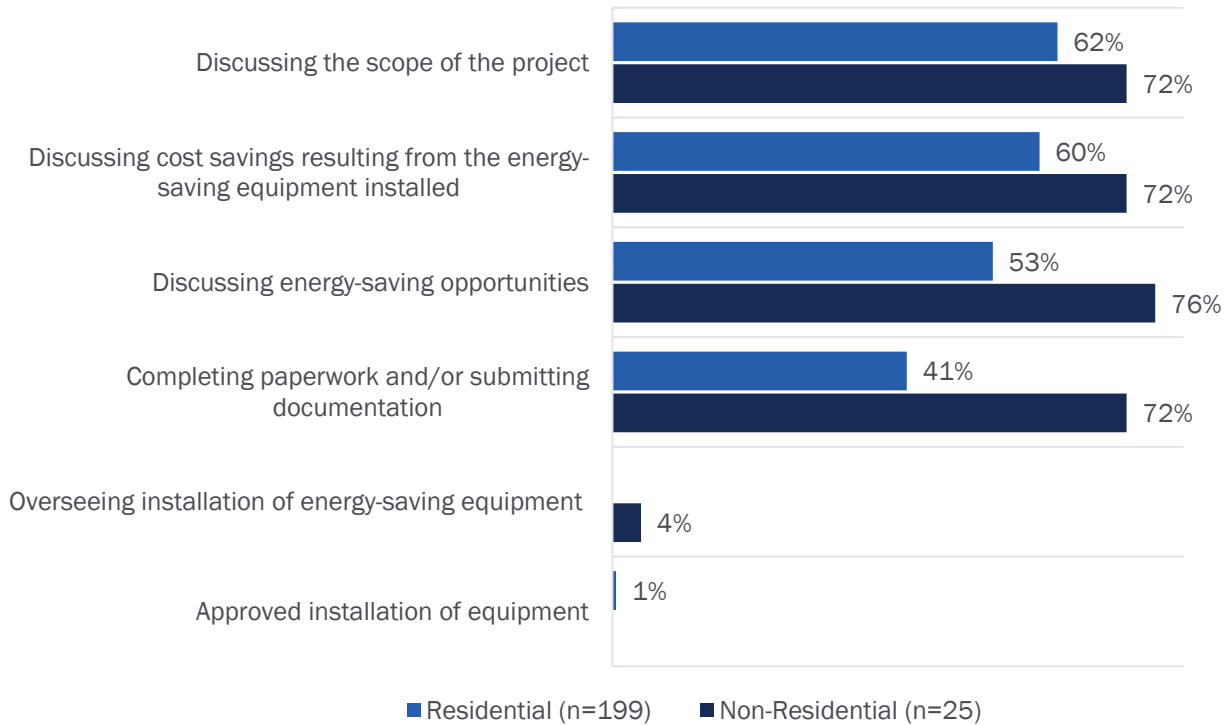
INVOLVEMENT IN PROJECT PROCESSES

Overall, residential and non-residential respondents reported being highly involved in most aspects of the project (Figure 8).²³ More than 70% of non-residential respondents indicated involvement in discussing the project scope, cost-savings resulting from the project, and energy-saving opportunities, as well as completing paperwork for the project. Residential respondents were also involved in these four aspects, though at lower rates than non-residential respondents. Few respondents from either survey reported involvement in overseeing or approving equipment installation.

²² We did not include this question in the eco+ survey because the aggregator (ecobee) made first contact with all eco+ participants.

²³ We did not ask this question in the eco+ survey because the enrollment and participation processes were the same for all eco+ participants.

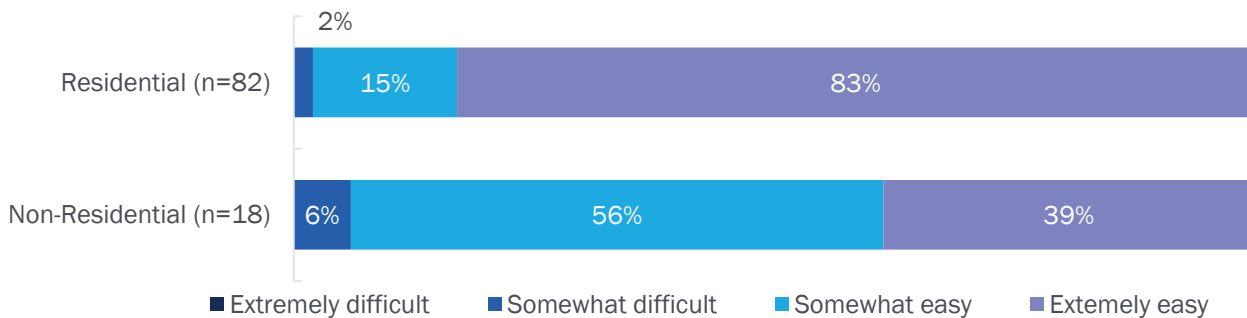
Figure 8. Residential and Non-Residential Respondents' Involvement in Program Processes



Note: Four percent of residential respondents said they were “not sure” whether they were involved in any of these project aspects, and 5% said they were not involved in any of them. Additionally, 4% of non-residential respondents said they were “not sure” whether they were involved in any of these project aspects.

In alignment with the core principle of simplification in the MAP program theory, those involved in paperwork and documentation reported that they found related processes generally easy to complete. The vast majority of the 82 residential (98%) and 18 non-residential (95%) respondents who were involved in documentation reported that the process was somewhat or extremely easy (Figure 9).

Figure 9. Ease of Completing Paperwork and Documentation



We asked the few respondents who found the documentation process at least somewhat difficult to explain their rating. We received two responses from residential survey respondents and one response from a non-residential respondent. One residential respondent expressed challenges due to the lack of response from their aggregator after their initial submission to participate in the program, necessitating follow-up several weeks later to schedule an appointment. The other residential respondent highlighted difficulties in providing required information. The one non-residential respondent that provided insight into their rating stated that they feel “nothing is easy” when working with their PA.

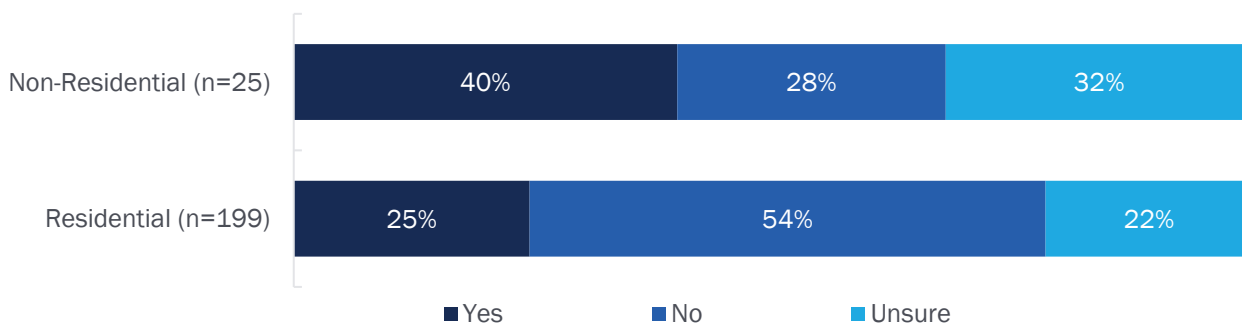
As non-residential customers have organization-specific decision-making processes, we also asked all non-residential respondents about their role in the project approval process. Nearly three-quarters of respondents (72%) indicated collaborating with decision-makers at their company or organization to approve the project, while 28% reported directly approving it.

AGGREGATOR RECOMMENDATIONS

Given the importance of flexibility as a core principle in MAPs, we wanted to understand the extent to which aggregators proposed additional projects with their customers. To accomplish this, we asked residential and non-residential survey respondents if their aggregators recommended additional projects besides the project they completed.

Survey data suggest that there may have been more flexibility with non-residential projects. Non-residential respondents were more likely than residential respondents to report that their aggregator recommended additional projects at the time of the MAP projects. Approximately two-fifths (40%) of non-residential respondents reported that the aggregator recommended additional projects. A smaller share of residential respondents (25%) reported that the aggregator recommended additional projects (Figure 10).

Figure 10. Residential and Non-Residential Respondents Who Received Aggregator Recommendations



We asked those who said their aggregator made recommendations to describe the recommendations (Table 16). The most common aggregator recommendation among residential respondents involved weatherization (5%), such as air sealing, insulation, or weather stripping. The next most commonly reported recommendations included upgrades to their air conditioner fan condenser/motor (4%), LED lighting (4%), and whole house fans (4%).

Table 16. Other Energy-Saving Recommendations for Residential Respondents

Other Projects Recommended by Aggregator	Residential Respondents (n=199)
Weatherization measures (e.g., air sealing, insulation)	5%
AC fan condenser/motor	4%
LED lighting	4%
Whole house fan	4%
High-efficiency water heater	3%
Low-flow toilet	3%
Solar panels	2%
Smart thermostat	1%
Energy-efficient appliances	1%

Other Projects Recommended by Aggregator	Residential Respondents (n=199)
Did not recall the aggregator's other recommendations	5%
No other recommendations/Unsure	78%

Non-residential respondents most frequently reported that the aggregator recommended high-efficiency HVAC systems, with 16% of respondents saying they received this recommendation from the aggregator (Table 17). Nearly one-tenth (8%) of non-residential respondents received a recommendation for building controls, the second most common recommendation among non-residential respondents.

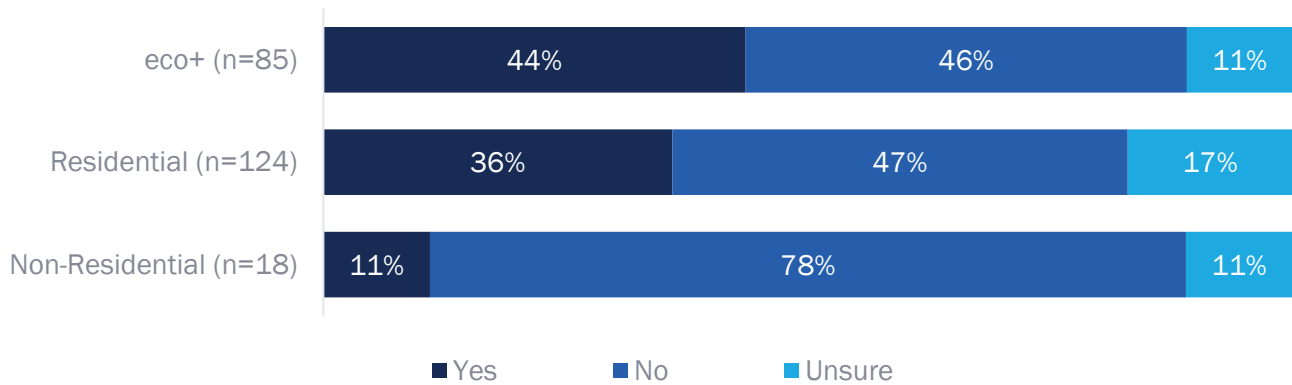
Table 17. Other Energy Saving Recommendations for Non-Residential Respondents

Other Projects Recommended by Aggregator	Non-residential Respondents (n=25)
High-efficiency HVAC	16%
Building controls (e.g., lighting, refrigeration, HVAC)	8%
Chiller	4%
High-efficiency water heater	4%
LED lighting	4%
Retro-commissioning	4%
Solar panels	4%
No recommendations made/unsure	60%

ADDITIONAL DESIRED ENERGY-SAVING UPGRADES

In addition to exploring aggregator recommendations, we asked all eco+ respondents (n=85) and those residential and non-residential respondents who indicated they were involved with discussing the scope of the project with their aggregator (n=124, n = 18, respectively) if there were other energy-saving upgrades they wanted to have done that were not included in the MAP project (Figure 11). We found that eco+ and residential respondents were more likely than non-residential respondents to report that there were energy-saving upgrades they wanted but were not included in their MAP project. Forty-four percent of eco+ respondents affirmed that, at the time of their enrollment in eco+, there were other energy-saving upgrades they wanted to pursue. More than one-third of residential respondents (36%) answered similarly. Fewer non-residential respondents (11%) reported wanting to include other energy-saving upgrades during their MAP participation than the other two survey groups.

Figure 11. Interest in Other Energy-Saving Upgrades



Note: The evaluation team asked all eco+ respondents this question because we assumed that all were aware of the eco+ project scope as they would have had to configure their device and agree to the use of their data.

To better understand unmet customer needs, we asked respondents who said yes to the previous question to describe the energy-saving upgrades they were interested in at the time of the MAP project (Table 18). The most common measure among eco+ respondents was solar panels, with 11% of respondents explaining they were interested in this type of project at the time of their enrollment in eco+. Nearly one-tenth of eco+ respondents considered insulation (8%), and 7% reported wanting windows or door upgrades

Table 18. Top Five Energy-Saving Measures eco+ Respondents Wanted at the Time of MAP Participation

Top Five Energy-Saving Measures Wanted by Participants	Percent of Respondents (n=85)
Solar panels	11%
Insulation	8%
Windows/doors	7%
High-efficiency HVAC	6%
Another brand of smart thermostat	5%
Did not want any other measure/unsure	56%

Note: For the full list of responses to this question, please refer to Appendix D, Table 23.

Among residential respondents involved in scope discussions with their aggregators (n=124) almost one-fifth (18%) of reported wanting weatherization measures, followed by high-efficiency heating and/or cooling equipment (7%) (Table 19).

Table 19. Top-Five Energy-Saving Measures Residential Respondents Wanted at the Time of MAP Participation

Top Five Energy-Saving Measures Wanted by Participant	Percent of Respondents (n=124)
Weatherization measures (e.g., air sealing, insulation, weather stripping)	18%
High-efficiency HVAC	7%
Energy-efficient appliances	6%
High-efficiency hot water heater	5%
Solar panels	2%
Did not want any other measure/unsure	64%

Note: For the full list of responses to this question, please refer to Appendix D, Table 24.

Among non-residential respondents involved in scope discussions with their aggregators (n=18), two described the additional energy-saving projects they wanted but did not include in their MAP project (Table 20). The additional desired measures were a building automation system (BAS) and building controls

Table 20. Other Energy Saving Measures Non-Residential Respondents Wanted at the Time of MAP Participation

Other Energy-Saving Measures Wanted by Participant	Number of Respondents (n=18)
Building Automation System (BAS)	1
Building controls (e.g., lighting, refrigeration, HVAC)	1
Did not want any other measure	16

Note: For the full list of responses to this question, please refer to Appendix D, Table 25.

PROJECT COST

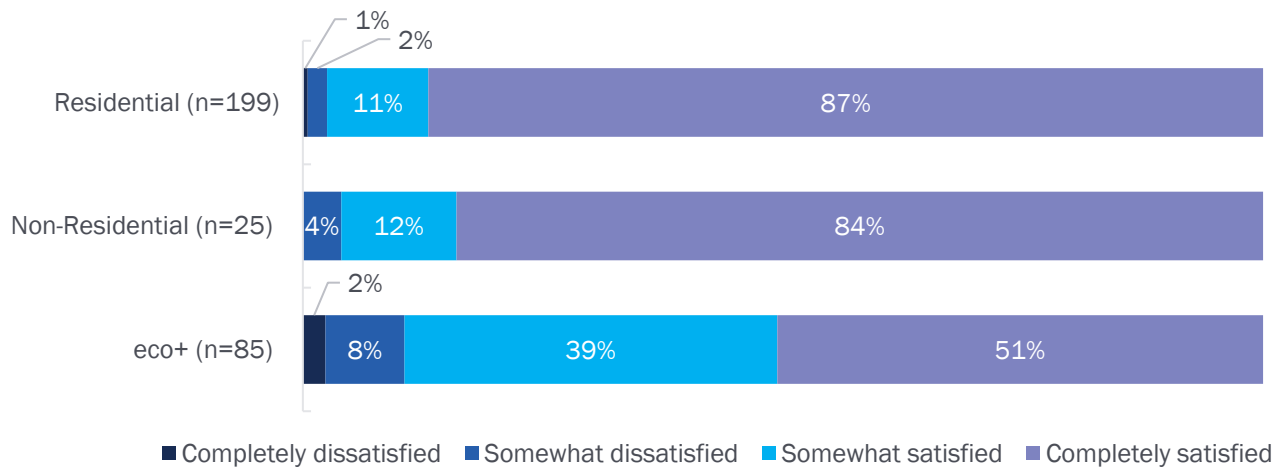
Through the residential and non-residential surveys, we asked respondents about the cost of the projects completed through MAP. We did not ask about project cost in the eco+ survey because it is free for owners of an ecobee smart thermostat to enroll in eco+.

Most residential respondents (88%, n=176) reported that the project did not cost them anything. The four residential respondents who provided the cost of their project reported costs ranging from \$750 to \$3,000, with an average of \$1,425. Five of the 14 non-residential respondents who provided their project's cost reported that it was free. Nine respondents reported costs ranging from \$2,000 to \$600,000, with an average spend of \$171,778.

4.4.3 EXPERIENCE WITH AGGREGATOR

Aggregator satisfaction was high among all survey respondents. At least 90% of respondents across the three surveys reported being somewhat or completely satisfied (Figure 12). While all three groups were generally satisfied, residential and non-residential respondents were more likely to report being completely satisfied than eco+ respondents. Specifically, 87% of residential and 84% of non-residential respondents were completely satisfied, compared to 51% of eco+ respondents.

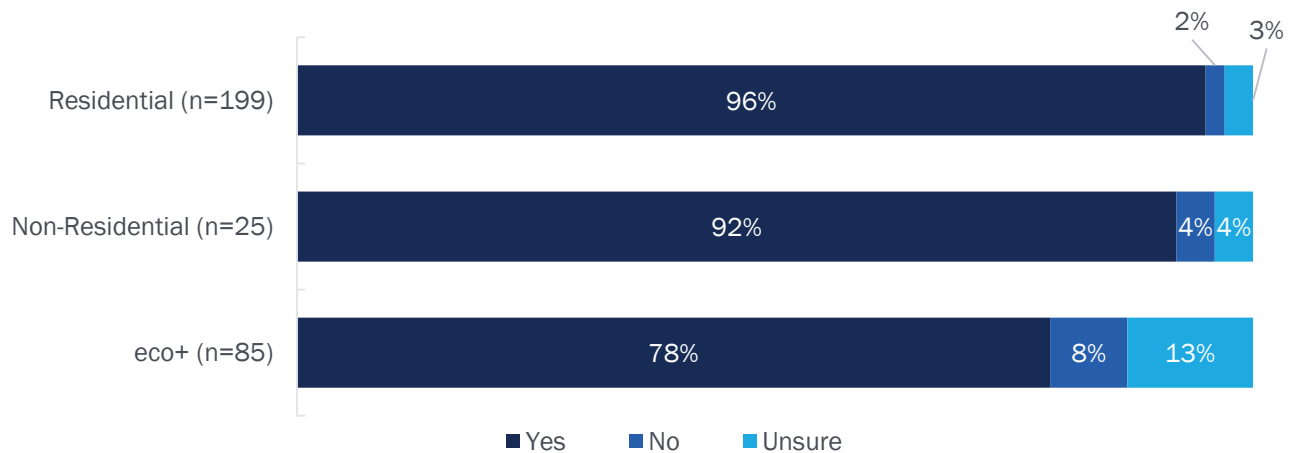
Figure 12. Respondents' Satisfaction with Aggregator



We asked those who expressed dissatisfaction with their aggregator to explain their response. The reasons for dissatisfaction among residential respondents generally involved the aggregator failing to install equipment, installing the wrong or defective equipment, or causing damage to the home in the installation process. One non-residential respondent explained that they were dissatisfied because the aggregator overestimated the rebate amount. Eco+ respondents said they were dissatisfied because of difficulties configuring or operating their thermostats and an inability to achieve cost savings through the program.

Respondents in each survey group were generally willing to recommend their aggregator to others (Figure 13). More than 90% of residential and non-residential respondents affirmed they would recommend their MAP aggregator. Most eco+ respondents (78%) were also willing to recommend their aggregator, though at a slightly lower rate than the other two survey groups.

Figure 13. Willingness to Recommend the MAP Aggregator to Others



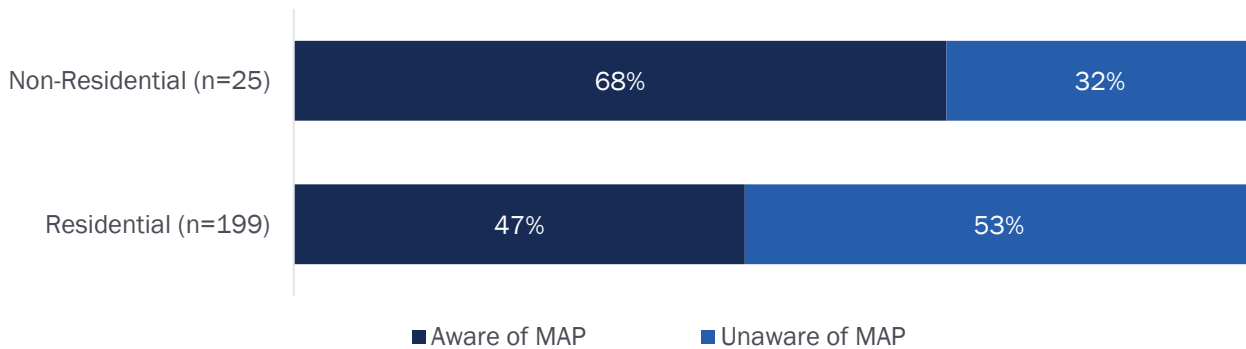
We asked those unwilling to recommend the aggregator to explain their answer. Among residential respondents, the most commonly cited reasons pertained to inconvenience and damage to the home or existing equipment. One non-residential respondent specified that they would not recommend their aggregator because they received inaccurate information about the rebate. The eco+ respondents cited several reasons, including reduced home comfort and a lack of savings on their utility bills. Eco+ respondents also mentioned technological limitations, such as the thermostats being unable to accurately measure and adjust to weather in real-time, difficulty configuring the device, and a lack of optimization for the time in which most energy is used.

4.4.4 MAP AWARENESS

As PAs conduct limited customer outreach for MAP and aggregators can decide how they market MAP to their customers (see Section 4.1), the evaluation team considered it plausible that respondents may have been unaware that they were participating in a statewide program. As such, we informed survey respondents that the project they completed with their aggregator was part of a larger initiative and described the program to respondents. After explaining to respondents that they participated in MAPs, we asked residential and non-residential respondents whether they were aware of the MAP prior to responding to our survey. We did not ask eco+ respondents about their MAP awareness because they received a streamlined set of questions.²⁴

We found that, although a notable share of both groups reported awareness of MAP, non-residential participants were more aware of the program compared to residential respondents (Figure 14). Specifically, over two-thirds (68%) of non-residential respondents reported they were aware of the program, whereas 47% of residential participants reported being aware of MAP prior to taking the survey.

Figure 14. Residential and Non-Residential Respondent Awareness of MAP



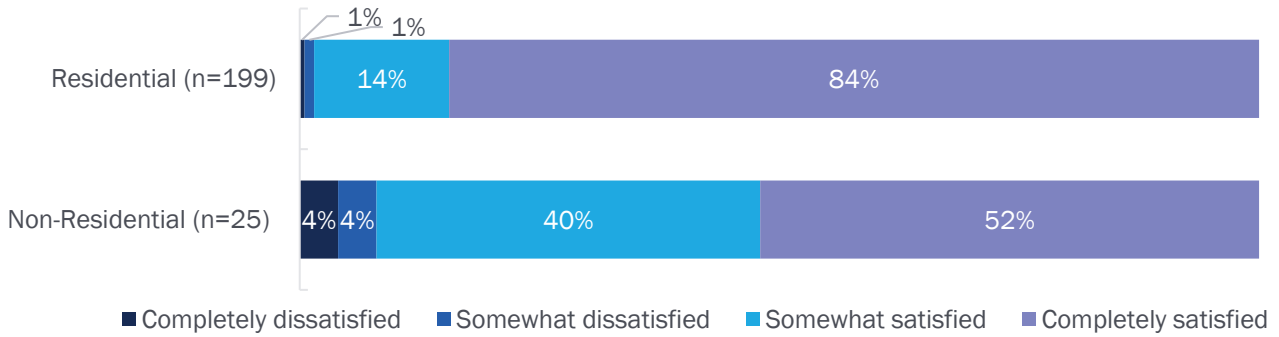
4.4.5 MAP SATISFACTION

The majority of residential and non-residential survey respondents were generally satisfied (completely or somewhat satisfied) with their MAP experience (Figure 15).²⁵ While the share of respondents who were somewhat or completely satisfied was similar across both groups, residential respondents were more likely to indicate being completely satisfied than non-residential respondents (84% vs. 52%, respectively).

²⁴ Given our knowledge of eco+ communication about their offering and the unique approach (i.e., no aggregator at the home and a lack of communication about the larger program), they did not receive the awareness question.

²⁵ Rather than asking eco+ respondents about their satisfaction with the MAP, we collected their level of satisfaction with the eco+ program specifically. We present those results in Figure 12 above.

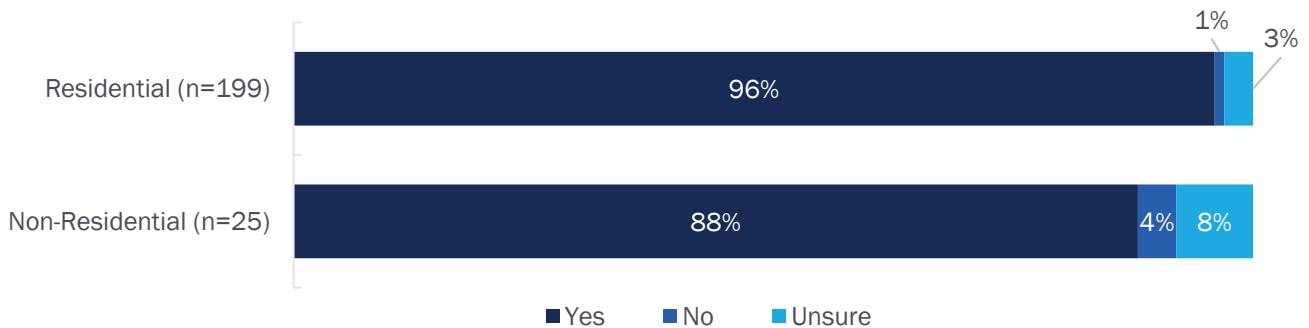
Figure 15. Participant Satisfaction with MAP



The majority of residential and non-residential respondents also said they would recommend MAP to others (Figure 16).²⁶ Specifically, 96% of residential and 88% of non-residential respondents indicated they would recommend the program.

Those respondents who said they were unwilling to recommend MAP were asked to explain further. The two residential respondents stated that they had difficulty working with the aggregator and that the project damaged their property. The one non-residential respondent who would not recommend MAP stated that it was because of issues with their rebate funds.

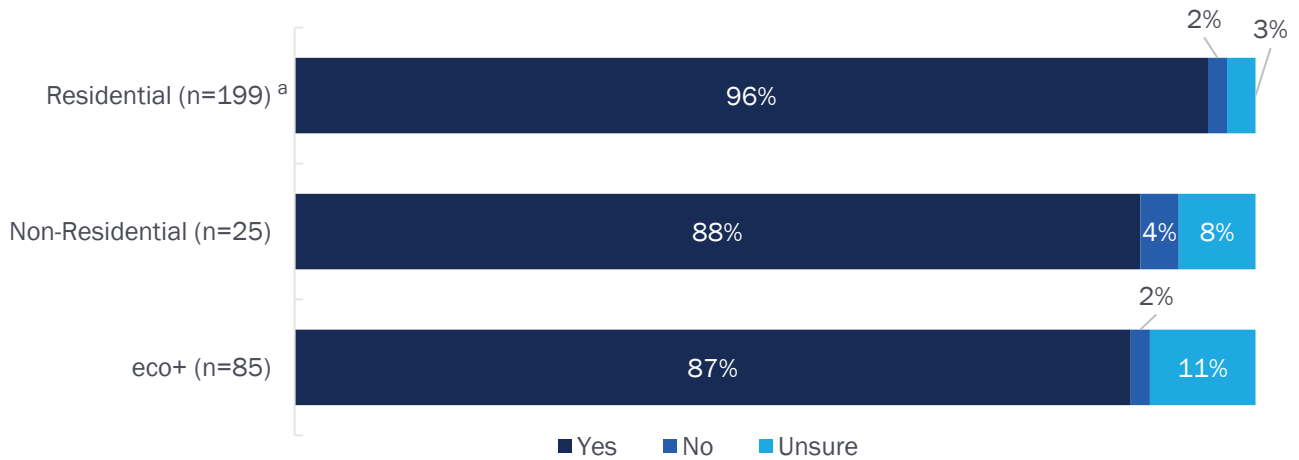
Figure 16. Willingness to Recommend MAPs to Others



The majority of respondents across all survey segments would be willing to participate in a similar program in the future (Figure 17). In each of the three survey groups, no more than 4% of respondents said they would not participate in a similar program again. Out of the three groups, residential respondents had the highest willingness to participate.

²⁶ Instead of asking eco+ respondents for their likelihood of recommending MAPs to others, we asked about their likelihood of recommending eco+. We present these results in Figure 13.

Figure 17. Willingness to Participate in a Similar Program in the Future



^aTotal sum is greater than 100% due to rounding.

When asked to explain their answer, those who said they were unwilling to participate in a similar program again cited various reasons. Residential respondents explained they would not participate in the future due to damage to the home caused by the aggregator, difficulty working with the aggregator, and lack of interest in the program. The one non-residential respondent who described their unwillingness said they would not participate again because of issues with program funding. The one eco+ respondent who answered this question attributed their unwillingness to reductions in home comfort and dissatisfaction with smart thermostats.

5. CONCLUSIONS AND RECOMMENDATIONS




In this section, we offer conclusions and recommendations based on overall performance then dive deeper into flexibility, simplification, and scale.

5.1 OVERALL PERFORMANCE

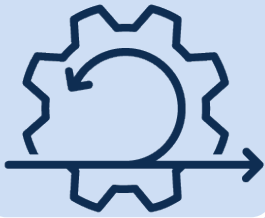
In general, interviewed aggregators and surveyed customers were highly satisfied with the MAP and willing to participate in a similar program in the future. Interviewed aggregators, implementers, and program staff liked the pay-for-performance model and NMEC approach. The pay-for-performance model and NMEC approach theoretically offer the flexibility and simplification articulated in the program theory. However, we found that this is not always the case in practice. Key barriers to fully achieving the MAP’s principles were the short ramp-up time from program concept to program start, limited program years (2022–2023), and individual differences in program design.

The next three subsections discuss findings regarding each of the interrelated core principles in more detail; Table 21 provides a quick overview. Where applicable, we note where tweaks to MAP design could be made to better align with theory, enjoy continued success, or act on lessons learned.

Table 21. Delivery on Core Principles

Core Principle	Description of Principle/Theory	Evidence of Principle in Action
 Flexibility	<p>The programs do not offer a prescriptive set of qualifying measures. Instead, aggregators may determine the correct solutions for their customers. This theoretically enables aggregators to freely design optimal solutions that appropriately balance individual customer’s specific needs with the program’s energy savings, demand reduction, and decarbonization goals.</p>	<p style="text-align: center;">Limited</p> <ul style="list-style-type: none"> Aggregators implemented energy-saving measures that they would not have been able to implement in traditional EE programs, such as LED lighting. Given the urgency around implementation, projects that could be implemented quickly and easily were favored, contributing to generally homogenous projects that left some customer needs unmet, particularly in the residential sector.
 Simplification	<p>Compared to traditional prescriptive programs, the MAPs reduce technical and administrative burdens to aggregators and customers by streamlining project approval, customer enrollment, savings measurement (i.e., using pop-NMEC), and incentive payment. This simplification theoretically reduces barriers to entry.</p>	<p style="text-align: center;">PA Dependent</p> <ul style="list-style-type: none"> One PA did not require any upfront engineering review or pre-approval process. The three that did implement a pre-approval process did so with disparate levels of rigor. For the one PA that employed a rigorous upfront review process, aggregators reported that participation was more complex than with the other PAs.
 Scale	<p>The program is available to any aggregator who signs an Aggregator Agreement and meets qualification requirements. This market approach provides access to a growing number of aggregators, theoretically supporting competition and vendor diversity, thus spurring new and innovative solutions.</p>	<p style="text-align: center;">Limited</p> <ul style="list-style-type: none"> Although non-residential MAPs were more successful in recruiting aggregators than residential ones, neither sector exhibited evidence of vendor competition as articulated in the program theory. Similarly, while the energy-saving measures included in non-residential projects were more diverse than those in residential projects, there were no examples of MAPs in either sector implementing innovative solutions.

5.2 FLEXIBILITY



The core principle of flexibility allows for aggregators to determine the correct solutions for their customers, as the MAPs do not offer a prescriptive set of qualifying measures. This theoretically enables aggregators to freely design optimal solutions that appropriately balance individual customer-specific needs with the program's energy savings, demand reduction, and decarbonization goals.

Overall Assessment: Limited

Conclusion 1: Measures not offered through traditional programs are still in demand in the market. Interviewed PAs and aggregators noted that the MAPs enabled aggregators to implement energy-saving measures that they would not have been able to through traditional EE programs, such as lighting measures. All aggregators shared the belief that MAP's flexibility on the equipment selections and the fact that savings were "at the meter", provided opportunities for savings. This included bringing in more locations from multi-location customers, adding controls, and specifying high-efficiency equipment for lighting. Aggregators believe these options would not be possible through traditional prescriptive rebate programs.

Furthermore, according to D.21.12-011, cost-effectiveness threshold requirements were waived for the 2022 and 2023 program years, as it was an emergency program. As such, the program operated on a stand-alone basis, separate from the EE portfolios. Moving forward, MAP will become part of the PA's EE portfolios and will be subject to cost-effectiveness requirements, per D.23.06-055. It is unknown at this time how removing the cost-effectiveness exemption may impact program design in future years.

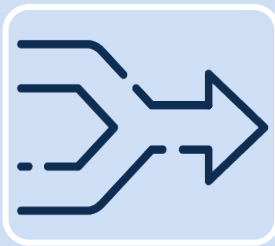
Conclusion 2: The urgency around MAP implementation, combined with the intentional flexibility provided to aggregators, translated into aggregators pursuing projects that could be implemented quickly and easily. While this is an example of MAP flexibility, it contributed to generally homogenous projects that left some customer needs unmet, particularly in the residential sector. Information gathered through program staff interviews suggests that because MAPs came about as a response to the Governor's State of Emergency proclamation, the rush to launch MAPs, implement energy-saving solutions, and achieve energy savings influenced the solutions offered to non-residential and residential customers. This is because solutions had to be quick and easy to install. Across all PAs, five distinct categories of solutions were offered to residential customers and six distinct categories to non-residential customers. Specifically, residential solutions offered included an exhaust or whole house fan, a variable-frequency drive (VFD) motor for their HVAC system, LED lighting, a pool pump, or eco+ thermostat optimization. Non-residential solutions offered were LED lighting (including fixtures); HVAC upgrades; refrigeration upgrades; behavior, retro-commissioning, and operational optimization (BRO) measures; chillers; and energy management systems.

These aggregators installed, on average, two energy-savings solutions for residential customers and one for non-residential customers. For some customers, the lack of solution offerings may have resulted in unmet needs, especially in the residential sector, as 36% of the residential survey respondents who were involved in discussing scope with their aggregators indicated that there were other energy-saving upgrades that they wanted to have done that were not included in the MAP project. While we do not know why these solutions were not included, the top residential measures desired were weatherization measures (18%), followed by high-efficiency heating and/or cooling equipment.



- **Recommendation 2:** Future recruitment efforts should include a concerted effort to identify and enroll aggregators positioned to pursue different types of projects. Additionally, PAs should consider highlighting the non-prescriptive nature of the program in recruitment efforts, which is seen as a benefit.

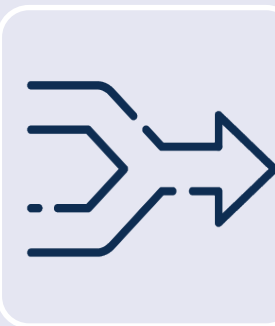
5.3 SIMPLIFICATION



The core principle of simplification means that compared to traditional prescriptive programs, the MAPs reduce technical and administrative burdens to aggregators and customers by streamlining project approval, customer enrollment, savings measurement (i.e., using pop-NMEC), and incentive payment. This theoretically reduces barriers to entry.

Overall Assessment: PA Dependent

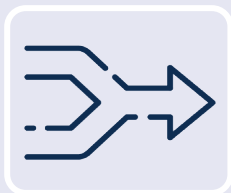
Conclusion 3: Overall, MAP successfully streamlined participation and incentive payments for aggregators and customers, but differences in individual MAP designs have created some challenges. The majority of survey respondents involved with paperwork and documentation reported that they found the process somewhat or extremely easy to complete (residential (98%), non-residential (95%)). Interviewed aggregators also noted the ease of participating as compared to traditional or custom²⁷ programs. On the other hand, although MAP funding was available statewide, and many consider it a “statewide” program, the PAs implemented their programs differently. Differing processes and customer eligibility requirements across the PAs created barriers to participation and frustration among some aggregators. For aggregators working in SCE territory, this was due to the more stringent eligibility requirements and more rigorous technical review and pre-approval process compared to the other PAs. Additionally, MCE and SDG&E provided upfront incentive payments while PG&E and SCE did not, making it more difficult for aggregators with limited financial capital to participate. Moving forward, each PA will run its own distinct MAP program following the current CPUC solicitation process.



- **Recommendation 3a:** MAPs should follow a uniform design. While slight variation may be necessary due to operational differences across the PAs, at a minimum, eligibility requirements and offering an upfront incentive payment should be consistent.
- **Recommendation 3b:** PAs should consider using some of the same data portals and processes statewide. This will create a more streamlined and consistent process for implementers, aggregators, customers, and evaluators.

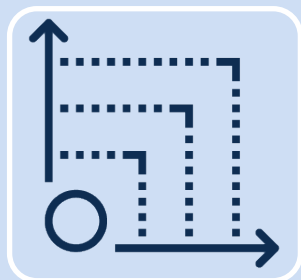
²⁷ Customer programs “are site-specific energy efficiency projects. Custom Projects require unique calculations for each project, as they do not rely on fixed DEER or workpaper values.” <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/custom-projects-review>

Conclusion 4: Not all sites are suitable for savings measurement using pop-NMEC, but they may have high energy savings that can be achieved at peak hours, thus reducing grid strain. A few aggregators reported that in cases where a comparison group was not identifiable to estimate savings, projects were disqualified, thus creating a barrier to participation. This mainly applied to customers with large campuses (e.g., movie studios) or specialized industrial processes. The NMEC rulebook identifies the use of comparison groups as one way to help determine energy savings, accounting for exogenous factors that impact energy usage across the population.



- **Recommendation 4:** When traditional comparison groups are not available, consider using other approaches, such as synthetic controls.

5.4 SCALE



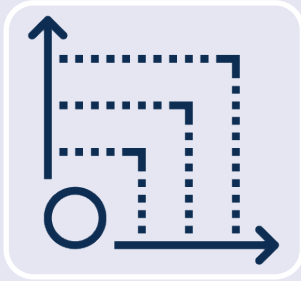
The core principle of scale means that the program is available to any aggregator who signs an Aggregator Agreement and meets qualification requirements. This market approach provides access to a growing number of aggregators, theoretically supporting competition and vendor diversity, thus spurring new and innovative solutions.

Overall Assessment: Limited

Conclusion 5: Potential for scale exists if program design and incentives remain attractive to aggregators. At this time, there is limited evidence of competition and vendor diversity, and new and innovative solutions have not arisen yet but this could be due to limited time in the marketplace so far. Scale is difficult to achieve with nascent programs, and MAPs will need to assess how their lists of participating aggregators will change over the coming years and set key performance indicators to track growth. In 2022 and 2023, at least 168 aggregators were recruited statewide to participate in MAP.²⁸ Forty-five aggregators participated in MAP (27%), while 109 signed up but did not complete any projects (near participants, 65%) and 14 were recruited but did not sign up (non-participants, 8%). Two aggregators served MCE territory, 31 served PG&E territory, 21 served SCE territory, and 13 served SDG&E territory. Most interviewed aggregators reported having existing relationships with the PAs and being in business for 15 years, on average. The majority (93%) of the 45 participating aggregators served non-residential customers, while 7% served residential customers.

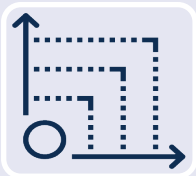
Most interviewed aggregators agreed that, in many cases, MAP created an opportunity to accelerate individual projects and allowed aggregators to expand projects. This was related to the relatively high level of financial incentives. Additionally, several aggregators mentioned that offering a higher percentage for the first or second incentive payments would make it more attractive for cash-strapped smaller businesses to participate. In terms of scale, this indicates that a longer running program cycle with an incentive structure that is more front-loaded may encourage a wider range of aggregators and projects.

²⁸ There may be more than 168 aggregators recruited for MAP because program staff noted that they only kept track of aggregators who expressed interest in participating at the time of recruitment. As such, aggregators who did not respond to PA outreach and/or recruitment efforts may not have been documented and may not be accounted for in this study.



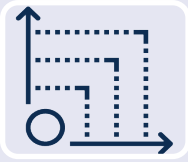
- **Recommendation 5a:** PAs should develop key performance indicators to measure new or diverse vendor procurement. In doing so, the term “diverse” should also be defined.
- **Recommendation 5b:** PAs should consider paying a larger portion of the incentive upfront rather than all equal payments, similar to MCE or SDG&E, to attract smaller and/or more diverse aggregators.
- **Recommendation 5c:** The PAs should consider holding workshops targeted at new aggregators. Additionally, support for onboarding and training of new aggregators will be needed to ensure MAP reaches its intended scale and impact.
Workshops should also be held for the full network, which would provide opportunities for cooperative knowledge sharing. These workshops could address some knowledge, skills, and abilities that aggregators need to fully achieve the core principles of MAP (i.e., training or resources that could help ensure aggregators explore their customers’ needs).

Conclusion 6: Some aggregators participate across multiple PA territories, which, if encouraged, could help the continued expansion of the program; however, differences in program design could prevent gains. Out of 168 participating, near, and non-participating aggregators, 16 participated in more than one PA territory. This demonstrates the MAP’s potential to scale because not only did the program allow multiple aggregators to sign up, but it also allowed multiple aggregators to sign up with one or more PAs and implementers and offer energy-saving solutions to customers in multiple and overlapping jurisdictions across the state. However, PAs do not currently have access to aggregator contact lists from other PAs, which limits potential outreach to already interested aggregators. Additionally, aggregators working with multiple PAs reported the most barriers working with SCE. These included more stringent eligibility requirements compared to other PAs and difficulties with program communication and processes. These barriers could impact the ability to scale effectively within SCE territory.



- **Recommendation 6:** PAs could consider data-sharing practices that would allow for aggregator participation contact data (including near and non-participants) to be shared across the PAs in an effort to increase participation and help scale the program.

Conclusion 7: MAP may be more feasible to scale for the non-residential sector, given that it is easier to achieve detectable savings at the meter. Interviewed aggregators discussed less risk and larger payouts with this sector. PAs reported that finding aggregators for the residential sector was challenging because for detectable savings to be achieved and for the program to be worth their investment of time, resources, and funds, aggregators would need to recruit large numbers of residential customers to participate. This proved difficult given the rush to launch the MAPs to achieve energy savings. However, there may be additional opportunities in the residential sector that leverage existing networks of customers such as original equipment manufacturers (OEMs) specializing in efficient or demand-reducing products such as heat pump water heaters or electric vehicle chargers. Similar to ecobee, other OEMs may be able to have widespread participation across multiple PA territories, which results in large energy savings in the aggregate and low-risk.



- **Recommendation 7:** PAs should consider recruiting additional OEMs as aggregators to increase aggregator and customer participation.

APPENDIX A. AGGREGATOR INTERVIEW INSTRUMENT

IN-DEPTH INTERVIEW GUIDE



MAP Aggregator IDI
Guide FINAL.pdf

APPENDIX B. SURVEY INSTRUMENTS

This appendix contains the survey instruments used to collect data from residential, non-residential, and ecobee's eco+ Thermostat Optimization program participants.

RESIDENTIAL SURVEY



CA_SW_MAPs_Residential_Participant_Survey

NON-RESIDENTIAL SURVEY



CA_SW_MAPs_Non-Residential_Participant_Survey

ECO+ SURVEY



CA_SW_MAPs_eco+_Participant_Survey_2024

APPENDIX C. SURVEY RESPONSE RATES

SURVEY RESPONSE RATE METHODOLOGY

We fielded three web surveys from March 21 to March 27, 2024 (eco+), March 21 to March 29, 2024 (Residential), and March 25 to April 3, 2024 (Non-Residential). Table 22 provides a summary of the survey dispositions for each of the three surveys.²⁹

Table 22. Survey Disposition Summary

Disposition	eco+	Residential	Non-Residential	All
Completes	85	199	25	309
Partial completes	0	0	0	0
Refusals/Break-offs	10	31	14	55
Non-contacts	2,510	4,836	88	7,434
Others	0	0	0	0
Break-offs (with eligibility)	3	8	1	12
Unknown if eligible for survey	7	23	13	43
Unknown if eligible for survey, other	0	0	0	0
Unknown if eligible household/business/respondent	2,440	3,045	83	5,568
Unknown if eligible household/business/respondent, other	0	0	0	0
Unused sample	70	1,791	5	1,866
Ineligible for survey	6	6	0	12
Ineligible household/business/respondent	0	0	0	0
Ineligible sample units	45	603	11	659

RESPONSE RATE CALCULATIONS

The evaluation team used the American Association for Public Opinion Research (AAPOR) Response Rate 3 (RR3), which excludes estimates of eligibility for unknown sample units and partial completes. Equation 1 presents the formula used to calculate AAPOR RR3. The definitions of the letters used in the formula are listed below.

Equation 1. AAPOR RR3 Formula

$$I$$

$$[(I+P) + (R1) + (e1*((UH1+UO1) + (e2*(UH2+UO2)) + (e3*UH3)))]$$

Where:

I = Completes

P = Partial completes

²⁹ Dispositions are the results for each potential response to a survey, these could include survey bounce-backs, ineligible respondents, or respondents who may end the survey prior to completion. Each of these dispositions are used to calculate response rates for surveys.

R = Refusals/Break-offs

NC = Non-contacts

O = Others

R1 = Break-offs (with eligibility)

UH1 = Unknown if eligible for survey

UO1 = Unknown if eligible for survey, other

UH2 = Unknown if eligible household/business/respondent

UO2 = Unknown if eligible household/business/respondent, other

UH3 = Unused sample

X1 = Ineligible for survey

X2 = Ineligible household/business/respondent

X3 = Ineligible sample units

e1: Estimated % of sample that is eligible to complete survey = $(I+P+R1) / (I+P+R1+X1)$

e1inverse: % of sample that is ineligible to complete survey = $100\% - e1$

e2: Estimated % of sample that is eligible HH/BUS/R = $(I+P+R1+UH1+UO1+X1) / (I+P+R1+UH1+UO1+X1+X2)$

e2inverse: % of sample that is ineligible HH/BUS/R = $100\% - e2$

e3: Estimated % of sample that is an eligible sample unit = $(I+P+R1+UH1+UO1+UH2+UO2+X1+X2) / (I+P+R1+UH1+UO1+UH2+UO2+X1+X2+X3)$

e3inverse: Estimated % of sample that is an ineligible sample unit = $100\% - e3$

APPENDIX D. SUPPLEMENTAL SURVEY DATA TABLES

Table 23. Energy-Saving Measures eco+ Respondents Wanted at the Time of MAP Participation

Energy-Saving Measures Wanted by Participants	Percent (n=85)
Solar panels	11%
Insulation	8%
Windows/doors	7%
HVAC	6%
Energy-saving appliances	5%
Other smart thermostat	5%
Heat pump water heater	4%
LED lighting	2%
Smart plugs	2%
Participating in time-of-use/DR programs	2%
Remote occupancy and temperature sensor	1%
Air sealing	1%
Smart humidifier	1%
Whole house fan	1%
Did not want any other energy-saving upgrades/unsure	56%
Total^a	132%

^a Total does not sum to 100% due to respondents with multiple responses.

Table 24. Energy-Saving Measures Residential Respondents Wanted at the Time of MAP Participation

Energy-Saving Measures Wanted by Participant	Percent (n=124)
Weatherization measures (e.g., air sealing, insulation, weather stripping)	18%
High-efficiency heating and/or cooling equipment	7%
Energy-efficient appliances	6%
High-efficiency hot water heater	5%
LED lighting	2%
Solar panels	2%
Smart thermostat	2%
Low-flow toilet	2%
AC fan condenser/motor	1%
Whole house fan	1%
Did not want any other energy-saving upgrades/unsure	64%
Total^a	109%

^a Total does not sum to 100% due to respondents with multiple responses.

Table 25. Energy-Saving Measures Non-Residential Respondents Wanted at the Time of MAP Participation

Energy-Saving Measures Wanted by Participant	Percent (n=18)
Building Automation System (BAS)	6%
Building controls (e.g., lighting, refrigeration, HVAC)	6%
Did not want any other energy-saving upgrades/unsure	89%
Total	100%



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