2024 STATEWIDE LOAD IMPACT EVALUATION OF CALIFORNIA CAPACITY BIDDING PROGRAMS

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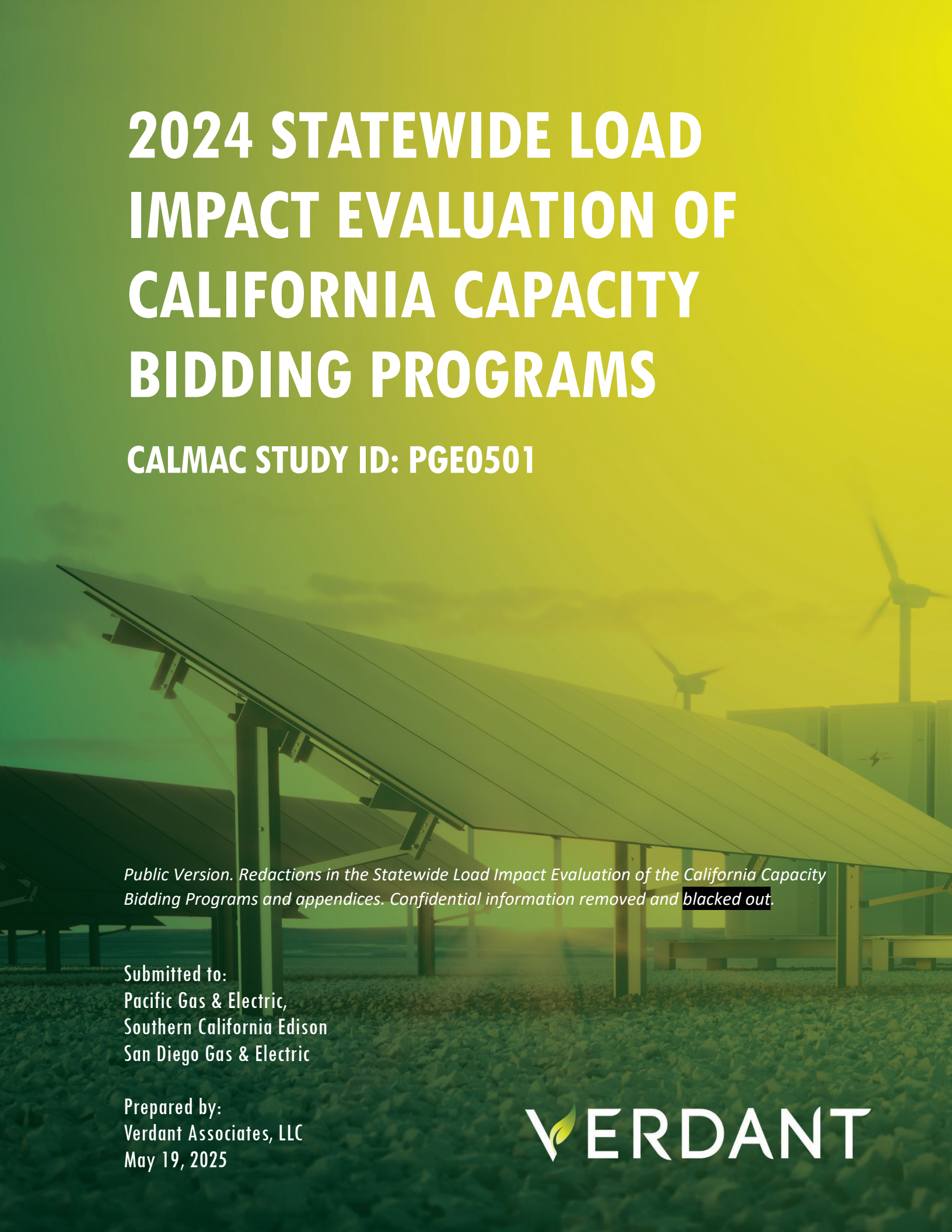

Public Version. Redactions in the Statewide Load Impact Evaluation of the California Capacity Bidding Programs and appendices. Confidential information removed and blacked out.

Submitted to:
Pacific Gas & Electric,
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ABSTRACT

This report details the Program Year (PY) 2024 load impact evaluation for the statewide Capacity Bidding Programs (CBP), offered by three California investor-owned utilities (IOUs): Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E). The objective of this evaluation is to assess the performance of the PY2024 CBP in a manner that conforms to the Load Impact Protocols (LIP) adopted by the CPUC in Decision (D.) 24-12-003. The two primary objectives of the CBP load impact evaluation are to conduct an ex post and an ex ante analysis of each IOU's CBP. The goal of the ex post analysis is to estimate CBP load impacts for each PY2024 event, as well as for an average event day, using methods that conform to the LIP. The goal of the ex ante analysis is to forecast CBP aggregate (MWh/h) and per capita (kWh/h) load reductions for PY2025 through PY2035 and conduct a "back cast" of PY2024 under 1-in-2 and 1-in-10 weather scenarios.

The CBP is a statewide price-responsive aggregator program launched in 2007. While each of the IOUs' CBP offerings are slightly different, the PY2024 program enables aggregators to contract with groups of residential and non-residential customers to collectively respond to CBP events. Each aggregator can make nominations to one or more of the various CBP offerings (referred to as "products") that vary by customer class, event triggers, and prices. The aggregator receives day-ahead or day-of notifications[1] of events and arranges for load reductions during the event. The aggregator then receives monthly capacity payments based on nominated capacity (even if an event is not called), plus additional energy payments (for bundled customers only at SCE and SDG&E) based on the kWh reduction obtained during CBP events.

The number of PY2024 CBP event days varied between the IOUs, with PG&E having two test and 8 market award event days, SCE having 15 market award event days, and SDG&E having two market award event days. The number of customers dispatched for each event ranged from one to 286 across the IOUs. All SCE and SDG&E customers nominated in a given month were dispatched for each event, while PG&E resources were dispatched based on more granular Sub-Load Aggregation Point (SubLAP) needs and market awards (outside of test events which include close to all nominated customers).

The ex post analysis used a customer-specific hourly regression based approach for estimating the load impact of each event dispatch. Estimated load impacts are detailed for each event dispatch in this report along with the average event performance by local capacity area (LCA), SubLAP, and industry type. Ex ante impacts are also presented that detail expected load reductions for each CBP product in 2025 through 2035 based on participant enrollment forecasts and prior program performance.

[1] PG&E and SCE only have Day-Ahead CBP products.

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1 EXECUTIVE SUMMARY

This report presents the statewide load impact evaluation of the Capacity Bidding Program (CBP) for the 2024 program year (PY2024). The report covers the statewide CBP offered by three California investor-owned utilities (IOUs): Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E).

The objective of this evaluation is to assess the PY2024 CBP in a manner that conforms to the Load Impact Protocols (LIP) adopted by the CPUC in Decision (D.) 24-12-003. At a high level, there are two main objectives related to the CBP load impact evaluation:

- **Ex Post Analysis:** The goal of the ex post analysis is to estimate load impacts for PY2024 CBP events and for an average event day that conforms to the LIP.
- **Ex Ante Analysis**: The goal of the ex ante analysis is to forecast CBP aggregate (MWh/h) and per capita (kWh/h) load reductions for PY2025 through PY2035 and conduct a "back cast" of PY2024 under 1-in-2 and 1-in-10 weather scenarios in a manner that conforms to the LIP.

Program Overview

The CBP is a statewide price-responsive aggregator program launched in 2007. While each of the IOUs' CBP program offerings are slightly different, they all enable aggregators to contract with groups of residential and non-residential customers to collectively respond to CBP events. Each aggregator can make nominations to various program offerings (referred to as "products") that vary by customer class, event triggers, and prices. The aggregator receives day-ahead and/or day-of (SDG&E only) notifications[2] of events and arranges for load reductions during the event. The aggregators then receive monthly capacity payments based on their nominated capacity (even if an event is not called), plus additional energy payments (for bundled customers only at SCE and SDG&E) based on the kWh reduction during CBP events. The aggregator is also notified of reduced payments or penalties if their aggregation of customers does not collectively achieve the nominated capacity. CBP aggregators can adjust their nominations and the products in which they participate on a monthly basis.

In PY2024, residential customers were not enrolled in the CBP programs available to them. Additionally, SDG&E did not have any events called for the day-of notification products. As a result, only non-residential day-ahead notification events occurred in PY2024 across all IOUs.

[2] PG&E and SCE only have Day-Ahead CBP products in PY2024.

Role of Aggregators

In the CBP, aggregators are the entity responsible for contracting with eligible customers for participation. They design and manage their customer marketing, customer acquisition, and retention, and also notify all contracted customers of CBP events. Additionally, aggregators receive all payments and penalties from the IOUs and compensate their enrolled customers for participation. Each aggregator's customers are grouped into distinct resources[3] by sub-load aggregation points (SubLAP) and each resource provides a single monthly nomination, whereupon all contracted customers within a resource are dispatched by the aggregator.

Eligibility

The CBP is open to all bundled customers that are billed on a utility residential (PG&E and SCE), commercial, industrial or agricultural rate schedule. The CBP is also available to Direct Access and Community Choice Aggregation (CCA) customers. CBP participation is available through a third-party aggregator or to qualifying customers acting as a self-aggregator. Customers may not be enrolled in another capacity DR program, however, can dually enroll in the Emergency Load Reduction Program (ELRP), Critical Peak Pricing (CPP) for SCE and SDG&E, or Peak Day Pricing (PDP) for PG&E.

Incentives

Aggregators receive capacity payments based on their monthly nominated capacity, product selected, event duration, and delivery performance. If an aggregator's delivery capacity underperforms the stated tariff threshold, the aggregator receives a capacity shortfall penalty. For months with no dispatched events, CBP aggregators receive the full monthly capacity payment based on their nominations with no energy payments. Additional energy payments ($/kWh) are made to the aggregator based on the measured kWh reductions achieved during dispatched events.

CBP Product Offerings

As stated previously, each IOU's CBP product offerings are unique. Each IOU's CBP products are described at length below.

PG&E CBP

PG&E's CBP operates from May through October and only offers day-ahead participation. PG&E's CBP offered one product in PY2024: *Elect DA.* The Elect DA product operates with a maximum event duration of four-hours and can be dispatched between 5 p.m. and 10 p.m. during the month of May and between 4 p.m. and 9 p.m. during the months of June through October. Aggregators set their own CAISO market

[3] A resource is a group of enrolled CBP customers under a single option, aggregator, and SubLAP, that are dispatched together.

bid price. Excluding holidays, events can be called Monday through Saturday except for the month of October when the events can be called Monday through Friday. Aggregators provide separate nominations for weekday and Saturday events. PG&E's CBP is open to both residential and non-residential participation, however, there was no residential participation in PY2024.

SCE CBP

SCE offered only one CBP product in PY2024: *CBP DA*. The CBP DA product operates from May through October and can be dispatched between 5 p.m. and 10 p.m. during the month of May and between 4 p.m. and 9 p.m. during the months of June through October. SCE sets the CAISO market bid price and dispatch strategy. Events can be called Monday through Saturday, excluding holidays. Aggregators provide separate nominations for weekday and Saturday events. SCE's CBP is open to both residential and non-residential participation, however, there was no residential participation in PY2024. SCE eliminated their CBP DA product at the end of 2024 and replaced it with the CBP Elect DA (CBP-E) product in 2025. The CBP Elect DA product was approved on March 3, 2025, with an effective date of February 25, 2025.

Starting with program year 2025 and moving forward, SCE operates CBP Elect DA, which operates mostly under the same general program design as the PY2024 CBP DA product, and will also be open to both residential and non-residential participation. The CBP Elect DA product offers three price trigger options ($200/MWh, $400/MWh, and $600/MWh), rather than SCE setting the CAISO market price as took place in the PY2024 CBP DA product. Other than this change in price triggers, CBP Elect DA is generally designed and operates similarly to PY2024 CBP DA. This includes that events may be triggered between the hours of 5 p.m. to 10 p.m. for May and 4 p.m. to 9 p.m. for June through October, Monday through Saturday for May through September, and Monday through Friday for October, excluding holidays.

SDG&E CBP

SDG&E offers two CBP products that are only open to non-residential customers: the *Elect DA 1-9 Hour* and the *Elect DO 1-9 Hour*. The Elect DA 1-9 Hour is a day-ahead product, and the Elect DO 1-9 Hour is a day-of product. Both products operate from 1 p.m. to 9 p.m., have the same three price triggers options ($200/MWh, $400/MWh, and $600/MWh), and operate Monday through Saturday during the months of May through October. In PY2024, SDG&E only had event participation in the Elect DA 1-9 Hour product with a $600/MWh option. As such, SDG&E's ex ante forecasts only include forecasts for the Elect DA 1-9 Hour product with a $600/MWh option.

PY2024 Events

Table 1-1 through Table 1-3 present the CBP event day details for PG&E, SCE and SDG&E. These details include the event dates, event types, start and end times, duration and the dispatched customer counts and dispatched capacity. As seen in the tables below, the number of CBP event days varied between the

IOUs in PY2024, with PG&E having two test and 8 market award event days, SCE having 15 market award event days, and SDG&E having two market award event days.

TABLE 1-1: PG&E PY2024 CBP EVENT DETAILS

Event Date (2024)	Event Type	Event Start (Prevailing Time)	Event End (Prevailing Time)	Event Duration	Dispatched Customers	Dispatched Capacity (MW)
June 5th	Market Award	4:00 PM	5:00 PM	1	3	[redacted]
June 26th	Test Event	6:00 PM	8:00 PM	2	250	19.60
July 5th	Market Award	5:00 PM	7:00 PM	2	4	[redacted]
July 10th	Market Award	6:00 PM	8:00 PM	2	1	[redacted]
July 11th*	Market Award	6:00 PM	8:00 PM	2	17	1.72
July 12th	Market Award	7:00 PM	8:00 PM	1	1	[redacted]
July 23rd	Market Award	7:00 PM	8:00 PM	1	1	[redacted]
July 24th	Market Award	7:00 PM	8:00 PM	1	1	[redacted]
July 25th	Market Award	7:00 PM	9:00 PM	2	1	[redacted]
August 28th*	Test Event	6:00 PM	8:00 PM	2	286	18.62

*Event contains multiple dispatches on the event day. Event details are inclusive of the full range of event hours, maximum event duration, sum of dispatched customers and sum of dispatched capacity.

TABLE 1-2: SCE PY2024 CBP EVENT DETAILS

Event Date (2024)	Event Type	Event Start (Prevailing Time)	Event End (Prevailing Time)	Event Duration	Dispatched Customers	Dispatched Capacity (MW)
July 10th	Market Award	5:00 PM	9:00 PM	4	38	1.17
July 11th	Market Award	4:00 PM	9:00 PM	5	38	1.17
July 25th	Market Award	6:00 PM	9:00 PM	3	38	1.17
August 5th	Market Award	4:00 PM	9:00 PM	5	39	1.18
September 3rd	Market Award	6:00 PM	8:00 PM	2	39	1.18
September 4th	Market Award	5:00 PM	9:00 PM	4	39	1.18
September 5th	Market Award	5:00 PM	9:00 PM	4	39	1.18
September 6th	Market Award	5:00 PM	9:00 PM	4	39	1.18
September 9th*	Market Award	6:00 PM	8:00 PM	3	39	1.18
October 1st	Market Award	5:00 PM	8:00 PM	3	28	1.01
October 2nd	Market Award	5:00 PM	8:00 PM	3	28	1.01
October 3rd	Market Award	6:00 PM	7:00 PM	1	28	1.01
October 4th	Market Award	6:00 PM	7:00 PM	1	28	1.01
October 7th*	Market Award	5:00 PM	9:00 PM	4	28	1.01
October 8th*	Market Award	5:00 PM	7:00 PM	2	28	1.01

*Event contains multiple dispatches on the event day. Event details are inclusive of the full range of event hours, maximum event duration, sum of dispatched customers and sum of dispatched capacity.

TABLE 1-3: SDG&E PY2024 CBP ELECT DA EVENT DETAILS

Event Date (2024)	Event Type	Event Start (Prevailing Time)	Event End (Prevailing Time)	Event Duration	Dispatched Customers	Dispatched Capacity (MW)
August 27th	Market Award	6:00 PM	8:00 PM	2	[redacted]	[redacted]
September 5th	Market Award	6:00 PM	8:00 PM	2	[redacted]	[redacted]

Methodology

The ex post analysis includes all CBP events in PY2024. Given there was no residential CBP participation in PY2024, the ex post analysis approach was developed exclusively for non-residential customers, relying on a customer-specific regression approach for ex post impacts. The ex post regression models are hourly models, where each hour of the day is modelled separately from other hours of the day. Non-residential customers typically have heterogenous loads, making it difficult to broadly apply a given regression model specification across all customers and thus necessitating site-specific models. Additionally, customer-specific regressions facilitate various aggregations of results required for reporting (i.e., industry type, customer size, etc.).

For the ex ante analysis of PG&E and SDG&E non-residential customers, Verdant used the ex post regression models to develop weather adjusted reference loads. Most non-residential customers only participated in one or two events in PY2024, which did not allow for the estimation of weather adjusted load reductions directly using ex post regression models. As a result, Verdant applied the percent load reductions seen in the ex post analysis to the reference loads to develop ex ante load impacts. Additional degradation rates were applied to the third and fourth hours of dispatch in the ex ante analysis to account for participant fatigue during longer duration events. PG&E's residential ex ante analysis was developed based on the PY2023 residential ex ante analysis.

The ex ante analysis of SCE's CBP Elect DA relied on estimation of reference loads from new and likely CBP Elect DA program participants, which modeled ex post analysis reference loads with an additional weather adjustment. Non-residential impacts were derived for May 2025 customer nominations, while residential customer impacts were derived from a subset of Emergency Load Reduction Program (ELRP) A.4 participants' PY2024 ex post results.

Statewide Ex Post Results

For all IOU's, the PY2024 CBP events represent non-residential, Day-Ahead CBP participation. PG&E's residential Elect DA was unsubscribed in PY2024, SCE's CBP DO ended at the end of PY2023, and SDG&E's non-residential Elect DO did not have any event before it became unsubscribed.

Table 1-4 presents the ex post results for each IOU's average event day. For PG&E this includes all events where HE20 was an event hour (80% of event days, comprising 99% of participant event hours across all event days[4]) and all event days for SCE and SDG&E. For each IOU, the impacts represent the average event impact in the hour of interest. For PG&E the hour of interest is HE20 and for SCE the hour of interest in HE19. For SDG&E, all events include the same event hours, as a result the hours of interest are inclusive of all events and event hours. The number of customers presented in Table 1-4 represents the average number of customers dispatched for events.

TABLE 1-4: STATEWIDE EX POST RESULTS SUMMARY – AVERAGE EVENT DAY

IOU	Program	Num. of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Dispatch Delivery Perf. (%)
			Ref. Load	Load Impact	Ref. Load	Load Impact		
PG&E	Non-Residential Elect DA	69	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Residential Elect DA	--	--	--	--	--	--	--
SCE	CBP DA	34	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
SDG&E	Non-Residential Elect DA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Non-Residential Elect DO	--	--	--	--	--	--	--

Note: Each IOU's overall ex post results are confidential due to customer counts being less than 15 or one customer making up 15% or more of event day load or impacts.

For each IOU, the following ex post results were identified:

PG&E. On average, PG&E's non-residential Elect DA participants provided per capita load reduction of [redacted] kWh/h, representing a delivery performance of [redacted] % of nominated capacity during the hour of interest (HE20). This was a marked improvement in delivery performance from PY2023, which was 86% on average.

SCE. On average, SCE's CBP DA dispatched 34 customers and provided [redacted] kWh/h per customer resulting in an average delivery performance of [redacted] % in the hour of interest (HE19). Impacts are largely driven by one large school customer that previously participated in SCE's CBP DO program (which sunset at the end of PY2023). PY2024 represents the last year of the CBP DA, which will be replaced by the CBP Elect DA starting in PY2025.

SDG&E. SDG&E's CBP ex post performance was substantially influenced by one customer. This customer [redacted] events in PY2024. As a result, the majority of nominated capacity was not available for curtailment leading to an average dispatch delivery performance of [redacted]%.

[4] HE20 represents 56% of all participant events hours for PG&E.

However, load reductions still represented [redacted] % of the estimated baseline with an average per capita load reduction of [redacted] kWh/h.

Table 1-5 presents the PY2024 average monthly nomination during months with events (customer counts and capacity), average dispatch customer counts and capacity (MW), and the average event day load ex post load impacts and delivery performance. Delivery performance is a key metric for identifying how well resources perform relative to their stated level of available load reductions (nominations). A delivery performance of 100% indicates that dispatched participants provided exactly their stated level of load curtailment, while a delivery performance of greater or less than 100% indicated that dispatched participants provided more or less load reductions (respectively) than the resources' stated nominations.

TABLE 1-5: STATEWIDE DELIVERY PERFORMANCE

		Average Nominations		Average Dispatch		Ex Post Average Impact	
IOU	Program	Number of Customers	Capacity (MW)	Number of Customers	Capacity (MW)	Capacity (MW)	Delivery Perf. (%)
PG&E	Non-Residential Elect DA	283	21.6	69	5.1	[redacted]	[redacted]
	Residential Elect DA	--	--	--	--	--	--
SCE	CBP DA	34	1.1	34	1.1	[redacted]	[redacted]
SDG&E	Non-Residential Elect DA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Non-Residential Elect DO	--	--	--	--	--	--

Table 1-5 presents the following results for each IOU:

PG&E. PG&E had an average nomination of 283 customers representing 21.6 MW of capacity in PY2024 in months where events occurred (June, July and August). The average dispatch in PY2024 included 69 customers representing 5.1 MW of nominated capacity. The average dispatched customers and capacity were lower than the monthly nominations as a result of the necessity for CBP resources (and CAISO awards) rather than the availability of CBP resources. Overall, non-residential CBP Elect DA resources overperformed relative to their nominated capacity, providing an average dispatch delivery performance of [redacted] % ([redacted] MWh/h impact).

SCE. SCE had an average monthly nomination of 34 customers representing 1.1 MW of capacity in PY2024 in months where events occurred. The average dispatch in PY2024 included all nominated customers. Overall, the average PY2024 delivery performance was [redacted] % during HE19.

SDG&E. SDG&E had [redacted] MW of nominated capacity during months with event participation, the majority ([redacted]%) of which came from one customer. As stated previously, this customer [redacted]

[redacted] during all PY2024 events, leading to poor performance that is not typical for SDG&E's Elect DA program. Overall, the SDG&E Elect DA program had a dispatch delivery performance of [redacted]%.

Statewide Ex Ante Results

Each IOU provided enrollment forecasts for future program years. Across all years in the ex ante forecast, PG&E anticipates 431 non-residential and 1,336 residential CBP Elect DA customers in the month of August. Additionally, SDG&E anticipates [redacted] customers to participate in its CBP Elect DA and zero participation in the CBP Elect DO across all years and months in the ex ante forecast. SCE's ex ante forecast includes 495 non-residential and 291 residential customers in 2025 and 561 non-residential and 363 residential customers on all subsequent years. SCE expects the same non-residential customers that were enrolled in CBP DA will also be enrolled by their aggregator on CBP Elect DA starting in 2025 onward, plus growth on the program attributed to the benefits of various bidding options and the conclusion of the Demand Response Auction Mechanism (DRAM) Pilot at the end of 2024.

There were several ex ante assumptions that influenced the ex ante results for the IOUs. These are discussed in detail in each IOU's ex ante section presented later in this report and in the ex ante methodology section (Section 3.3.1). However, there are several high level forecast assumptions worth including here. These include:

- **Program and Portfolio Ex Ante Impacts.** While there were dually enrolled CBP customers for PG&E and SDG&E in PY2024, there were no dual-program event days for enrolled CBP customers. With collaboration from PG&E and SDG&E, it was decided that program and portfolio ex ante impacts would assume no dual-program event days for CBP customers in the ex ante forecasts. Additionally, the SCE CBP Elect DA ex ante analysis assumes no dual program days. As a result, program and portfolio ex ante impacts are the same for the three IOUs.

- **Four-hour Event Dispatch.** The Load Impact Protocol (LIP) 24-Hour Slice-of-Day requirements state that a four consecutive hour dispatch is required in ex ante within Availability Assessment Hours on the worst day of each month[5]. As a result, the ex ante analysis assumes a four-hour dispatch for each IOU. PG&E requested that the first four hours of the five-hour RA window be selected to represent the four-hour event dispatch. SCE and SDG&E requested the last four hours of the RA window to represent the four-hour dispatch. For SDG&E this represents the hours in which all SDG&E CBP Elect DA events have occurred within the last three program years (PY2022 to PY2024).

- **PG&E Residential Ex Ante.** In PY2024, there was no residential participation in PG&E's CBP Elect DA. As a result, there is no ex post analysis to inform the ex ante analysis for these customers. Since PG&E continues to anticipate residential participation in 2025 and beyond, Verdant used the PY2023 residential ex ante analysis to inform the PY2024 ex ante residential impacts.

[5] LIP Filing Guide 5.1 at 11.

- **SCE Residential Ex Ante.** In PY2024, there was no residential participation in SCE's CBP DA, nor were they included in a recent evaluation years' ex ante analyses. As a result, there is no ex post analysis to inform the ex ante analysis for these customers. Given that SCE anticipates residential participation from Self-Generation Incentive Program participants, ex ante reference loads were developed from AMI data of SGIP participants that are likely to participate in CBP Elect DA. Ex ante impacts were developed using a subset of ELRP A.4 participants' PY2024 ex post load impacts.

Table 1-6 presents the PY2025 statewide ex ante aggregate (MWh/h) and per capita (kWh/h) load impacts under the August Utility 1-in-2 worst day scenario. Given that PG&E's and SDG&E's enrollment forecasts for August do not change from year to year, the August forecasts are the same for PY2025 through PY2035 for these IOUs.

TABLE 1-6: STATEWIDE 2025 UTILITY 1-IN-2 AUGUST SYSTEM WORST DAY AVERAGE EX ANTE LOAD IMPACT OVER A 4-HOUR DISPATCH

IOU	Program	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
			Ref. Load	Load Impact	Ref. Load	Load Impact		
PG&E	Non-Residential Elect DA	431	123.9	40.8	287.5	94.6	33%	96.8
PG&E	Residential Elect DA	1,336	1.6	0.4	1.2	0.3	24%	84.9
SCE	Non-Residential Elect DA	495	86.8	10.9	153.3	22.0	14%	89.5
SCE	Residential Elect DA	251	0.46	0.06	1.62	0.22	14%	87.6
SDG&E	Non-Residential Elect DA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	77.6
SDG&E	Non-Residential Elect DO	0	--	--	--	--	--	--

Table 1-7 presents the hourly aggregate ex ante load impacts for PG&E, SCE and SDG&E 1-in-2 system worst day conditions for CBP operating months in 2025. The highlighted yellow and green hours represent the hours of the RA window for each month, and the green highlighted hours represent the hours of the four-hour event dispatch. These tables also represent the slice of day impacts (MWh/h) given the assumptions in the ex ante analysis.

TABLE 1-7: STATEWIDE 2025 CBP ELECT HOURLY TABLES (HE16 THROUGH HE24, MWH/H)

IOU	Program	Month	Hour Ending								
			16	17	18	19	20	21	22	23	24
PG&E	Non-Residential DA	May	0.0	0.0	22.9	23.9	24.8	24.9	8.7	1.1	0.0
		June	0.0	29.4	29.9	31.6	32.8	11.2	1.2	0.0	0.0
		July	0.0	39.6	40.1	41.6	42.7	15.6	2.1	0.0	0.0
		Aug.	0.0	42.4	42.9	44.7	45.7	18.0	3.8	0.0	0.0
		Sept.	0.0	33.9	35.0	36.3	36.1	14.2	2.5	0.0	0.0
		Oct.	0.0	23.4	23.8	24	23.6	8.6	1.4	0.0	0.0
	Residential DA	May	0.0	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0
		June	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0	0.0
		July	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0	0.0
		Aug.	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0	0.0
		Sept.	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0	0.0
		Oct.	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0	0.0
SCE	Non-Residential DA	May	0.0	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0
		June	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		July	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		Aug.	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		Sept.	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		Oct.	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0	0.0
	Residential DA	May	0.0	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0
		June	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0	0.0
		July	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0	0.0
		Aug.	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0	0.0
		Sept.	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0	0.0
		Oct.	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0	0.0
SDG&E	Non-Residential DA	May	[redacted]								
		June	[redacted]								
		July	[redacted]								
		Aug.	[redacted]								
		Sept.	[redacted]								
		Oct.	[redacted]								

Note: PG&E non-residential DA impacts are anticipated to persist beyond the four-hour dispatch.

Findings by IOU

The PY2024 Load Impact analysis key findings for each IOU are as follows:

PG&E FINDINGS

- Non-residential Elect DA delivery performance increased in PY2024 compared to prior years. For all events with more than one nominated customer dispatched, delivery performance exceeded 100%. In some cases, delivery performance exceeded [redacted]%, however these dispatches were for a small number of nominated participants. On the average event day in HE20 delivery performance was [redacted]%.

- On June 26th, almost all non-residential Elect DA nominated customers were dispatched for a test event. On average these customers provided [redacted] MWh/h of load reductions over two hours.
- HE20 was the most frequently dispatched event hour in PY2024. On average, non-residential Elect DA customers provided [redacted] kWh/h of load reductions during this hour.
- The non-residential Elect DA ex ante analysis finds that the non-residential customer segment is anticipated to provide an average hourly load reduction of 40.8 MWh/h to 41.8 MWh/h during a four-hour dispatch in 2025 depending on the weather scenario in the month of August.
- The residential Elect DA had no participation in PY2024. However, PG&E continues to anticipate residential participation in 2025 and beyond. The ex ante analysis, which relied on the PY2023 ex ante analysis, finds that the residential Elect DA is anticipated to provide an average hourly load reduction of 0.39 MWh/h in 2025 over a four-hour dispatch, regardless of month or weather scenario.

SCE FINDINGS

- There was an increase in CBP DA participation from PY2023. Additionally, the CBP DA provided (across all event days and dispatches) more load reduction than were forecasted in the PY2023 ex ante analysis.
- On average, the CBP DA provided [redacted] % of nominated capacity ([redacted] % in HE19 of the average event day). However, delivery performance ranged from [redacted] % through [redacted]% depending on the event day dispatches.
- The PY2024 ex post load impacts are heavily on the performance of one customer that comprised more than half of event day loads, making most SCE results confidential.
- The CBP DA was discontinued at the end of PY2024 and the successor CBP Elect DA program began operating in 2025. The CBP Elect DA shares the same general program design as PY2024 CBP DA. CBP Elect DA is expected to have increased program participation in 2025 compared to the PY2024 CBP DA product primarily due to favorable additional bidding options. Due to the increased participation, PY2024 ex post results may not be representative for estimating future program impacts (Note, PY2024 CBP DA only had 34 enrolled customers). Non-residential ex ante impacts rely on May 2025 CBP Elect DA nominations and residential ex ante impacts are based upon a subset of participants' ELRP A.4 load ex post load impacts. The SCE CBP Elect DA ex ante analysis estimates roughly 11 MWh/h of dispatchable capacity in August of 2025, regardless of the weather scenario. The majority of this capacity is expected to come from non-residential participation (10.9 MWh/h), with a small amount of residential capacity (0.06 MWh/h).

SDG&E FINDINGS

- There was a decrease in CBP Elect DA and CBP Elect DO participation in PY2023. As of October 2024, only the $600/MWh option has participation with [redacted] nominated customers. No other CBP product has forecasted ex ante participation in 2025. The ex ante enrollment forecasts projects [redacted] customer in the CBP Elect DA $600/MW option for all month and years included in the forecast.

- There were two CBP Elect DA events in PY2024 with dispatch delivery performances of [redacted]% (August 27th) and [redacted] % (September 5th). However, this is largely the result of a [redacted] which prevented it from contributing its [redacted] MW of nominated capacity to event dispatch. The two CBP DA events provided an average event-hour load reduction of [redacted] MWh/h on August 27th and [redacted] MWh/h on September 5th.

- The PY2025 ex ante forecast estimates that the CBP DA will provide [redacted] MWh/h of load reduction of a four-hour dispatch under SDG&E August 1-in-2 weather conditions. The majority of these load impacts come from [redacted].

Recommendations

The evaluation team's recommendations for the CBP and future evaluations are as follows:

- **Continued performance monitoring.** Each IOU has specific uncertainties for program performance for some customers or customer segments going into PY2025. While each IOU monitors the performance of their CBP offerings, there are a few areas that should receive close attention in PY2025.
  - PG&E should monitor the performance of residential customers as the newly enrolled residential customers may perform differently than the residential customers in PY2023 (on which the PY2024 ex ante is based). While the expected MWh/h contributions from this sector is small relative to the non-residential sector (0.39 MWh/h vs. 40.8 MWh/h), these customers represent a new set of participants, likely without historical CBP performance. The PY2025 evaluation should include an evaluation of these customers and identify how they may be different from prior residential CBP participants.
  - SCE is launching the CBP Elect DA product for the 2025 event season after the sunset of the CBP DA product at the end of PY2024. SCE should closely monitor the performance of CBP Elect DA during market events. Additionally, SCE should consider conducting at least one test event for all newly enrolled customers to establish baseline delivery performance expectations for the new CBP Elect DA product. The PY2025 evaluation should pay attention to CBP Elect DA performance improvements over the course of the 2025 CBP season as the new product becomes established.
  - SDG&E had consistent delivery performance across all event hours in PY2024. However, the majority of expected load curtailment comes from one customer, [redacted] who was unable to participate in PY2024 events. Additionally, this customer stated that they have undergone facility efficiency improvements that make a forecast of future

energy use based on historical energy usage difficult. The ex ante analysis tried to account for this situation, but some uncertainty still remains. SDG&E should closely monitor the performance of [redacted] and call a test event if no market events occur. Additionally, SDG&E should request this participant's aggregator to adjust its nominations if this customer's performance falls short of nominated capacity.

- **Identify customers with battery storage.** Verdant carries forward the recommendation from the PY2023 evaluation to identify customers that have battery storage. These customers have specific load shape patterns that necessitate thoughtful modeling. This is especially relevant for residential customers who are typically evaluated using a panel model with a matched control group within the LIP framework. Residential battery storage customers often need to be segmented separately from other residential customers to accurately estimate load reductions. Tracking which participants have battery storage will improve the estimation of ex post and ex ante impacts going forward, especially for residential customers.

- **Long Duration Events.** Apart from SCE events, no CBP event in PY2024 lasted longer than two hours in duration. The evaluation team recognizes that CBP dispatches are based on market conditions and needs, so longer duration market events (market award events lasting longer than two hours) may not "naturally" occur in PY2025. However, IOUs should consider conducting a test event that occurs for longer than two hours with the purpose of testing the ability of CBP resources to sustain load impacts for events longer than two hours if one does not occur through a market award. This will allow future program evaluations to more accurately estimate ex ante load impacts over a four-hour dispatch and update degradation rates for future program years.

2 INTRODUCTION

This report presents the statewide load impact evaluation of the Capacity Bidding Program (CBP) for the 2024 program year (PY2024). The report covers the statewide CBP offered by three California investor-owned utilities (IOUs): Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E).

2.1 EVALUATION OBJECTIVES

The objective of this evaluation is to assess the PY2024 CBP in a manner that conforms to the Load Impact Protocols (LIP) adopted by the CPUC in Decision (D.) 08-04-050. At a high level, there are two main objectives related to the CBP load impact evaluation:

- **Ex Post Analysis:** The goal of the ex post analysis is to estimate load impacts for PY2024 CBP events and for an average event day that conforms to the LIP.
- **Ex Ante Analysis**: The goal of the ex ante analysis is to forecast CBP aggregate (MWh/h) and per capita (kWh/h) load reductions for PY2025 through PY2035 and conduct a "back cast" of PY2024 under 1-in-2 and 1-in-10 weather scenarios in a manner that conforms to the LIP.

2.2 PROGRAM OVERVIEW

The CBP is a statewide price-responsive aggregator program launched in 2007. While each of the IOUs' CBP programs are slightly different in their offerings, the current program enables aggregators to contract with groups of residential and non-residential customers to collectively respond to events. Each aggregator can make nominations to various program offerings (referred to as "products") that vary by customer class, event triggers, and prices. The aggregator receives day-ahead and/or day-of (SDG&E only) notifications[6] of events and arranges for load reductions during the event. The aggregator then receives monthly capacity payments based on nominated capacity (even if an event is not called), plus additional energy payments (for bundled customers only at SCE and SDG&E) based on the kWh reduction during CBP events. The aggregator is also notified of reduced payments or penalties if their aggregation of customers does not collectively achieve the nominated capacity. CBP aggregators can adjust their nominations and product participation monthly.

[6] PG&E and SCE only have Day-Ahead CBP program products.

In PY2024, residential customers were not enrolled in the CBP. Additionally, SDG&E did not have any events called for the day-of notification products within its program. As a result, only non-residential day-ahead notification events occurred in PY2024 across all IOUs.

2.2.1 Role of Aggregators

In the CBP, aggregators are the entity responsible for contracting with eligible customers for participation. Each aggregator is responsible for designing its own demand response offering, including customer acquisition, retention, and marketing. Aggregators are also responsible for notifying contracted customers after an IOU has notified them of a CBP event; the IOUs do not directly notify customers enrolled through aggregators of an event. Additionally, aggregators are the entity receiving payments and penalties from each IOU. Each aggregator's customers are grouped into distinct resources by sub-load aggregation points (SubLAP). Each resource provides a single monthly nomination, whereupon all contracted customers in a resource are dispatched by the aggregator.

2.2.2 Eligibility

Customers are considered eligible for the CBP program schedule if they are a bundled customers and billed on a utility residential (PG&E and SCE), commercial, industrial or agricultural rate schedule. The CBP Is also available to Direct Access ("DA") and Community Choice Aggregation ("CCA") customers. CBP participation is available through a third-party aggregator or to qualifying customers acting as a self-aggregator. Customers may not be enrolled in another capacity DR program. However, a customer can dually enroll in the Emergency Load Reduction Program (ELRP), Critical Peak Pricing (CPP) for SCE and SDG&E or Peak Day Pricing (PDP) for PG&E.

2.2.3 Incentives

Aggregators receive capacity payments based on their monthly nominated capacity, product selected, event duration, and delivery performance. If an aggregator's delivery capacity underperforms the stated tariff threshold, the aggregator receives a capacity shortfall penalty. For months with no dispatched events, CBP aggregators receive the full monthly capacity payment based on their nominations with no energy payments. Additional energy payments ($/kWh) are made to the aggregator based on the measured kWh reductions achieved during dispatched events.

2.2.4 CBP Product Offerings

As stated previously, each IOU's CBP product offerings are unique. Each IOU's CBP products are described at length below.

PG&E CBP

PG&E's CBP operates from May through October and only offers day-ahead participation. PG&E's CBP offered one product in PY2024: *Elect DA*. The Elect DA product operates with a maximum event duration of four-hours and can be dispatched between 5 p.m. and 10 p.m. during the month of May and between 4 p.m. and 9 p.m. during the months of June through October. Aggregators set their own CAISO market bid price. Excluding holidays, events can be called Monday through Saturday except for the month of October when the events can be called Monday through Friday. Aggregators provide separate nominations for weekday and Saturday events. PG&E's CBP is open to both residential and non-residential participation, however, there was no residential participation in PY2024.

SCE CBP

SCE offered only one CBP product in PY2024: *CBP DA*. The CBP DA product operates from May through October and can be dispatched between 5 p.m. and 10 p.m. during the month of May and between 4 p.m. and 9 p.m. during the months of June through October. SCE sets the CAISO market bid price and dispatch strategy. Events can be called Monday through Saturday, excluding holidays. Aggregators provide separate nominations for weekday and Saturday events. SCE's CBP is open to both residential and non-residential participation, however, there was no residential participation in PY2024.

PROGRAM CHANGES

SCE eliminated their CBP DA product at the end of 2024 and replace it with the CBP Elect DA (CBP-E) product. The CBP Elect DA product was approved on March 3, 2025, with an effective date of February 25, 2025. The CBP Elect DA is open to both residential and non-residential participation. The product offers three price triggers options ($200/MWh, $400/MWh, and $600/MWh), rather than SCE setting the CAISO market price as in the CBP DA product. However, similarly to CBP DA, CBP Elect DA events may be triggered between the hours of 5 p.m. to 10 p.m. for May and 4 p.m. to 9 p.m. for June through October, Monday through Saturday for May through September, and Monday through Friday for October, excluding holidays.

SDG&E CBP

SDG&E offers two CBP products that are only open to non-residential customers: the *Elect DA 1-9 Hour* and the *Elect DO 1-9 Hour*. The *Elect DA 1-9 Hour* is a day-ahead product, and the *Elect DO 1-9 Hour* is a day-of product. Both products operate from 1 p.m. to 9 p.m., have the same three price triggers options ($200/MWh, $400/MWh, and $600/MWh), and operate Monday through Saturday during the months of May through October. In PY2024, SDG&E only had event participation in the *Elect DA 1-9 Hour* product with a $600/MWh option. As such, SDG&E's ex ante forecasts only include forecasts for the *Elect DA 1-9 Hour* product with a $600/MWh option.

2.3 REPORT TERMINOLOGY

To keep the PY2024 report consistent and comparable with prior years, Verdant adopted reporting terminology used for previous program years. However, some of the terminology may have changed slightly due to changes in each IOUs CBP and in the LIP filing guide. Key terminology used throughout this report is defined in Table 2-1.

TABLE 2-1: REPORT TERMINOLOGY

Terminology	Definition
Program	The combination of IOU and customer sector.
Product	An offering within each program. For example, PG&E's non-residential Elect DA.
Option	An enrollment option within a product. For example, SDG&E has three price triggers options ($200/MWh, $400/MWh, and $600/MWh) within their two CBP products (DA and DO).
Resource	A group of enrolled CBP customers under a single option, aggregator, and SubLAP, to be dispatched together.
Sector	Residential or non-residential. Note that CBP only had non-residential participants in PY2024.
Nomination	A monthly nominated resource by program, product, aggregator, and SubLAP. A nominated resource has a corresponding capacity nomination (MW) for its enrolled customers.
Dispatch	An entity called for a market-triggered or test event. An entity can include a dispatched resource, dispatched customers, dispatched capacity, etc. Not all nominated entities are dispatched during a given event.
Average Event Day	For each product, the average event day is calculated as the average of all events dispatched, regardless of event hours and number of SubLAPs. The program-level average event day is the sum of all product-level average event days. However, in some cases events may be excluded from the average event day.
Delivery Performance	A percentage metric equal to the ex-post aggregate load impacts divided by the overall dispatched capacity. For the average event day, the delivery performance is based on an adjusted nomination, where only the nominations for the dispatched resources in each respective hour are accounted. As a result, the nominations for the average event day can vary by hour. Delivery Performance is abbreviated as "Delivery Perf." in tables.
Dually Enrolled	If a customer is concurrently enrolled in the CBP and a separate demand response (DR) program, they are considered as dually enrolled during the CBP.

2.4 REPORT ORGANIZATION

The remainder of this report plan is organized into the following sections.

- **Section 3 - Study Methodology** presents an overview of the data sources and ex post and ex ante impact methodologies used for this study.
- **Section 4 - PG&E PY2024 Results** presents an overview of PY2024 PG&E CBP participation and events, the estimated ex post and ex ante load impacts, and a summary of key findings.

- **Section 5 - SCE PY2024 Results** presents an overview of PY2024 SCE CBP participation and events, the estimated ex post and ex ante load impacts, and a summary of key findings.

- **Section 6 - SDG&E PY2024 Results** presents an overview of PY2024 SDG&E CBP participation and events, the estimated ex post and ex ante load impacts, and a summary of the key findings.

- **Section 7 - PY2024 Statewide Results Summary** presents a statewide summary of program participation, ex post and ex ante load impacts, and key findings.

3 METHODOLOGY

This section presents the data sources and the ex post and ex ante methodologies used for the Load Impact Evaluations of the CBP in PY2024.

3.1 DATA SOURCES

Verdant worked with the IOUs to obtain the data necessary for conducting the ex post and ex ante load impact analyses for the CBP. Descriptions of the data sources are detailed below.

Aggregator Nomination and Resource Data. These data include the monthly capacity nomination, products, and resources for each program, along with the monthly nominated customer enrollment.

Customer information. These data consist of customer-level information for all PY2024 customers enrolled in the CBP through an aggregator. These data generally contain customer account and premise IDs alongside a variety of other attributes useful for the segmentation of impacts, including customer size, nearest weather station, SubLAP, net-energy-metering (NEM) status, and North American Industry Classification System (NAICS) codes and/or descriptions.

AMI data. The service-point-level Advanced Metering Infrastructure (AMI) data for CBP customers. AMI data was requested for the period starting April 1st, 2024, through October 31st, 2024. All AMI data was provided as hourly or sub-hourly usage intervals.

Weather data. The study used hourly weather data for all weather stations represented in the customer information data. The dates of the hourly weather data match those of the AMI data (April 1st, 2024, through October 31st, 2024).

CBP, AutoDR, and other DR program data. The study required comprehensive data on customer enrollment in CBP and any other DR programs available to customers for dual enrollment. These data include CBP event dates and times, the duration of each CBP event, and event type (test vs. market award) information. Verdant also requested relevant information for the AutoDR program and other programs in which CBP participants can be dually enrolled.

Participant forecasts. The ex ante forecasts rely on participation projections over the forecast horizon. Each IOU provided their participant forecasts for the CBP.

Weather scenarios. The ex ante forecasts rely on data representative of the various weather scenarios in the each of the climate zones under different conditions (e.g., 1-in-2 and 1-in-10 weather years, typical event day, system peak, etc.). Separate versions of the weather scenario data were provided by both the utility and CAISO, though they are typically very similar.

Data Validation

Upon data receipt, Verdant cataloged and validated the completeness of all datasets. Missing or erroneous data points were reported back to each IOU via a data completeness summary. Verdant flagged gaps in the participant-level AMI data to identify and submit additional requests for these missing AMI usage intervals. To detect potentially erroneous AMI data, Verdant programmatically and visually reviewed daily load shapes for all nominated participants. For example, Verdant reviewed periods of zero or near-zero AMI usage reads that may have indicated that a meter was not reporting usage normally for a given period. Generally, Verdant aimed to omit as little AMI data as possible. However, for a small number of customers, large intervals of data were excluded from the analyses, as they were not representative of customer event day conditions.

Verdant also reviewed all weather data files for completeness and accuracy. For a few weather stations, Verdant filled in small gaps of missing hourly temperature reads using interpolated values (by way of the average of leading and lagging hourly intervals). Some weather stations included large gaps of consecutive hourly readings or highly irregular or erroneous temperature readings. For these stations, the weather data were not used, and the corresponding participants were remapped to the next closest weather station within the same region (for example, the next closest coastal weather station for a coastal customer).

3.2 EX POST METHODOLOGY

The ex post analysis relied on a regression-based approach for estimating impacts. The ex post regression models are hourly models, where each hour of the day is modelled separately from other hours of the day. Given the variety of CBP customer types and aggregators, hourly customer-specific regressions are estimated. Non-residential customers typically have heterogenous loads, making it difficult to broadly apply a given regression model specification across all customers and thus necessitating site-specific models. Additionally, customer-specific regressions facilitate various aggregations of results required for reporting (i.e., industry type, customer size, etc.).

Vedant's ex post approach included four main steps as detailed in Figure 3-1. Each of these steps are described in further detail in the following subsections.

FIGURE 3-1: EX POST ANALYSIS STEPS

3.2.1 Participant Analysis

CBP participants come from a large pool of customer types and aggregators across the three IOUs. The participant analysis is a preliminary exploratory analysis to determine if there are any obvious issues or participant characteristics that may influence the approach for estimating load impacts. For example, reviewing customers' daily load shapes to determine whether explanatory variables are needed or if a custom model should be included in the candidate model selection for a given customer.

A key component of the participant analysis is a precursory weather sensitivity analysis to determine whether a participant's non-event day load is temperature sensitive. For those participants found to have weather sensitive loads, their corresponding ex post model typically includes a temperature-based weather variable to control for the influence of temperature on energy consumption (kWh). The weather sensitivity analysis uses a linear regression of daily average load as a function of month of the year, day of the week, and a degree day threshold. If the regression resulted in positive and statistically significant degree day coefficients at the 95th percentile, the CBP participant was considered weather sensitive. In some cases, weather sensitive customers did not include a weather based explanatory variable in the regression model. These cases represent loads that have overall variations in daily loads that correlate to long term temperature trends; however, temperature may not play a substantial role in the hour-to-hour energy usage. Agriculture pumping sites are a primary example of this phenomenon, where daily usage is typically higher during hotter periods, but the hour-to-hour load is a binary of on or off. Additional details regarding model specification and results of the weather sensitivity analysis are included in Appendix B.

3.2.2 Proxy Day Selection

The second step of the ex post analysis was to select proxy days to use for testing candidate models in model selection. Proxy event days represent non-event days with event-like conditions (based on temperature). In many programs, these are typically the hottest or coldest non-event days within the relevant season. However, since the CBP events are not necessarily driven by temperature, Verdant selected proxy event days based on a distance metric,[7] selecting the non-event, non-holiday days that are closest to temperature for the average event day during the CBP season. Verdant selected 5 weekday and 3 weekend proxy days. However, no weekend CBP events occurred in PY2024 and thus the weekend proxy days were not used in the ex post analysis. Given that each CBP participant can be dispatched on different event days (depending on their SubLAP), the selection of proxy event days is specific to each customer

[7] The distance metric for proxy day selection distance metric used to Select proxy days included:

$$Distance\ Metric = |(MaxTemp\_RA\_Window_{avg\ event} - MaxTemp\_RA\_Window_{non-\ event})| + |(AvgDailyTemp_{avg\ event} - AvgDailyTemp_{non-\ event})|$$

and may result in a different set of dates Selected between CBP participants. Additional details on the selected proxy event days are included in Appendix C.

3.2.3 Model Selection

Verdant tested candidate model specifications separately for each customer. While the candidate models differ, they are comprised of two components: a set of independent variables to capture CBP event impacts and a second set of independent variables to capture effects related to the reference loads. Insights from the participant analysis helped inform which model specifications to test for the customer base. For example, customers with weather sensitive loads were tested with model specifications that contained weather variables, primarily cooing degree hour (CDH) variables, meant to capture the weather effects on hourly energy consumption, while models for weather insensitive customers did not contain weather variables and instead more heavily relied on other time-based effects. In all cases, the regression models control for the following: day of the week, month, event days, and dual-program enrollment, as applicable.

Verdant considered a variety of factors to determine which model specification was the most appropriate or applicable to estimate CBP impacts for each customer. This process included the following steps:

1. First, Verdant reviewed its catalog of model specifications from prior DR evaluations to develop a catalog of candidate models, incorporating new adjustments or additional models based on the needs of the analysis and model performance.
2. The performance of candidate models was evaluated using proxy event days as holdout days with presumed event hours to assess the bias and error of each candidate model and to establish whether a candidate model generated statistically significant impact parameters. When a candidate model consistently produced statistically significant impact estimates for the selected proxy event days, the model was rejected, as there should not be statistically significant impacts for days where events did not occur.
3. Next, an arbitration routine assessed the model coefficients for anticipated sign and statistical significance. This routine was primarily used to assess accurate accounting of weather-based coefficients. Parameters meant to capture temperature effects should not be negative. Second, the model fit statistics were considered to ensure the model adequately explained the variance in the data. Models failing these tests were rejected.

4. Next, Verdant examined the error and bias values of the remaining candidate models. Normalized Mean Absolute Error (NMAE) and Normalized Mean Bias Error (NMBE) were the primary metrics explored. NMAE represents the average of the normalized absolute error between actual load and estimated load on proxy event days, while NMBE represents the normalized average bias between actual load and estimated load on proxy event days. For some customers, the presence of zero load prevented the NMAE and NMBE metrics from being properly calculated. For these customers, the root mean squared error (RMSE) was used for scoring candidate models. The candidate model with the lowest score was selected, which represents the model that minimized error and bias. In the odd case of a tie between model specifications for a given customer, the candidate model with the highest adjusted R-squared was selected. Performance metrics are presented in Appendix C.
5. The average estimated proxy event load shape was then compared to the average actual proxy event day load shape. If the selected model did not produce a load shape that sufficiently matches the actual proxy event day or a shape that contains erroneous load fluctuations, then the candidate models for that participant were revised and/or modeling data was examined for outliers. After which, steps one through four of the model selection process were revisited as necessary.

3.2.4 Impact Estimation

The final selected models were used to predict event day load and estimate program impacts for each hour of each event day. Importantly, model specifications included an event day impact variable to help capture additional event day effects outside of the event window (for example, pre-cooling and snapback effects before or after an event window). Equation 3-1 presents the general model specification used to estimate ex post impacts.

EQUATION 3-1: EX POST GENERAL MODEL SPECIFICATION

$$kWh_{d,h} = \beta_{0,h} + \beta_{1d,h}EventDay_d EventID_d + \beta_{2,h}Weather_h + \sum_m \beta_{5,h,m}Month_m + \sum_w \beta_{6,h,w}Wday_w + \beta_{6,h,d}AvgLoad_d + \beta_{7,h}OtherEventHour_h + \varepsilon_{d,h}$$

Where:

$kWh_{d,h}$	The hourly delivered kWh usage on event day *d* during hour *h*.
$\beta_{0,\mathrm{h}}$	The intercept of the regression model during hour *h.*
$EventDay_e EventID_d$	The interaction between the event day dummy and an event ID that corresponds to a specific event day. Its coefficient $\beta_{1\mathrm{d,h}}$ yields the impact of an event on usage on day *d* during hour *h.*
$Weather_{\mathrm{h}}$	A temperature-based weather variable in hour *h*.
$Month_{m}$	A dummy variable for each month *m.*
$Wday_d$	A dummy variable indicating the day of the week *d.*
$AvgLoad_d$	The average daily load during a specific period (e.g., the afternoon) of day *d*.

$OtherEventHour_h$	A dummy variable, indicating whether hour *h* is an event hour for a participant dually enrolled in another event-based demand response program.
$\varepsilon_{d,h}$	The error term

The interaction between $EventDay_dEventIDd$ results in a set of 24 $\beta_{1d,h}$ estimates (one from each hourly model) that capture event-specific impacts. The set of 24 estimates are used to estimate program impacts during the event window and capture any other event day effects, such as precooling or snapback, for hours outside of the event window. In essence, $\beta_{1d,h}$captures the difference between actual event day load for a given hour and the estimated baseline. For the ex post analysis, $\beta_{1d,h}$ estimates over the event window provide the impact estimates of for each event day.

The estimated impacts for each participant are aggregated to multiple domains of interest for each CBP product, including but not limited to, industry type, customer size, and geographical location, to provide the IOUs with data on participant and resource performance at the desired levels.

Confidence Intervals and Uncertainty Adjusted Impacts

The uncertainty adjusted impacts in the ex post analysis represent the confidence intervals around the event day impact coefficients $\beta_{1\mathrm{d},h}$ for each hour of an event day. When estimating confidence intervals, Verdant assumed that impacts were independent across participants. To estimate the 5th, 10th, 50th, 90th and 95th percentiles, the variance of each estimate was pooled to each level of reporting aggregation and then converted to standard errors for each hour. The calculated standard errors were then used to develop the uncertainty adjusted impacts as confidence intervals.

3.3 EX ANTE METHODOLOGY

Verdant produced ex ante load impacts for 11 years following each PY (12 years, including the current PY backcast). For each IOU, the ex ante impacts include, at a minimum, the hourly ex ante load impacts by CBP product, local capacity area (LCA), SubLAP, and customer size at the aggregate and per-nominated customer (per capita) basis. Verdant produced ex ante impacts for each typical event day and monthly IOU and CAISO system worst day under 1-in-2 and 1-in-10 weather conditions. Additionally, the ex ante impacts were produced for the average hourly load impacts across the RA hours (5 PM to 10 PM for May, and 4 PM to 9 PM for June through October). However, the Load Impact Protocol (LIP) 24-Hour Slice-of-Day requirements, a four consecutive hour dispatch is required in ex ante within Availability Assessment Hours on the worst day of each month[8]. For PG&E, the first four hours of the RA window were used to represent a four-hour dispatch. For SDG&E, the last four hours of the RA window represent event hours.

[8] LIP Filing Guide 5.1 at 11.

3.3.1 Key Ex Ante Analysis and Enrollment Forecast Assumptions

Prior to discussing the ex ante methodology, it is worth highlighting key ex ante and enrollment forecasts assumptions associated with each IOU as they pertain to the ex ante approach. The following subsections discuss key enrollment assumptions for each IOU. More detailed discussions on enrollment forecasts are discussed in each IOUs respective sections. Additional assumptions are included in IOU's specific ex ante results sections.

Key PG&E Ex Ante Analysis and Enrollment Assumptions

There are three key assumptions for PG&E's ex ante analysis. These are:

- **Delivery Performance.** A key consideration to PG&E's enrollment forecast is the assumption of a 100% delivery performance for PY2025 nominated resources. Across all PY2024 test events and market award event days with more than one participant, the dispatch delivery performance exceeded 100%. As a result, the enrollment forecast was designed to achieve a 100% delivery performance for currently enrolled nominated customers (~40 MW in August). No adjustment is used to account for a delivery performance shortfall, as a shortfall is not anticipated. Additional discussions surrounding PG&E's PY2024 delivery performance results are presented in Section 4.

- **Residential Participation.** Since there was no residential participation in PG&E's CBP Elect DA in PY2024 to inform ex ante residential forecasts, the prior year's (PY2023 Load Impact Evaluation) ex ante per capita impacts and reference loads were used as a proxy for these customers, with collaboration from PG&E. Due to the lack of residential participation in PY2024, PG&E's enrollment forecast was designed to produce a conservative estimate of MW associated with residential customers. The prior year's (PY2023 Load Impact Evaluation) ex ante per capita impacts were not determined to be weather sensitive, therefore, ex ante MW forecasts are expected to be the same across all weather scenarios.

- **Program and Portfolio Ex Ante Impacts.** While there were dually enrolled CBP customers in PY2024, there were no dual-program event days for enrolled CBP customers. With collaboration from PG&E, it was decided that program and portfolio ex ante impacts would be identical and assume no dual-program event days for CBP customers.

Key SCE Ex Ante Analysis and Enrollment Assumptions

As mentioned previously, SCE's CBP DA offering was discontinued at the end of 2024 and the successor product (SCE CBP Elect DA) was approved on March 3,2025. The new CBP Elect DA product has substantially greater non-residential customer enrollment in 2025 than was seen in the PY2024 ex post analysis[9] and prior years. Additionally, the ex ante enrollment forecasts anticipate residential

[9] The CBP Elect DA has 482 non-residential customers enrollments as of May 2025 whereas the PY2024 CBP DA had less 40 customers enrolled and dispatched for events.

participation in CBP Elect DA. As a result, the future customer mix in SCE's CBP is different than in prior program years. Given the changes to the participant makeup and changes to program rules, there is no SCE specific CBP ex post analysis that can be effectively used to forecast CBP Elect DA program performance. Therefore, the SCE ex ante analysis relies on the assumptions detailed below. Additional SCE ex ante assumptions are discussed in Section 5.4.

- **Non-Residential Ex Ante Impacts.** The non-residential ex ante impacts are derived from May 2025 CBP Elect DA nominations, which included more than 480 enrolled customers. Verdant scaled the nominated capacity to account for minor enrollment growth in 2025 (482 to 495 customers) and for enrollment growth that will occur after 2025 (495 to 561 customers starting in 2026). This resulted in an estimated hourly aggregate impact of 10.9 MWh/h in 2025 and 12.4 MWh/h for all years after 2025 (2026 through 2035). Given impacts are based on nominations, impacts assume a 100% delivery performance, are the same for all event hours, are weather independent, and do not degrade during longer duration events.

- **Residential Ex Ante Impacts.** There was no residential participation in SCE's PY2024 CBP DA (or in prior years) nor are there existing 2025 residential capacity nominations to inform ex ante impacts. To estimate ex ante impacts for residential customers Verdant relied on ex post impacts from a subset of ELRP A.4 participants. SCE anticipates that the residential participant population will be comprised of Self Generation Incentive Program (SGIP) battery storage participants. As a result, the ELRP A.4 ex post results provide a good source for ex ante impacts. However, there are key differences that make many of the A.4 participants unsuitable candidates for use in CBP ex ante impact estimation. These differences include ELRP's allowance of net load to estimate impacts (CBP requires delivered load) and the SGIP requirement for daily cycling of the storage system (meaning that systems are actively used for TOU arbitrage and self-consumption). As a result of these differences, CBP residential per capita impacts are expected to be smaller than ELRP A.4 average impacts.

  A subset of ELRP A.4 participants were used to develop SCE's residential ex ante impacts. These participants typically had small or zero load impacts during event hours. Verdant reviewed the PY2024 ELRP ex post table generator and derived an impact of 0.22 kWh/h for residential load impacts for each ex ante event hour[10]. Given that anticipated DR curtailment is driven by weather insensitive storage systems, impacts are assumed to be weather incentive and sustained over the full event dispatch.

- **Program and Portfolio Ex Ante Impacts.** The ex ante impact analysis assumes no dual program days for enrolled CBP Elect DA customers. As a result, program and portfolio impacts are identical.

[10] SCE residential ex ante impacts are the average of a subset of ELRP A.4 participants' ex post impacts during HE 21 and 22 on the "average weekday (any hours)". While HE 22 was not an event hour, the load shape indicates event day load reductions occurred in HE22 and dispatch was misaligned with event hours.

Key SDG&E Ex Ante Analysis and Enrollment Assumptions

- [redacted]
  - [redacted]
  - [redacted]
- **Program and Portfolio Ex Ante Impacts.** While there were dually enrolled CBP customers in PY2024, there were no dual-program event days for enrolled CBP customers. With collaboration from SDG&E, it was decided that program and portfolio ex ante impact forecasts would be the same.

3.3.2 Non-Residential Customer Ex Ante Methodology

Verdant's approach to the estimation of ex ante load impacts for PG&E's and SDGE's non-residential participants is largely informed by the ex post methodology and impact estimates. SCE's ex ante analysis was informed by developing reference loads for newly enrolled CBP Elect DA participants and May 2025 capacity nominations. Generalized steps for the non-residential ex ante analysis are presented in Figure 3-2.

FIGURE 3-2: EX ANTE ANALYSIS STEPS – NON-RESIDENTIAL CUSTOMERS

1. **Develop Ex Ante Drivers.** Prior to ex ante modeling, Verdant developed the ex ante drivers dataset. The dataset contains assumptions about ex ante event day characteristics for each month and each ex ante weather scenarios required to predict the ex ante reference loads for each customer. Whereas the ex post impacts reflect actual event day conditions, the ex ante impacts are based on different planning assumptions, primarily the different scenarios that reflect typical or extreme weather conditions. While the weather scenarios are the most obvious element of the ex ante drivers, the models used to estimate reference loads often require the development of other variables related to load characteristics. Examples of this include average morning loads or days of the week, which often include several model specifications to help ensure that the baseline more reliably reflects event day conditions prior to dispatch. For the ex ante drivers, these variables were based on conditions seen in PY2024. As for weekday dummy variables, the ex ante drivers assume a value of 0.2 (1 divided by 5) to represent each weekday with equal weight.
2. **Estimate Reference Loads.** Using the customer-specific ex post models with the ex ante driver data as predictive inputs, Verdant estimated ex ante reference loads for each customer. For customers without an ex post model, an ex ante model was selected following the same approach used to develop ex post models.
3. **Estimate Ex Ante Impacts.** For PG&E and SDG&E, most customers were only dispatched for one or two events during PY2024 (discussed in each IOUs respective event summary section, 4.2 and 6.2). As a result, Verdant could not establish a reliable relationship between temperature and load impacts to estimate weather adjusted impacts through the inclusion of an interaction between the temperature and event hour terms within the models. This required that Verdant examine the percent load reduction as a function of hour of the day, the nth hour of an event, and temperatures by various customer groupings. Verdant found that there was no clear relationship between temperature conditions and percent load reductions and in most cases no clear relationship between hour and percent load reductions. As a result, ex ante impacts are derived from the percent load reductions seen in the ex post analysis. Given that reference loads vary by temperature, estimated load reductions also vary by weather scenario, as percent load reductions represent a ratio of impacts divided by reference load.

   For SCE, non-residential impacts were based on May 2025 capacity nominations. Capacity nominations and current CBP Elect DA program enrollment were used to develop typical per capita load impacts at the SubLAP level.
4. **Apply Participant Forecasts.** After producing ex ante reference loads and load impacts, each customer is grouped into the lowest level domain (participant groups of LCA, SubLAP, and customer size[11]) of

[11] Lowest level domains (participant groups) for the SCE ex ante analysis included LCA and SubLAP. Per capita impacts could not be developed for customer size based on nominations data.

the participant forecast. Reference loads and impacts in each domain are then averaged to represent the typical customer of a given domain. This is then multiplied by the share of participants in the enrollment forecasts to produce the MW forecast for each month and year by the lowest level of aggregation. Each group's MW forecast is then summed at each respective level of reporting.

Confidence Intervals and Uncertainty Adjusted Impacts

The uncertainty adjusted impacts in the ex ante analysis represent the variance and confidence intervals of the of ex post impact estimates. Given PG&E and SDG&E impacts are estimated as a function of ex post percent load reductions, the uncertainty of the ex ante impacts relate directly to the uncertainty of the ex post analysis. For SCE, the ex post analysis was also used given the lack of alternative approaches. However, it should be noted that the customer makeup of the SCE ex post and ex ante analysis is considerably different.

3.3.3 Residential Customer Ex Ante Methodology

PG&E Residential Customer Ex Ante Methodology

While the PY2024 CBP did not have any residential participation, PG&E is forecasting small residential CBP MWs and enrollment in PY2025 and beyond. Verdant relied on per capita reference loads and impacts from the PY2023 ex ante analysis of residential participants. Generalized steps for the residential customers in the ex ante analysis are presented in Figure 3-3 and discussed in further detail below.

FIGURE 3-3: EX ANTE ANALYSIS STEPS – PG&E RESIDENTIAL STORAGE CUSTOMERS

1. **Carry Forward Relevant SubLAP Level Ex Ante Results.** PG&E provided Verdant with the PY2023 ex ante table generator, which included ex ante residential storage results for three SubLAPs. The per capita reference loads and impacts for these SubLAPs were carried forward into the PY2024 ex ante results.
2. **Adjust Ex Ante Reference Loads for New SubLAPs.** For SubLAPs that were not included in the PY2023 ex ante analysis, Verdant developed a regression model to adjust existing ex ante reference loads and new predict reference loads for SubLAPs based on typical ex ante scenario temperatures for that SubLAP. The regression equation is present in Equation 3-2.

EQUATION 3-2: RESIDENTIAL EX ANTE REFERENCE LOAD ADJUSTMENT MODEL SPECIFICATION

$$ReferencekWh_{s,m,h} = \beta_0 + \beta_{1,m}Month_m + \beta_h Hour_h + \beta_h Hour_h Temp_{s,h} + \varepsilon$$

Where:

$ReferencekWh_{s,m,h}$	The weather adjusted ex ante reference load for scenario *s* in month *m* for hour *h.*
β_0	The intercept of the regression model.
$Month_m$	A dummy variable indicating month *m.*
$Hour_h$	A dummy variable indicating hour *h.*
$Hour_h Temp_{s,h}$	An interaction between hour *h* and the temperature for ex ante scenario *s* during hour *h.*

3. **Apply Average Ex Ante Impacts to new SubLAPs.** Verdant applied the PY2023 overall average per capita impact for each hour to all SubLAPs not represented in the PY2023 ex ante analysis.
4. **Apply Participant Forecasts.** After producing per capita ex ante reference loads and load impacts, the LCA and SubLAP level the participant forecasts are applied to each respective group and multiplied to generate separate overall, LCA-level, and SubLAP-level aggregate forecasts.

Confidence Intervals and Uncertainty Adjusted Impacts

The uncertainty adjusted impacts in the residential ex ante analysis represent the variances surrounding the PY2023 ex ante MW forecasts (converted to standard errors).

SCE Residential Customer Ex Ante Methodology

While the PY2024 CBP did not have any residential participation, SCE is forecasting residential enrollment in PY2025 and beyond. SCE anticipates these participants to be SGIP battery storage customers. As a result, Verdant identified SGIP customers that are likely to participate in DR (based on application submission dates) and requested their associated AMI data to develop weather adjusted reference loads. Given that the likely residential SCE CBP Elect DA customers are battery storage customers, impacts were derived from a subset of ELRP A.4 customers. Generalized steps for the SCE residential ex ante analysis are presented in Figure 3-4 and discussed in further detail below.

FIGURE 3-4: EX ANTE ANALYSIS STEPS – SCE RESIDENTIAL STORAGE CUSTOMERS

1. **Develop Ex Ante Drivers.** As with the non-residential customer ex ante analysis, the ex ante drivers dataset contains assumptions about ex ante event day characteristics for each month and each ex ante weather scenarios required to predict the ex ante reference loads for each customer.
2. **Estimate Reference Loads.** Given SCE residential customers were not included in the ex post analysis, ex ante models needed to be developed to estimate ex ante reference loads. The reference load model selection followed the same approach used on the ex post model selection. However, the modeling approach differed slightly. The SCE residential ex ante reference loads relied upon an hourly

panel model with customer fixed effects, where customers from each SubLAP were segmented into their own modeling groups. Equation 3-3 describes the SCE residential general model specification.

EQUATION 3-3: SCE RESIDENTIAL EX ANTE GENERAL MODEL SPECIFICATION

$$kWh_{d,h,i} = \beta_{0,h} + \beta_{1,h} Weather_h + \sum_m \beta_{2,h,m} Month_m + \gamma_i + \varepsilon_{d,h,i}$$

Where:

$kWh_{d,h,i}$	The hourly delivered kWh usage on event day *d* during hour *h for participant i*.
$\beta_{0,\mathrm{h}}$	The intercept of the regression model during hour *h.*
$Weather_{\mathrm{h}}$	A temperature-based weather variable in hour *h*.
$Month_{m}$	A dummy variable for each month *m.*
γ_i	Customer fixed effect for customer *i.*
$\varepsilon_{d,h,i}$	The error term

Using the selected ex ante models with the ex ante driver data as predictive inputs, Verdant estimated ex ante reference loads for each customer.

3. **Estimate Per Capita Impacts Loads.** As stated previously, Verdant reviewed a subset of PY2024 ELRP A.4 ex post results and derived an impact of 0.22 kWh/h for residential load impacts to be applied to each ex ante event hour. The rational for this is described in SCE's ex ante assumption (Section 3.3.1).

4. **Apply Participant Forecasts.** After producing per capita ex ante reference loads and load impacts the participant forecasts are applied to each respective SubLAP and multiplied to generate separate overall, LCA-level, and SubLAP-level aggregate forecasts.

Confidence Intervals and Uncertainty Adjusted Impacts

The uncertainty adjusted impacts in the residential ex ante analysis represent the variances surrounding a subset of PY2024 ELRP A.4 participant's ex post load impacts as presented in the ex post table generator.

4 PACIFIC GAS & ELECTRIC

This section presents PG&E's PY2024 CBP participation, event days, and ex post and ex ante load impact summaries. As discussed previously, PG&E offered residential and non-residential CBP products in PY2024: *CBP Elect DA*. The *Elect DA* product operates with a maximum event duration of four hours and can be dispatched between 5 p.m. and 10 p.m. during the month of May and between 4 p.m. and 9 p.m. during the months of June through October. In PY2024, PG&E had no residential participation in the *Residential Elect DA* product.

4.1 PG&E CBP PARTICIPATION

Table 4-1 below presents the monthly distribution of enrolled customers and nominations for the PG&E CBP products. Throughout PY2024, there was no enrollment in the residential portion of PG&E's CBP. For the non-residential Elect DA product, there was an average monthly nomination of 270 customers, ranging from a low of 210 in October to a high of 313 in September. Monthly nominated capacity for weekday participation ranged from 18.2 MW (in October) to 23.8 MW (in September). Saturday nominations ranged from 0 MW (in October) to 3.7 MW (in September).

TABLE 4-1: PG&E MONTHLY NOMINATIONS

		Residential Elect DA			Non-Residential Elect DA		
			Nominated Capacity (MW)			Nominated Capacity (MW)	
Month	Number of Aggregators	Enrolled Customers	Weekday	Saturday	Enrolled Customers	Weekday	Saturday
May	4	0	--	--	249	21.3	1.4
June	3	0	--	--	253	20.1	1.7
July	4	0	--	--	292	23.5	1.5
August	4	0	--	--	304	21.2	1.6
September	4	0	--	--	313	23.8	3.7
October	4	0	--	--	210	18.3	0.0

There were 441 distinct customers in the non-residential Elect DA product who were nominated for at least one month in PY2024. Table 4-2 describes the distribution of enrolled customers by industry type and customer size. Agriculture, Mining, and Construction was the most common industry type with 325 enrolled customers (~74% of all PG&E PY2024 CBP enrolled customers). The Agriculture, Mining, and Construction segment is also the largest customer segment within each of the three size categories, representing 86% of small customers, 81% of medium customers, and 58% of large customers enrolled in the non-residential Elect DA product. The Water, Wholesale, Transport, and Other Utilities and Retail Stores segments also had significant enrollment in the two larger size categories.

TABLE 4-2: PG&E PY2024 ENROLLMENT IN NON-RESIDENTIAL ELECT DA BY INDUSTRY AND CUSTOMER SIZE

Industry Type	Under 20 kW (Small)	20kW to 199.99 kW (Medium)	200kW or Greater (Large)	Total
Agriculture, Mining & Construction	18	220	87	**325**
Water, Wholesale, Transport, Other Utilities	2	38	25	**65**
Retail Stores	1	13	17	**31**
Manufacturing	0	0	14	**14**
Offices, Hotels, Finance, Services	0	0	3	**3**
Schools	0	0	2	**2**
Institutional/Government	0	0	1	**1**
Total	**21**	**271**	**149**	**441**

4.2 PG&E EVENT SUMMARY

PG&E's Elect DA product had 10 events with 14 distinct dispatches. Table 4-3 presents the event details for all 10 event days and Table 4-4 presents the details for the two event days that had multiple dispatch times. In PY2024 there were eight market award days and two test event days. The majority of participation occurred on test event days, which had had 250 and 286 customers dispatched on June 26th and August 28th, respectively. All market award event days had between 1 and 17 participants which were comprised of 19 unique customers. All event day dispatches, regardless of event type, lasted only one or two hours in duration. There were five event days that included only a single dispatched customer, which was the same customer in all cases. Most of the nominated customers were dispatched for only one or two events.

TABLE 4-3: PG&E PY2024 CBP EVENT DETAILS

Event Date (2024)	Event Type	Event Start (Prevailing Time)	Event End (Prevailing Time)	Event Duration	Dispatched Customers	Dispatched Capacity (MW)
June 5th	Market Award	4:00 PM	5:00 PM	1	3	[redacted]
June 26th	Test Event	6:00 PM	8:00 PM	2	250	19.61
July 5th	Market Award	5:00 PM	7:00 PM	2	4	[redacted]
July 10th	Market Award	6:00 PM	8:00 PM	2	1	[redacted]
July 11th*	Market Award	6:00 PM	8:00 PM	2	17	1.72
July 12th	Market Award	7:00 PM	8:00 PM	1	1	[redacted]
July 23rd	Market Award	7:00 PM	8:00 PM	1	1	[redacted]
July 24th	Market Award	7:00 PM	8:00 PM	1	1	[redacted]
July 25th	Market Award	7:00 PM	9:00 PM	2	1	[redacted]
August 28th*	Test Event	6:00 PM	8:00 PM	2	286	18.62

*Event contains multiple dispatches on the event day. Event details are inclusive of the full range of event hours, maximum event duration, sum of dispatched customers and sum of dispatched capacity.

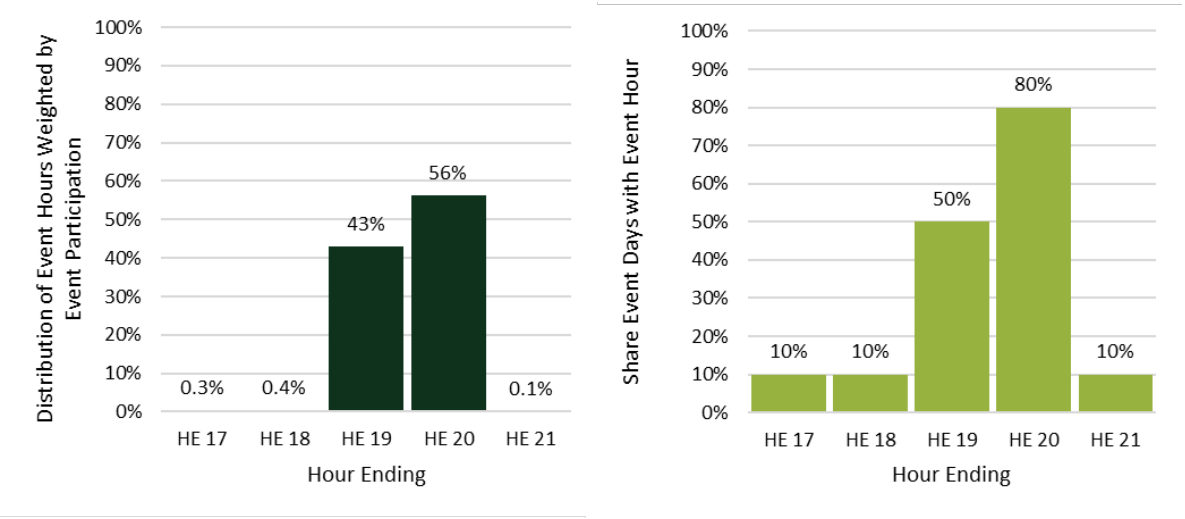
As depicted in Table 4-4, there were two event days with multiple dispatches (differing start and/or end hours), each with two distinct dispatch windows. However, the event windows for these dispatches overlap and only differ by one hour in duration on each day. For ex post impacts and delivery performances, these event days are discussed by their distinct dispatch windows.

TABLE 4-4: PG&E PY2024 CBP EVENT DAY DETAILS – MULTIPLE DISPATCH DAYS

Event Date (2024)	Dispatch Number	Event Start (Prevailing Time)	Event End (Prevailing Time)	Event Duration	Dispatched Customers	Dispatched Capacity (MW)
July 11th	Dispatch 1	6:00 PM	8:00 PM	2	1	[redacted]
July 11th	Dispatch 2	7:00 PM	8:00 PM	1	16	[redacted]
August 28th	Dispatch 1	6:00 PM	8:00 PM	2	155	9.51
August 28th	Dispatch 2	7:00 PM	8:00 PM	1	131	9.16

Figure 4-1 presents the distribution of event hours weighted by event participation for each PY2024 event hour (left) and the share of events that contained each hour of the event window (right). As seen, the most common event hours for enrolled customers were hour ending HE19 and HE20 with 43% and 56% event hours, respectively. Combined, these hours make up 99% of participation weighted event hours. HE20 was the most common event hour, included in 80% of events. The two event dispatches that did not include HE20 as an event hour were June 5th and July 5th which had participation from four and three nominated customers, respectively.

FIGURE 4-1: PG&E PY2024 CBP DISTRIBUTION OF EVENT HOURS (LEFT) AND SHARE OF EVENTS WITH A GIVEN HOUR (RIGHT)



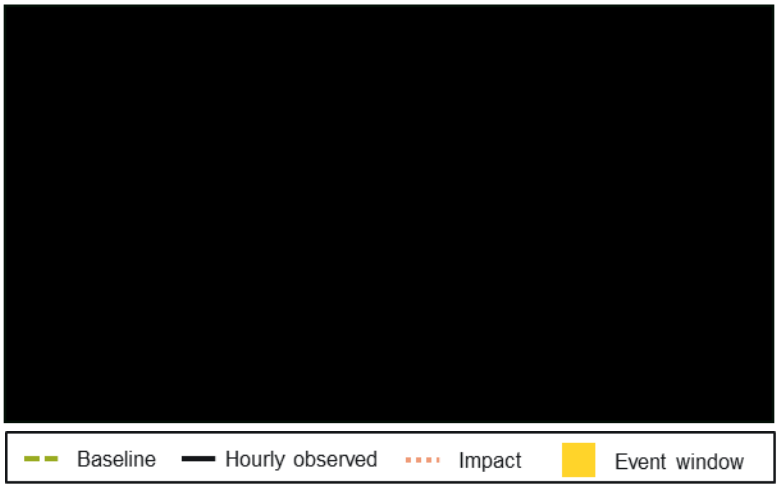
Definition of the Average Event Day

For PG&E, the average event day is inclusive of all event days where HE20 was an event hour, which includes the vast majority of PY2024 event dispatches. As mentioned previously, the two excluded event dispatches were June 5th and July 5th, which had little customer participation. The reason these event dispatches were excluded from the average event day was to establish an hour of focus that was exclusive of all non-event hours.

4.3 PG&E EX POST IMPACTS

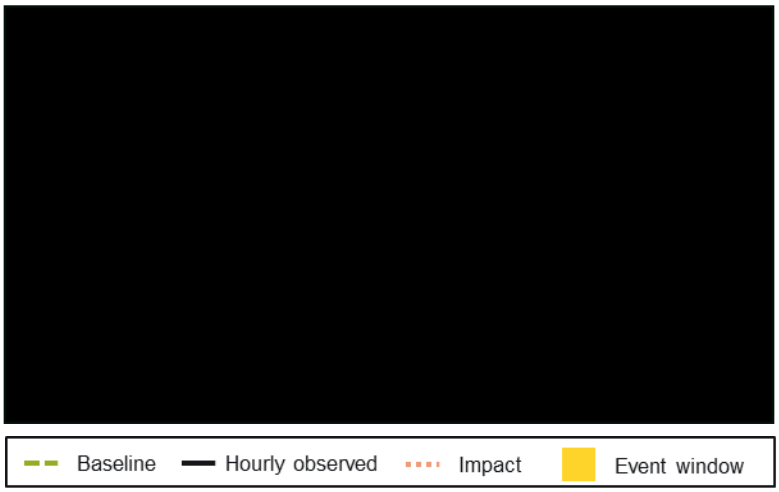
Prior to discussing the ex post impacts of PG&E's non-residential Elect DA, it is worth presenting the average event day load shape as it provides context for the remainder of the ex post discussion. Figure 4-2 presents the average event day load shape for a non-residential CBP Elect DA customer. The figure presents the average estimated baseline (reference load), the actual hourly observed load, and the estimated impacts (load reductions) for the average event day. The highlighted yellow hours indicate an event hour where one or more customers were dispatched for an event. The vertical dotted line represents the hour in which all participants are participating in a CBP event, in this case HE20. The data underlying this figure are available in a protocol compliant Microsoft Excel Table Generator.

FIGURE 4-2: PG&E NON-RESIDENTIAL ELECT DA AVERAGE EVENT DAY LOAD SHAPE



In reviewing the daily average load shape there are visually identifiable load impacts in hours beyond HE19 and HE20. HE21 also has noticeable load reduction. While this was an event hour, it was an event hour for only a single participant and only on one event day and represents less than one percent of participation weighted event hours (described in Figure 4-1 above). Much of the apparent load reduction is a result of customers slowly increasing their loads back to their counterfactual reference loads after the end of the event, which results in impacts persisting beyond the event hours. Figure 4-3 present this phenomenon on the June 26th test event day. As seen there are load reductions in HE21 after the last hour of dispatch (HE20).

FIGURE 4-3: PG&E NON-RESIDENTIAL ELECT DA JUNE 26TH TEST EVENT DAY



PG&E Ex Post Impact Monthly Performance Summary

Table 4-5 present the monthly performance summary for the average event day in a given month.[12] In PY2024, there was no event where the entire nominated capacity was dispatched. However, the August 28th event day dispatched 285 of the 304 nominated customers that month, which makes it a good proxy for the delivery performance for the entire suite of customers (along with the average event day HE20). The average delivery performance across 285 customers was [redacted]% of the nominated capacity (an average ex post load reduction of [redacted] MW) which exceeded the monthly total August nomination of 21.2 MW.

Across the three months that had events dispatched, the share of the monthly nominated capacity that was delivered ranged from a low of [redacted]% in July to a high of [redacted]% in June.

TABLE 4-5: PG&E PY2024 AVERAGE MONTHLY PERFORMANCE SUMMARY

Month	Number of Event Days in Month	Monthly Nominations*		Average Monthly Dispatch		Ex Post Full Event Hour Average Impact**	
		Number of Customers	Capacity (MW)	Number of Customers	Capacity (MW)	Capacity (MW)	Delivery Perf.
May	0	249	21.3	--	--	--	--
June	2	253	20.1	166	17.1	[redacted]	[redacted]
July	7	292	23.5	3	[redacted]	[redacted]	[redacted]
August	1	304	21.2	285	18.6	[redacted]	[redacted]
September	0	313	23.8	--	--	--	--
October	0	210	18.3	--	--	--	--
Average Event Day (HE20)	--	283	21.6	69	5.1	[redacted]	[redacted]

*Average event day monthly nominations represent the average nominated customers and capacity during months in which PY2024 events occur.

**Ex post delivery performance and impacts for event days with multiple event dispatches only include the hours in which all resources called on that day are participating. For example, HE20 on August 28th.

PG&E Ex Post Impact Results by Event Day and Dispatch

Table 4-6 presents the average event hour load impacts for each event dispatch. As a reminder dispatches are defined by their distinct event start and end times. All nominated customers were dispatched on each event day, but for two event days there were two distinct event dispatch time periods. The table below presents the number of nominated customers called for an event dispatch, the hours in which the events occurred, the aggregate and per capita reference loads and load impacts

[12] For days with multiple dispatches, only the hours in which all resources that participated in the event are represented. For example, HE20 on August 28th.

TABLE 4-6: PG&E PY2024 AVERAGE LOAD IMPACT BY EVENT DAY

Event Date (2024)	Event Hours (HE)	Num. of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Dispatch Delivery Perf. (%)	Temp (F)
			Ref. Load	Load Impact	Ref. Load	Load Impact			
June 5th	17	3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	91.0
June 26th*	19-20	248	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	91.3
July 5th	18-19	4	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	90.8
July 10th	19-20	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	101.8
July 11th	19-20	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	106.8
	20	16	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	99.6
July 12th	20	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	103.0
July 23rd	20	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	101.5
July 24th	20	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	100.0
July 25th	20-21	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	93.8
Aug 28th	19-20	155	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	89.1
	20	130	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	97.0
Average Event	**20**	**69**	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**91.7**

*Two customers are not included due to poor data quality or missing data. The exclusion of these customers was determined to have a minimal impact of ex post results were dropped from the analysis.

Figure 4-4 presents the dispatch delivery performance associated with each event day dispatch. For all event day dispatches, with more than one customer, delivery performance exceeded 100% with the June 5th and July 5th events exceeding [redacted]% of dispatched capacity.

FIGURE 4-4: PG&E AVERAGE EVENT HOUR DELIVERY PERFORMANCE BY EVENT DAY

4.3.1 PG&E Average Event Day Impacts by Participant Subgroups

Table 4-7 through Table 4-9 present the average event day reference loads, impacts and percent load reduction for non-residential CBP Elect DA participants by Industry Type, Local Capacity Area, and SubLAP, respectively. Additional details on how these groupings perform on specific event days are presented in the Ex Post Table Generators presented in Appendix A. Given that not all groupings of customer were dispatched for each event, the average number of customers in sub-level groupings of the average event day may not equal the overall average event day count of participants.

TABLE 4-7: PG&E PY2024 AVERAGE LOAD IMPACT BY INDUSTRY TYPE

Industry Type	Avg. Number of Customers in Events	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
Agriculture, Mining and Construction	170	11.2	8.7	65.6	51.2	78%	91.7
Manufacturing	8	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	91.0
Office, Hotels, Finance, Services	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	77.8
Schools	2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	86.8
Wholesale, Transport and other Utilities	2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	97.4

TABLE 4-8: PG&E PY2024 AVERAGE LOAD IMPACT BY LOCAL CAPACITY AREA

Local Capacity Area	Avg. Number of Customers in Events	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
Greater Bay Area	12	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	62.6
Greater Fresno Area	107	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	96.1
Kern	9	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	98.3
North Coast and North Bay	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	74.8
Sierra	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	99.4
Stockton	7	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	101.8
Other	133	11.1	9.0	83.4	67.9	81%	91.1

TABLE 4-9: PG&E PY2024 AVERAGE LOAD IMPACT BY SUBLAP

SubLAP	Avg. Number of Customers in Events	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
PGCC	15	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	60.4
PGEB	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	73.1
PGF1	108	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	96.1
PGKN	9	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	98.3
PGNB	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	74.8
PGNP	42	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	81.0
PGSB	3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	83.5
PGSI	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	99.4
PGST	7	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	101.8
PGZP	91	7.8	7.0	86.0	77.7	90%	96.9

4.3.2 Comparison of Ex Post Impacts

This section discusses how the PY2024 ex post load impacts compared to previous years. Given that the residential CBP Elect DA was unsubscribed in PY2024, only comparisons to non-residential CBP Elect DA are made.

As seen in Table 4-10, there has been a steady decrease in non-residential CBP Elect DA average nominated customers since PY2022. However, the average PY2024 nominated capacity (MW) was only 2.4 MW lower than in PY2023 despite having 150 fewer nominated customers, as the average nominated capacity per participant increased significantly between PY2023 and PY2024.

TABLE 4-10: PG&E CBP ELECT DA NON-RESIDENTIAL AVERAGE NOMINATIONS PY2021 THROUGH PY2024

Program Year	Avg. Monthly Nominated Capacity (MW)	Avg. Nominated Customers
2021	13.5	365
2022	31.3	475
2023	23.8	430
2024	21.4	270

Table 4-11 presents the average event day performance across program years since PY2021. Overall, CBP Elect DA performed better in PY2024 than in PY2023 both in terms of delivery performance ([redacted] % versus 86%) and percent load reductions ([redacted] % versus 22%). Additionally, the PY2024 program was comprised of

larger customers that made larger load reductions resulting in an average proxy full system[13] load reduction of [redacted] MWh/h[14] compared to 20.5 MWh/h in PY2023. Where aggregate impacts are calculated as the average monthly capacity nomination multiplied by the average event day delivery performance.

TABLE 4-11: PG&E CBP ELECT DA NON-RESIDENTIAL CURRENT VERSUS PREVIOUS EX POST – AVERAGE EVENT DAY

Program Year	Avg. Monthly Nominated Customers	Aggregate (MWh/h)			Per Capita (kWh/h)			Temp (F)
		Nominated Capacity	Load Impact	Delivery Perf.	Reference Load	Load Impact	Percent Load (%)	
2021	365	13.5	13.0	96%	81.6	35.6	44%	87
2022	475	31.3	28.0	89%	150.9	58.9	39%	96
2023	430	23.8	20.5	86%	219.2	47.2	22%	91
2024*	**270**	21.4	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**92**

*The PY2024 customer counts differ from the PG&E Ex Post Table Generator average event day customer counts (Appendix A). This table uses the average monthly nominated count of customers and MW capacity (from all months) to make a comparison with prior years. Per capita impacts remain unchanged.

Table 4-12 shows the PY2024 ex post impacts for HE20 on the average event day and for the June 26th event (the event dispatch with the highest customer participation) and compares these ex post impacts to the PY2023 Ex Ante August system worst (peak) day impacts. As seen, the PY2024 Elect DA had significantly lower program enrollment than previously forecasted in PY2023, however, the PY2024 enrolled CBP Elect DA customers provided larger load reductions per capita than the PY2023 forecast (~[redacted] kWh/h actual compared to 35.5 kwh/h forecasted). The PY2024 ex post aggregate load impact was less than the 2023 ex ante forecast by approximately [redacted] MWh/h due (at least in part) to the lower participant counts and monthly nominated capacity than previously forecasted.

[13] Full system load events represent event dispatches where all program resources dispatched for an event. For purposes of this comparison the average monthly nominated customer counts and corresponding aggregate impacts are used as a proxy for what would have likely occurred given a full system dispatch.

[14] Calculated as the average monthly nominated capacity multiplied by the average event day delivery performance.

TABLE 4-12: PG&E CBP ELECT DA NON-RESIDENTIAL EX POST (AVERAGE EVENT DAY) VERSUS PREVIOUS YEAR EX ANTE (PG&E 1-IN-2 AUGUST SYSTEM WORST DAY)

Estimate	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
PY2023 Ex Ante	1,130	206.1	39.9	182.4	35.3	19%	84
Current Ex Post (June 26th)	**248**	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**91**
Current Ex Post (Avg. Event)*	**270**	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**92**

*The PY2024 customer counts differ from the PG&E Ex Post Table Generator) average event day customer counts (Appendix A). This table uses the average monthly nominated count of customers and MW capacity to make a comparison with prior years. Per capita impacts remain unchanged.

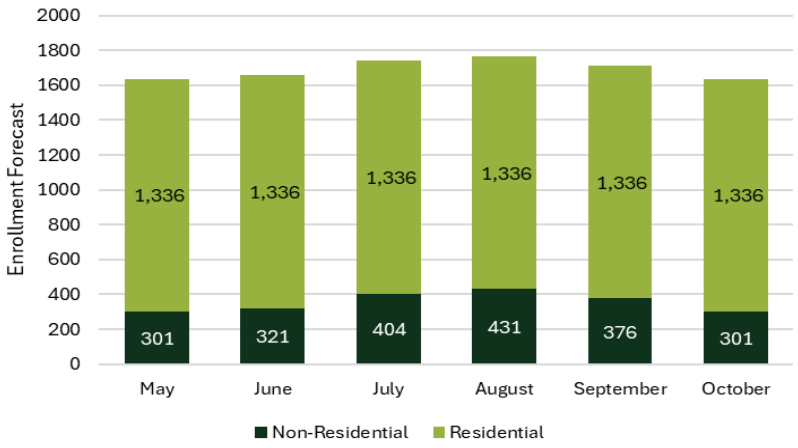
4.4 PG&E EX ANTE IMPACTS

This section presents the ex ante forecasts, results, and key assumptions used to develop ex ante forecasts.

Enrollment Forecasts

PG&E provided Verdant with enrollment forecasts for years 2025 through 2035 as present in Figure 4-5. PG&E is forecasting both residential and non-residential participation in the CBP over this period, both of which remain consistent throughout the eleven year forecast. PG&E anticipates 1,336 residential CBP participation from May to October of the forecast. For non-residential customers, the participation forecast ranges from a low of 301 customers participating in May to a high of 431 customers participating in August.

FIGURE 4-5: PG&E PARTICIPANT FORECASTS BY MONTH – 2025 THROUGH 2035



PG&E Ex Ante Analysis Assumptions

There are several key assumptions for PG&E's ex ante analysis which are presented below.

- **Delivery Performance.** A key consideration of PG&E's enrollment forecast is the assumption of 100% delivery performance for PY2025 nominated resources. Across all PY2024 test events and market award event days with more than one participant, the dispatch delivery performance exceeded 100%. As a result, the enrollment forecast was designed to achieve a 100% delivery performance for currently enrolled nominated customers (~40 MW in August). In prior year's, an adjustment to the ex ante forecast was made based on the assumption that nomination delivery would be less than 100%. However, for PY2024, no delivery performance shortfall adjustment is used, as a shortfall is not anticipated based on PY2024 ex post performance.

- **Residential Participation.** Since there was no residential participation in PG&E's CBP Elect DA in PY2024 to inform ex ante residential forecasts, the prior year's (PY2023 Load Impact Evaluation) ex ante per capita impacts and reference loads were used as a proxy for these customers, with collaboration from PG&E. Due to the lack of residential participation in PY2024, PG&E's enrollment forecast was designed to produce a conservative estimate of MW associated with residential customers. The prior year's (PY2023 Load Impact Evaluation) ex ante per capita impacts were not determined to be weather sensitive, therefore, ex ante MW forecasts are expected to be the same across all weather scenarios.

- **Program and Portfolio Ex Ante Impacts.** While there were dually enrolled CBP customers in PY2024, there were no dual-program event days for enrolled CBP customers. With collaboration from PG&E, it was decided that program and portfolio ex ante impacts would be identical and assume no dual-program event days for CBP customers.

- **Four-hour Event Dispatch.** The Load Impact Protocol (LIP) 24-Hour Slice-of-Day requirements state that a four consecutive hour dispatch is required in ex ante within Availability Assessment Hours on the worst day of each month[15]. For PG&E, the first 4 hours of the RA window are reported for ex ante.

- **Weather Sensitive Load Reductions.** A key component of ex ante analysis is developing weather normalized impacts for various weather scenarios. The PY2024 event season only contained one or two events for most Elect DA customers. Given that the ex post and ex ante analysis rely on hourly customer-specific models, each customer only has one or two data points in each hour for a regression model to determine the relationship between impacts and temperature. Verdant determined that there was not enough information to reliably produce weather normalized load impacts.

    - As a result, the ex ante analysis applied the percent load reductions from ex post results to estimate ex ante load impacts. Since reference loads are weather sensitive for weather sensitive customers, and impacts are derived from a percent load reductions, the ex ante load impacts are implicitly weather sensitive and vary across weather scenarios. Percent load reductions were developed based on the average percent load reduction in each n^{th} hour of events (i.e., first hour,

[15] LIP Filing Guide 5.1 at 11.

second hour, etc.) by customer groups of LCA, SubLAP, and Industry type. If a percent load reduction was not available for any given nth hour of dispatch, the next closest percent load reduction was applied with a degradation rate assumption (discussed below)

- **Snapback.** The ex post analysis found no evidence of snapback after the end of events. Additionally, impacts appear to persist after the event dispatch in the hour immediately following events. As a result, the ex ante analysis carried forward the observed first and second hour post event percent load reductions for the two hours after the presumed end of the event.

- **Degradation Rates.** Prior CBP evaluations developed degradation rates meant to capture how CBP participants maintain their load reductions through longer duration events. In PY2024 events lasted no longer than two hours. As a result, there are no historic four duration events that meaningfully represent the CBP Elect DA as it currently exists. As a result, Verdant applied degradation rates from the PY2023 ex ante analysis. In the third hour of dispatch Verdant applied a degradation rate of 85% and 87% in the fourth hour of dispatch.

PG&E Ex Ante Load Impact Summary

Prior to discussing the ex ante impacts, it is worth presenting the aggregate ex ante load shapes for the non-residential and residential CBP Elect DA products, as it provides context for remainder of the ex ante discussion. Figure 4-6 and Figure 4-7 present the aggregate ex ante load shape under the PG&E 1-in-2 August system worst day conditions for the non-residential and residential products respectively. The figures present the aggregate estimated baseline (reference load), the estimated hourly observed load, and the estimated impacts (load reductions) for a four-hour dispatch. The highlighted yellow hours indicate the full five-hour resource adequacy (RA) window. The grey dashed lines denote the start and end of the four-hour dispatch. As seen in Figure 4-6, the non-residential Elect DA impacts persist beyond the four-hour dispatch.

FIGURE 4-6: PG&E NON-RESIDENTIAL CBP ELECT DA LOAD SHAPE (PG&E 1-IN-2 AUGUST SYSTEM WORST DAY)

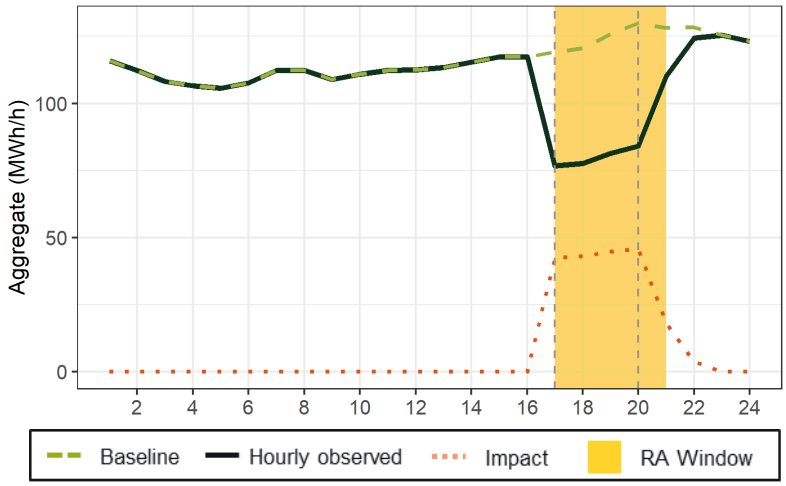


FIGURE 4-7: PG&E RESIDENTIAL CBP DA ELECT LOAD SHAPE (PG&E 1-IN-2 AUGUST SYSTEM WORST DAY)

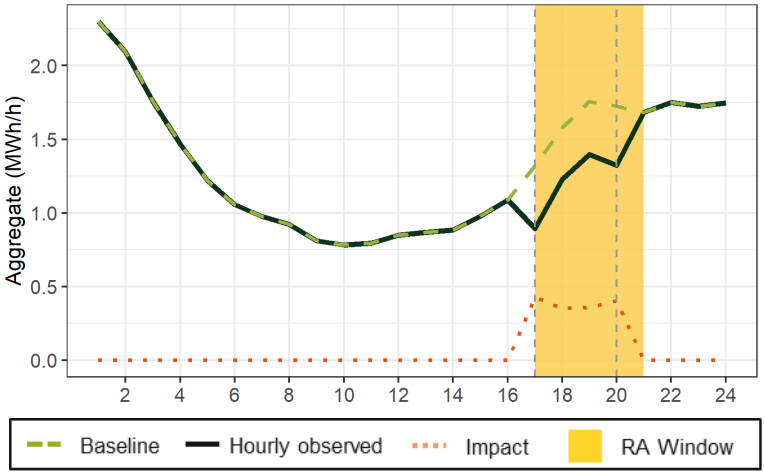


Table 4-13 and Table 4-14 present the August system worst day (peak day) average ex ante load impacts over the four-hour dispatch (HE17 – HE20) for the non-residential Elect DA and residential Elect DA in 2025. The non-residential Elect DA is forecast to provide an average hourly load reduction of 40.8 MWh/h to 41.8 MWh/h during the four-hour dispatch depending on the weather scenario. The residential Elect DA is forecast to provide an average hourly load reduction of 0.39 MWh/h across all scenarios for a four-hour dispatch.

TABLE 4-13: PG&E NON-RESIDENTIAL ELECT DA PY2025 AUGUST SYSTEM WORST DAY AVERAGE EX ANTE LOAD IMPACT OVER A 4-HOUR DISPATCH (HE17 – HE20)

Weather Year	Weather Source	Event Dispatch (HE)	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
				Ref. Load	Load Impact	Ref. Load	Load Impact		
1-in-2	PG&E	17-20	431	123.9	40.8	287.5	94.6	33%	96.8
1-in-10	PG&E	17-20	431	126.1	41.4	292.5	96.0	33%	101.3
1-in-2	CAISO	17-20	431	124.7	41.0	289.2	95.0	33%	97.9
1-in-10	CAISO	17-20	431	124.8	41.1	289.6	95.2	33%	98.9

TABLE 4-14: PG&E RESIDENTIAL ELECT DA PY2025 AUGUST SYSTEM WORST DAY AVERAGE EX ANTE LOAD IMPACT OVER A 4-HOUR DISPATCH (HE17 – HE20)

Weather Year	Weather Source	Event Dispatch (HE)	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
				Ref. Load	Load Impact	Ref. Load	Load Impact		
1-in-2	PG&E	17-20	1,336	1.60	0.39	1.19	0.29	24%	84.9
1-in-10	PG&E	17-20	1,336	1.86	0.39	1.39	0.29	21%	91.3
1-in-2	CAISO	17-20	1,336	1.75	0.39	1.31	0.29	22%	88.8
1-in-10	CAISO	17-20	1,336	1.81	0.39	1.35	0.29	21%	89.9

PG&E Hourly Tables

Table 4-15 and Table 4-16 present the hourly aggregate ex ante load impacts for PG&E 1-in-2 and 1-in-10 system worst day conditions for non-residential and residential Elect DA operating months. The highlighted yellow and green hours represent the hours of the RA window for each month, and the green highlighted hours represent the hours of the four hour event window PG&E used for their ex ante forecast. The additional light red hours represent the impacts that persist beyond the RA window. These tables also represent the slice of day impacts given the assumptions in the ex ante analysis.

For the non-residential hourly tables there is variation in forecasted load impacts from month to month with the largest impacts occurring in August and the smallest impacts occurring in May. For the residential customers there is no variation in impacts month to month (though there is variation in impact hour to hour within a month) given the assumption of weather insensitive impacts and static enrollment forecasts across the entire year.

TABLE 4-15: PY 2025 PG&E NON-RESIDENTIAL ELECT DA HOURLY TABLES (HE16 THROUGH HE24)

Hour Ending	PG&E 1-in-2 System Worst Day (MWh/h)						PG&E 1-in-10 System Worst Day (MWh/h)					
	May	June	July	Aug.	Sept.	Oct.	May	June	July	Aug.	Sept.	Oct.
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	29.4	39.6	42.4	33.9	23.4	0.0	29.6	39.9	42.9	34.7	24.0
18	22.9	29.9	40.1	42.9	35.0	23.8	23.3	30.2	40.3	43.4	35.8	24.6
19	23.9	31.6	41.6	44.7	36.3	24.0	24.4	31.8	41.7	45.5	37.3	25.1
20	24.8	32.8	42.7	45.7	36.1	23.6	25.4	33.0	42.7	46.6	37.3	24.7
21	24.9	11.2	15.6	18.0	14.2	8.6	25.4	11.2	15.6	18.3	14.7	9.1
22	8.7	1.2	2.1	3.8	2.5	1.4	9.0	1.2	2.1	3.8	2.8	1.5
23	1.1	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 4-16: PY 2025 PG&E RESIDENTIAL ELECT HOURLY IMPACT TABLES (HE16 THROUGH HE24)

Hour Ending	PG&E 1-in-2 System Worst Day (MWh/h)						PG&E 1-in-10 System Worst Day (MWh/h)					
	May	June	July	Aug.	Sept.	Oct.	May	June	July	Aug.	Sept.	Oct.
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	0.00	0.43	0.43	0.43	0.43	0.43	0.00	0.43	0.43	0.43	0.43	0.43
18	0.43	0.35	0.35	0.35	0.35	0.35	0.43	0.35	0.35	0.35	0.35	0.35
19	0.35	0.36	0.36	0.36	0.36	0.36	0.35	0.36	0.36	0.36	0.36	0.36
20	0.36	0.40	0.40	0.40	0.40	0.40	0.36	0.40	0.40	0.40	0.40	0.40
21	0.40	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00
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

PG&E Ex Ante Comparisons to Prior Years

Table 4-17 present a comparison of the current ex ante "backcast" for PY2024 (PG&E 1-in-2 August system worst day) with the PY2024 ex post average event day for non-residential customers. Given that there was no residential Elect DA participation in PY2024, only non-residential Elect DA is discussed. It should also be noted that the number of customers reflected in the current ex post average event day represents the average monthly nomination customer counts. This is done to develop comparable aggregate impacts

between the ex post and ex ante results. Per capita impacts remain unchanged however, aggregate impacts differ from average event day presented in the ex post discussion of the average event day.

The comparison shows how the non-residential Elect DA customers would have performed given a four-hour dispatch under the ex ante assumptions discussed previously. Overall, aggregate reference loads are very similar in the ex ante "backcast" with the current ex post (87.0 MWh/h in the ex ante versus [redacted] MWh/h on the average event day[16]) and the aggregate load impacts are also very similar across these two scenarios. The ex post per capita reference loads and impacts, however, differ slightly from the ex ante numbers due to event day weighting in the ex post averages. This weighting occurs because larger customers were more frequently dispatched in PY2024 than smaller customers. As a result, the proportions of customer by size in the ex ante backcast enrollment forecast for the month of August are more similar to the PY2024 nominated customers than the dispatched customers.

TABLE 4-17: PG&E CURRENT EX ANTE (PG&E 1-IN-2 AUGUST SYSTEM WORST DAY VS. CURRENT EX POST (AVERAGE EVENT)

Estimate (PY 2024)	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
Current Ex Ante	307	87.0	27.9	283.5	91.0	33%	97
Current Ex Post	**270**	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**92**

*The PY2024 customer counts differ from the PG&E Ex Post Table Generator) average event day customer counts (Appendix A). This table uses the average monthly nominated count of customers and MW capacity to make a comparison with the current ex ante analysis and to develop aggregate ex post result for this comparison. Per capita impacts remain unchanged.

Table 4-18 presents the current year and prior year ex ante forecasts for 2025 for both residential and non-residential Elect DA customers under PG&E 1-in-2 weather conditions. The non-residential aggregate ex ante MW forecasts for 2025 are very similar (both equaling roughly 40 MWh/h) during the reporting window. The PY2023 LIP required reporting impacts during the entire five hour RA window. However, PY2023's ex ante assumed 0 impacts for the fifth hour. The per capita load impacts, however, are estimated to be substantially larger in the current PY2024 forecasts than in PY2023 (94.6 kWh/h compared with 35.3 kWh/h).

The residential CBP Elect DA ex ante impact analysis is based on the analysis from prior years. However, the underlying participant forecasts and distribution of those participants differ between PY2023 and PY2024, resulting in different forecasts of the aggregate and per capita load impacts. The per capita

[16] For the purpose of drawing comparisons between the ex ante "backcast" and ex post aggregate impacts, the ex post aggregate results assume a dispatch of 270 customers (the average monthly nominated customers across all months). As a result, aggregate reference loads and impacts are calculated by multiplying the per capita impacts by the assumed dispatch of 270 customers.

impacts in PY2024 are slightly larger than PY2023 (0.3 kWh/h versus 0.2 kWh/h), but the PY2024 aggregate impacts are smaller than the PY2023 forecast (0.4 MWh/h versus 0.7 MWh/h).

TABLE 4-18: PG&E PY 2025 CURRENT EX ANTE VS. PRIOR YEAR EX ANTE (PG&E 1-IN-2 AUGUST SYSTEM WORST DAY)

Program	Estimate	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
			Ref. Load	Load Impact	Ref. Load	Load Impact		
Non-Res Elect DA	PY2023 Forecast	1,130	206.1	39.9	182.4	35.3	19%	84
	PY2024 Forecast	**431**	**123.9**	**40.8**	**287.5**	**94.6**	**33%**	**97**
Residential Elect DA	PY2023 Forecast	3,158	4.0	0.7	1.3	0.2	18%	84
	PY2024 Forecast	**1,336**	**1.6**	**0.4**	**1.2**	**0.3**	**24%**	**85**

4.5 PG&E FINDINGS

The PY2024 Load Impact analysis key findings for the PG&E CBP Elect DA products are as follows:

- Non-residential Elect DA delivery performance increased in PY2024 compared to prior years. For all events with more than one nominated customer dispatched, delivery performance exceeded 100%. In some cases, delivery performance exceeded [redacted]%, however these dispatches were for a small number of nominated participants. On the average event day (HE20), delivery performance was [redacted]%.

- On June 26th, almost all non-residential Elect DA nominated customers were dispatched for a test event. On average these customers provided [redacted] MWh/h of load reductions over two hours.

- HE20 was the most frequently dispatched event hour in PY2024. On average, non-residential Elect DA customers provided [redacted] kWh/h of load reductions during this hour.

- The non-residential Elect DA ex ante analysis finds that the non-residential customer segment is anticipated to provide an average hourly load reduction of 40.8 MWh/h to 41.8 MWh/h during a four-hour dispatch in 2025 depending on the weather scenario in the month of August.

- The residential Elect DA had no participation in PY2024. However, PG&E continues to anticipate residential participation in 2025 and beyond. The ex ante analysis, which relied on the PY2023 ex ante analysis, finds that the residential Elect DA is anticipated to provide an average hourly load reduction of 0.39 MWh/h in 2025 over a four-hour dispatch, regardless of month or weather scenario.

5 SOUTHERN CALIFORNIA EDISON

This section presents SCE's CBP participation, event days, and ex post and ex ante load Impact summaries. As discussed previously, SCE offered one CBP product in PY2024, *CBP DA*. The *CBP DA* product operates from May through October and can be dispatched between 5 p.m. and 10 p.m. in May and between 4 p.m. and 9 p.m. in the months of June through October. SCE sets the CAISO market bid price and dispatch strategy. Events are called Monday through Saturday, excluding holidays. Aggregators provide separate nominations for weekday and Saturday events. SCE's CBP is open to both residential and non-residential participation. However, there was no residential participation in PY2024.

Program Changes

There were several programs changes that occurred that impact the PY2024 load impact evaluation. Key changes include:

- Following the PY2023 event season, SCE discontinued its Day-Of CBP product (*CBP DO*).
- Starting in PY2024 the *CBP DA* product became a summer only program (May through October).
- Aligning the program event window with the RA window from 4pm to 9pm.
- At the conclusion of the PY2024 event season, the *CBP DA* product was discontinued and will be replaced by the new CBP Elect DA product.
- The new CBP Elect DA product offers three event price trigger options ($200/MWh, $400/MWh and $600/MWh). SCE launched the new product in 2025. SCE received an approval notification for CBP Elect DA on March 3rd, 2025 with an effective data of February 25th, 2025.

5.1 SCE CBP PARTICIPATION

Table 5-1 below presents the monthly distribution of enrolled customers and nominations for the SCE CBP DA product. On average, the non-residential CBP had approximately 39 enrolled customers (ranging from a low of 28 in October to a high of 46 in May) with an average nominated capacity of 1.14 MW for CBP DA.

TABLE 5-1: SCE MONTHLY NOMINATIONS

Month	Number of Aggregators	Non-Residential CBP DA		
		Enrolled Customers	Nominated Capacity (MW)	
			CBP DA	Saturday (Economic)
May	3	45	1.26	0.18
June	2	36	1.04	0.68
July	2	38	1.17	0
August	2	39	1.18	0
September	2	39	1.18	0
October	2	28	1.01	0

Table 5-2 describes the distribution of enrolled customers by industry type and customer size. Across all months, there were 45 customers enrolled in the CBP in PY2024 at any point during the program year. The majority (86%) of customers have a Retail/Stores industry type classification, consistent with the last two program years. Additionally, there was one large school customer and five other large customers.

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TABLE 5-2: SCE PY2024 CUSTOMER ENROLLMENT BY INDUSTRY TYPE AND CUSTOMER SIZE

Industry Type	Under 20 kW (Small)	20kW to 199.99 kW (Medium)	200kW or Greater (Large)	Total
Retail Stores	1	26	12	**39**
Schools	--	--	1	**1**
Other	--	--	5	**5**
Total	**1**	**26**	**18**	**45**

5.2 SCE EVENT SUMMARY

SCE's CBP DA program had 15 events with 18 distinct dispatches. Table 5-3 presents the event details for all 15 event days. Table 5-4 presents the details for partial system events by their distinct dispatch. All events were CAISO market awarded events. No CBP test events occurred in PY2024. Events lasted between two to five hours and occurred in July, August, September, and October. All resources were dispatched on each of the 15 event days and a total of 48 event hours in PY2024 across all events (12 in July, 5 in August, 17 in September, and 14 in October). Additional details on the distribution of event hours are presented in Figure 5-1.

TABLE 5-3: SCE PY2024 CBP EVENT DETAILS

Event Date (2024)	Event Type	Event Start (Prevailing Time)	Event End (Prevailing Time)	Event Duration	Dispatched Customers	Dispatched Capacity (MW)
July 10th	Market Award	5:00 PM	9:00 PM	4	38	1.17
July 11th	Market Award	4:00 PM	9:00 PM	5	38	1.17
July 25th	Market Award	6:00 PM	9:00 PM	3	38	1.17
August 5th	Market Award	4:00 PM	9:00 PM	5	39	1.18
September 3rd	Market Award	6:00 PM	8:00 PM	2	39	1.18
September 4th	Market Award	5:00 PM	9:00 PM	4	39	1.18
September 5th	Market Award	5:00 PM	9:00 PM	4	39	1.18
September 6th	Market Award	5:00 PM	9:00 PM	4	39	1.18
September 9th*	Market Award	6:00 PM	8:00 PM	3	39	1.18
October 1st	Market Award	5:00 PM	8:00 PM	3	28	1.01
October 2nd	Market Award	5:00 PM	8:00 PM	3	28	1.01
October 3rd	Market Award	6:00 PM	7:00 PM	1	28	1.01
October 4th	Market Award	6:00 PM	7:00 PM	1	28	1.01
October 7th*	Market Award	5:00 PM	9:00 PM	4	28	1.01
October 8th*	Market Award	5:00 PM	7:00 PM	2	28	1.01

*Event contains multiple dispatches on the event day. Event details are inclusive of the full range of event hours, maximum event duration, sum of dispatched customers and sum of dispatched capacity.

As depicted in Table 5-4, there were three events with multiple dispatches (differing start and/or end hours), each with two distinct dispatch windows. However, the event windows for these dispatches overlap and only differ by one hour in duration on each day. For ex post impacts and delivery performances, these event days are discussed by their distinct dispatch windows.

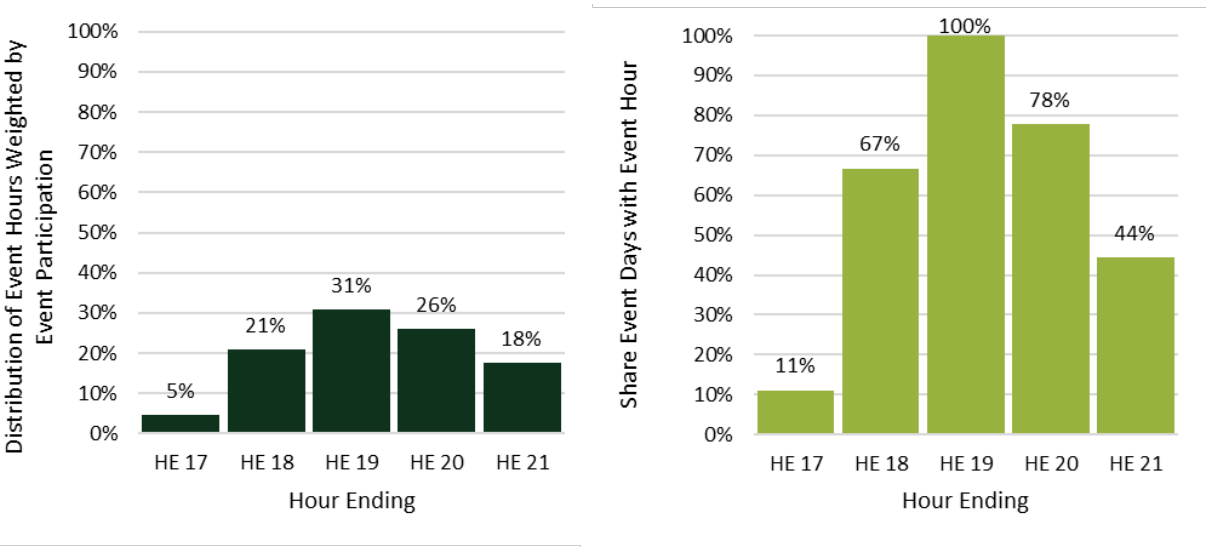
TABLE 5-4: SCE PY2024 CBP EVENT DAY DETAILS – MULTIPLE DISPATCH EVENTS

Event Date (2024)	Dispatch Number	Event Start (Prevailing Time)	Event End (Prevailing Time)	Event Duration	Dispatched Customers	Dispatched Capacity (MW)
September 9th	Dispatch 1	5:00 PM	8:00 PM	3	17	[redacted]
September 9th	Dispatch 2	6:00 PM	8:00 PM	2	22	[redacted]
October 7th	Dispatch 1	5:00 PM	8:00 PM	3	5	[redacted]
October 7th	Dispatch 2	5:00 PM	9:00 PM	4	23	[redacted]
October 8th	Dispatch 1	5:00 PM	7:00 PM	2	16	[redacted]
October 8th	Dispatch 2	6:00 PM	7:00 PM	1	12	[redacted]

Figure 5-1 presents the distribution of event hours weighted by event participation in each PY2024 event hour (left) and the share of events that contained each hour of the program event window (right). As seen, the most common event hours for enrolled customers were hours ending (HE) 18, HE19, and HE20 with

21%, 31% and 26% of hours, respectively. Additionally, all CBP DA dispatches were inclusive of HE19, with more than half of dispatches inclusive of HE18 (67%) and HE20 (78%).

FIGURE 5-1: SCE PY2024 CBP DISTRIBUTION OF EVENT HOURS BY HOUR (LEFT) AND SHARE OF EVENTS WITH A GIVEN HOUR (RIGHT)



Definition of the Average Event Day

For SCE, the average event day is inclusive of all event days and all customers who were dispatched for an event in PY2024 are represented in the load. However, event hours vary from one event to another. As a result, some hours of the average event day represent a blend of event and non-event hours. Figure 5-1 (right) above depicts the shares of event dispatches in which the hour is an event hour. This can also be interpreted as the ratio of event hours to non-event by hour ending. Given that HE19 is an event hour for all event dispatches, HE19 on the average event day is made up of 100% event hours. Comparatively, 89% of HE17 on the average event day is comprised of non-event hours. As a result, HE19 is the most informative hour of the average event day.

5.3 SCE EX POST IMPACT RESULTS

Prior to discussing the ex post impacts, it is worth presenting the average event day load shape as it provides context for the remainder of the ex post discussion. Figure 5-2 presents the average event day load shape for the average non-residential CBP DA customers. This figure presents the average estimated baseline (reference load), the actual hourly observed load, and the estimated impacts (load reductions) for the average event day. The highlighted yellow hours indicate an event hour where one or more customers were dispatched for an event. The vertical dotted line represents the hour in which all

customers are participating in a CBP event, in this case HE19. However, load reductions are still identifiable in the hours surrounding the event.

FIGURE 5-2: SCE AVERAGE EVENT DAY LOAD SHAPE NON-RESIDENTIAL CBP DA

As depicted, there are visually identifiable load impacts that, on average during HE19, are [redacted]% of the estimate baseline representing roughly [redacted] kWh/h of load impacts.

SCE Ex Post Impact Monthly Performance Summary

In PY2024 all nominated resources were dispatched for each event day. As a result, the monthly average load reductions are a good indicator of how well SCE CBP DA resources performed in each month. Table 5-5 below presents the monthly nomination, event day dispatched resources, and the average of full dispatch event hours from the ex post analysis. CBP DA customers delivered an average of [redacted] MWh/h during the average PY2024 event day, resulting in a [redacted]% delivery performance during HE19. However, the average delivery performance ranged from [redacted]% to [redacted]% depending on the month. As in prior years, results depended heavily on the performance of one school customer that had substantially larger load than the other customers in the program (who previously participated in the CBP DO program).

TABLE 5-5: SCE PY2024 AVERAGE MONTHLY SUMMARY

Month	Number of Event Days in Month	Monthly Nominations		Average Monthly Dispatch		Ex Post Full Event Hour Average Impact	
		Number of Customers	Capacity (MW)	Number of Customers	Capacity (MW)	Capacity (MW)	Delivery Perf.
May	0	46	1.26	--	--	--	--
June	0	37	1.04	--	--	--	--
July	3	38	1.17	38	1.26	[redacted]	[redacted]
August	1	39	1.18	39	1.04	[redacted]	[redacted]
September	5	39	1.18	39	1.17	[redacted]	[redacted]
October	6	28	1.01	28	1.18	[redacted]	[redacted]
Average Event Day (HE19)	--	34	1.11	34	1.18	[redacted]	[redacted]
Average Event Day (All Hours)	--	34	0.70	34	1.01	[redacted]	[redacted]

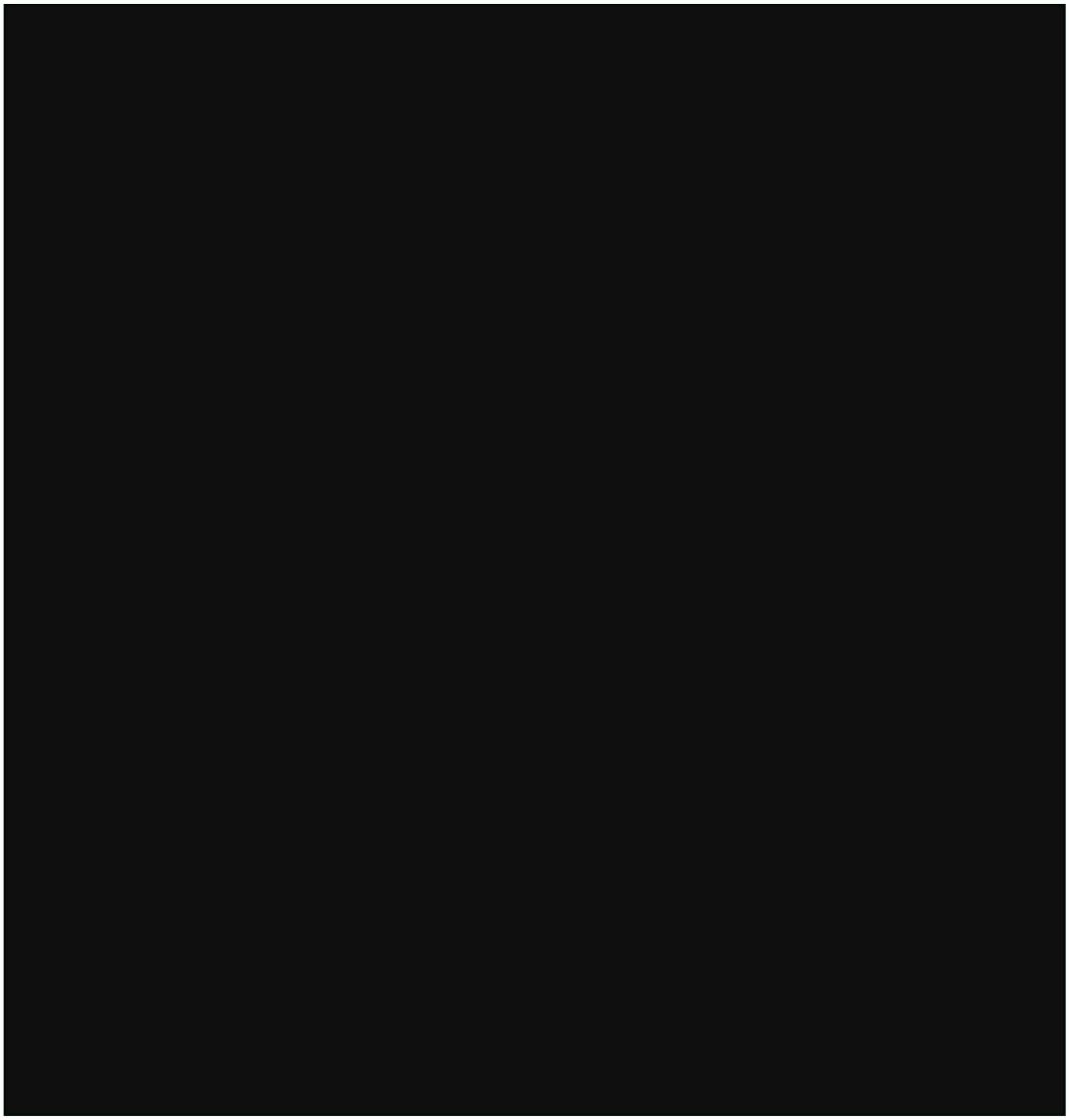
SCE Ex Post Impact Results by Event Day and Dispatch

Table 5-6 presents the average event hour load impacts for each event dispatch. As a reminder dispatches are defined by their distinct event start and end times. All nominated customers were dispatched on each event day, but for three event days there were two distinct event dispatches. This table presents the number of nominated customers called for an event, the hours in which their events occurred, the aggregate and per capita load reference loads and load impacts. Figure 5-3 further presents the nomination delivery performance associated with each event day dispatch. As seen, delivery performance was the highest for the October 4th event with [redacted]% delivery performance. However, the full range of delivery performance ranges from [redacted]% to [redacted]%. As stated previously, the ex post results are heavily influenced by one customer.

TABLE 5-6: SCE PY2024 AVERAGE LOAD IMPACT BY EVENT DAY

Event Date (2024)	Event Hours (HE)	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Dispatch Delivery Perf. (%)	Temp (F)
			Ref. Load	Load Impact	Ref. Load	Load Impact			
July 10th	18-21	38	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	84.7
July 11th	17-21	38	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	82.6
July 25th	19-21	38	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	84.4
August 5th	17-21	39	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	87.3
Sept. 3rd	19-20	39	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	83.3
Sept. 4th	18-21	39	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	89.0
Sept. 5th	18-21	39	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	93.1
Sept. 6th	18-21	39	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	92.1
Sept. 9th	18-20	17	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	89.9
Sept. 9th	19-20	22	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	94.1
Oct. 1st	18-20	28	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	80.1
Oct. 2nd	18-20	28	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	82.8
Oct. 3rd	19	28	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	77.3
Oct. 4th	19	28	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	78.5
Oct. 7th	18-20	23	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	79.7
Oct. 7th	18-21	5	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	68.4
Oct. 8th	18-19	16	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	73.6
Oct. 8th	19	12	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	88.4
Average Event	**19**	**34**	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**85.9**

FIGURE 5-3: SCE AVERAGE EVENT HOUR DELIVERY PERFORMANCE BY EVENT DAY



SCE Average Event Hour Impacts by Participant Subgroups

Table 5-7 through Table 5-9 present the average event day reference loads, impacts and percent load impacts for CBP DA participants. Additional details on how these groupings perform on specific event days are presented in the Ex Post Table Generators presented in Appendix A. For reference, there were 34 participants on average dispatched on each event day, with a maximum of 39 and minimum of 28 customers.

TABLE 5-7: SCE PY2024 AVERAGE LOAD IMPACT BY INDUSTRY TYPE

Industry Type	Avg. Number of Customers in Events	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
Retail Stores	33	3.9	0.4	117.3	11.9	10%	86.4
Schools	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	68.4

Note: The "Other" industry type customer de-enrolled in the CBP DA prior to the first event in PY2024 and had no PY2024 event participation.

TABLE 5-8: SCE PY2024 AVERAGE LOAD IMPACT BY LOCAL CAPACITY AREA

Local Capacity Area	Avg. Number of Customers in Events	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
LA Basin	29	3.1	0.4	105.5	13.1	12%	87.5
Ventura	5	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	76.8

TABLE 5-9: SCE PY2024 AVERAGE LOAD IMPACT BY SUBLAP

SubLAP	Avg. Number of Customers in Events	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
SCEC	15	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	95.8
SCEW	14	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	78.8
SCNW	5	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	76.8

SCE Comparison of Ex Post Results

This section discusses how the PY2024 ex post load impacts compared to previous years. Given that the CBP DO program no longer exists, only comparisons to CBP DA are made. As a reminder, in previous program years the CBP DA was a full year program while the PY2024 CBP DA was a summer program. As a result, we only compare it with prior summer CBP DA performance.

As seen in Table 5-10 there was a steady decrease in CBP DA participation since 2021 with the PY2023 program only nominating one customer with less than [redacted] MW. However, after the sunsetting of the CBP DO program at the end of 2023, CBP DA saw increased participation with an average monthly nomination of 38 customers and 1.1 MW.

TABLE 5-10: SCE CBP DA AVERAGE SUMMER NOMINATIONS PY2021 THROUGH PY2024

Program Year	Avg. Monthly Nominations	Avg. Nominated Customers
2021	7.6	312
2022	0.9	83
2023	[redacted]	1
2024	1.1	38

Table 5-11 presents the average event day performance across program years since 2021. Overall, CBP DA performed better in PY2024 than in PY2023 both in terms of delivery performance and percent load reductions. However, the PY2023 participant makeup (one customer), makes a direct comparison between these years less useful.

TABLE 5-11: SCE DA CURRENT VERSUS PREVIOUS EX POST, AVERAGE EVENT DAY

Program Year	Avg. Monthly Nominated Customers	Aggregate (MWh/h)			Per Capita (kWh/h)			Temp (F)
		Nom. Capacity	Load Impact	% Delivered	Reference Load	Load Impact	Percent Load (%)	
2021 (Summer)	312	7.6	4.0	53%	81.1	12.8	16%	82
2022 (Summer)	83	0.9	1.1	117%	78.8	12.8	16%	84
2023 (Summer)	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	95
2024	**34**	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**86**

Note: PY2024 average monthly nomination customer counts and capacity only include months in which events occurred.

Table 5-12 shows the PY2024 ex post average event day (HE19) impacts compared to PY2023 August System Worst Day (peak day). As seen, the number of customers forecasted (PY2023 ex ante) was slightly larger than ex post average event day in PY2024. Despite having smaller ex post participant counts, there was an increase in in per capita load impacts relative to the ex ante forecast. As a result, CBP DA customers provided load reduction and delivered 0.8 MWh/h on average, compared to the 0.5 MWh/h previously forecasted.

TABLE 5-12: SCE DA CURRENT EX POST (AVERAGE EVENT DAY) VERSUS PREVIOUS YEAR EX ANTE (SCE 1-IN-2 AUGUST SYSTEM WORST DAY)

Estimate	Avg. Number of Customers in Events	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
PY2023 Ex Ante	42	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	88
Current Ex Post	**34**	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**86**

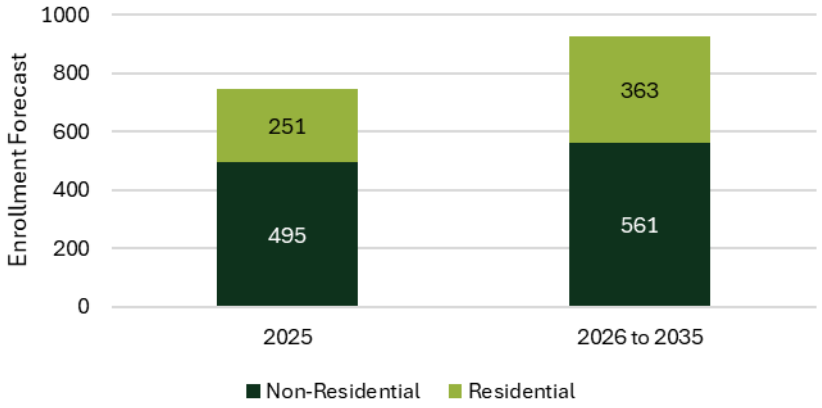
5.4 SCE EX ANTE IMPACTS

SCE's CBP DA was sunset at the end of the PY2024 CBP season. The successor CBP Elect DA product was approved on March 3, 2025, with an effective date of February 25, 2025, and has enrolled participants and received nominations. The following SCE ex ante analysis represents the first year of the SCE CBP DA Elect program. This section presents the ex ante forecasts, results, and key assumptions used to develop ex ante forecasts.

Enrollment Forecasts

SCE provided Verdant with enrollment forecasts for years 2025 through 2035 as present in Figure 5-4. SCE is forecasting both residential and non-residential participation in the new CBP Elect DA over the 10-year forecast horizon. The forecast provided to Verdant represents anticipated August enrollment (residential and non-residential) for each year. SCE is forecasting 495 non-residential and 251 residential customers to participate in CBP Elect DA in 2025. SCE is forecasting 561 non-residential and 363 residential customers from 2026 through 2035. Verdant took these customers and allocated them to SCE SubLAPs.

FIGURE 5-4: SCE PARTICIPANT FORECASTS – 2025 THROUGH 2035



SCE Ex Ante Analysis Assumptions

Given limited PY2024 program participation in the prior CBP DA product and the creation of the new CBP Elect DA program, there is no direct ex post analysis to inform the ex ante analysis. As a result, the ex ante analysis relies on a set of assumptions. These key assumptions include:

- **Non-Residential Ex Ante Impacts.** The non-residential ex ante impacts are derived from May 2025 CBP Elect DA nominations, which included more than 480 enrolled customers. Verdant scaled the nominated capacity to account for minor enrollment growth in 2025 (482 to 495 customers) and for enrollment growth that will occur after 2025 (495 to 561 customers starting in 2026). This resulted in an estimated hourly aggregate impact of 10.9 MWh/h in 2025 and 12.4 MWh/h for all years after 2025 (2026 through 2035). Given impacts are based on nominations, the impacts assume a 100% deliver performance, are the same all event hours, are weather independent, and do not consider potential degradation of impacts across longer duration events.

- **Residential Ex Ante Impacts.** There was no residential participation in SCE's PY2024 CBP DA (or in prior years) nor are there existing 2025 residential capacity nominations to inform ex ante impacts. To estimate ex ante impacts for residential customers Verdant relied on ex post impacts from a subset of ELRP A.4 participants. SCE anticipates that its residential participant population will be comprised of Self Generation Incentive Program (SGIP) battery storage participants. As a result, the ELRP A.4 ex post results provide a good source for ex ante impacts. However, there are key differences that make many of the A.4 participants unsuitable candidates for use in CBP ex ante impact estimation. These differences include ELRP's allowance of net load to estimate impacts (CBP requires delivered load) and the SGIP requirement for daily cycling of the storage system (meaning that systems are actively used for TOU arbitrage and self-consumption). As a result of these differences, CBP residential per capita impacts are expected to be smaller than ELRP A.4 average impacts.

  A subset of ELRP A.4 participants were used to develop SCE residential ex ante impacts. These participants typically had small or zero load impacts during event hours. Verdant reviewed the PY2024 ELRP ex post table generator and derived an impact of 0.22 kWh/h for residential load impacts for each ex ante event hour.[17] Given that anticipated DR curtailment is driven by weather insensitive storage systems, impacts are assumed to be weather insensitive and sustained over the full event dispatch.

- **Program and Portfolio Ex Ante Impacts.** The ex ante impact analysis assumes no dual program days for enrolled CBP Elect DA customers. As a result, program and portfolio impacts are identical.

[17] SCE residential ex ante impacts are the average of a subset of ELRP A.4 participants' ex post load impacts during HE 21 and 22 on the "average weekday (any hours)". While HE 22 was not an event hour, the load shape indicates event day load reductions during that hour and load curtailment appears misaligned with event hours.

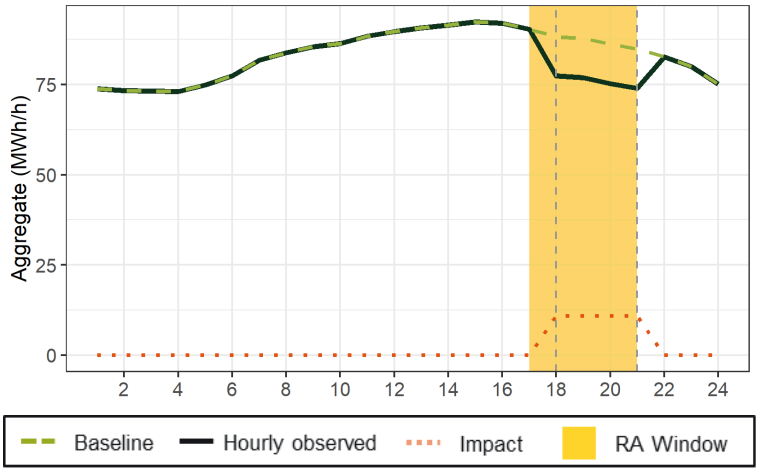
- **Four-hour Event Dispatch.** The Load Impact Protocol (LIP) 24-Hour Slice-of-Day requirements state that a four consecutive hour dispatch is required in ex ante within Availability Assessment Hours on the worst day of each month.[18] For SCE, the last 4 hours of the RA window are reported for ex ante.

- **Snapback.** The SCE ex ante analysis does not have a clear ex post analysis for which to estimate program snapback. As a result, snapback is not included in SCE's ex ante analysis. The PY2024 ex post analysis of SCE's CBP DA does have minimal snapback, however on the average event day, snapback resulted in a less than 1.5% load increase.

SCE Ex Ante Load Impact Summary

Prior to discussing the ex ante impacts, it is worth presenting the aggregate ex ante load shapes for the non-residential and residential CBP Elect DA products, as it provides context for remainder of the ex ante discussion. Figure 5-5 and Figure 5-6 present the aggregate ex ante load shape under the SCE 1-in-2 August system worst day conditions for the non-residential and residential products respectively. The figures present the aggregate estimated baseline (reference load), the estimated hourly observed load, and the estimated impacts (load reductions) for a four-hour dispatch. The highlighted yellow hours indicate the full five-hour resource adequacy (RA) window. The grey dashed lines denote the start and end of the four-hour dispatch. As seen in Figure 5-6, anticipated residential participants (or at a least a relevant portion of participants) are expected to be use their batteries for daily TOU arbitrage (as the reference load already includes apparent load reductions during the 4pm to 9pm window). However, it should be noted that the reference loads were developed using likely participants from SGIP, rather than actual participants. Conversely, non-residential reference loads (seen in Figure 5-5) represent enrolled CBP participants.

FIGURE 5-5: SCE NON-RESIDENTIAL CBP ELECT DA LOAD SHAPE (SCE 1-IN-2 AUGUST SYSTEM WORST DAY)



[18] LIP Filing Guide 5.1 at 11.

FIGURE 5-6: SCE RESIDENTIAL CBP DA ELECT LOAD SHAPE (SCE 1-IN-2 AUGUST SYSTEM WORST DAY)

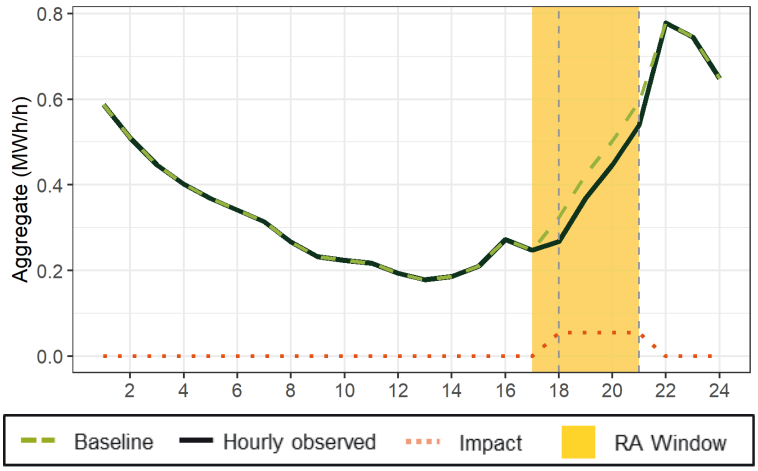


Table 5-13 and Table 5-14 present the August system worst day (peak day) average ex ante load impacts over the four-hour dispatch (HE18 – HE21) for the non-residential CBP Elect DA and residential CBP Elect DA in 2025. The non-residential CBP Elect DA is forecast to provide an average hourly load reduction of 10.9 MWh/h during the four-hour dispatch across all weather scenarios. The residential CBP Elect DA is forecast to provide an average hourly load reduction of 0.06 MWh/h across all scenarios for a four-hour dispatch.

TABLE 5-13: SCE NON-RESIDENTIAL ELECT DA PY2025 AUGUST SYSTEM WORST DAY AVERAGE EX ANTE LOAD IMPACT OVER A 4-HOUR DISPATCH (HE18 – HE21)

Weather Year	Weather Source	Event Dispatch (HE)	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
				Ref. Load	Load Impact	Ref. Load	Load Impact		
1-in-2	SCE	18-21	495	86.8	10.9	153.3	22.0	14%	89.5
1-in-10	SCE	18-21	495	88.1	10.9	156.0	22.0	14%	92.6
1-in-2	CAISO	18-21	495	85.0	10.9	149.7	22.0	15%	86.9
1-in-10	CAISO	18-21	495	88.3	10.9	156.3	22.0	14%	91.5

TABLE 5-14: SCE RESIDENTIAL ELECT DA PY2025 AUGUST SYSTEM WORST DAY AVERAGE EX ANTE LOAD IMPACT OVER A 4-HOUR DISPATCH (HE18 – HE21)

Weather Year	Weather Source	Event Dispatch (HE)	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
				Ref. Load	Load Impact	Ref. Load	Load Impact		
1-in-2	SCE	18-21	251	0.46	0.06	1.62	0.22	14%	87.6
1-in-10	SCE	18-21	251	0.51	0.06	1.81	0.22	12%	90.7
1-in-2	CAISO	18-21	251	0.42	0.06	1.44	0.22	15%	85.1
1-in-10	CAISO	18-21	251	0.49	0.06	1.75	0.22	13%	89.9

SCE Hourly Tables

Table 5-15 and Table 5-16 present the hourly aggregate ex ante load impacts for SCE 1-in-2 and 1-in-10 system worst day conditions for non-residential and residential CBP Elect DA operating months. The highlighted yellow and green hours represent the hours of the RA window for each month, where the green highlighted hours represent the hours of the four hour event window used for the SCE ex ante forecast. These tables also represent the slice of day impacts given the assumptions in the ex ante analysis. Given the ex ante analysis assumes weather incentive impacts and a constant monthly enrollment forecast, the load impacts are the same across weather scenarios and CBP operating months.

TABLE 5-15: PY 2025 SCE NON-RESIDENTIAL ELECT DA HOURLY TABLES (HE16 THROUGH HE24)

Hour Ending	SCE 1-in-2 System Worst Day (MWh/h)						SCE 1-in-10 System Worst Day (MWh/h)					
	May	June	July	Aug.	Sept.	Oct.	May	June	July	Aug.	Sept.	Oct.
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	10.9	10.9	10.9	10.9	10.9	0.0	10.9	10.9	10.9	10.9	10.9
19	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
20	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
21	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
22	10.9	0.0	0.0	0.0	0.0	0.0	10.9	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 5-16: PY 2025 SCE RESIDENTIAL ELECT HOURLY IMPACT TABLES (HE16 THROUGH HE24)

Hour Ending	SCE 1-in-2 System Worst Day (MWh/h)						SCE 1-in-10 System Worst Day (MWh/h)					
	May	June	July	Aug.	Sept.	Oct.	May	June	July	Aug.	Sept.	Oct.
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.06	0.06	0.06	0.06	0.06	0.00	0.06	0.06	0.06	0.06	0.06
19	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
20	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
21	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
22	0.06	0.00	0.00	0.00	0.00	0.00	0.06	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

SCE Ex Ante Comparisons to Prior Years

Table 5-17 presents the current year and prior year ex ante forecasts for 2025 for both residential and non-residential CBP Elect DA customers under SCE 1-in-2 weather conditions. The non-residential aggregate ex ante MW forecasts for 2025 have increased from PY2023 estimates (1.0 MWh/h in PY2023 to 10.7 MWh/h in PY2024). This is largely driven by an increase in expected program enrollment and greater per capita impacts. It should be that the PY2024 had access to actual enrollment and program

nominations, whereas the PY2023 ex ante analysis did not have any actual CBP Elect DA enrollment information to inform their forecasts.

The PY2023's ex ante analysis did not include a residential enrollment or MWh/h forecasts. As a result, no comparison can be made.

TABLE 5-17: SCE CURRENT EX ANTE VS. PRIOR YEAR EX ANTE (SCE 1-IN-2 AUGUST SYSTEM WORST DAY, 2025)

Program	Estimate	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
			Ref. Load	Load Impact	Ref. Load	Load Impact		
Non-Res Elect DA	PY2023 Forecast	84	28.5	1.0	350.7	11.6	3%	87.9
	PY2024 Forecast	495	86.8	10.9	153.3	22.0	14%	89.5
Residential Elect DA	PY2023 Forecast	--	--	--	--	--	--	--
	PY2024 Forecast	251	0.46	0.06	1.62	0.22	14%	87.6

Given the closure of the CBP DA program, the PY2024 evaluation did not conduct a 2024 ex ante backcast of SCE CBP DA program impacts. As a result, the ex ante analysis does not include a comparison of current ex ante and current ex post results.

5.5 SCE FINDINGS

The PY2024 Load Impact analysis key findings for the SCE CBP DA and CBP Elect DA products are as follows:

- There was an increase in CBP DA participation from PY2023. Additionally, the CBP DA provided (across all event days and dispatches) more load reduction than were forecasted in the PY2023 ex ante analysis.
- On average, the CBP DA provided [redacted]% of nominated capacity ([redacted] % in the HE19 of the average event day). However, delivery performance ranged from [redacted]% through [redacted]% depending on the event day dispatches.
- The PY2024 ex post load impacts are heavily on the performance of customer that comprised nearly more than half of event day loads, making most SCE results confidential.
- The CBP DA was discontinued at the end of PY2024. The CBP Elect DA is expected to have increased program participation in 2025 compared to the PY2024 CBP DA product. Due to the increased participation and changes to SCE's CBP product offerings, PY2024 ex post results are not directly applicable for estimating future program impacts. As a result, ex ante impacts rely on to-date program nominations and ELRP A.4 load ex post load impacts. The SCE CBP Elect DA ex ante analysis estimates roughly 11 MWh/h of dispatchable capacity in August of 2025, regardless of weather scenario. The

majority of this capacity is expected to come from non-residential participation (10.9 MWh/h), with a small amount of residential capacity (0.06 MWh/h)

6 SAN DIEGO GAS AND ELECTRIC

This section presents SDG&E's CBP participation, event days, and ex post and ex ante load Impact summaries. As discussed previously, SDG&E offers two CBP products that are open to non-residential customers: the *Elect DA 1-9 Hour* and the *Elect DO 1-9 Hour*. The *Elect DA 1-9 Hour* operates as the day-ahead product and the *Elect DO 1-9 Hour* as the day-of product. Both products operate from 1 p.m. to 9 p.m., have the same three price triggers ($200/MWh, $400/MWh, and $600/MWh), and operate Monday through Saturday during the months of May through October. In PY2024, SDG&E's CBP only had event participation in the *Elect DA 1-9 Hour* product with a $600/MWh option.

6.1 SDG&E CBP PARTICIPATION

Table 6-1 and Table 6-2 below present the monthly distribution of enrolled customers and nominations for the SDG&E's Elect DA and Elect DO product by price trigger option. Elect DA had its greatest participation (by number of enrolled customers) with 75 nominated customers in May. However, after May the number of nominated customers decreased to a monthly average of [redacted] customers and [redacted] MW of nominated capacity. For the Elect DO product, CBP nominations were limited to May and June, averaging a nominated capacity of [redacted] MW. No Elect DO events were called during the 2024 season.

TABLE 6-1: SDG&E MONTHLY NOMINATIONS CBP ELECT DA

Month	Number of Aggregators	DA 1pm-9pm-$200 MW		DA 1pm-9pm-$400 MW		DA 1pm-9pm-$600 MW	
		Enrolled Customers	Nominated Capacity (MW)	Enrolled Customers	Nominated Capacity (MW)	Enrolled Customers	Nominated Capacity (MW)
May	2	0	--	70	[redacted]	[redacted]	[redacted]
June	1	0	--	0	--	[redacted]	[redacted]
July	2	0	--	0	--	[redacted]	[redacted]
August	3	0	--	0	--	[redacted]	[redacted]
September	3	0	--	0	--	[redacted]	[redacted]
October	2	0	--	0	--	[redacted]	[redacted]

TABLE 6-2: SDG&E MONTHLY NOMINATIONS CBP ELECT DO

Month	Number of Aggregators	DO 1pm-9pm-$200 MW		DO 1pm-9pm-$400 MW		DO 1pm-9pm-$600 MW	
		Enrolled Customers	Nominated Capacity (MW)	Enrolled Customers	Nominated Capacity (MW)	Enrolled Customers	Nominated Capacity (MW)
May	2	[redacted]	[redacted]	49	[redacted]	0	--
June	1	0	--	[redacted]	[redacted]	0	--
July	0	0	--	0	--	0	--
August	0	0	--	0	--	0	--
September	0	0	--	0	--	0	--
October	0	0	--	0	--	0	--

Table 6-3 describes the distribution of enrolled customers by industry type and customer size for SDG&E Elect DA and DO products. The most common industry was Retail Stores with 118 customers (~89% of all CBP customers). Other industries each represent less than five percent of the total number of CBP customers. Retail Stores were also the largest segment across the medium and large size categories, representing 96% and 78% of enrolled customers, respectively. No CBP Elect DA or Elect DO customers were described as small customers (under 20 kW).

TABLE 6-3: SDG&E ELECT DA AND ELECT DO PY2024 CUSTOMER ENROLLMENT BY INDUSTRY TYPE AND CUSTOMER SIZE

Industry Type	Under 20 kW (Small)	20kW to 199.99 kW (Medium)	200kW or Greater (Large)	Total
Agriculture, Mining & Construction	--	[redacted]	[redacted]	[redacted]
Manufacturing	--	--	[redacted]	[redacted]
Retail Stores	--	76	42	**118**
Schools	--	--	[redacted]	[redacted]
Wholesale, Transport and other Utilities	--	--	[redacted]	[redacted]
Other	--	--	[redacted]	[redacted]
Total	--	**79**	**54**	**133**

6.2 SDG&E EVENT SUMMARY

Table 6-4 presents the CBP event details. The CBP Elect DA product had two events in PY2024. Each event lasted two hours, beginning at 6 pm. One event occurred in August while the other occurred in September. Both events were CAISO market awarded events with [redacted] dispatched customers and [redacted] MW of dispatched capacity. All nominated resources were dispatched during the two events and all nominated resources were enrolled in the $600/MWh DA notification option. No CBP test events occurred in PY2024.

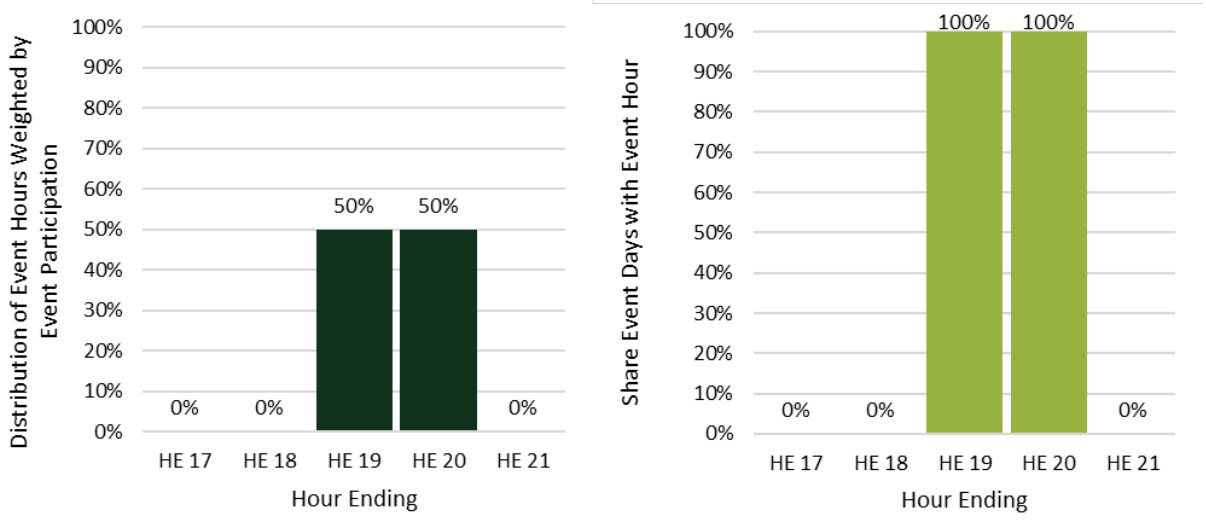
Additionally, no CBP Elect DO events occurred in PY2024. As a result, the ex post analysis does not cover CBP Elect DO.

TABLE 6-4: SDG&E PY2024 CBP ELECT DA EVENT DETAILS

Event Date (2024)	Event Type	Event Start (Prevailing Time)	Event End (Prevailing Time)	Event Duration	Dispatched Customers	Dispatched Capacity (MW)
August 27th	Market Award	6:00 PM	8:00 PM	2	[redacted]	[redacted]
September 5th	Market Award	6:00 PM	8:00 PM	2	[redacted]	[redacted]

Figure 6-1 presents the distribution of Elect DA event hours weighted by participation in each event hour (left) and the share of events that contained each hour of the program event window (right). Both events started at the beginning of hour ending (HE) 19 and lasted two hours.

FIGURE 6-1: SDG&E PY2024 CBP ELECT DA DISTRIBUTION OF EVENT HOURS BY HOUR (LEFT) AND SHARE OF EVENTS WITH A GIVEN HOUR (RIGHT)



Definition of the Average Event Day

For SDGE, the average event day is inclusive of all event days and all customers who were dispatched for an event in PY2024 are represented in the load. Additionally, the two event days are inclusive of the same dispatch window as a result, the average event day is the true average of each hour for which events occurred.

6.3 SDG&E EX POST IMPACTS

Prior to discussing the ex post impacts, it is worth presenting the average event day load shape as it provides context for the remainder of the ex post discussion. Figure 6-2 presents the average event day load shape for the average non-residential Elect DA customer. The figure presents the average estimated baseline (reference load), the actual hourly observed load, and the estimated impacts (load reductions) for the average event day. The highlighted yellow hours indicate an event hour where one or more customers were dispatched for an event. Across all event hours, the [redacted] Elect DA customers provided an average load reduction of [redacted] kWh/h (or [redacted]% of the estimated baseline).

FIGURE 6-2: SDG&E AVERAGE EVENT DAY LOAD SHAPE

[redacted]

SDG&E Ex Post Impact and Monthly Performance Summary

Table 6-5 presents the average event-hour load impacts for each event day. As seen, program performance was consistent across the two PY2024 events providing [redacted] MW (August 27th) and [redacted] MW (September 5th) of load reductions on average during event hours. Additionally, both events provided load percent reductions of [redacted]% and [redacted]% on the August 27th and September 5th event days, respectively. Despite

this, the average delivery performance for these events was [redacted] % and [redacted] % of nominated capacity (August 27th and September 5th respectively), highlighting the impact of the [redacted] on CBP DA delivery performance. In other words, there was not enough event day reference load present to provide the full capacity of load reductions.

TABLE 6-5: SDG&E CBP ELECT DA PY2024 AVERAGE EVENT HOUR LOAD IMPACT BY EVENT DAY

Event Date (2024)	Event Hours (HE)	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Dispatch Delivery Perf. (%)	Temp (F)
			Ref. Load	Load Impact	Ref. Load	Load Impact			
Aug. 27th	19-20	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	70.0
Sep. 5th	19-20	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	80.7
Average Event	**19-20**	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**75.4**

Figure 6-3 further presents the PY2024 delivery performance for each event day. As previously discussed, the delivery performance is nearly the same for both events.

FIGURE 6-3: SDG&E AVERAGE EVENT HOUR DELIVERY PERFORMANCE BY EVENT DAY

Table 6-6 presents the monthly performance summary. Given that only one event occurred in each month, the delivery performance metrics for each August and September event also represent the average monthly delivery performance in August and September for the CBP Elect DA. There were no CBP Elect DO events in PY2024, as a result there are no delivery performance metrics for Elect DO.

TABLE 6-6: SDG&E CBP ELECT DA PY2024 MONTHLY SUMMARY

Month	Number of Event Days in Month	Monthly Nominations		Average Monthly Dispatch		Ex Post Event Hour Average Impact	
		Number of Customers	Capacity (MW)	Number of Customers	Capacity (MW)	Capacity (MW)	Delivery Perf.
May	0	75	13.7	--	--	--	--
June	0	[redacted]	[redacted]	--	--	--	--
July	0	[redacted]	[redacted]	--	--	--	--
August	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
September	1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
October	0	[redacted]	[redacted]	--	--	--	--
Average Event Day	--	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

SDG&E Average Event Hour Impacts by Industry Type

Table 6-7 presents the average load impacts by industry type. As seen, the majority of PY2024 load impacts come from two industry types, [redacted] and [redacted]. Each of the groupings has two customers that provide [redacted] % of the aggregate impacts ([redacted] MW of [redacted] MW). Additionally, these two industry types provided percent load reductions of [redacted] % and [redacted] % respectively.

TABLE 6-7: SDG&E PY2024 AVERAGE LOAD IMPACT BY INDUSTRY TYPE

Industry Type	Avg. Number of Customers in Events	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
Agriculture, Mining and Construction	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	74.3
Manufacturing	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	74.3
Retail Stores	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	76.8
Wholesale, Transport and other Utilities	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	74.3
Other	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	74.5

SDG&E Comparison of Ex Post Results

This section discusses how the PY2024 ex post load impacts compared to previous years. Table 6-8 presents the average monthly Nominations (MW) and average number of nominated customers for both CBP Elect DA and CBP Elect DO programs. Relative to PY2023, the CBP Elect DA program had increased participation in terms of average monthly nominated capacity, however, there were fewer nominated customers on a monthly average. For CBP Elect DO, there has been a steady decrease in participation

since 2021. Additionally, there was no PY2024 participation in the CBP Elect DO after the month of June and no Elect DO events occurred in PY2024. As a result, the Elect DO product is not discussed further in the comparison of ex post results with prior years.

TABLE 6-8: SDG&E CBP DA AND DO AVERAGE SUMMER NOMINATIONS PY2021 THROUGH PY2024

	CBP Elect DA		CBP Elect DO	
Program Year	Avg. Monthly Nominations	Avg. Nominated Customers	Avg. Monthly Nominations	Avg. Nominated Customers
2021	1.1	46	3.4	133
2022	[redacted]	3	2.1	63
2023	2.0	84	1.8	51
2024	[redacted]	22	[redacted]	[redacted]

Table 6-9 presents the average event day performance across program years since 2021. Overall, CBP Elect DA provided more load reduction in PY2024 than in PY2023 by all metrics (average MW impact, per capita load impact and percent load reductions). However, the CBP Elect DA had a lower delivery performance in PY2024 than in PY2023 ([redacted] % versus 42% respectively). Much on this reduction was due to changes to the nominated customers makeup between these program years (new customer additions and exiting of existing customers). Again, the delivery performance seen in PY2024 is highly impacted by the [redacted] which resulted in abnormally low loads during the two PY2024 event days.

TABLE 6-9: SDG&E ELECT DA CURRENT VS. PREVIOUS EX POST, AVERAGE EVENT DAY

		Aggregate (MWh/h)			Per Capita (kWh/h)			
Program Year	Avg. Monthly Nominated Customers	Nom. Capacity	Load Impact	Delivery Perf.	Reference Load	Load Impact	Percent Load (%)	Temp (F)
2021	46	1.1	0.3	25%	110.9	5.8	5%	75
2022	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	83
2023	84	2.0	0.8	42%	97.7	10	10%	73
2024	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**75**

Note: PY2024 average monthly nomination counts and nominated capacity include only months in which events occurred.

Table 6-10 shows the PY2024 ex post average event day impacts compared to PY2023 August System Worst Day (peak day) forecast for 2024. As seen, the PY2024 Elect DA had less program enrollment than previously anticipated in the PY2023 ex ante forecasts. However, the PY2024 enrolled CBP Elect DA customers provided more MW of load reductions ([redacted] MW) than forecasted (0.8 MW) on average.

TABLE 6-10: SDG&E ELECT DA CURRENT EX POST (AVERAGE EVENT DAY) VS. PREVIOUS YEAR EX ANTE (SDG&E 1-IN-2 AUGUST SYSTEM WORST DAY)

Estimate	Avg. Number of Customers in Events	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
PY2023 Ex Ante	104	8.7	0.8	81.4	7.7	9%	83
Current Ex Post	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**75**

6.4 SDG&E EX ANTE IMPACTS

This section presents the ex ante forecasts, results, and key assumptions used to develop ex ante forecasts.

Enrollment Forecasts

SDG&E will continue to offer the Elect DA and Elect DO programs the three price trigger options ($200/MWh, $400/MWh, or $600/MWh).[19] However, at the end of PY2024, only the CBP Elect DA $600/MWh option had any participation from aggregators. As a result, their ex ante participant forecasts reflects how the CBP products are currently subscribed. At the end of PY2024, there were [redacted] customers enrolled in the CBP. SDG&E is assuming a 20% increase in participation from October 2024 enrollments that will remain static for all months and years across the ex ante forecast period. This results in a participant forecast of [redacted] across all years and months for Elect DA $600/MWh option, as presented in Figure 6-4. SDG&E is forecasting zero enrollment in all other CBP DA products.

FIGURE 6-4: SDG&E PARTICIPANT FORECASTS BY MONTH – 2025 THROUGH 2035

[19] SDG&E also has a residential CBP pilot not covered by this evaluation.

SDG&E Ex Ante Assumptions

The following assumptions were used to develop ex ante load impact estimates.

Weather Sensitive Impacts: A key component of ex ante analysis is developing weather normalized impacts for various weather scenarios. The PY2024 event season only contained two events for Elect DA customers. Given that the ex post and ex ante analysis rely on hourly customer-specific models, each customer only has two data point in each hour for a regression model to determine the relationship between impacts and temperature. Verdant determined that there was not enough information to reliably produce weather normalized load impacts. Additionally historical impacts were not appropriate given the changes in customer makeup between PY2023 and PY2024.

As a result, the ex ante analysis applied the percent load reductions from ex post results to estimate ex ante load impacts. Since reference loads are weather sensitive for weather sensitive customers, and impacts are derived from a percent load reductions, the ex ante load impacts are implicitly weather sensitive and vary across weather scenarios.

In determining the appropriate percent load reductions to use, Verdant examined the ex post load impacts for the remaining active CBP customers used in the ex ante analysis, excluding [redacted]. The ex post impacts (and delivery performance) are presented in Table 6-11. Across each ex post event day, percent load reductions were static at [redacted] %. As a result, aggregate ex ante impacts were assumed to provide load reductions of [redacted]%. Separate percent load reductions were developed for different subgrouping (for example customer size), however, the aggregate load reductions always equated to the overall load reduction of [redacted] %, excluding [redacted].

TABLE 6-11: SDG&E CBP ELECT DA PY2024 AVERAGE EVENT HOUR LOAD IMPACT BY EVENT DAY

Event Date (2024)	Event Hours (HE)	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Dispatch Delivery Perf. (%)	Temp (F)
			Ref. Load	Load Impact	Ref. Load	Load Impact			
Aug. 27th	19-20	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	69.6
Sep. 5th	19-20	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	79.1
Average Event	**19-20**	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	75.4

[redacted]

[redacted].

- [redacted]
- [redacted][20]

Delivery Performance: The overall nomination delivery performance seen in PY2024 was [redacted] % across the average day hours. However, this delivery performance was primarily attributed to [redacted]. [redacted] nominated capacity comprised [redacted] MW of the [redacted] MW nominated in August and September of PY2024 ([redacted] % of nominated capacity). Additionally, the PY2024 CBP Elect DA had new participants enter the program that make historical comparisons of delivery performance to the Elect DA program inappropriate for the ex ante analysis. As a result, Verdant did not cap load impacts based on historic dispatch delivery performances as done for prior evaluations. However, Verdant did validate that load impacts did not exceed the anticipated CBP Elect DA program nominations.

Four-hour Event Dispatch. The Load Impact Protocol (LIP) 24-Hour Slice-of-Day requirements state that a four consecutive hour dispatch is required in ex ante within Availability Assessment Hours on the worst day of each month[21]. As a result, the ex ante analysis uses a four-hour dispatch in the last four hours of the RA window. The last four hours were selected because there have only been Elect DA program event dispatches in the last four hours of RA window within the last three program years (PY2022-PY2024).

Snapback. The ex post analysis found no evidence of snapback after the end of the events. As a result, no snapback is included in the ex ante load shape for Elect DA participants.

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20 [redacted]

21 LIP Filing Guide 5.1 at 11.

Degradation Rates. Prior CBP evaluations developed degradation rates intended to capture how CBP participants maintain their load reductions through longer duration events. In PY2024, however, each event lasted only two hours, reducing the likelihood of degradation. Additionally, half of the customers included in the ex ante analysis were new to the program in PY2024. As a result, there are no historic four hour duration events that meaningfully represent the current CBP Elect DA customer base.

Verdant reviewed the PY2022 ELRP event day load shapes for [redacted] and found that this customer was capable of providing a sustained four-hour dispatch. As a result, Verdant did not apply degradation rates to [redacted]. However, Verdant applied degradation rates in the last two hours of the RA window for all other customers. The degradation rates used were developed for the PY2023 ex ante analysis of the Elect DO product. PY 2023 Elect DO was selected to represent Elect DA participation because the PY2023 Elect DA degradation rates for the last two hours of the RA window were overly aggressive for a group of customers that did not have any degradation of impacts in the two-hour events. In the third hour of dispatch Verdant applied a degradation rate of 77% and 79% in the fourth hour of dispatch.

Program and Portfolio Ex Ante Impacts. While there were dually enrolled CBP customers in PY2024, there were no dual-program event days for enrolled CBP customers. With collaboration from SDG&E, it was decided that program and portfolio ex ante impact forecasts would be the same.

SDG&E Ex Ante Load Impact Summary

Prior to discussing the ex ante impacts, it is worth presenting the aggregate ex ante load shape for Elect DA as it provides context for remainder of the ex ante discussion, Figure 6-5 presents the aggregate ex ante load shape under the SDG&E 1-in-2 August system worst day conditions. The figure presents the aggregate estimated baseline (reference load), the estimated hourly observed load, and the estimated impacts (load reductions) for a four-hour dispatch. The highlighted yellow hours indicate the full five-hour resource adequacy (RA) window. The grey dashed lines denote the start and end of the four-hour dispatch.

FIGURE 6-5: SDG&E CBP ELECT DA LOAD SHAPE (SDG&E 1-IN-2 AUGUST SYSTEM WORST DAY)

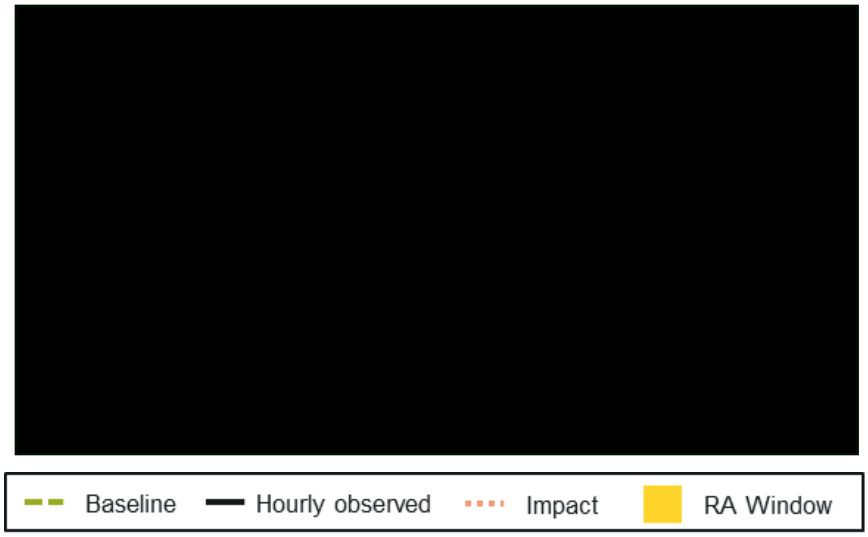

Table 6-12 presents the August system worst day (peak day) average ex ante load impacts over the four-hour dispatch (HE18 – HE21) for PY2025. Across all dispatch hours, the ex ante analysis estimates that the program provides [redacted] to [redacted] MW of load impact per hour depending on the weather scenario.

TABLE 6-12: SDG&E ELECT DA PY2025 AUGUST SYSTEM WORST DAY AVERAGE EX ANTE LOAD IMPACT OVER A 4-HOUR DISPATCH (HE18 – HE21)

Weather Year	Weather Source	Event Dispatch (HE)	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
				Ref. Load	Load Impact	Ref. Load	Load Impact		
1-in-2	SDG&E	18-21	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	77.6
1-in-10	SDG&E	18-21	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	81.0
1-in-2	CAISO	18-21	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	78.8
1-in-10	CAISO	18-21	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	84.6

SDG&E Hourly Tables

Table 6-13 presents the hourly aggregate ex ante load impacts for SDG&E 1-in-2 and 1-in-10 system worst day conditions for program operating months. Since the ex ante enrollment is static at [redacted] customers from 2025 through 2035, these hourly tables present the hourly ex ante load reductions by month across all years in the ex ante forecast (2025 through 2035). The highlighted hours represent the hours of the RA window for each month (light yellow and green) with the green highlighted hours representing the four hour event window used for SDG&E's four-hour dispatch. These tables also represent the slice of day

impacts given the assumption in the ex ante analysis. As seen, there is little variation in forecasted load impacts from month to month, with slightly larger impacts in the second hour of the event (third hour of the RA window) in all months.

TABLE 6-13: SDG&E PY 2025 CBP ELECT DA HOURLY TABLES (HE16 THROUGH HE24)

Hour Ending	SDG&E 1-in-2 System Worst Day						SDG&E 1-in-10 System Worst Day					
	May	June	July	Aug.	Sept.	Oct.	May	June	July	Aug.	Sept.	Oct.
16	[redacted]											
17	[redacted]											
18	[redacted]											
19	[redacted]											
20	[redacted]											
21	[redacted]											
22	[redacted]											
23	[redacted]											
24	[redacted]											

SDG&E Ex Ante Comparisons to Prior Years

Table 6-14 presents a comparison of the current ex ante "backcast" for PY2024 (SDG&E 1-in-2 August system worst day) with the PY2024 average event day. The comparison shows how the [redacted] Elect DA customers would have performed given a four-hour dispatch, under the assumptions discussed previously. The aggregate reference loads are larger in the ex ante "backcast" ([redacted] MW in the ex ante versus [redacted] MW on the average event day), this is primarily due to the assumption that [redacted] would not have occurred. As a result, the aggregate load impact is nearly [redacted] larger in the ex ante estimate for PY2024 than what was seen on the average event day.

TABLE 6-14: SDG&E CURRENT EX ANTE (SDG&E 1-IN-2 AUGUST SYSTEM WORST DAY VS. CURRENT EX POST AVERAGE EVENT)

Estimate (PY 2024)	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
Current Ex Ante	[redacted]						78.8
Current Ex Post							**75.4**

Table 6-15 presents the current year and prior year ex ante forecasts for the year 2025. Differences in the ex ante forecasts for 2025 are largely driven by the changes in participation from PY2023 and PY2024. There are substantially fewer customers in the updated forecast (PY2024), but the aggregate and per capita impacts are larger than previously forecasted.

TABLE 6-15: SDG&E PY 2025 CURRENT EX ANTE VS. PRIOR YEAR EX ANTE (SDG&E 1-IN-2 AUGUST SYSTEM WORST DAY)

Estimate	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
		Ref. Load	Load Impact	Ref. Load	Load Impact		
PY2023 Forecast	107	8.7	0.8	81.4	7.7	9%	83
PY2024 Forecast	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	78

6.5 SDG&E FINDINGS

The PY2024 evaluation identified the following key findings for SDG&E's CBP:

- There was a decrease in CBP Elect DA and CBP Elect DO participation in PY2023. As of October 2024, only the $600/MWh option has participation with [redacted] nominated customers. No other CBP product has forecasted ex ante participation in 2025. The ex ante enrollment forecasts projects [redacted] customer in the CBP Elect DA $600/MW option for all month and years included in the forecast.

- There were two CBP Elect DA events in PY2024 with dispatch delivery performances of [redacted]% (August 27th) and [redacted] % (September 5th). However, this is largely the result of a [redacted] which prevented it from contributing its [redacted] MW of nominated capacity to event dispatch. The two CBP DA events provided an average event-hour load reduction of [redacted] MWh/h on August 27th and [redacted] MWh/h on September 5th.

- The PY2025 ex ante forecast estimates that the CBP DA will provide [redacted] MWh/h of load reduction of a four-hour dispatch under SDG&E August 1-in-2 weather conditions. The majority of these load impacts come from [redacted].

7 PY2024 STATEWIDE RESULTS SUMMARY

This section provides the statewide summary of the PY2024 CBP ex post performance results, ex ante forecasts, and key findings associated with the PY2024 CBP. Results broken out by IOU are provided in the prior sections.

7.1 STATEWIDE EX POST RESULTS

For all IOU's, the PY2024 CBP events represent non-residential, Day-Ahead (DA) CBP participation. PG&E's residential Elect DA was unsubscribed in PY2024, SCE's CBP Day-Of (DO) ended at the end of PY2023, and SDG&E's non-residential Elect DO did not have any event dispatches before it became unsubscribed.

Table 7-1 presents the ex post results for each IOU's average event day. For PG&E this includes all events where HE20 was an event hour (80% of event days, comprising 99% of participant event hours across all event days) and all event days for SCE and SDG&E. For each IOU, the impacts represent the average event impact in the hour of interest.[22] For PG&E the hour of interest is HE20 and for SCE the hour of interest is HE19. For SDG&E, all events include the same event hours, as a result the hours of interest are inclusive of all event hours. The number of customers presented in Table 7-1 is the average number of customers nominated across all events.

TABLE 7-1: STATEWIDE EX POST RESULTS SUMMARY – AVERAGE EVENT DAY

IOU	Program	Num. of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Dispatch Delivery Perf. (%)
			Ref. Load	Load Impact	Ref. Load	Load Impact		
PG&E	Non-Residential Elect DA	69	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Residential Elect DA	--	--	--	--	--	--	--
SCE	CBP DA	34	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
SDG&E	Non-Residential Elect DA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Non-Residential Elect DO	--	--	--	--	--	--	--

Note: Each IOU's overall ex post results are confidential due to customer counts being less than 15 or one customer making up 15% or more of event day load or impacts.

For each IOU, the following ex post results were identified:

[22] The hour of interest is the hour that was most frequently an event hour for a given IOU. For PG&E the hour of interest is HE20, for SCE the hour of interest in HE19, for SDG&E the hours of interest are HE19 and HE20 combined.

PG&E. On average, PG&E's non-residential Elect DA participants provided per capita load reduction of [redacted]kWh/h, representing a delivery performance of [redacted]% of nominated capacity during the hour of interest (HE20). This was a marked improvement in delivery performance from PY2023, which was 86% on average.

SCE. On average, SCE's CBP DA dispatched 34 customers and provided [redacted] kWh/h per customer resulting in an average delivery performance of [redacted]% in the hour of interest (HE19). Impacts are largely driven by one large school customer that previously participated in SCE's DO CBP program (which sunset at the end of PY2023). PY2024 represents the last year of the CBP DA, which will be replaced by the CBP Elect DA starting in PY2025.

SDG&E. SDG&E's CBP ex post performance was substantially influenced by one customer. This customer [redacted] events in PY2024. As a result, the majority of nominated capacity was not available for curtailment leading to an average dispatch delivery performance of [redacted]%. However, load reductions still represented [redacted]% of the estimated baseline with an average per capita load reduction of [redacted]kWh/h.

Table 7-2 presents the PY2024 average monthly nomination **during months with events** (customer counts and capacity), average dispatch customer counts and capacity (MW), and the average event day ex post load impacts and delivery performance. Delivery performance is a key metric for identifying how well resources perform relative to their stated level of available load reductions (nominations). A delivery performance of 100% indicates that dispatched participants provided exactly their stated level of load curtailment, while a delivery performance of greater than or less than 100% indicated that dispatched participants provided more or less load reductions (respectively) than the resources' stated nominations.

TABLE 7-2: STATEWIDE DELIVERY PERFORMANCE

		Average Nominations		Average Dispatch		Ex Post Average Impact	
IOU	Program	Number of Customers	Capacity (MW)	Number of Customers	Capacity (MW)	Capacity (MW)	Dispatch Delivery Perf.
PG&E	Non-Residential Elect DA	283	21.6	69	5.1	[redacted]	[redacted]
	Residential Elect DA	--	--	--	--	--	--
SCE	CBP DA	34	1.1	34	1.1	[redacted]	[redacted]
SDG&E	Non-Residential Elect DA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Non-Residential Elect DO	--	--	--	--	--	--

From Table 7-2 we find the following result for each IOU:

PG&E. PG&E had an average nomination of 283 customers representing 21.6 MW of capacity in PY2024 in months where events occurred (June, July and August). The average dispatch in PY2024 included 69 customers representing 5.1 MW of nominated capacity. The average dispatched customers and capacity were lower than the monthly nominations as a result of the necessity for CBP resources (and CAISO awards) rather than the availability of CBP resources. Overall, non-residential CBP Elect DA resources overperformed relative to their nominated capacity, providing an average dispatch delivery performance of [redacted]% ([redacted]MWh/h impact).

SCE. SCE had an average monthly nomination of 34 customers representing 1.1 MW of capacity in PY2024 in months where events occurred. The average dispatch in PY2024 included all nominated customers. Overall, the average PY2024 delivery performance was [redacted]% during HE19.

SDG&E. SDG&E had [redacted] MW of nominated capacity during months with event participation, the majority ([redacted]%) of which came from one customer. As stated previously, this [redacted] that is not typical for SDG&E's Elect DA program. Overall, the SDG&E Elect DA program had a dispatch delivery performance of [redacted]%.

7.2 STATEWIDE EX ANTE RESULTS

Each IOU provided enrollment forecasts for future program years. Across all years in the ex ante forecast, PG&E anticipates 431 non-residential customers and 1,336 residential CBP Elect DA customers in the month of August. Additionally, SDG&E anticipates [redacted] customers to participate in the non-residential Elect DA and zero participation in the CBP DA Elect across all years and months in the ex ante forecast. SCE's ex ante forecast includes 495 non-residential and 291 residential customers in 2025 and 561 non-residential and 363 residential customers on all subsequent years.

There were several ex ante assumptions that influenced the ex ante results for PG&E, SCE and SDG&E. These are discussed in detail in each IOU's ex ante section presented later in this report and in the ex ante methodology section (Section 3.3.1). However, there are several high level forecast assumptions worth including here. These include:

- **Program and Portfolio Ex Ante Impacts.** While there were dually enrolled CBP customers for PG&E and SDG&E in PY2024, there were no dual-program event days for enrolled CBP customers. With collaboration from PG&E and SDG&E, it was decided that program and portfolio ex ante impacts would assume no dual-program event days for CBP customers. Additionally, the SCE Elect DA ex ante analysis assumes no dual program days. As a result, program and portfolio ex ante impacts are the same for the three IOUs.

- **Four-hour Event Dispatch.** The load Impact Protocol (LIP) 24-Hour Slice-of-Day requires a four consecutive hour dispatch is required for ex ante impacts within Availability Assessment Hours on the worst day of each month. As a result, the ex ante analysis assumes a four-hour dispatch for each IOU. PG&E requested that the first four hours of the five hour RA window be selected to represent the four-hour event dispatch. SCE and SDG&E requested the last four hours of the RA window to represent the four-hour dispatch. For SDG&E this represents the hours in which all SDG&E CBP Elect DA events have occurred within the last three program years (PY2022 to PY2024).

- **PG&E Residential Ex Ante.** In PY2024, there was no residential participation in PG&E's CBP Elect DA. As a result, there is no ex post analysis to inform the ex ante analysis for these customers. Verdant used the PY2023 residential ex ante analysis to inform the PY2024 ex ante residential impacts.

- **SCE Residential Ex Ante.** In PY2024, there was no residential participation in SCE's CBP DA, nor were they included in a recent evaluation years' ex ante analyses. As a result, there is no ex post analysis to inform the ex ante analysis for these customers. Given that SCE anticipates residential participation from Self-Generation Incentive Program participants, ex ante reference loads were developed from AMI data of SGIP participants that are likely to participate in CBP. Ex ante impacts were developed using a subset of ELRP A.4 participants' PY2024 ex post load impacts.

Table 7-3 presents the PY2025 statewide ex ante aggregate (MWh/h) and per capita (kWh/h) load impacts under the August Utility 1-in-2 worst day scenario. Given that PG&E's and SDG&E's enrollment forecasts for August do not change from year to year, the August forecasts are the same for PY2025 through PY2035 for these IOUs.

TABLE 7-3: STATEWIDE 2025 UTILITY 1-IN-2 AUGUST SYSTEM WORST DAY AVERAGE EX ANTE LOAD IMPACT OVER A 4-HOUR DISPATCH

IOU	Program	Number of Customers	Aggregate (MWh/h)		Per Capita (kWh/h)		Percent Load Reduction (%)	Temp (F)
			Ref. Load	Load Impact	Ref. Load	Load Impact		
PG&E	Non-Residential Elect DA	431	123.9	40.8	287.5	94.6	33%	96.8
PG&E	Residential Elect DA	1,336	1.6	0.4	1.2	0.3	24%	84.9
SCE	Non-Residential Elect DA	495	86.8	10.9	153.3	22.0	14%	89.5
SCE	Residential Elect DA	251	0.46	0.06	1.62	0.22	14%	87.6
SDG&E	Non-Residential Elect DA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	77.6
SDG&E	Non-Residential Elect DO	0	--	--	--	--	--	--

Table 7-4 presents the hourly aggregate ex ante load impacts for PG&E, SCE and SDG&E 1-in-2 system worst day conditions for CBP operating months in 2025. The highlighted yellow and green hours represent the hours of the RA window for each month, and the green highlighted hours represent the hours of the

four-hour event dispatch. These tables also represent the slice of day impacts (MWh/h) given the assumptions in the ex ante analysis.

TABLE 7-4: STATEWIDE 2025 CBP ELECT HOURLY TABLES (HE16 THROUGH HE24, MWH/H)

IOU	Program	Month	Hour Ending								
			16	17	18	19	20	21	22	23	24
PG&E	Non-Residential DA	May	0.0	0.0	22.9	23.9	24.8	24.9	8.7	1.1	0.0
		June	0.0	29.4	29.9	31.6	32.8	11.2	1.2	0.0	0.0
		July	0.0	39.6	40.1	41.6	42.7	15.6	2.1	0.0	0.0
		Aug.	0.0	42.4	42.9	44.7	45.7	18.0	3.8	0.0	0.0
		Sept.	0.0	33.9	35.0	36.3	36.1	14.2	2.5	0.0	0.0
		Oct.	0.0	23.4	23.8	24	23.6	8.6	1.4	0.0	0.0
	Residential DA	May	0.0	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0
		June	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0	0.0
		July	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0	0.0
		Aug.	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0	0.0
		Sept.	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0	0.0
		Oct.	0.0	0.43	0.35	0.36	0.4	0.0	0.0	0.0	0.0
SCE	Non-Residential DA	May	0.0	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0
		June	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		July	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		Aug.	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		Sept.	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		Oct.	0.0	0.0	10.9	10.9	10.9	10.9	0.0	0.0	0.0
	Residential DA	May	0.0	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0
		June	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0	0.0
		July	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0	0.0
		Aug.	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0	0.0
		Sept.	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0	0.0
		Oct.	0.0	0.0	0.06	0.06	0.06	0.06	0.0	0.0	0.0
SDG&E	Non-Residential DA	May	[redacted]								
		June	[redacted]								
		July	[redacted]								
		Aug.	[redacted]								
		Sept.	[redacted]								
		Oct.	[redacted]								

Note: PG&E non-residential DA impacts are anticipated to persist beyond the four-hour dispatch.

7.2.1 Findings by IOU

The PY2024 Load Impact analysis key findings for each IOU are as follows:

PG&E Findings

- Non-residential Elect DA delivery performance increased in PY2024 compared to prior years. For all events with more than one nominated customer dispatched, delivery performance exceeded 100%. In some cases, delivery performance exceeded [redacted]%, however these dispatches were for a small number of nominated participants. On the average event day (HE20), delivery performance was [redacted]%.

- On June 26th, almost all non-residential Elect DA nominated customers were dispatched for a test event. On average these customers provided [redacted] MWh/h of load reductions over two hours.

- HE20 was the most frequently dispatched event hour in PY2024. On average, non-residential Elect DA customers provided [redacted] kWh/h of load reductions during this hour.

- The non-residential Elect DA ex ante analysis finds that the non-residential customer segment is anticipated to provide an average hourly load reduction of 40.8 MWh/h to 41.8 MWh/h during a four-hour dispatch in 2025 depending on the weather scenario in the month of August.

- The residential Elect DA had no participation in PY2024. However, PG&E continues to anticipate residential participation in 2025 and beyond. The ex ante analysis, which relied on the PY2023 ex ante analysis, finds that the residential Elect DA is anticipated to provide an average hourly load reduction of 0.39 MWh/h in 2025 over a four-hour dispatch, regardless of month or weather scenario.

SCE Findings

- There was an increase in CBP DA participation from PY2023, likely attributed to the discontinuation of the CBP DO at the end of PY2023. Additionally, the CBP DA provided (across all event days and dispatches) more load reduction than were forecasted in the PY2023 ex ante analysis.

- On average, the CBP DA provided [redacted]% of nominated capacity ([redacted]% in the HE19 of the average event day). However, delivery performance ranged from [redacted]% through [redacted]% depending on the event day dispatches.

- The PY2024 ex post load impacts are heavily on the performance of one customer that comprised more than half of event day loads, making most SCE results confidential.

- The CBP DA was discontinued at the end of PY2024 and the successor CBP Elect DA program begins operating in 2025. The CBP Elect DA is expected to have increased program participation in 2025 compared to the PY2024 CBP DA product. Due to the increased participation and changes to SCE's CBP product offerings, PY2024 ex post results are not directly applicable for estimating future program impacts. As a result, ex ante impacts rely on to-date program nominations and a subset of participants' ELRP A.4 load ex post load impacts. The SCE CBP Elect DA ex ante analysis estimates roughly 11 MWh/h of dispatchable capacity in August of 2025, regardless of the weather scenario. The majority of this capacity is expected to come from non-residential participation (10.9 MWh/h), with a small amount of residential capacity (0.06 MWh/h).

SDG&E Findings

- There was a decrease in CBP Elect DA and CBP Elect DO participation in PY2023. As of October 2024, only the $600/MWh option has participation with [redacted] nominated customers. No other CBP product has forecasted ex ante participation in 2025. The ex ante enrollment forecasts projects [redacted] customer in the CBP Elect DA $600/MW option for all month and years included in the forecast.

- There were two CBP Elect DA events in PY2024 with dispatch delivery performances of [redacted]% (August 27th) and [redacted]% (September 5th). However, this is largely the result of a [redacted] which prevented it from contributing its [redacted] MW of nominated capacity to event dispatch. The two CBP DA events provided an average event-hour load reduction of [redacted] MWh/h on August 27th and [redacted] MWh/h on September 5th.

- The PY2025 ex ante forecast estimates that the CBP DA will provide [redacted] MWh/h of load reduction of a four-hour dispatch under SDG&E August 1-in-2 weather conditions. The majority of these load impacts come from [redacted].

Recommendations

The evaluation team's recommendations for the CBP and future evaluations are as follows:

- **Continued performance monitoring.** Each IOU has specific uncertainties for program performance for some customers or customer segments going into PY2025. While each IOU monitors the performance of their CBP offerings, there are a few areas that should receive close attention in PY2025.

  - PG&E should monitor the performance of residential customers as the newly enrolled residential customers may perform differently than the residential customers in PY2023 (on which the PY2024 ex ante is based). While the expected MWh/h contributions from this sector is small relative to the non-residential sector, these customers represent a new set of participants, likely without historical CBP performance. The PY2025 evaluation should include an evaluation of these customers and identify how they may be different for prior residential CBP participants.

  - SCE is launching the CBP Elect DA product for the 2025 event season after the sunset of the CBP DA product at the end of PY2024. SCE should closely monitor the performance of CBP Elect DA during market events. Additionally, SCE should consider conducting at least one test event for all newly enrolled customers to establish baseline delivery performance expectations for the new CBP Elect DA product. The PY2025 evaluation should pay attention to CBP Elect DA performance improvements over the course of the 2025 CBP season as the new product becomes established.

  - SDG&E had consistent delivery performance across all event hours in PY2024. However, the majority of expected load curtailment comes from one customer, [redacted], who was unable to participate in PY2024 events. Additionally, this customer

stated that they have undergone facility efficiency improvements that make a forecast of future energy use based on historical energy usage difficult. The ex ante analysis tried to account for this situation, but some uncertainty still remains. SDG&E should closely monitor the performance of [redacted] and call a test event if no market events occur. Additionally, SDG&E should request this participant's aggregator to adjust its nominations if this customer's performance falls short of nominated capacity.

- **Identify customers with battery storage.** Verdant carries forward the recommendation from the PY2023 evaluation to identify customers that have battery storage. These customers have specific load shape patterns that necessitate thoughtful modeling. This is especially relevant for residential customers who are typically evaluated using a panel model with a matched control group within the LIP framework. Residential battery storage customers often need to be segmented separately from other residential customers to accurately estimate load reductions. Tracking which participants have battery storage will improve the estimation of ex post and ex ante impacts going forward, especially for residential customers.

- **Long Duration Events.** Apart from SCE events, no CBP event in PY2024 lasted longer than two hours in duration. The evaluation team recognizes that CBP dispatches are based on market conditions and needs, so longer duration market events (market award events lasting longer than two hours) may not "naturally" occur in PY2025. However, IOUs should consider conducting a test event that occurs for longer than two hours with the purpose of testing the ability of CBP resources to sustain load impacts for events longer than two hours if one does not occur through a market award. This will allow future program evaluations to more accurately estimate ex ante load impacts over a four-hour dispatch and update degradation rates for future program years.

APPENDIX A TABLE GENERATORS

Verdant produced ex post and ex ante table generators for each IOU, which are Excel files that allow interested stakeholders to observe the impacts of various key domains, including industry type, size, aggregator and SubLAP. These are provided in the following separate files:

- Appendix A-1: *PY2024_PG&E_CBP_Ex_Post_Load_Impacts_FINAL_PUBLIC.xlsx*
- Appendix A-2: *PY2024_PG&E_CBP_Ex_Ante_Load_Impacts_NonResidential_FINAL_ PUBLIC.xlsx*
- Appendix A-3: *PY2024_PG&E_CBP_Ex_Ante_Load_Impacts_Residential_FINAL_PUBLIC.xlsx*
- Appendix A-4: *PY2024_SCE_CBP_Ex_Post_Load_Impacts_FINAL_PUBLIC.xlsx*
- Appendix A-5: *PY2024_SCE_CBP_Ex_Ante_Load_Impacts_NonResidential _FINAL_PUBLIC.xlsx*
- Appendix A-6: *PY2024_SCE_CBP_Ex_Ante_Load_Impacts_Residential_FINAL_PUBLIC.xlsx*
- Appendix A-7: *PY2024_SDG&E_CBP_Ex_Post_Load_Impacts_FINAL_PUBLIC.xlsx*
- Appendix A-8: *PY2024_SDG&E_CBP_Ex_Ante_Load_Impacts_FINAL_PUBLIC.xlsx*

APPENDIX B WEATHER SENSITIVITY ANALYSIS

The model specifications used to test proxy days for each participant are based on the determination of weather sensitivity across the season by customer. Equation B-1 presents the general model specification for estimating the effect of temperature on daily average load. For this exercise, the input data was limited to weekdays between 11 AM to 9 PM for the months of April through October. Residential segments were assumed to be weather sensitive and did not undergo weather sensitivity analysis.

EQUATION B-1: WEATHER SENSITIVITY GENERAL MODEL SPECIFICATION

$$AvgLoad_d = \beta_0 + \beta_1 CDD_d + \sum_w \beta_{2w} DayType_d + \sum_m \beta_{3m} Month_d + \varepsilon_d$$

Where:

$AvgLoad_d$	The average hourly kWh load on day *d*
β_0	The intercept of the regression model
β_1	The coefficient for effect on load of Cooling Degree Days
CDD_d	The total Cooling Degree Days on day *d*
β_{2w}	The set of coefficients for effect on load by day of the week *w* (Monday through Friday)
$DayType_d$	A dummy variable for the day of the week for day *d*
β_{3t}	The set of coefficients for effect on load by month of the year (April through October)
$Month_d$	A dummy variable for the month of the year for day *d*
ε_d	The error term

The weather sensitivity regression model is tested three separate times for each participant, once each for daily Cooling Degree Day (CDD) values calculated with bases 60, 65, and 70 degrees respectively. If the estimate for the coefficient on CDD β_1 is positive and statistically significant at the 95% level for any of the three CDD model variants, the participant is considered weather sensitive. Table B-1 through Table B-4 display the total counts of ex post customers by weather sensitivity designation.

TABLE B-1: WEATHER SENSITIVITY REGRESSION RESULTS – PG&E

Industry Type	Num. of Customers	Num. of Customers Weather Sensitive	Num. of Customers Non-Weather Sensitive
Agriculture, Mining and Construction	321	124	197
Manufacturing	14	8	6
Office, Hotels, Finance, Services	1	0	1
Schools	2	1	1
Wholesale, Transport and other Utilities	5	4	1
Total	**343**	**137**	**206**

TABLE B-2: WEATHER SENSITIVITY REGRESSION RESULTS – SCE EX POST

Industry Type	Num. of Customers	Num. of Customers Weather Sensitive	Num. of Customers Non-Weather Sensitive
Retail Stores	38	36	2
Schools	1	1	0
Total	**39**	**37**	**2**

TABLE B-3: WEATHER SENSITIVITY REGRESSION RESULTS – SCE EX ANTE NON-RESIDENTIAL

Industry Type	Num. of Customers	Num. of Customers Weather Sensitive	Num. of Customers Non-Weather Sensitive
Agriculture, Mining and Construction	140	44	96
Retail Stores	259	246	13
Schools	1	1	0
Wholesale, Transport and other Utilities	23	20	3
Other	30	17	13
Total	**453**	**328**	**125**

TABLE B-4: WEATHER SENSITIVITY REGRESSION RESULTS – SDG&E

Industry Type	Num. of Customers	Num. of Customers Weather Sensitive	Num. of Customers Non-Weather Sensitive
Agriculture, Mining and Construction	[redacted]	[redacted]	[redacted]
Manufacturing	[redacted]	[redacted]	[redacted]
Other	[redacted]	[redacted]	[redacted]
Retail Stores	[redacted]	[redacted]	[redacted]
Wholesale, Transport and other Utilities	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]

APPENDIX C PROXY DAY & MODEL SELECTION

C.1 PROXY DAY SELECTION

The model selection for each participant is based on assessing performance on a set of proxy event days, which are non-event, non-holiday days with event-like weather conditions. Proxy days were selected based on how temperature profiles for each non-event day compare to that of the average event day for each customer. Table C-1 through Table C-3 present the five most frequently selected weekday proxy days for each weather station by IOU. Note that some customers were assigned a slightly different set of proxy days, depending on their AMI data availability, dual program enrolment, and/or number of dispatched events. Proxy day event days were selected at the individual participant level to account for differences in event participation and availability of non-event days.

TABLE C-1: SELECTED EX POST PROXY DAYS, PG&E

Station Name	Dates Selected
Bakersfield	2024-06-05, 2024-06-11, 2024-07-18, 2024-08-01, 2024-08-12
Chico	2024-06-07, 2024-07-15, 2024-08-27, 2024-08-29, 2024-08-30
Cupertino	2024-07-19, 2024-07-23, 2024-08-27, 2024-09-03, 2024-09-23
Fresno	2024-06-11, 2024-07-01, 2024-07-18, 2024-07-31, 2024-08-12
Marysville	2024-06-28, 2024-07-15, 2024-07-31, 2024-08-14, 2024-08-16
Milpitas	2024-06-12, 2024-06-18, 2024-07-26, 2024-08-02, 2024-08-14
Paso Robles	2024-06-03, 2024-06-11, 2024-06-17, 2024-07-31, 2024-08-12
Sacramento	2024-05-31, 2024-07-09, 2024-07-31, 2024-08-08, 2024-08-14
Salinas	2024-05-29, 2024-06-25, 2024-07-22, 2024-07-29, 2024-08-12
San Rafael	2024-07-19, 2024-08-27, 2024-09-27, 2024-09-30, 2024-10-03
Santa Maria	2024-06-06, 2024-07-30, 2024-08-13, 2024-08-30, 2024-09-25
Stockton	2024-07-02, 2024-07-03, 2024-07-05, 2024-07-12, 2024-07-23

TABLE C-2: SELECTED EX POST PROXY DAYS, SCE

Station Name	Dates Selected
Cathedral City	2024-06-24, 2024-07-02, 2024-07-03, 2024-07-18, 2024-08-20
El Segundo	2024-07-16, 2024-07-22, 2024-07-23, 2024-08-08, 2024-09-12
Goleta	2024-06-27, 2024-07-05, 2024-07-22, 2024-08-07, 2024-10-28
Long Beach	2024-06-24, 2024-06-25, 2024-07-22, 2024-07-26, 2024-08-13
Moorpark	2024-07-05, 2024-07-22, 2024-08-02, 2024-08-15, 2024-08-21
Rialto	2024-07-05, 2024-07-24, 2024-08-02, 2024-08-06, 2024-08-20
Romoland	2024-07-05, 2024-07-09, 2024-07-19, 2024-07-24, 2024-08-20
Rosemead	2024-08-02, 2024-08-06, 2024-08-16, 2024-08-19, 2024-08-21
San Dimas	2024-07-05, 2024-08-02, 2024-08-06, 2024-08-19, 2024-08-21
Santa Ana	2024-08-06, 2024-08-15, 2024-08-16, 2024-08-21, 2024-09-10
Westminster	2024-07-22, 2024-07-23, 2024-08-13, 2024-08-26, 2024-09-10
Yucca Valley	2024-07-02, 2024-07-17, 2024-07-19, 2024-08-19, 2024-08-20

TABLE C-3: SELECTED EX POST PROXY DAYS, SDG&E

Station Name	Dates Selected
Gillespie Field	2024-07-25, 2024-08-02, 2024-08-05, 2024-08-06, 2024-09-04
Lindbergh Field	2024-07-24, 2024-08-12, 2024-08-13, 2024-08-19, 2024-09-04
Miramar	2024-07-25, 2024-08-05, 2024-08-14, 2024-08-19, 2024-09-04

C.2 MODEL SELECTION & PERFORMANCE METRICS

The model selection for each participant is based on assessing performance on a set of proxy event days, the non-event days with event-like weather conditions, and wherein the assessment is concerned primarily with accuracy and precision. Accuracy represents how closely on average the calculated baseline matches the observed load. Bias is a component of measuring accuracy, which indicates the extent to which the calculated baseline over- or under-estimates the load. In contrast, precision indicates how reliably a baseline is close to the observed load. It is possible to have a model that on average is highly accurate with very poor precision, such as when a method both under- and over-predicts load by substantial amounts with regularity. Likewise, it is possible to have a method that is very precise but highly inaccurate, such as when a model over- or under-estimates the load with high consistency. Of course, a baseline can also be neither accurate nor precise.

The primary metrics for accuracy and precision in this analysis are Normalized Mean Bias Error (NMBE) and Normalized Mean Absolute Error (NMAE), respectively. Other assessments of baselines have often used the Mean Percent Error (MPE) as the metric to assess accuracy and the Mean Absolute Percent Error

(MAPE) and Coefficient of Variation of the Root Mean Square Error (CVRMSE) as the metrics for precision. Table C-4 presents the description and mathematical formula for each relevant metric.

A preference for NMBE and NMAE is based primarily on a shortcoming of the MPE and MAPE when working with observed values of zero, which result in a division-by-zero error and the loss of the corresponding data point. Notably, the formulas for the NMBE and NMAE go against a convention seen in some contexts (e.g., ASHRAE), where the error is calculated as the baseline minus the observed. This runs contrary to the more typical conventions of calculating MPE and MAPE. For the sake of consistent interpretation of the NMBE and MPE, where negative values indicate overestimation of the baseline, Verdant has calculated the error as the observed load minus the calculated baseline for all metrics.

TABLE C-4: DESCRIPTIONS AND EQUATIONS FOR PERFORMANCE METRICS

Metric Type	Metric	Description	Formula
Accuracy/Bias	Mean Percent Error (MPE)	Represents the average of the errors in the calculated baselines as a percentage of the observed load.	$MPE = \frac{1}{n}\sum_{i=1}^{n}\frac{y_i - \hat{y}_i}{y_i}$
	Normalized Mean Bias Error (NMBE)	Represents the normalized average bias in the calculated baselines.	$NMBE = \frac{\frac{1}{n}\sum_{i=1}^{n}(y_i - \hat{y}_i)}{\bar{y}}$
	Root Mean Squared Errors (RMSE)	Represents the average distance between the observed load and the calculated baselines.	$RMSE = \frac{1}{n}\sum_{i=1}^{n}(y_i - \hat{y}_i)^2$
Precision	Mean Absolute Percent Error (MAPE)	Represents the average of the absolute errors in the calculated baselines as a percentage of the observed load.	$MAPE = \frac{1}{n}\sum_{i=1}^{n}\left\|\frac{y_i - \hat{y}_i}{y_i}\right\|$
	Normalized Mean Absolute Error (NMAE)	Represents the average of the normalized absolute error in the calculated baselines.	$NMAE = \frac{\frac{1}{n}\sum_{i=1}^{n}\lvert y_i - \hat{y}_i\rvert}{\bar{y}}$
	Coefficient of Variation of the Root Mean Squared Errors (CV[RMSE])	Represents the normalized average of the squared errors between the observed load and calculated baselines.	$CV[RMSE] = \frac{\sqrt{\frac{1}{n}\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}}{\bar{y}}$

Table C-5 through Table C-9 present summaries of the model performance metrics on proxy event days by IOU. For non-residential subgroups, these metrics are broken down by industry based on NAICS codes, where model performance varies by industry type and by SubLAP for residential segments. Overall, the models have good performance, with some expected variability based on industry type. Namely, Agriculture, Mining and Construction industry customers have on average the highest values for CV RMSE and NMAE/NMBE, indicative of predictive difficulties, such as those that result from long stretches of zero load interjected by shorter usage peaks for agricultural pumping. In contrast, manufacturing and retail

customers, which have more consistent occupancy and operations, have excellent performance metrics across bias and precision.

TABLE C-5: SPECIFICATION TEST RESULTS FOR PROXY DAY TESTING – PG&E

Industry Type	# of Customers	CV RMSE	NMBE	NMAE	Adjusted R^2
Agriculture, Mining and Construction	321	68.393	39.642	68.393	0.708
Manufacturing	14	0.166	0.077	0.166	0.683
Office, Hotels, Finance, Services	1	1.513	1.023	1.513	0.756
Schools	2	0.288	-0.166	0.288	0.570
Wholesale, Transport and other Utilities	5	0.159	-0.023	0.159	0.913

TABLE C-6: SPECIFICATION TEST RESULTS FOR PROXY DAY TESTING – SCE NON-RESIDENTIAL EX POST

Industry Type	# of Customers	CV RMSE	NMBE	NMAE	Adjusted R^2
Retail Stores	38	0.329	0.220	0.329	0.724
Schools	1	0.027	0.006	0.027	0.666

TABLE C-7: SPECIFICATION TEST RESULTS FOR PROXY DAY TESTING – SCE RESIDENTIAL EX ANTE

SubLAP	# of Customers	CV RMSE	NMBE	NMAE	Adjusted R^2
SCEC	389	1.059	-0.096	0.645	0.355
SCEN	48	0.827	-0.064	0.568	0.436
SCEW	127	1.164	-0.065	0.731	0.348
SCHD	13	0.932	-0.027	0.652	0.308
SCLD	14	0.665	-0.040	0.472	0.595
SCNW	153	1.108	-0.096	0.694	0.391

TABLE C-8: SPECIFICATION TEST RESULTS FOR PROXY DAY TESTING – SCE NON-RESIDENTIAL EX ANTE

Industry Type	# of Customers	CV RMSE	NMBE	NMAE	Adjusted R^2
Agriculture, Mining and Construction	134	27.089	26.704	27.089	0.255
Retail Stores	256	0.095	0.044	0.095	0.606
Schools	1	0.045	0.001	0.045	0.526
Wholesale, Transport and other Utilities	23	0.545	0.459	0.545	0.523
Other	29	0.399	0.242	0.399	0.431

TABLE C-9: SPECIFICATION TEST RESULTS FOR PROXY DAY TESTING – SDG&E

Industry Type	# of Customers	CV RMSE	NMBE	NMAE	Adjusted R^2
Agriculture, Mining and Construction	[redacted]	6.951	4.502	6.951	0.902
Manufacturing	[redacted]	0.148	0.042	0.148	0.863
Other	[redacted]	0.597	0.318	0.597	0.567
Retail Stores	[redacted]	0.099	0.017	0.099	0.658
Wholesale, Transport and other Utilities	[redacted]	0.208	0.011	0.208	0.720

C.3 ACTUAL VS PREDICTED PROXY DAY LOAD SHAPES

As a means of visually assessing how well the collection of selected regression models predicts average load, Figure C-1 through Figure C-3 present the average observed and predicted load during ex post proxy event days by IOU. In general, these figures demonstrate excellent model fits, with slight deviations due to outliers or a small sample size of customers.

FIGURE C-1: PG&E PROXY DAY ACTUAL VS. PREDICTED LOAD

FIGURE C-2: SCE PROXY DAY ACTUAL VS. PREDICTED LOAD

FIGURE C-3: SDG&E PROXY DAY ACTUAL VS. PREDICTED LOAD