

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

FINAL REPORT

CALMAC ID: SDGo376

2025 Final Load Impact Evaluation for San Diego Gas & Electric's Small Commercial & Agricultural Critical Peak Pricing



Prepared for SD&GE
By Demand Side Analytics, LLC
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ACKNOWLEDGEMENTS

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ABSTRACT

This study quantifies forecasted load impacts for SDG&E's Critical Peak Pricing (CPP) rates for Small customers (< 20 kW demand) in the commercial and agricultural rate classes, beginning with PY2025. CPP rates increase energy prices during peak hours on event days in exchange for lower rates during other summer hours. CPP rates are the default commercial rates for SDG&E.

This study typically addresses two primary research questions, evaluated separately for each utility:

1. **Ex post:** *What were the 2025 demand reductions from 4 to 9 p.m. on event days?*
2. **Ex ante:** *What is the expected magnitude of future load reductions by CPP customers under 1-in-2 weather conditions?*

Because no events occurred in 2025, the study focuses solely on this ex-ante question.

Ex ante, Small CPP customers would be expected to deliver demand reductions of 0.9 MW in 2025, with impacts growing slightly over time with changes in forecasted enrollments. These impacts are similar to those estimated from PY 2023-2024, but they are somewhat lower than those estimated through PY 2022, when CPP enrollments were much higher.

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1 EXECUTIVE SUMMARY

SDG&E's Critical Peak Pricing (CPP) is a dynamic rate for commercial and agricultural customers. CPP rates are time-of-use (TOU) rates that include price adders from 4 to 9 p.m. on event days. Customers pay lower rates during the other, non-event hours in the summer. Event days are called based on system demand, and customers can sign up to receive day-ahead or day-of notifications. TOU rates with a CPP component are the default rates for Small Commercial (< 20kW demand) customers, and an optional rate for Small Agricultural customers. Small Commercial customers can opt out of the rates at any time.

The study is focused on one primary research question: Based on historical event impacts, what is the magnitude of load reduction capability for 1-in-2 weather planning conditions?

SDG&E did not call any CPP event days in PY 2025 since the minimum conditions to trigger an event were not met. As such, no additional ex post results are reported here, though the ex post impacts from previous years (PY 2023 and PY 2024) factor into the ex ante forecasts.

Table 1-1 and Table 1-2 summarize the Small CPP ex ante reductions under August Worst Day conditions for a 1-in-2 weather year for both agricultural sites and commercial sites. Results are shown under both CAISO and SDG&E peaking conditions and reflect the reduction capability from 4-9 p.m.

Small Commercial sites are expected to deliver 0.29 to 0.30 MW per hour on event days, with this impact growing over time to 0.37 to 0.38 MW. Small Agricultural sites are expected to deliver reductions of 0.26 to 0.28 MW per hour on event days, with this impact growing over time to 0.31 to 0.34 MW.

Table 1-1: Summary of Ex Ante Demand Reductions – Small Commercial

Weather Type	Year	Sites	CAISO		SDG&E	
			Program	Portfolio Adj	Program	Portfolio Adj
1-in-2	2025	14,757	0.29	0.29	0.30	0.30
1-in-2	2026	13,730	0.27	0.27	0.28	0.28
1-in-2	2027	14,026	0.28	0.28	0.29	0.29
1-in-2	2028	14,397	0.29	0.29	0.29	0.29
1-in-2	2029	14,817	0.30	0.30	0.30	0.30
1-in-2	2030	15,287	0.30	0.30	0.31	0.31
1-in-2	2031	15,816	0.32	0.32	0.32	0.32
1-in-2	2032	16,416	0.33	0.33	0.33	0.33
1-in-2	2033	17,097	0.34	0.34	0.35	0.35
1-in-2	2034	17,871	0.36	0.36	0.36	0.36

Weather Type	Year	Sites	CAISO		SDG&E	
			Program	Portfolio Adj	Program	Portfolio Adj
1-in-2	2035	18,748	0.37	0.37	0.38	0.38

Table 1-2: Summary of Ex Ante Demand Reductions – Small Agricultural

Weather Type	Year	Sites	CAISO		SDG&E	
			Program	Portfolio Adj	Program	Portfolio Adj
1-in-2	2025	55	0.26	0.26	0.28	0.28
1-in-2	2026	55	0.22	0.22	0.25	0.25
1-in-2	2027	56	0.23	0.23	0.25	0.25
1-in-2	2028	58	0.25	0.25	0.27	0.27
1-in-2	2029	59	0.24	0.24	0.27	0.27
1-in-2	2030	60	0.24	0.24	0.26	0.26
1-in-2	2031	62	0.26	0.26	0.28	0.28
1-in-2	2032	64	0.26	0.26	0.28	0.28
1-in-2	2033	68	0.28	0.28	0.31	0.31
1-in-2	2034	70	0.29	0.29	0.32	0.32
1-in-2	2035	75	0.31	0.31	0.34	0.34

2 INTRODUCTION

SDG&E's Critical Peak Pricing is a dynamic rate for commercial and agricultural customers. These rates are designed to incentivize customers to reduce electricity use during peak hours on the handful of days that drive utilities' needs for additional power infrastructure.

SDG&E's CPP rates are time-of-use rates with price adders from 4 to 9 p.m. on event days, with customers paying lower rates during the other, non-event hours in the summer. Event days are called based on system demand, and customers can sign up to receive day-ahead or day-of notifications.

Between November 2015 and April 2016, SDG&E transitioned over 120,000 small business customers onto time of use rates with a critical peak component (CPP-TOU). SDG&E has since also transitioned Small Agricultural customers from flat rates onto time of use rates and offered a CPP-TOU rate on a voluntary (opt-in) basis. Participation in recent years has decreased through the expansion of Community Choice Aggregations (CCAs), which do not offer CPP rates, but TOU rates with a CPP component remain the default rate for bundled commercial customers.

Due to mild weather conditions in the summer, SDG&E did not call any CPP event days for PY 2025.¹ Thus the focus of this evaluation is to quantify load reductions going forward for SDG&E and CAISO 1-in-2 weather conditions, both for the Small Commercial and the Small Agricultural programs.

2.1 CPP PROGRAM FEATURES

The following table outlines several relevant features of SDG&E's CPP rates for Small Commercial and Small Agricultural customers.

Table 2-1: SDG&E Small CPP Program Details

Program Feature	Details
Eligible Customers	Commercial and Agricultural customers with < 20 kW demand
Peak Window	4-9 p.m. year-round

¹ A CPP Event may be triggered if the day-ahead system load forecast for the potential event day is greater than 4,000 MW. Events may also be triggered in response to high forecasted temperatures, extreme conditions, and emergencies. Whenever the California Independent System Operator has issued an alert or warning notice, the California Independent System Operator shall be entitled to request that the utility, at its discretion, call a program event pursuant to this Schedule

Program Feature	Details
CPP Rate Adder	Various; generally \$1.17 per kWh for Small CPP sites
Incentive	Lower rates during other summer peak hours
Bill Protection	Yes, for first year
Default rate for C&I customers (bundled)?	Yes
Groups ineligible?	CCAs, Direct Access (DA) customers
Min./Max. Possible Events	Maximum 18 (no minimum). In recent years there have been 0 to 6 events per year.
Event Triggers	Day-ahead system load forecast > 4,000 MW Can also be triggered for high temp.'s, extreme conditions, emergencies and by CAISO request
Number of Events – PY2025	0

2.2 STUDY RESEARCH QUESTIONS

Table 2-2 summarizes key research questions for the PY 2025 evaluation:

Table 2-2: Key Research Questions

Research Question
<p>1 What is the ex ante load reduction capability for 1-in-2 weather conditions? How well does it align with ex post results and prior ex ante forecasts?</p>
<p>2 What concrete steps or experimental tests can be undertaken to improve CPP rate performance?</p>

3 DATA & METHODS

While there were no new events in PY 2025, previous year's impacts were estimated using the methodology outlined below. Impacts were primarily estimated using differences-in-differences with a matched control group. Site-specific individual regression models were also used in cases where there were too few customer sites in a given segment. Table 3-1 lists further detail on the evaluation data and methods:

Table 3-1: PY 2023 & 2024 Ex Post Evaluation Method Details

Utility/ Program	SDG&E
Analysis Method	Differences-in-Differences with matched control group Individual customer regressions if too few sites in customer segment
Loads Analyzed	Net loads (almost all sites) Delivered loads only for power generators
Groups	By rate class (Small Agricultural, Small Commercial)
Geographic segmentation	Climate Zone (Coastal, Inland)
Other segmentation	Industry, NEM, Power generators
Analyze event notifications?	Yes

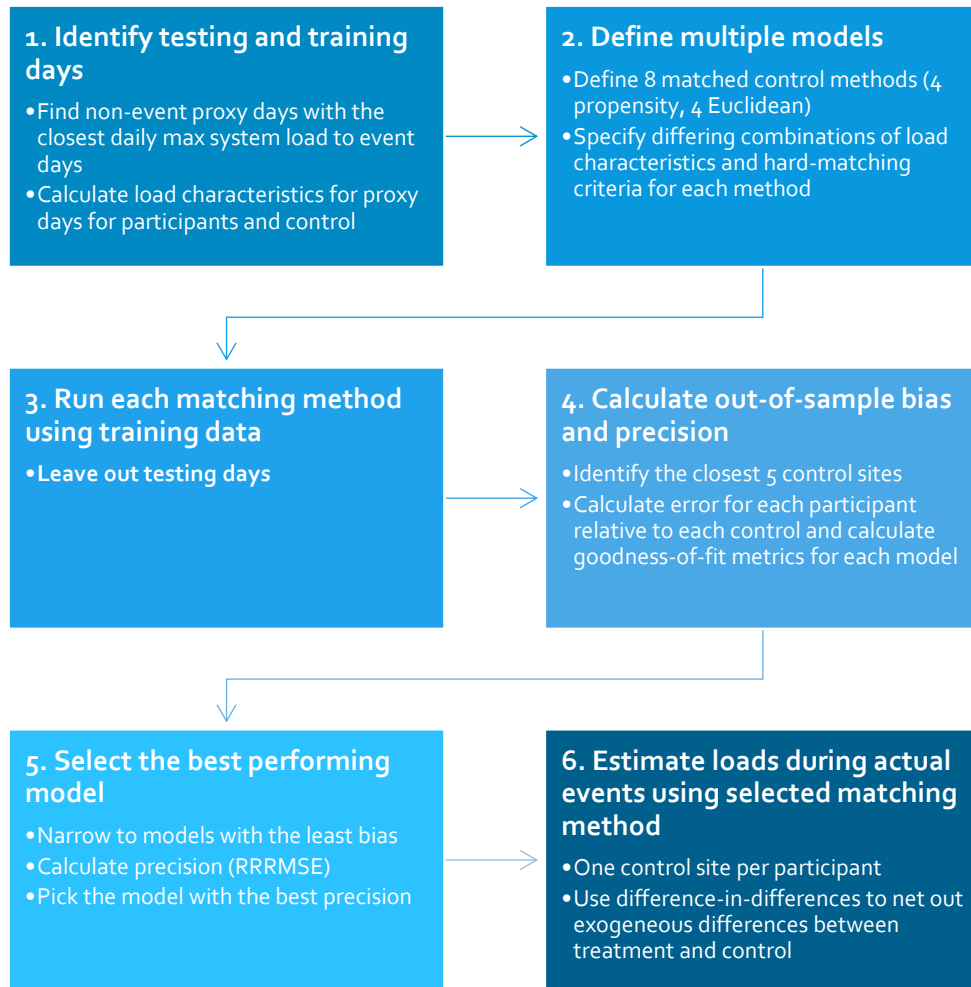
3.1 PY 2023 & 2024 EX POST METHODOLOGY

3.1.1 CONTROL GROUP SELECTION

Figure 3-1 summarizes the process used to select matched controls for the difference-in-difference analyses. First, several event-like, proxy days were chosen, with similar weather and system conditions to event days. CPP customers were then matched to non-CPP sites with similar energy-use patterns on the proxy days. More detail on proxy day selection can be found in Appendix B.

Matching methods included different combinations of proxy day load characteristics such as load factor, load shape, and weather sensitivity. Customers were always matched with control candidates in the same climate zone, net metering status, and size bin. Size bins were constructed using average usage on event-like, proxy days. For solar customers, size bins were constructed based on system size.

Figure 3-1: Out of Sample Process for Control Group Selection



Matches were evaluated and the process was iterated as necessary until strong matches were achieved for each group. Matching was assessed using bias and goodness-of-fit metrics.

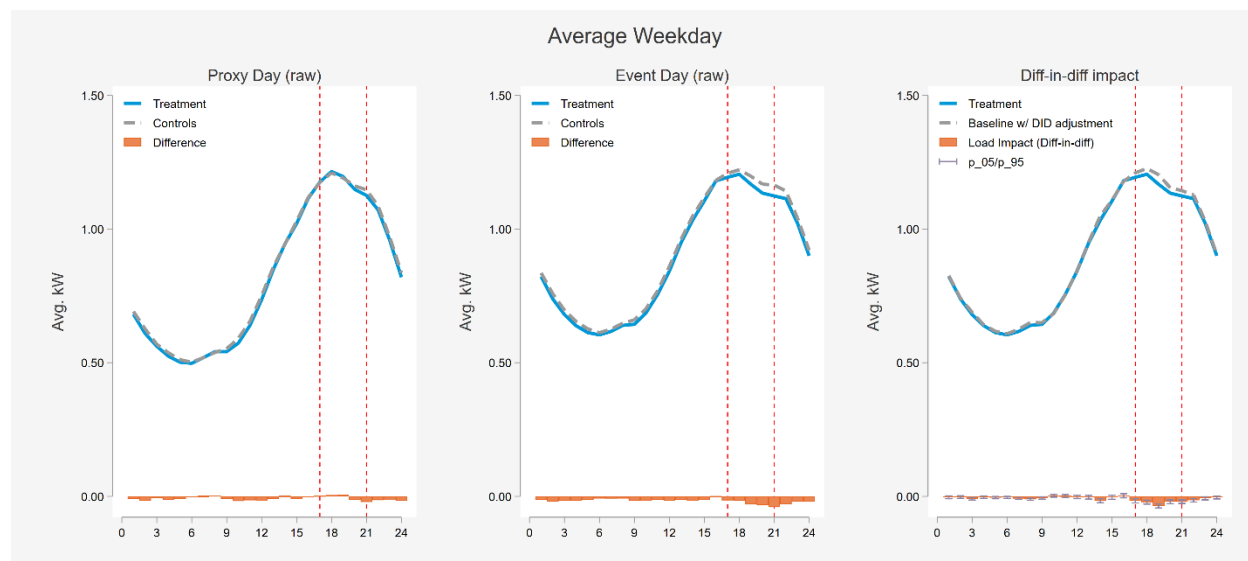
The difference-in-differences approach used the matches collectively as a control group to net out changes in energy usage patterns not due to the CPP events. The individual customer regressions also test for the inclusion of matched control sites as explanatory variables, representing the usage patterns on event days from similar sites. As such, regardless of evaluation methodology, each CPP site was matched to one or more non-CPP using a matching tournament where match quality was compared across eight different matching models to identify the best performing model.

3.1.2 DIFFERENCES-IN-DIFFERENCES

Figure 3-2 below demonstrates the mechanics of a difference-in-difference calculation. The data shown is generic and not specific to any group in this evaluation. In the first panel, average observed loads on

proxy days are shown for customers and for their matched controls. The difference between these two is the first “difference” and quantifies underlying differences between CPP customers and their controls not attributable to event participation. Note that this first difference is very small, indicative of a high-quality match and sufficient sample size to neutralize the noise inherent in individual customer loads.

Figure 3-2: Difference-in-Differences Calculation Example



The second panel shows the average observed CPP customer and matched control loads on event days. The gap between these two is the second “difference” which includes both the difference due to event participation and the underlying first difference observable on non-event days.

The third panel shows the average event day loads after netting out the proxy day difference from the event day control load. The result is the difference-in-differences impact, or the change in customers’ usage on event days vs. proxy days, net of any observed differences in the control group on those same days.

3.1.3 INDIVIDUAL CUSTOMER REGRESSIONS

In cases where a difference-in-differences approach was not possible due to insufficient sample size in the required matching categories, site-specific individual customer regression models were used.

For sites requiring individual customer regressions, an out of sample tournament was used to select site specific regression models among 120 possible specifications across 4 parameters:

- Industry profiles, constructed of loads for other similar commercial and industrial customers²
- Local solar irradiance data from nearest weather station
- Number of control sites (up to five matched controls from the matching process above)
- Lags of load data³

The industry profiles (based on NAICS codes) and control sites (up to five matches, from the matching process described above) are included as explanatory variables to include the event-day usage patterns of similar sites. A variety of within-subjects lagged loads (1 day, 1 week, 2 weeks) were also included in the model testing.

To implement out of sample testing, the top 50 system load days, excluding event days, were randomly divided into testing and training datasets. Bias and fit metrics were calculated using the testing dataset and the model with the best fit (lowest Root Mean Squared Error) was selected among models with the least bias (Mean Absolute Error⁴). Site-specific load impacts were estimated using the winning model for each site.

The figures below show the explanatory variables included in the site-specific model tournament and the number of sites for which each parameter was included in the winning model. The wide spread across parameters indicates that it was important to allow for individually-tailored models to be selected for each participating site.

² Selected from granular load profiles within climate zone and industry segment constructed and maintained by Demand Side Analytics for SDG&E population NMEC settlement validation.

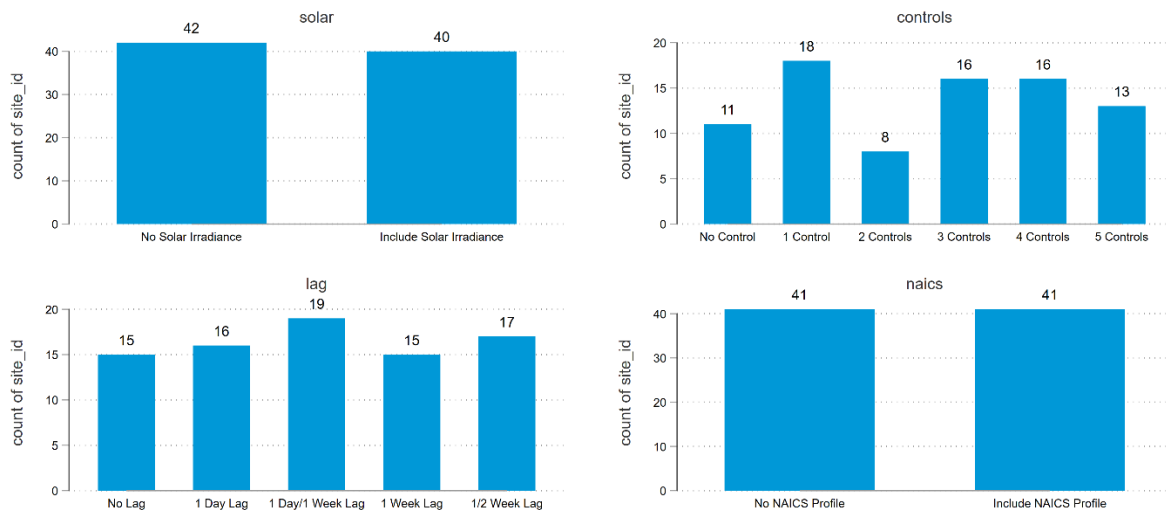
³ Lags were designed to capture the tendency of large commercial and industrial customers to operate on daily, weekly, or bi-weekly schedules irrespective of weather or time of year.

⁴ MAE was used rather than Mean Average Percent Error (MAPE) to ensure robustness for sites with loads very close to zero, common for sites with solar or other generation.

Figure 3-3: Variables Included in PY 2024 Best-Performing Site-Specific Models – Small Agricultural



Figure 3-4: Variables Included in PY 2024 Best-Performing Site-Specific Models – Small Commercial



3.2 EX ANTE METHODOLOGY

A key objective of DR evaluations is to quantify the relationship between demand reductions, temperature, and hour-of-day. The purpose of doing so is to establish the demand reduction capability under 1-in-2 weather conditions for planning purposes and, increasingly, for operations. When possible, we rely on the historical event performance to forecast ex-ante impacts for future years for different operating conditions.

3.2.1 EX ANTE MODEL INPUTS

For ex ante projections, we use a top-down enrollment model that includes PY2023 – PY2024 ex post percent impact estimates, system loads, and the CPP enrollment forecast from SDG&E. Weather and event-hour impacts were also tested for both CPP groups, but there were no significant trends in either of these measures on the PY 2023 or PY 2024 impact estimates, so they were not included. More detail on weather and event hour impacts can be found in the ex ante section of this report.

Table 3-2 provides an overview the ex ante methods:

Table 3-2: Ex Ante Analysis Details

Data/Parameter	Detail
Reference loads	SDG&E, CAISO 1-in-2 weather year loads
PY2025 Ex Post impacts included?	No events in PY2025
Historical impact estimates included?	Yes, PY2023 and PY2024
Weather impacts?	No, based on testing
Different percent impacts by event hour?	No, based on testing
Enrollment forecast	10 years (2025-2035), supplied by SDG&E

3.2.2 PORTFOLIO-ADJUSTED IMPACTS

For ex ante estimates, program-specific and portfolio-adjusted impacts are developed for each subgroup. Since customers may be able to participate in more than one energy-saving program, an attribution of savings estimates to separate DR programs is essential. This prevents double-counting savings for planning purposes. Ex post results are properly attributed by calculating the incremental impacts, or the load reduction beyond what was predicted or committed on dually called event hours. Modelling for ex ante is based solely on these incremental impacts.

For PY 2025, however, there was little dual-program participation with Small CPP, the only exception being ELRP. Because SDG&E counts CPP impacts before ELRP impacts in their portfolio aggregation, incremental impacts accounting for dual CPP-ELRP participation are handled in that evaluation. Any impacts for dual CPP-ELRP participants are therefore wholly attributed to CPP in this evaluation.

As such, in all cases the portfolio-adjusted impacts reported in this evaluation are equal to the program-specific impacts. Ex ante results will generally be presented as “portfolio-adjusted”, since these are the impacts used for planning, but they are equivalent to the program-specific values.

For clarity, Table 3-3 lists each program reviewed for dual-participation:

Table 3-3: Eligible Dually Enrolled Programs for Ex Ante Considerations

BIP	CBP	Thermostat Programs	ELRP
N/A	No dual participants	N/A	Adjustments made in ELRP evaluation

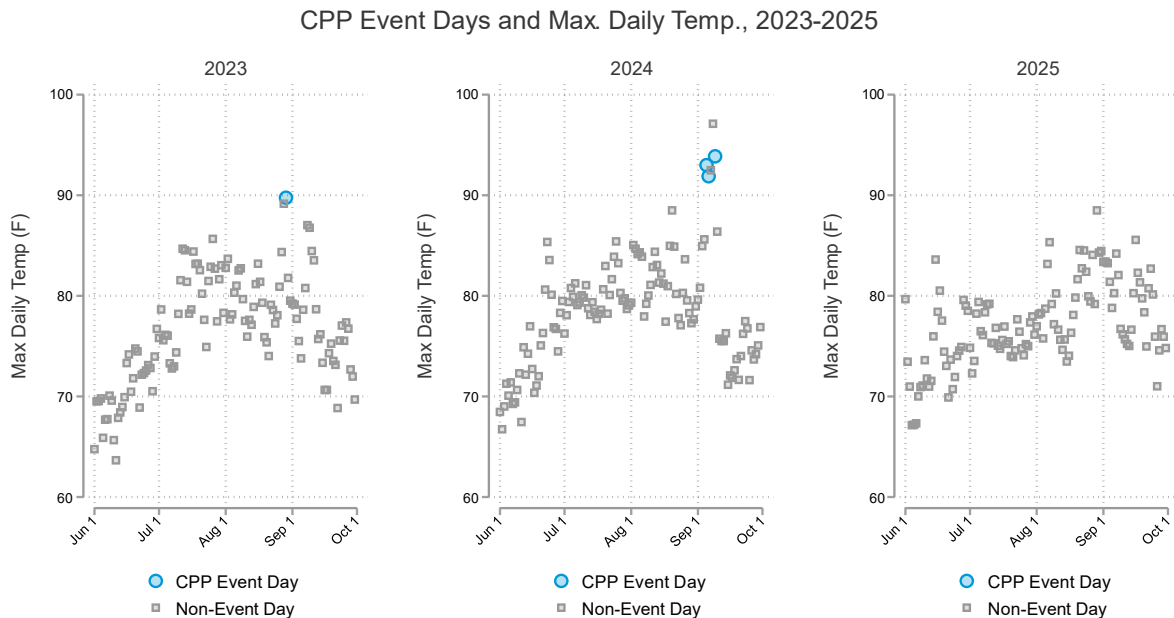
4 PY 2025 OVERVIEW

While PY 2025 has no ex post impacts to evaluate, we detail the Small CPP program status below, including weather conditions, enrollments, and load shapes through Summer 2025.

4.1 EVENTS

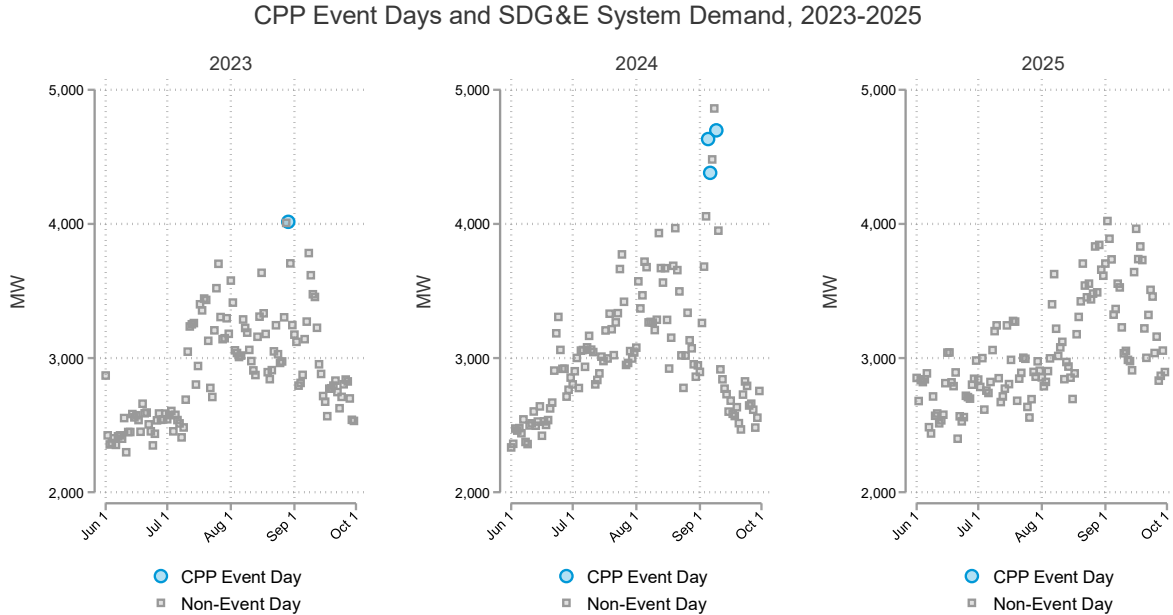
SDG&E CPP event days are generally called under extreme weather conditions by design. As shown in Figure 4-1 below, Summer 2025 was relatively mild in SDG&E territory, with no days reaching the extremes that were seen during the September 2024 events. While 2023 was generally similar in temperature to 2025, the single PY 2023 event was also called at a temperature above any that was reached in 2025.

Figure 4-1: CPP Event Days and Maximum Daily Temperatures, Summer 2023 – Summer 2025



SDG&E's minimum condition for triggering a CPP event is a day-ahead system forecast of over 4,000 MW. Figure 4-2, which plots actual loads for summer 2025 (rather than day-ahead forecasts), shows that the SDG&E system reached 4,000 MW on just one day during summer 2025, and loads only slightly surpassed the minimum threshold in that case.

Figure 4-2: CPP Event Days vs. System Loads



While SDG&E also allows for events to be triggered in response to high forecasted temperatures, on request from CAISO, or other emergencies, these did not occur in PY 2025.

4.2 ENROLLMENTS

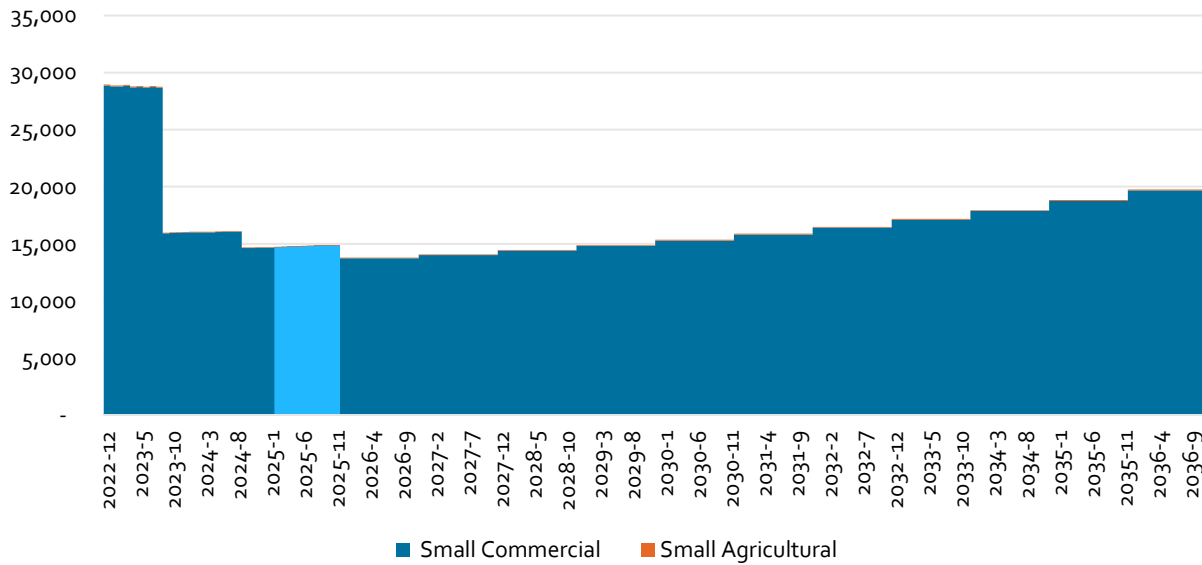
Table 4-1, summarizes the total number of sites in each group through the end of PY 2025. Nearly all the sites are commercial, though the agricultural sites have delivered ex post savings in recent years.

Table 4-1: Small Critical Peak Pricing Population Segments

Group	Rate Class	Total sites	Sites in analysis
Small Agricultural	Agricultural	55	55
Small Commercial	Commercial	14,757	14,757
Total		14,812	14,812

Figure 4-3 shows PY 2025 Small CPP enrollments in light blue, with recent past enrollments (starting after PY 2022) and projected future enrollments in navy. Small Agricultural enrollments are shown in orange, but they only make up a very small percentage of the total enrollments. Overall, enrollments fell slightly for PY 2025. This decrease was not due to any additional CCA migrations and was fairly small relative to reductions the rates experienced from PY 2021 – 2025.

Figure 4-3: Small CPP Historical Enrollments and Ex Ante Enrollment Forecast



Originally, SDG&E defaulted over 120,000 small customer sites onto CPP-TOU rates. Beginning in 2021, many Small CPP customers have switched to receiving energy from a Community Choice Aggregator (CCA), which removes them from CPP eligibility. Small CPP enrollments are currently below 15,000, but they are expected to grow in coming years since CPP rates remain the default for new commercial accounts.

4.3 EX POST IMPACT ESTIMATES IN RECENT EVALUATIONS

While no additional ex post impact estimates were calculated in this evaluation, Table 4-2 lists impacts by group in the most recent program years (2022-2024) for context. Small Commercial sites generally reduce their loads from 0 to 1% during CPP event hours, while the agricultural sites (less than 60) at times drop much more for CPP events (in percentage terms). Note that the number of events can contribute to variations from year-to-year: PY 2023 had only one CPP event, while PY 2024 had three, but these all came on consecutive weekdays during a September heat wave.

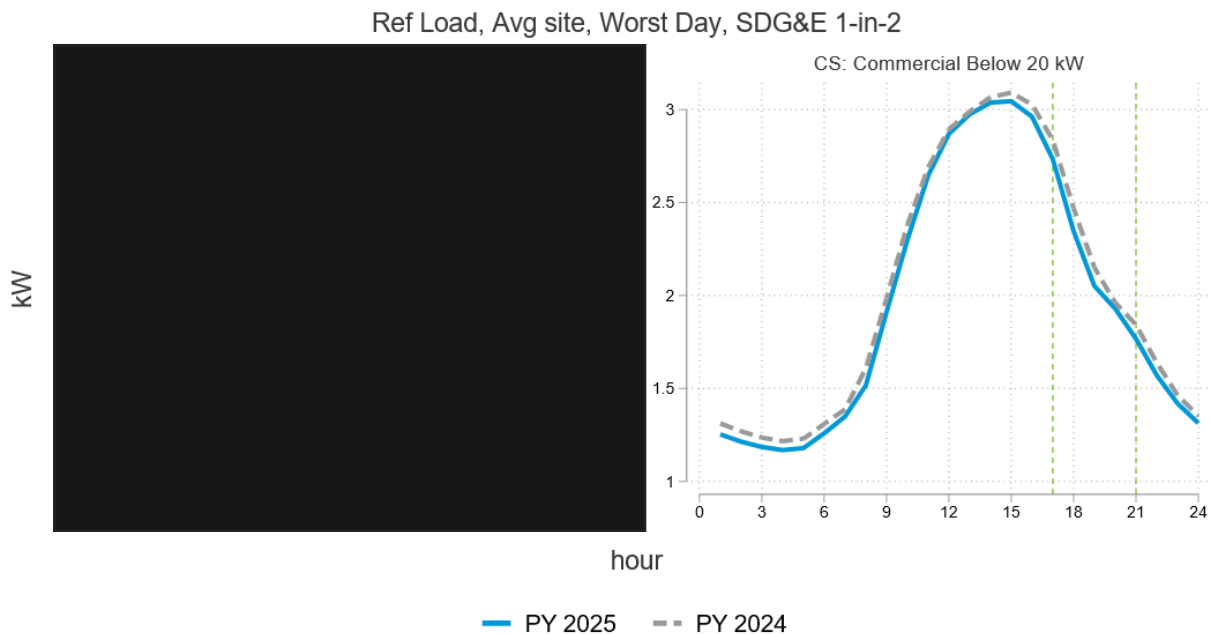
Table 4-2: Ex Post Impact Estimates in Recent Evaluations

Group	Percent Impact - 2022	Percent Impact - 2023	Percent Impact - 2024
Small Commercial	0.7%	0.4%	1.2%
Combined	(not reported)	0.5%	2.4%

4.4 PY 2025 HOURLY LOADS

Figure 4-4 below plots the average loads for used in the later ex ante analysis for both Small CPP groups. Changes in usage can be seen in variation from 2024 to 2025. Small commercial sites' loads were slightly lower in 2025. This was likely due to cooler temperatures and not some compositional change in the sites remaining on CPP rates. The agricultural sites, of which there are very few, have much noisier loads and seemed to rely on even more solar generation in 2025. Note that in both cases there is a drop in usage during the peak TOU hours from 4-9 p.m., which are also the CPP event hours (when called). This low peak usage for small sites generally leads to less flexibility in shifting for CPP events, over and above any shifting they already do daily for the TOU rate.

Figure 4-4: PY 2025 Reference Loads Used for Ex Ante Analysis Compared to PY 2024



5 EX ANTE LOAD IMPACTS

The key objective of this evaluation is to project, *ex ante*, the load reductions that CPP customers can deliver on future event days. These are intended to reflect performance under 1-in-2 worst day weather conditions for both CAISO and the SDG&E system.

In general, ex ante forecasts rely on the estimated ex post impacts for current or recent program years, as well as any relationship between weather and event hour to load reductions. For PY2025, ex ante modeling incorporated both PY2023 and PY2024 ex post impact estimates, but it did not include any differential impacts based on weather or the event hour.

5.1 EX ANTE MODEL INPUTS

For PY2025, the key inputs for ex ante impact model are:

- PY2023 ex post impact estimates (percent impacts)
- PY2024 ex post impact estimates (percent impacts)
- 1-in-2 weather normalized system load data for both CAISO and SDG&E
- CPP enrollment forecast through 2035

The following factors were also considered, but ultimately were not included in the ex ante model:

- Weather impacts on percent reductions
- Event-hour impacts on percent reductions

Note that while event hour and weather do not impact the percent reductions in the ex ante model, both hotter temperatures and earlier event hours result in larger aggregate impact estimates, since percent reductions are applied to larger reference loads in each case.

5.1.1 HISTORICAL IMPACT ESTIMATES

Since no events were called for PY 2025, no additional impact estimates were added to this evaluation.

PY2023 and PY 2024 ex post impacts were included in the ex ante model. PY2024 impacts differed from those estimated in PY 2023, and the low number of event days (three in 2024, one in 2023) likely drives the variance in the estimates over time. The PY2023 percent impacts were thus included to add more data to the model.

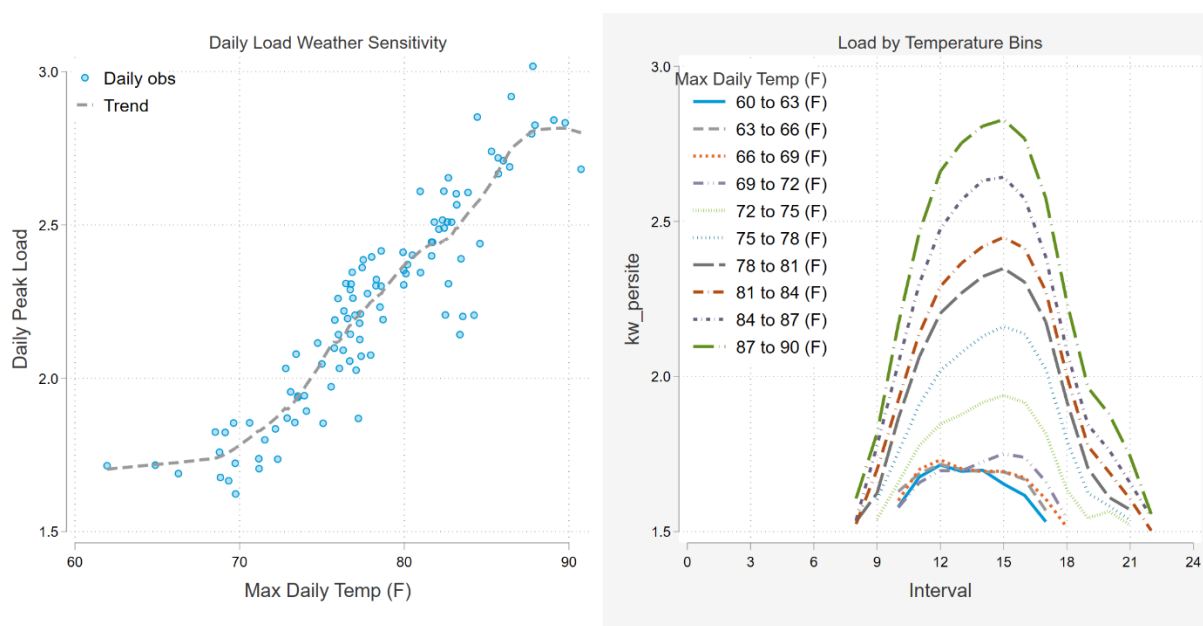
Impact estimates from PY2022 were not included since the number of customers has changed dramatically since that year: current CPP enrollments are less than 50% of what they were in the summer of 2022. These large decreases (due to the CCA expansion) likely affected not only the number

of customers but also the composition of the customer pool. As such, the 2022 results would be less applicable to the customer populations that SDG&E can expect going forward.

5.1.2 WEATHER IMPACTS

Figure 5-1 summarizes the relationship between weather and Small Commercial customer loads in 2025. Only non-event days are included. The left panel in Figure 5-1 shows average hourly loads for current customers for different temperature bins, defined by the daily maximum temperature. The right panel shows the relationship between daily maximum temperatures and hourly loads. The hottest temperature day in the right panel is the highest load curve. In 2025 we see the expected pattern that energy demand and discretionary load increases with hotter weather.

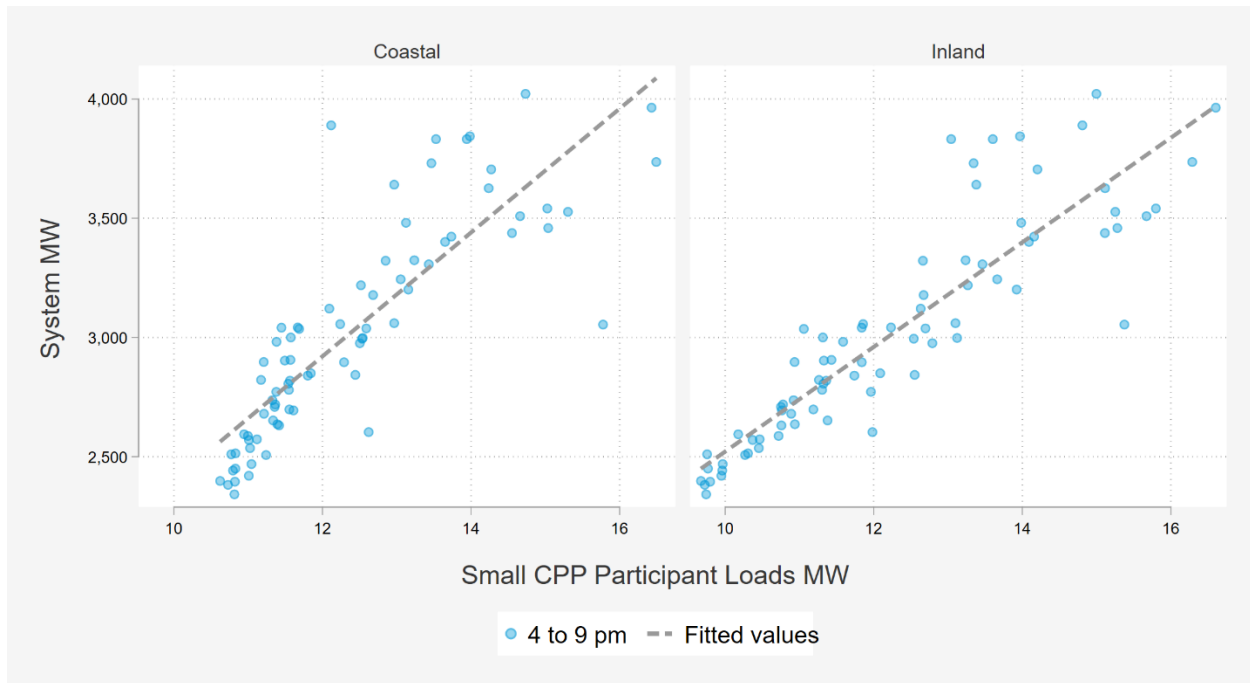
Figure 5-1: Weather Sensitivity of Small Commercial CPP Loads



2025 May to mid-Oct loads, excluding weekends/holidays and events

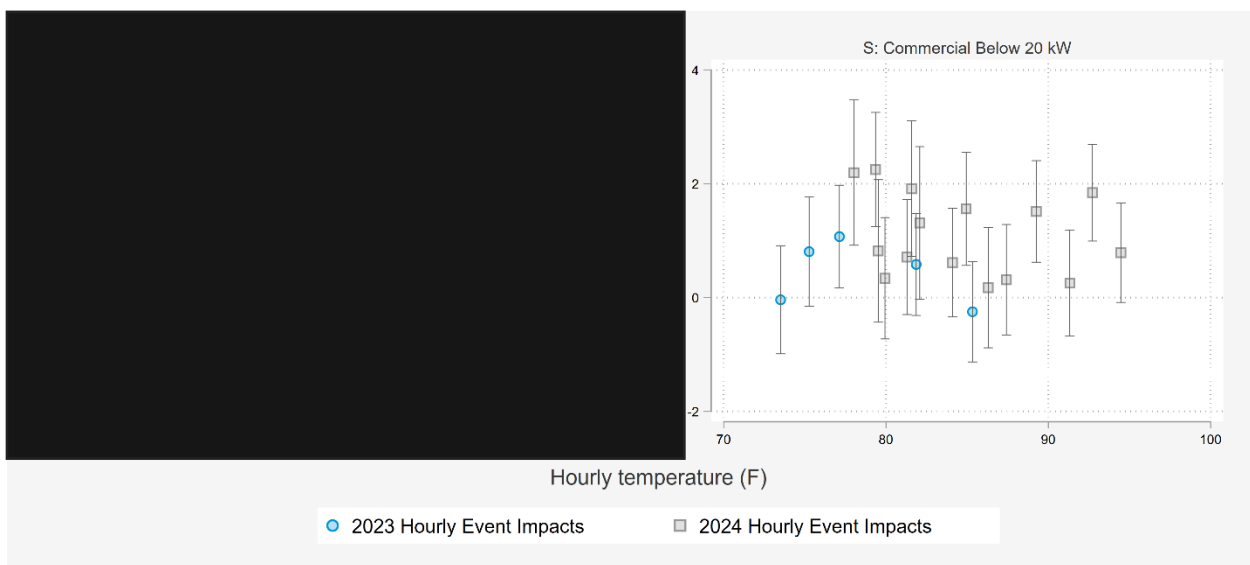
Figure 5-2 shows the relationship between aggregate Small Commercial CPP loads and SDG&E daily peak loads. Small Commercial CPP loads are highly correlated with system load daily peaks during the 4 to 9 p.m. window. However, Small Commercial loads peak around 3 p.m. (HE 15) and drop sharply thereafter, leaving relatively little discretionary load to curtail after about 6 p.m. (HE 18). Essentially, about half of Small Commercial load has dissipated by the time system peaks typically occur. Small CPP customers are therefore not in a strong position to provide reductions when resources are needed most.

Figure 5-2: Small Commercial CPP Load versus System Daily Peaks



Both PY 2023 and PY 2024 impacts were used to model ex ante impacts for PY 2025. Figure 5-3 shows hourly event percent reductions for these events as a function of hourly temperatures, separately for Agricultural and Commercial customers. The symbols indicate 2023 and 2024 impact estimates, with bars showing a 95% confidence interval around each (where confidence intervals that include zero being statistically insignificant). Overall, there is no clear trend in the impacts as temperatures rise.

Figure 5-3: Small Commercial CPP Hourly Reductions and Temperatures with Uncertainty



5.2 EX ANTE LOAD IMPACTS

Table 5-1 and Table 5-2 summarize the ex ante demand reduction capability by forecast year and planning condition for the Small Commercial and Small Agricultural groups. The tables reflect hourly demand reductions available from 4 p.m. to 9 p.m. on an August Worst Day under 1-in-2 weather conditions. Since no dual-participant groups were estimated separately for this evaluation, the values in the table reflect both the program-specific and portfolio-adjusted ex ante reductions.

Table 5-1: Small Commercial Ex Ante Impacts for August Worst Day (MW)

Weather Type	Year	Sites	CAISO		SDG&E	
			Program	Portfolio Adj	Program	Portfolio Adj
1-in-2	2025	14,757	0.29	0.29	0.30	0.30
1-in-2	2026	13,730	0.27	0.27	0.28	0.28
1-in-2	2027	14,026	0.28	0.28	0.29	0.29
1-in-2	2028	14,397	0.29	0.29	0.29	0.29
1-in-2	2029	14,817	0.30	0.30	0.30	0.30
1-in-2	2030	15,287	0.30	0.30	0.31	0.31
1-in-2	2031	15,816	0.32	0.32	0.32	0.32
1-in-2	2032	16,416	0.33	0.33	0.33	0.33
1-in-2	2033	17,097	0.34	0.34	0.35	0.35
1-in-2	2034	17,871	0.36	0.36	0.36	0.36
1-in-2	2035	18,748	0.37	0.37	0.38	0.38

Table 5-2: Small Agricultural Ex Ante Impacts for August Worst Day (MW)

Weather Type	Year	Sites	CAISO		SDG&E	
			Program	Portfolio Adj	Program	Portfolio Adj
1-in-2	2025	55	0.26	0.26	0.28	0.28
1-in-2	2026	55	0.22	0.22	0.25	0.25
1-in-2	2027	56	0.23	0.23	0.25	0.25
1-in-2	2028	58	0.25	0.25	0.27	0.27
1-in-2	2029	59	0.24	0.24	0.27	0.27
1-in-2	2030	60	0.24	0.24	0.26	0.26
1-in-2	2031	62	0.26	0.26	0.28	0.28
1-in-2	2032	64	0.26	0.26	0.28	0.28
1-in-2	2033	68	0.28	0.28	0.31	0.31
1-in-2	2034	70	0.29	0.29	0.32	0.32
1-in-2	2035	75	0.31	0.31	0.34	0.34

The enrollment forecast was developed by SDG&E and shows an increasing number of customers enrolled in the Small CPP groups. The slight drop in Small Commercial sites in 2026 is due to de-enrollments since PY 2025 ended. For 2025 – 2035, there is no modelling for de-enrollments from CCA expansion.

Figure 5-4 and Figure 5-5 show the load shape for the estimated worst day in August under 1-in-2 weather conditions for Small Commercial and Agricultural customers respectively. The estimated load with DR is shown with the solid blue line, compared to estimated loads without DR on the dotted line. Commercial customers load reductions are difficult to see since they are below 1%. While the agricultural impacts are much larger, they come from a very small pool of sites and as such have relatively noisy estimates.

Figure 5-4: Small CPP Commercial Program Specific Impacts

Table 1: Menu options

Type of results	Aggregate
Program	Commercial Below 20 kW
Category	All
Subcategory	All
Measurement Hours	5
Portfolio	Program Specific
Electric System	SDG&E
Day Type	WORST DAY
Weather Year	1-in-2
Forecast Year	2025
Month	August
Hour Ending View	HE (Prevailing Time)

Table 2: Event day information

Total enrolled accounts	14,757
Load reduction - 4 to 9 pm (MWh/hour)	0.30
% Load reduction - 4 to 9 pm	0.9%
Reduction significant (95% confidence level)	Yes

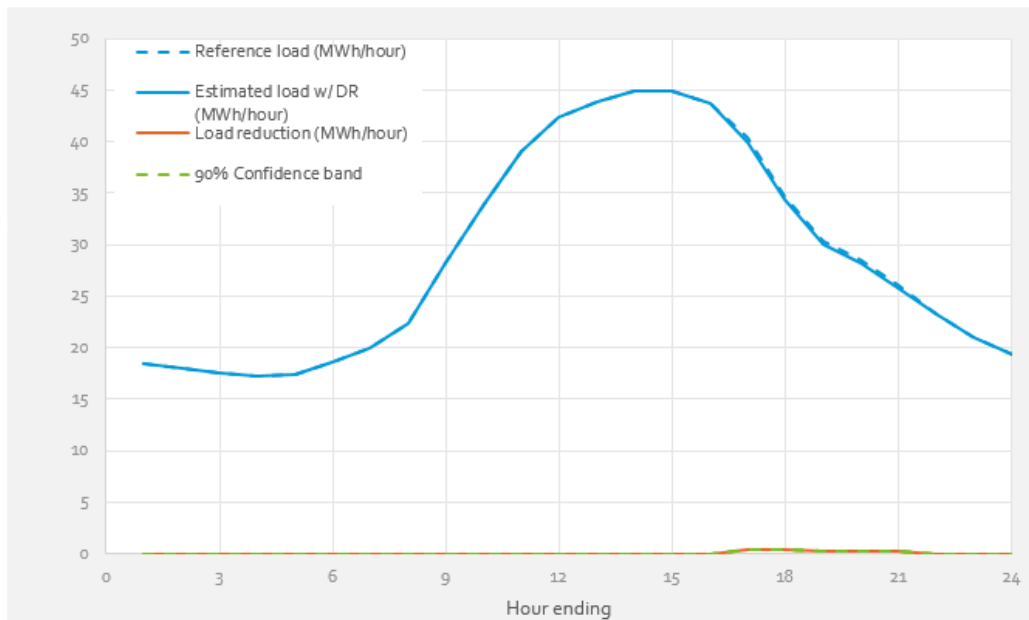


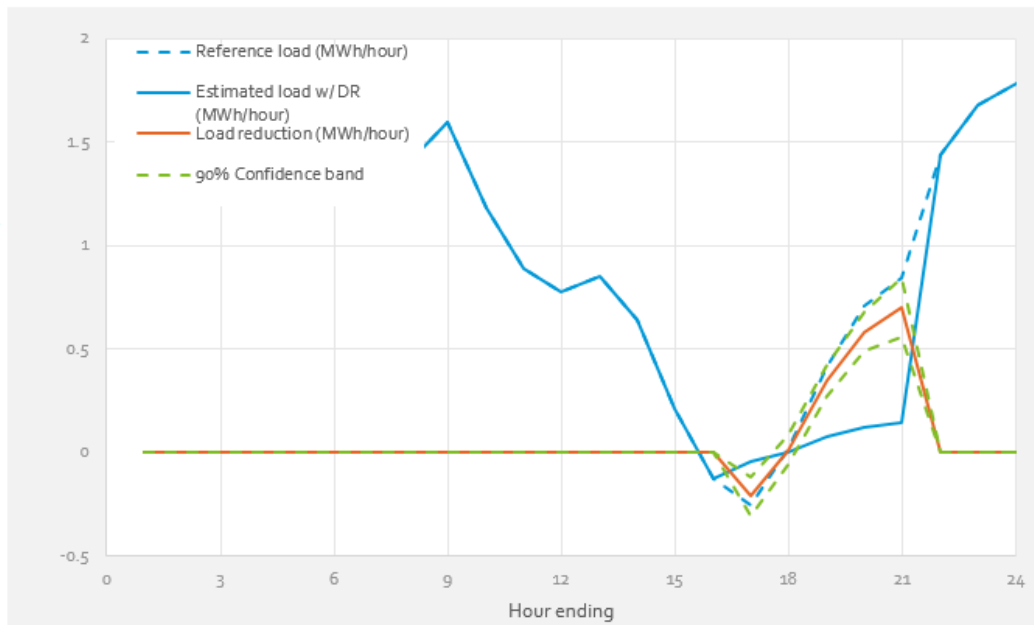
Figure 5-5: Small CPP Agricultural Program Specific Impacts

Table 1: Menu options

Type of results	Aggregate
Program	Agricultural Below 20 kW
Category	All
Subcategory	All
Measurement Hours	5
Portfolio	Program Specific
Electric System	SDG&E
Day Type	WORST DAY
Weather Year	1-in-2
Forecast Year	2025
Month	August
Hour Ending View	HE (Prevailing Time)

Table 2: Event day information

Total enrolled accounts	55
Load reduction - 4 to 9 pm (MWh/hour)	0.28
% Load reduction - 4 to 9 pm	82.7%
Reduction significant (95% confidence level)	Yes



5.3 COMPARISON OF EX POST AND EX ANTE LOAD IMPACTS

Table 5-3 and Table 5-4 compare the average site's ex post demand reductions to their expected, ex ante reductions under 1-in-2 planning conditions. Results are shown for the 4 to 9 p.m. window. The ex post demand reductions in the tables are the values applied in the ex ante modeling – these include both PY 2023 and PY 2024 ex post estimates, weighted by the number of participants in each event hour.

Across PY 2023 and 2024, the average Small Commercial customer delivered 0.02 kWh (0.9%) per hour during the from 4 to 9 p.m. The expected load reduction capability for 2025 under SDG&E and CAISO 1-in-2 weather conditions is similarly 0.02 kWh per hour per customer.

Table 5-3: Comparison of PY 2024 – Small Commercial

Result Type	Day Type	Period	Load without DR (avg site kWh/h)	Load Reduction (avg site kWh/h)	% Reduction	Event Avg Temp (F)
Ex Post	Avg Weekday Event	4 to 9 p.m.	2.39	0.02	0.9%	83.3
Ex Ante (CAISO)	Aug Worst Day, 1-in-2	4 to 9 p.m.	2.12	0.02	0.9%	82.0
Ex Ante (SDG&E)	Aug Worst Day, 1-in-2	Resource Adequacy: 4 to 9 p.m.	2.17	0.02	0.9%	83.7

*Ex Post impacts reflect those used for ex ante impact model: historical impacts weighted by number of current customers in each event.

For Small agricultural customers, ex post and ex ante estimates are identical in percentage terms (82.7%), though the ex post estimates are much larger in MW due to the higher reference loads for average sites during the PY 2023-2024 events.

Table 5-4: Comparison of PY 2024 Ex Post and Ex Ante Load Impacts – Small Agricultural

Result Type	Day Type	Period	Load without DR (avg site kWh/h)	Load Reduction (avg site kWh/h)	% Reduction	Event Avg Temp (F)
Ex Post	Avg Weekday Event	4 to 9 p.m.	18.44	15.24	82.7%	83.7
Ex Ante (CAISO)	Aug Worst Day, 1-in-2	4 to 9 p.m.	5.79	4.78	82.7%	82.7
Ex Ante (SDG&E)	Aug Worst Day, 1-in-2	4 to 9 p.m.	6.25	5.17	82.7%	85.2

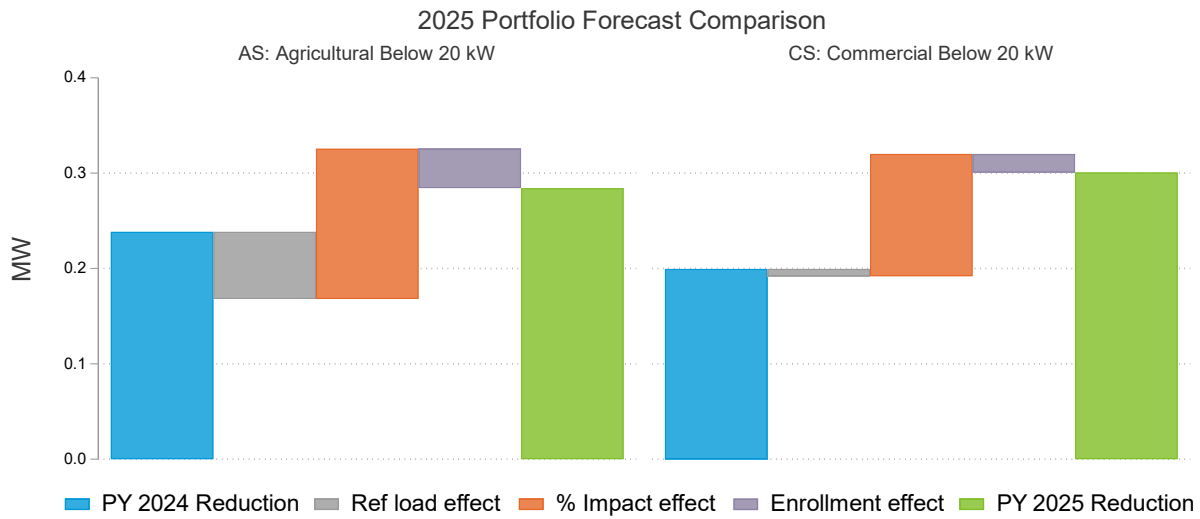
*Ex Post impacts reflect significant, incremental impacts, e.g. those used for ex ante impact model. Historical impacts weighted by number of current customers in each event.

Note that, in these tables, ex ante impacts are similar across weather conditions because only the reference loads are assumed to vary by weather. Ex post results also reflect the unique hourly temperature profiles of each event, whereas ex ante impacts assume a fixed number of sites and weather for a single peak day.

5.4 COMPARISON TO 2024 EX ANTE ESTIMATES

Figure 5-6 gives a breakdown of the difference in ex ante impact estimates from PY2024 and those generated in in PY2025 separated by Agricultural and Commercial sites. The graphs can be interpreted as the individual factors (changes in reference load, percent impacts, or enrollments) that explain any change in the estimated ex ante MW impacts in PY2024 (in blue) and PY2025 (in green).

Figure 5-6: Waterfall Analysis of 2024-2025 Ex Ante Impacts by Program



The ex ante impacts are similar in aggregate to those in the PY 2024 evaluation, with both groups expected to deliver 0.2 to 0.3 MW on an August system worst day. The estimates in this study are slightly higher than in the previous evaluation due to a small increase in the percent impacts, driven by the inclusion of all event-hour point estimates from PY 2023 and 2024 (previously insignificant impacts were set to zero in the forecast).

5.5 EX ANTE LOAD IMPACT SLICE-OF-DAY TABLES

Table 5-5 and Table 5-6 show the 2025 ex ante aggregate hourly impacts for each month under CAISO and SDG&E monthly peaking conditions, respectively. The load impacts in the table represent the sum of Small CPP Commercial and Small CPP Agricultural aggregate impacts by hour.

CPP tariffs only allow for dispatch from 4 p.m. to 9 p.m. so the Slice-of-Day table shows impacts aligned with the tariffed event window. The estimated reductions are typically larger in the hotter summer months and smaller in the cooler winter months. While the percent impacts underlying these estimates do not vary by weather or event hour, the aggregate impacts reported in the table vary by month and hour based on the reference loads.

Table 5-5: Slice of Day Table for CAISO 1-in-2 Weather Year Monthly Worst Day (Aggregate Impacts, MW)

Hour Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.05	0.05	0.06	0.10	0.10	0.12	0.15	0.16	0.07	0.05	0.02	-0.03
18	0.07	0.07	0.08	0.18	0.16	0.22	0.29	0.32	0.26	0.25	0.16	0.01
19	0.21	0.21	0.22	0.40	0.37	0.46	0.55	0.58	0.57	0.55	0.41	0.19
20	0.41	0.41	0.41	0.60	0.56	0.67	0.76	0.81	0.83	0.82	0.66	0.42
21	0.69	0.69	0.70	0.79	0.77	0.85	0.89	0.91	0.96	0.92	0.81	0.72
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Demand reductions are positive (Blue)

Load increases are negative (Orange)

Table 5-6: Slice of Day Table for SDG&E 1-in-2 Weather Year Monthly Worst Day (Aggregate Impacts, MW)

Hour Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.05	0.05	0.06	0.12	0.11	0.12	0.16	0.17	0.09	0.05	0.02	-0.03
18	0.07	0.07	0.08	0.22	0.20	0.22	0.31	0.34	0.32	0.24	0.16	0.01
19	0.21	0.21	0.22	0.43	0.41	0.46	0.57	0.63	0.66	0.53	0.41	0.19
20	0.41	0.41	0.41	0.64	0.61	0.67	0.79	0.85	0.94	0.79	0.66	0.42
21	0.69	0.69	0.70	0.80	0.80	0.85	0.89	0.94	1.00	0.90	0.81	0.72
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Demand reductions are positive (Blue)

Load increases are negative (Orange)

6 CONCLUSIONS AND RECOMMENDATIONS

Since no CPP events were called for PY 2025, ex ante impact estimates remain similar to those in the PY 2024 evaluation, with some changes in enrollments and reference loads. Overall, the Small CPP groups' delivery of demand reductions is heavily dependent on the enrolled population. In the absence of further CCA migrations, ex ante load impact estimates have increased slightly in PY2024 and PY2025.

Based on the PY 2025 ex ante impacts and results in previous evaluations, the following recommendations may aid program operations in future years. The recommendations may not be currently funded, and costs need to be considered alongside other research and program priorities.

- **Test events:** Given that no events were called for PY 2025, future evaluations may benefit from at least one annual data point in the form of a test event. This could also ensure smooth event dispatches later in the season.
- **Test notifications:** SDGE's PY 2024 impacts were reduced due to an issue with notifications for at least one high-performing site. The extent of the issue, as well as the readiness of the system for days with extreme system loads, would be better understood by testing the notifications ahead of time.
- **Enrollments:** PY 2025 again saw a slight decline in enrollments, though we are not aware of any plans for further CCA expansions. Assessing enrollment patterns as well as the types of customers that are enrolling/unenrolling in CPP rates could be helpful for the program team as well as evaluators.
- **Assess whether additional communications encouraging response improve reductions using randomized controlled trials.** A post event survey on event awareness and response barriers was conducted of Small Commercial CPP customers in September and October 2024. Results clearly showed that respondents recalled the events and were familiar with the 4 to 9 p.m. event window, and that most of these respondents took some action. The remainder were unable to shift load away from peak hours beyond what they do on a day-to-day basis for their TOU rate or because the loads were for critical equipment.

Of the respondents that did report shifting, 47% adjusted their thermostat settings. 58% were interested in additional shifting and in receiving information about how to shift. This suggests that offering education on load shifting along with event notifications may improve load impacts for this subset of customers.

Most sites already receive event notifications, but the impact of additional communications is unknown. We recommend testing the effectiveness of education on event response using randomized control trials, where certain customers would be randomly selected to either receive additional education with event notifications or not.