CRITICAL PEAK PRICING RATES
PY 2024 STATEWIDE EVALUATION
(PG&E, SCE, SDG&E)

DRMEC PRESENTATION, MAY 13, 2025

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

OUTLINE

- CPP Rates Overview & Executive Summary
- Ex Post Methodology
  - Differences-in-differences, no day-of baseline adjustments
- Ex Post Results
  - PY 2024
  - Comparison to previous years
- Ex Ante Methodology
  - No weather modeling
  - Includes PY 2023 estimates from different model
- Ex Ante Results
- Summary & Recommendations

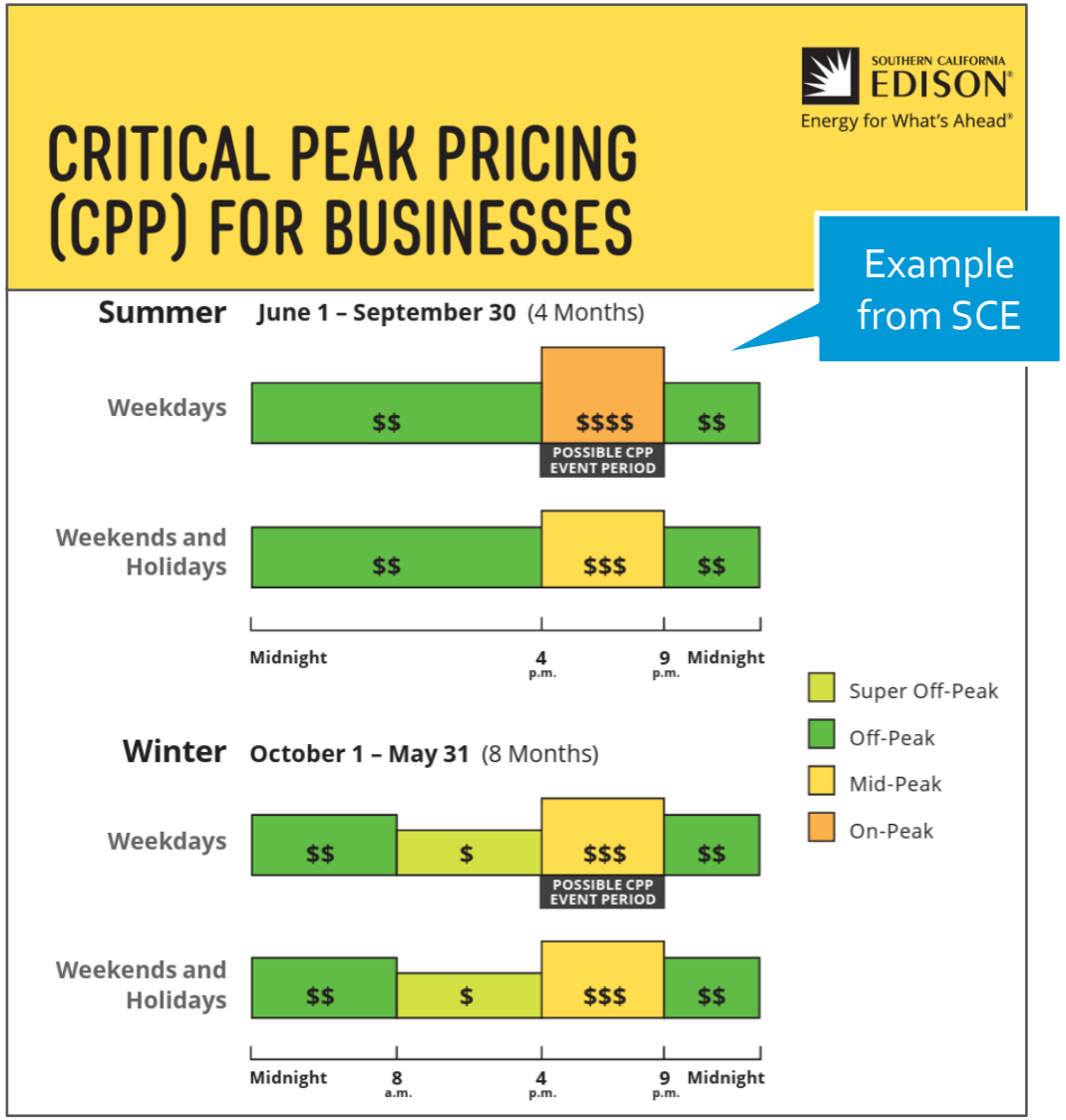
CPP RATES OVERVIEW &
PY 2024 EXECUTIVE SUMMARY

CPP IMPACT ESTIMATES WERE GENERALLY LOWER FOR PY 2024

Question	Answer	Details
Did the ex post model change?	**YES**	We do not include day-of adjustments to the reference loads. Previously, this assumed customers do not shift any loads to earlier hours on event days (up to 2 p.m.), which could bias the estimates.
Are the ex post impacts small for this type of intervention?	**NO**	Responses to dynamic pricing programs with default enrollments are often 0 to 1%.
Are the ex post impacts smaller than in previous years?	**MAYBE**	The point estimates are generally lower than in previous years, but not all. The 2021-2023 estimates fall within the confidence interval of the 2024 estimates, however (they're not statistically different).
Are most of the ex post impacts statistically significant?	**NO**	PY 2024 estimates were generally noisier since we don't include day-of adjustments to reference loads. Small percent impacts are difficult to distinguish from zero.
Did the ex ante model change?	**NO**	Modeling was largely similar.
Are the ex ante impacts smaller than in previous years?	**YES**	We are revising ex ante projections downward relative to the PY 2023 estimates.

CPP RATES ARE DEFAULT COMMERCIAL RATES AT ALL 3 IOUS

- Time-varying rates
  - No direct load control, more flexibility for customers
    - Time varying rates have smaller impacts per customer
  - Can have large enrollments vs. other programs
  - CPP rates: Price adders on event days
    - Event days called separately by IOUs, customers notified day ahead
- CPP = Default Commercial Rate
  - Default programs: Lower impacts per customer than Opt-In (often 0 to 1%)
  - Some customers may not have interest, may not have flexible loads from 4 to 9 p.m.
- Paired with TOU rates
  - Daily shifting for TOU will be differenced out in CPP impact analysis (so smaller impacts)
  - Smaller customers might have difficulty responding to changing prices beyond 3-part TOU rates



Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

TIPS FOR REDUCING ENERGY USE ON CPP EVENT DAYS

Small impacts?

Reducing/shifting flexible loads could happen daily for TOU rates (e.g. precooling)

CPP impacts will be small if flexible loads already shifted daily for TOU

Here are some good energy-reducing practices to use during CPP events:

- Turn off all nonessential, indoor/outdoor lighting, signage, window displays, fountains, and office equipment not in use
- Raise cooling thermostat settings to 78°F with a programmable thermostat; pre-cool by setting the thermostat several degrees below your preferred temperature setting hours before the event begins.
- Install sensory controllers on vending machines or shut them down for short periods of time
- Reduce production during CPP events or shift production to Off-Peak or Super Off-Peak hours (when CPP events will not occur)
- Unplug battery chargers and use only pre-charged equipment during On-Peak hours; charge battery operated equipment prior to CPP events
- Turn off ice machines between 4 p.m. and 9 p.m.

Warehouses

- Pre-charge all electric vehicles and battery-operated equipment before or after CPP event hours

Manufacturing and Food Processing

- Turn off motors, vertical lifts, conveyor belts, and nonessential process equipment
- Adjust schedules so energy-intensive production happens before and after CPP event hours
- Schedule batch or continuous processes before or after CPP event hours

Buildings

- Shut down unused rooms and facilities
- Install daylighting controls that let you adjust lighting levels

A CPP SUCCESS STORY

" It takes a lot of electricity to power 55 plants and 10 mine sites used to produce ready-mix

Ex post model change?

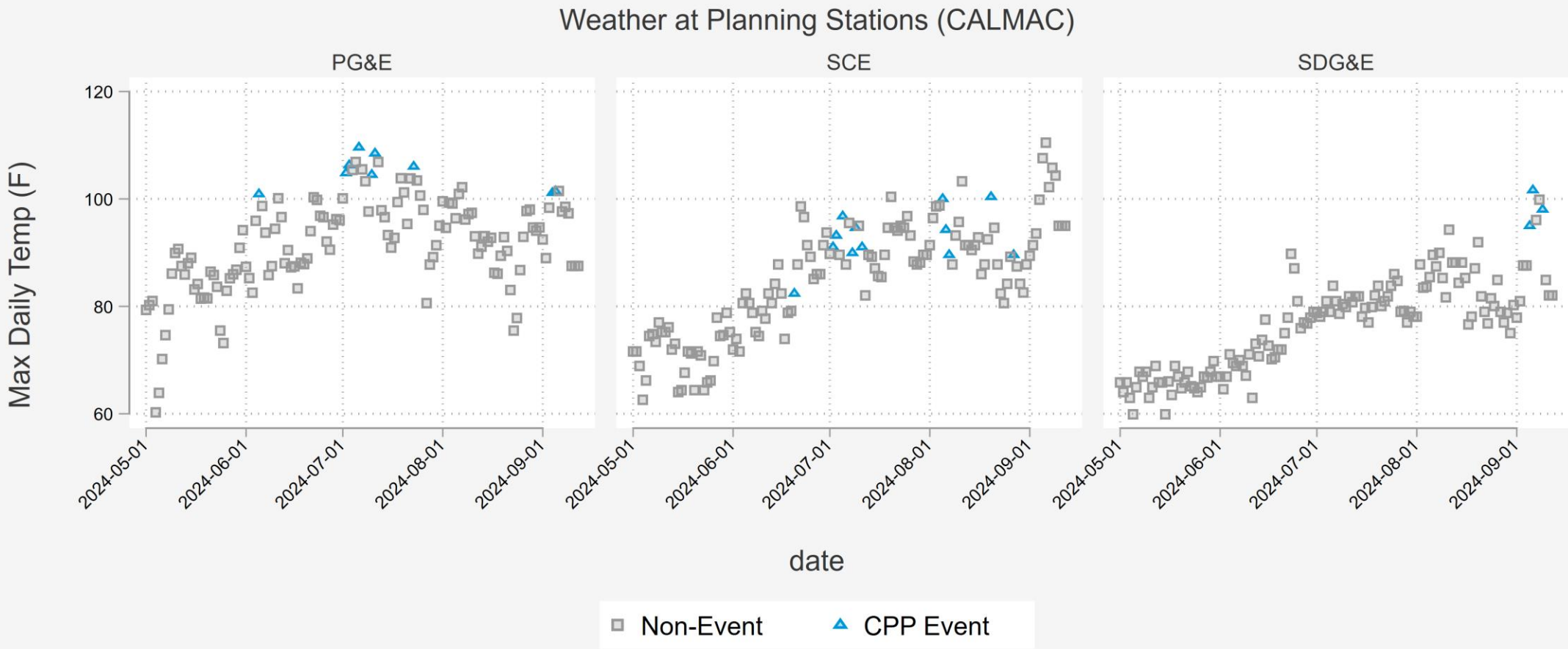
Outreach recommends shifting loads

If businesses shift on event days, models with day-of adjustments will set baseline higher to match the kWh in earlier hours

CPP RATE DETAILS BY IOU

	PG&E	SCE	SDG&E
Number of Events - PY2024	**9**	**12** (None in September)	**3** (All September)
Min./Max. Possible Events	Min. 9, Max. 15	Min. 12, Max. 15	Max. 18 (no Min.)
Event Triggers	Day ahead with high temps, high demand, or short supply	Forecasted system emergencies/extreme weather conditions, day-ahead prices, or CAISO Energy Emergency Alerts	Day-ahead system load forecast > 4,000 MW Can also be triggered for high temp.'s, extreme conditions, emergencies
CPP Rate Adder	$0.60 per kWh for < 75 kW, $0.90 per kWh for > 75 kW	$0.80 per kWh	$2.58 per kWh (most common rate, less for small sites)
Any insurance against CPP prices?	Bill protection for first year	Bill protection for first year	Bill protection for first year; Customers can pay to reserve capacity ($ per kW)

TOP DAYS CALLED FOR PG&E & SDG&E; SCE CALLED MILDER DAYS



Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

2024 EX POST ESTIMATES SMALLER BUT SIMILAR TO 2021-2023

Utility	Measure	2021	2022	2023	2024
PG&E	**Impact**	**0.8%**	**1.4%**	**1.1%**	**0.9%**
	Participants	107,443	111,974	107,258	103,577
SCE	**Impact**	**1.1%**	**0.8%**	**0.6%**	**0.3%**
	Participants	259,000	225,258	226,193	220,658
SDG&E (Medium & Large)	**Impact**	***(no events)***	***-0.3%*** *(Weekday)* ***2.7%*** *(Weekend)*	***3.2%***	***-1.1%***
	Participants	4,982	4,859	2,861	2,286

- Generally small impacts in other years (~1%)
- SDG&E estimates:

  2022: *4 weekday events (-0.3%), 1 weekend (2.7%)*

  2023: *One event day*

  2024: *At least one site with large impacts in previous years did not receive event notifications*

2024 EX POST ESTIMATES: GENERALLY NOT STATISTICALLY SIGNIFICANT

IOU	Sites	Load without DR (MW)	Load Reduction (MW)	% Load Reduction	Significant (10% level)	Significant (5% level)
PG&E (All Groups)	103,577	815.81	7.74	0.9%	Yes	No
SCE (All Groups)	220,658	1147.89	3.79	0.3%	No	No
SDG&E (Med. & Large)	2,286	111.30	-1.21	-1.1%	No	No

SDG&E Small evaluated separately, impacts ~1% for PY 2024

- 0 to 1% impacts
  - Not uncommon in recent years
- Responses noisy, large standard errors
  - Only PG&E statistically significant (at 10% level)
  - Several event days still have significant impact estimates (by size group – S/M/L)
  - Insignificant impact estimates (by event, group) set to zero in ex ante

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

2024 EX ANTE FORECASTS LOWER THAN 2023

Utility	Measure	PY 2023 Evaluation	PY 2024 Evaluation
PG&E	2024 Ex Ante Impact Estimate	9.0	7.1
	2024 Forecasted Enrollment	103,659	103,622
SCE	2024 Ex Ante Impact Estimate	7.8	4.2
	2024 Forecasted Enrollment	225,082	220,655
SDG&E (Medium & Large)	2024 Ex Ante Impact Estimate	3.2	0.8
	2024 Forecasted Enrollment	2,570	2,257

- Table compares August system 1-in-2 ex ante forecast for 2024 from PY 2023 evaluation vs. same calculation in 2024 evaluation
- Estimates generally smaller this year
  - Largely due greater noise in estimates, more ex post estimates insignificant
- SDG&E estimates less comparable across years
  - Large impacts in 2023, but just one event
  - 2024 estimates likely low due to notifications

EX ANTE HOURLY IMPACTS OVER TIME (SYSTEM 1-IN-2 WEATHER)

Year	PG&E	SCE	SDG&E (Med. & Large)
2024	7.1	4.2	0.8
2025	7.7	3.8	0.8
2026	7.3	3.8	0.9
2027	7.0	3.9	0.9
2028	6.4	3.9	0.9
2029	6.1	4.0	0.9
2030	5.8	4.0	0.9
2031	5.6	4.0	0.9
2032	5.4	4.0	1.0
2033	5.1	4.0	1.0
2034	4.9	4.0	1.1

- Ex ante impacts generated from PY 2023, PY 2024 ex post impacts
  - Blend of current and historical impact estimates
- Enrollment changes over time
  - PG&E Declining forecast
  - SCE: Slightly increasing enrollments from 2025-2029
  - SDG&E: Slightly increasing enrollments over time

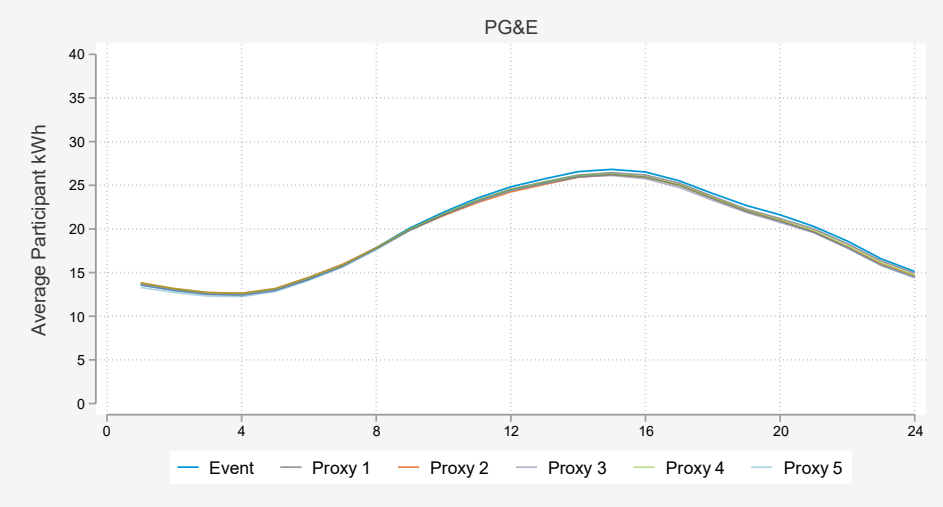
EX POST METHODOLOGY

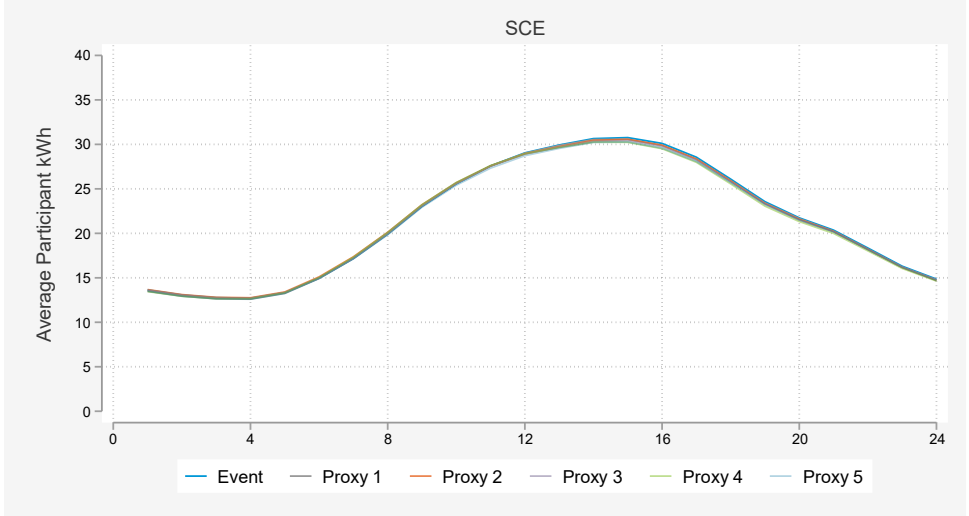
EX POST IMPACTS ESTIMATED WITH DIFFERENCES-IN-DIFFERENCES

Ex post estimation process:

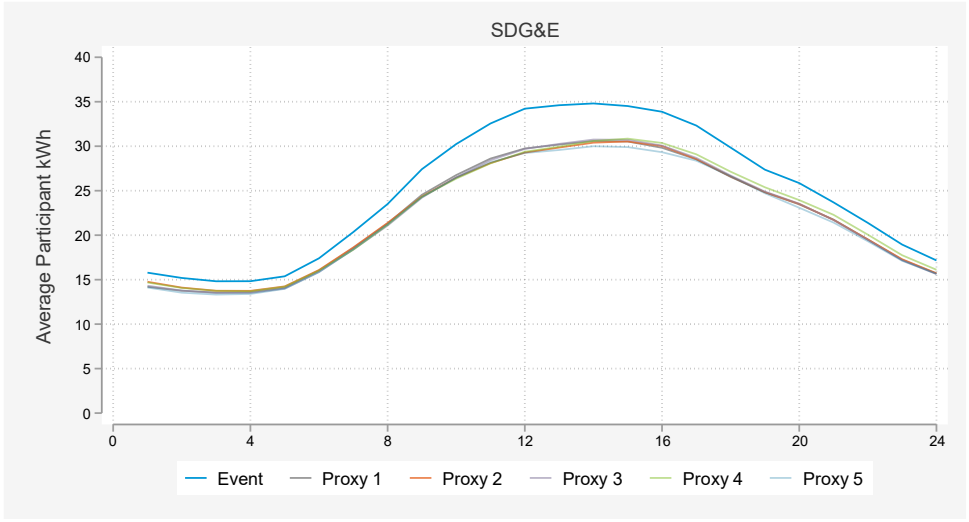
1. Find **proxy days** to compare across event days/non-event days
2. Match CPP sites to similar non-CPP sites (**matched control group**)
   - Drew samples for large groups (e.g. Small CPP for PG&E, SCE), so plenty of non-CPP sites to match to
   - Tournament for best matching model, Avg. pct. bias very close to zero, then take lowest RRMSE among
3. **Diff-in-Diff:** Compare across event/non-event days + participants/non-participants
   - Almost all participants estimated with simpe differences-in-differences
4. Individual customer regressions for small number of sites
   - Applied if insufficient sample size in that site's industry/size/climate zone, if site had unique loadshape, etc.
   - Regression models determined via tournament, individually for relevant sites

PG&E, SCE HAD COMPARABLE PROXY DAYS FOR DIFF-IN-DIFFS; SDG&E EVENT DAYS VERY DIFFERENT FROM OTHER SUMMER DAYS





- Graphs show Medium customers at each IOU for comparison
- SDG&E events on extremely hot days
  - Diff-in-Diff should still be best model since it's difficult to project out to extreme days with regression model



Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

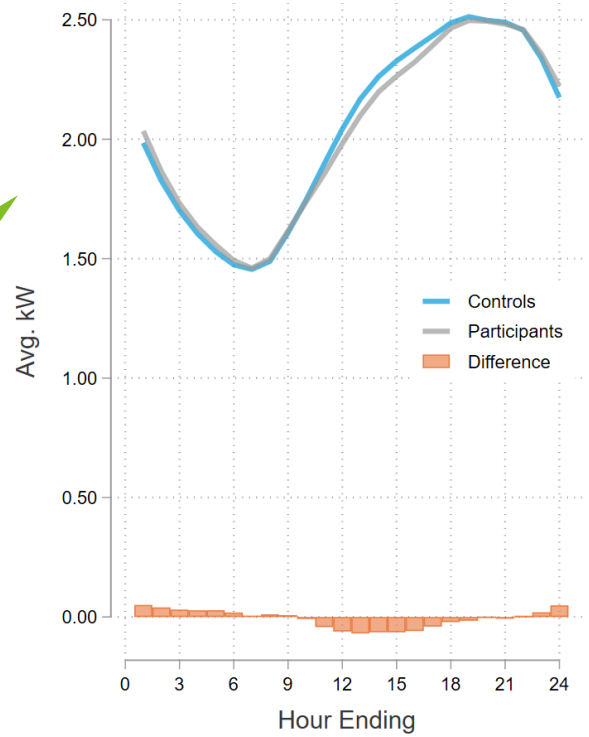
DIFFERENCES-IN-DIFFERENCES USED FOR MOST IMPACT ESTIMATES

- Match each participant to a similar non-participant site ⇨ Create a **matched control group** for comparison
- Compare hourly usage on event days to similar non-event days for both groups, take the difference:

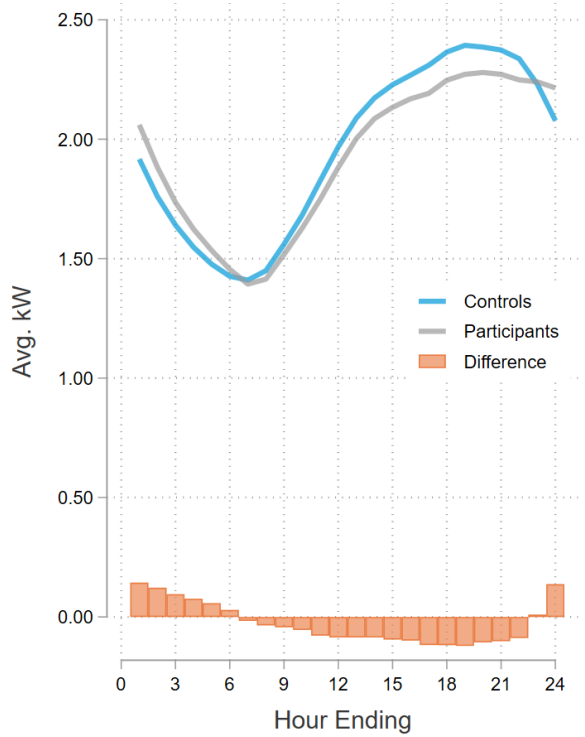
$$(kWh_{CPP,Event} - kWh_{CPP,No\ Event}) - (kWh_{Control,\ Event} - kWh_{Control,\ No\ Event})$$

Participants, matched control group should have similar loads on non-event days

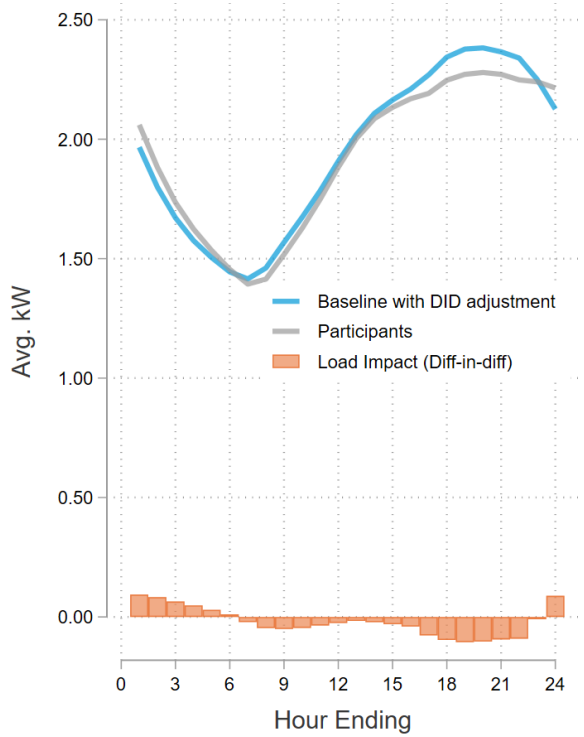
Non-Event Day



Event Day



Difference

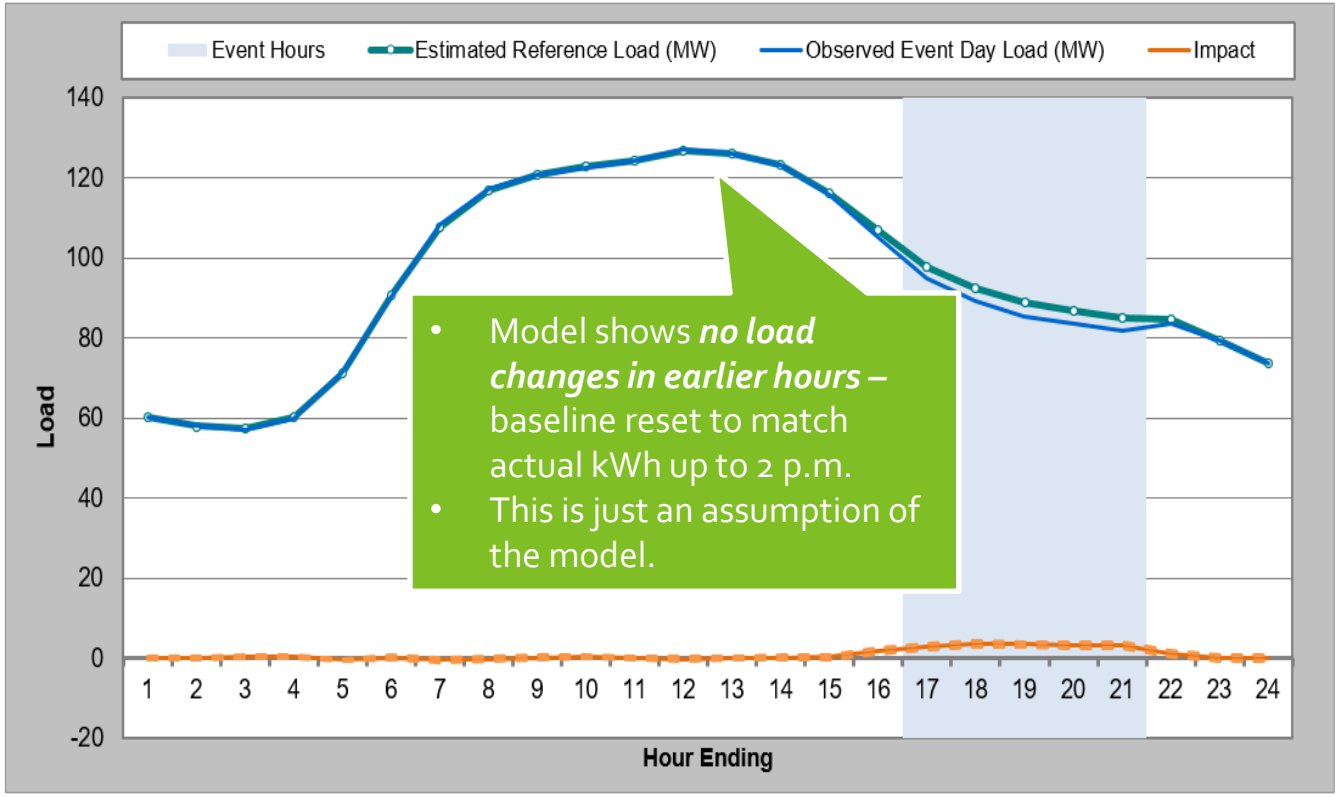


Impacts are the differences in Panel 2 ("Event Day"), minus any differences between the groups on non-event days

IN 2024 EVALUATION PLAN, WE DID NOT PROPOSE USING DAY-OF ADJUSTMENTS TO REFERENCE LOADS

- **Day-of adjustments** included previously
  - 2 adjustments: One for morning, one ***up to 2 p.m***. on event days
- **Reduces noise in estimates**
  - Model resets reference load based on actual event-day usage levels
  - This is the strength of this option
- **Can also lead to double-counting impacts**
  - We want to allow a more flexible model – customers can shift loads earlier, but standard errors also larger
- Example: Double-Counting
  - Suppose a factory shifted 100 kWh to earlier hrs. on an event day. With a day-of adjustment, the reference loads would be set 100 kWh higher.
  - Model just sees this as a day with higher loads for some reason, impacts to be measured relative to this higher baseline.
  - The 100 kWh reduction from the peak hours (moved into earlier hours) would then show up as a 200 kWh reduction
- We made different modeling decision for 2024 eval.

Example: SCE Large Industrial sites from PY 2023



EX POST RESULTS

PG&E: EX POST IMPACT ESTIMATES

Group	Sites	Load without DR (MW)	Load reduction (MW)	% Reduction	Significant (90% CI)	Significant (95% CI)
Large (200 kW and Above)	1,555	268.21	3.79	**1.4%**	Yes	No
Medium (20 to 199.99 kW)	16,295	373.65	3.31	**0.9%**	Yes	Yes
Small (Below 20 kW)	85,727	173.95	0.65	**0.4%**	Yes	Yes
Total	103,577	815.81	7.74	**0.9%**	Yes	No

- Percent impacts, aggregate impacts greatest for Large (>200 kW)
  - But lots of variance, estimates noisy so not statistically significant at 5% level
- Smaller impacts for Medium, Small sites

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

PG&E: PY 2024 EX POST IMPACT ESTIMATES SIMILAR TO 2022-2023

Group	Pct. Impact: 2022	Pct. Impact: 2023	Pct. Impact: 2024
Large (200 kW and Above)	1.7%	1.5%	**1.4%**
Medium (20 to 199.99 kW)	1.4%	0.8%	**0.9%**
Small (Below 20 kW)	1.1%	1.2%	**0.4%**
Total	**1.4%**	**1.1%**	0.9%

These are all *point estimates*, but they have a *distribution* (e.g. plus/minus a **confidence interval**)

The range of the estimates from 2022-2024 fall in the same confidence intervals, so we can't say 1.4%, 1.1% are **statistically different from 1.0%**

- 2024 impacts not statistically different from 2022-2023
- 95% conf. interval includes the 2022, 2023 estimates

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

SCE: EX POST IMPACTS

Group	Sites	Load without DR (MW)	Load reduction (MW)	% Reduction	Significant (90% CI)	Significant (95% CI)
Large (200 kW and Above)	1,769	376.42	3.23	0.9%	No	No
Medium (20 to 199.99 kW)	21,412	515.46	0.47	0.1%	No	No
Small (Below 20 kW)	197,477	256.01	0.09	0.0%	No	No
Total	**220,658**	**1147.89**	**3.79**	**0.3%**	**No**	**No**

- Percent impacts, aggregate impacts greatest for Large (>200 kW)
  - But lots of variance, estimates noisy so not statistically significant
- Smaller impacts for Medium, Small sites

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

SCE: EX POST IMPACT ESTIMATES, 2022-2024

Group	Pct. Impact: 2022	Pct. Impact: 2023	Pct. Impact: 2024
Large (200 kW and Above)	1.8%	1.3%	0.9%
Medium (20 to 199.99 kW)	0.1%	0.1%	0.1%
Small (Below 20 kW)	0.7%	0.5%	0.0%
Total	0.8%	0.6%	0.3%

These are all *point estimates*, but they have a *distribution* (e.g. plus/minus a **confidence interval**)

The range of the estimates from 2022-2024 fall in the same confidence intervals, so we can't say 0.8%, 0.6% are **statistically different from 0.4%**

- 2024 impacts not statistically different from 2022-2023
- 95% conf. interval includes the 2022, 2023 estimates

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

SDG&E: EX POST IMPACTS

Group	Sites	Load without DR (MW)	Load reduction (MW)	% Reduction	Significant (90% CI)	Significant (95% CI)
Large (200 kW and Above)	247	54.89	-1.18	-2.1%	No	No
Medium (20 to 199.99 kW)	2,039	27.66	-0.02	-0.1%	No	No

- Essentially zero impact for both groups in 2024
  - Lots of variance, estimates noisy so not statistically significant
- At least one site with large impacts in previous years did not receive notifications

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

SDG&E EX POST IMPACT ESTIMATES, 2022-2024

- 2024 events (3) all during early September heat wave in So. Cal.
- 2022, 2023 impact estimates within confidence interval of 2024 estimates
- Estimates vary quite a bit from year to year since fewer customers than other IOUs

Group	2022	2023	2024
Large	0.3%	4.9%	-2.3%
Medium	-1.1%	1.7%	-0.8%
Combined	***-0.3%** (Weekday)* ***2.7%** (Weekend)*	***3.2%****	-1.1%

Most Medium loads covered by capacity reservations

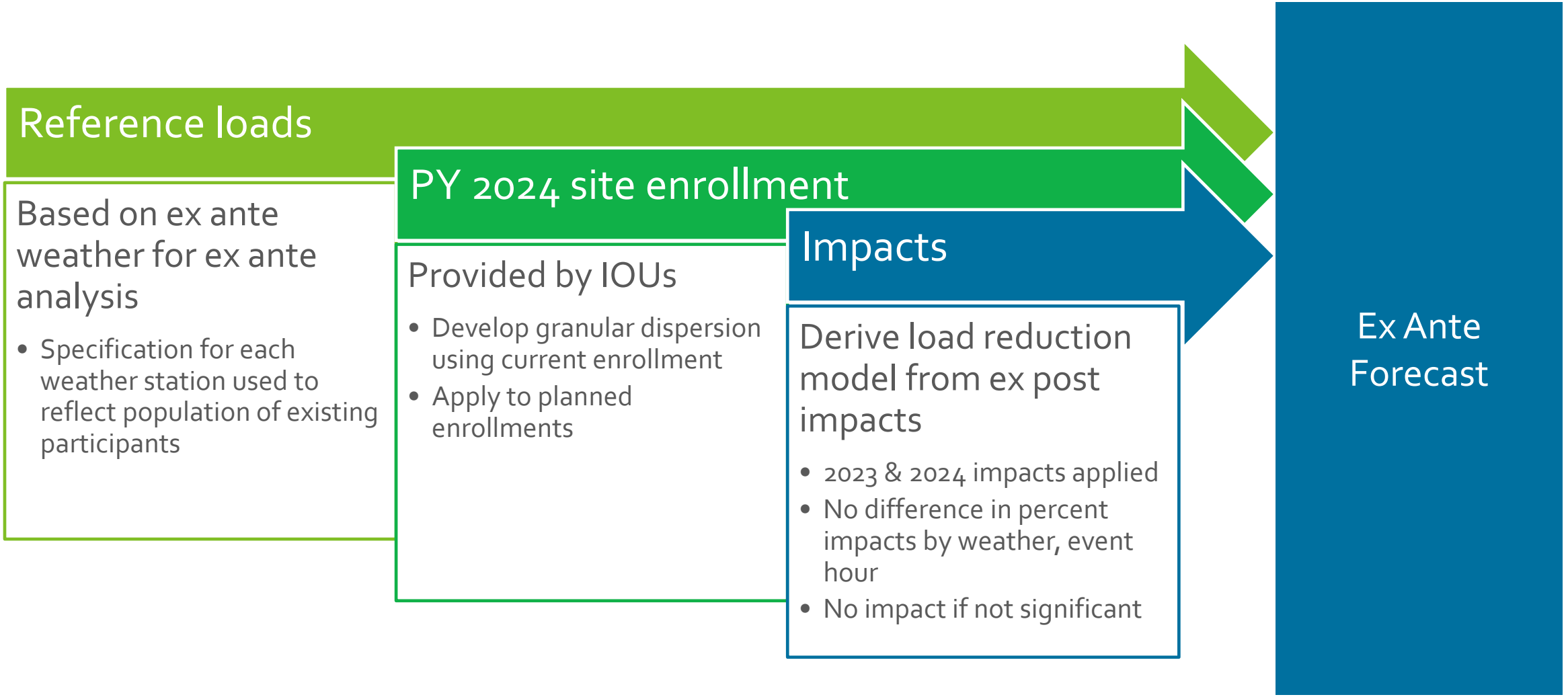
Only 1 event in 2023

2024: At least one site with large impacts didn't receive notifications

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

EX ANTE METHODOLOGY

EX ANTE METHODOLOGY OVERVIEW



Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

IMPACT ASSUMPTIONS FOR EX ANTE

Apply Ex Post Estimates

- Apply the incremental and significant for past two years' events
  - Includes both PY 2023 and PY 2024
  - Insignificant impacts ⇨ set ex ante prediction to zero
  - No impacts outside of the peak hours (4 to 9 p.m.)
- Percent impacts scaled to aggregate with enrollment forecast
  - Provided by each IOU's CPP program team
- 1-in-2 conditions
  - Separately for CAISO and each IOU's systems

Not Included in Models

- Weather
  - No significant trend in impacts by temperature
  - Consistent with recent PY evaluations
    - Only SCE Small has had temp. gradient in recent years
  - MW impacts still larger on hotter days since reference loads are higher
- Event Hour
  - No significant difference in event hour impacts

EXAMPLE: PG&E SLICE OF DAY

Hour Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	4.54	4.54	4.54	6.15	7.04	7.97	8.11	7.95	7.67	6.39	4.75	4.75
18	4.26	4.27	4.27	5.75	6.59	7.44	7.57	7.43	7.17	5.98	4.46	4.46
19	4.11	4.12	4.12	5.49	6.26	7.04	7.16	7.03	6.79	5.70	4.31	4.31
20	4.12	4.12	4.13	5.35	6.03	6.72	6.84	6.72	6.51	5.54	4.31	4.31
21	4.04	4.04	4.04	5.17	5.80	6.44	6.55	6.44	6.24	5.34	4.22	4.22
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

Percent impacts don't vary by temp. or event hour, but reference loads still larger in summer, hour 17

EX ANTE RESULTS

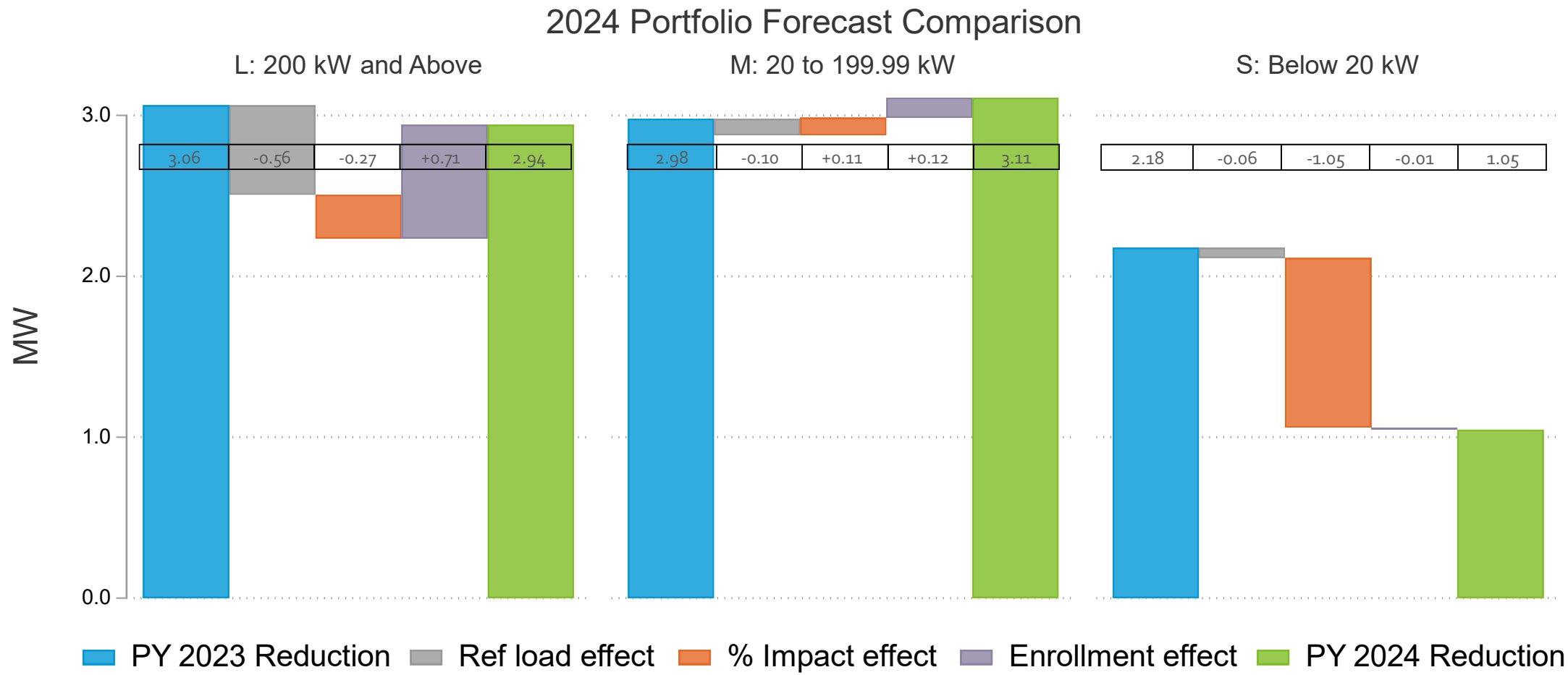
PG&E LARGE: GETTING FROM 2024 EX POST ESTIMATES TO EX ANTE

1. Start with 2024 ex post point estimates (which may not be statistically significant)
2. Combine with 2023 ex post estimates, setting insignificant estimates to zero
3. Estimate ex ante impacts, applying loads by weather year and enrollment forecasts from IOUs

These are the point estimates shown previously in Ex Post section

Result Type	Day Type	Load without DR (avg site kWh/h)	Load Reduction (avg site kWh/h)	% Reduction	Event Avg Temp (F)
Ex Post 2024 (All)	Avg. Weekday Event	268.21	3.79	1.4%	100.6
Ex Post- 2023 & 2024 (with insignificant estimates set to zero)	Avg. Weekday Event	343.28	3.81	1.1%	98.7
Ex Ante (CAISO)	Aug. Worst Day, 1-in-2	161.29	1.81	1.1%	93.7
Ex Ante (PG&E)	Aug. Worst Day, 1-in-2	168.78	1.89	1.1%	97.3

PG&E: IMPACTS LOWER THAN PY 2023 FORECAST MOSTLY DUE TO LOWER SMALL CPP PERCENT REDUCTIONS



Graphs decompose change from 2023 (blue) to 2024 (green) into changes in 1) Reference Loads, 2) Estimated % impacts, and 3) Enrollments

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

PG&E: EX ANTE FORECASTS THROUGH 2034 ~5-7 MW PER YEAR

Enrollments

Year	Large	Medium	Small	Total
2024	1,558	16,309	85,755	103,622
2025	1,506	14,448	79,796	95,750
2026	1,531	13,464	74,502	89,497
2027	1,552	12,554	69,574	83,680
2028	1,491	11,418	64,515	77,424
2029	1,510	10,642	60,274	72,426
2030	1,529	9,919	56,362	67,810
2031	1,544	9,250	52,724	63,518
2032	1,566	8,620	49,342	59,528
2033	1,585	8,043	46,221	55,849
2034	1,571	7,499	43,293	52,363

Decrease over time, subject to program changes

Impacts – Portfolio

Year	Large	Medium	Small	Total
2024	2.9	3.1	1.0	7.1
2025	2.6	4.0	1.1	7.7
2026	2.5	3.8	1.0	7.3
2027	2.5	3.5	1.0	7.0
2028	2.3	3.2	0.9	6.4
2029	2.2	3.0	0.8	6.1
2030	2.2	2.8	0.8	5.8
2031	2.2	2.7	0.7	5.6
2032	2.2	2.5	0.7	5.4
2033	2.1	2.4	0.7	5.2
2034	2.0	2.2	0.6	4.9

Most impacts from Large & Medium

PG&E: SLICE OF DAY

Hour Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	4.54	4.54	4.54	6.15	7.04	7.97	8.11	7.95	7.67	6.39	4.75	4.75
18	4.26	4.27	4.27	5.75	6.59	7.44	7.57	7.43	7.17	5.98	4.46	4.46
19	4.11	4.12	4.12	5.49	6.26	7.04	7.16	7.03	6.79	5.70	4.31	4.31
20	4.12	4.12	4.13	5.35	6.03	6.72	6.84	6.72	6.51	5.54	4.31	4.31
21	4.04	4.04	4.04	5.17	5.80	6.44	6.55	6.44	6.24	5.34	4.22	4.22
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

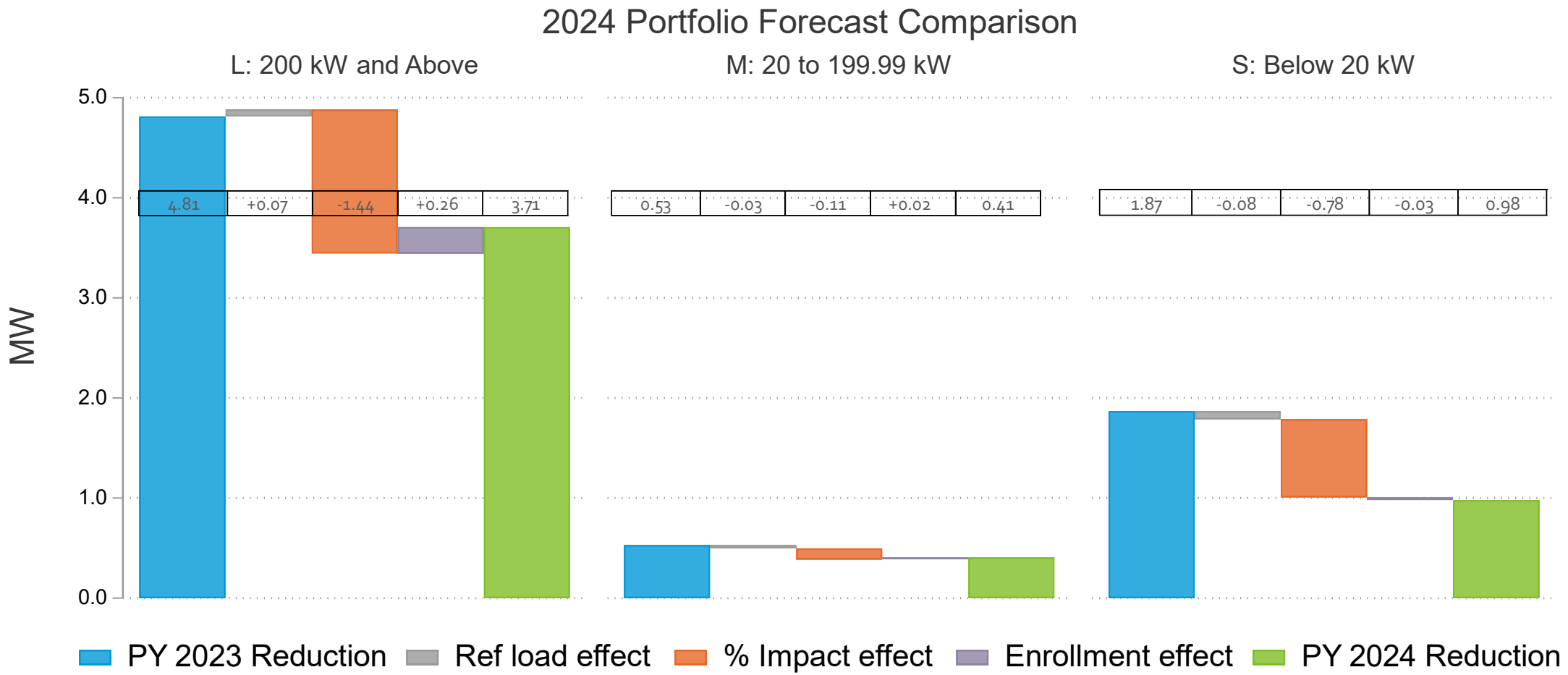
SCE LARGE: GETTING FROM 2024 EX POST ESTIMATES TO EX ANTE

1. Start with 2024 ex post point estimates (which may not be statistically significant)
2. Combine with 2023 ex post estimates, setting insignificant estimates to zero
3. Estimate ex ante impacts, applying loads by weather year and enrollment forecasts from IOUs

These are the point estimates shown previously in Ex Post section

Result Type	Day Type	Load without DR (avg site kWh/h)	Load Reduction (avg site kWh/h)	% Reduction	Event Avg Temp (F)
Ex Post 2024 (All)	Avg. Weekday Event	376.42	3.23	0.9%	86.2
Ex Post- 2023 & 2024 (with insignificant estimates set to zero)	Avg. Weekday Event	396.04	2.62	0.7%	86.9
Ex Ante (CAISO)	Aug. Worst Day, 1-in-2	226.52	1.50	0.7%	87.7
Ex Ante (SCE)	Aug. Worst Day, 1-in-2	230.27	1.53	0.7%	90.0

SCE: IMPACTS LOWER THAN PY 2023 FORECAST DUE TO LOWER PERCENT REDUCTIONS



Graphs decompose change from 2023 (blue) to 2024 (green) into changes in 1) Reference Loads, 2) Estimated % impacts, and 3) Enrollments

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

SCE: EX ANTE FORECASTS THROUGH 2034 ~5 MW PER YEAR

Enrollments

Year	Large	Medium	Small	Total
2024	1,767	21,412	197,476	220,655
2025	1,575	19,087	196,001	216,663
2026	1,591	19,267	197,810	218,668
2027	1,608	19,445	199,618	220,671
2028	1,623	19,620	201,422	222,665
2029	1,635	19,796	203,236	224,667
2030	1,635	19,796	203,236	224,667
2031	1,635	19,796	203,236	224,667
2032	1,635	19,796	203,236	224,667
2033	1,635	19,796	203,236	224,667
2034	1,635	19,796	203,236	224,667

Relatively stable over time, subject to program changes

Impacts – Portfolio

Year	Large	Medium	Small	Total
2024	2.7	0.7	0.8	4.2
2025	2.4	0.7	0.8	3.8
2026	2.4	0.7	0.8	3.8
2027	2.5	0.7	0.8	3.9
2028	2.5	0.7	0.8	3.9
2029	2.5	0.7	0.8	4.0
2030	2.5	0.7	0.8	4.0
2031	2.5	0.7	0.8	4.0
2032	2.5	0.7	0.8	4.0
2033	2.5	0.7	0.8	4.0
2034	2.5	0.7	0.8	4.0

Most impacts from Large

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

SCE: SLICE OF DAY

Hour Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	3.01	2.99	2.99	3.70	3.73	4.23	4.33	4.40	4.47	4.06	3.60	2.99
18	2.84	2.82	2.82	3.44	3.47	3.91	4.00	4.06	4.13	3.76	3.36	2.82
19	2.69	2.68	2.68	3.20	3.23	3.60	3.68	3.72	3.77	3.45	3.12	2.68
20	2.65	2.64	2.64	3.09	3.11	3.43	3.49	3.53	3.56	3.30	3.01	2.64
21	2.60	2.59	2.59	2.98	3.01	3.28	3.34	3.37	3.39	3.16	2.91	2.59
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

SDG&E LARGE: GETTING FROM 2024 EX POST ESTIMATES TO EX ANTE

1. Start with 2024 ex post point estimates (which may not be statistically significant)
2. Combine with 2023 ex post estimates, setting insignificant estimates to zero
3. Estimate ex ante impacts, applying loads by weather year and enrollment forecasts from IOUs

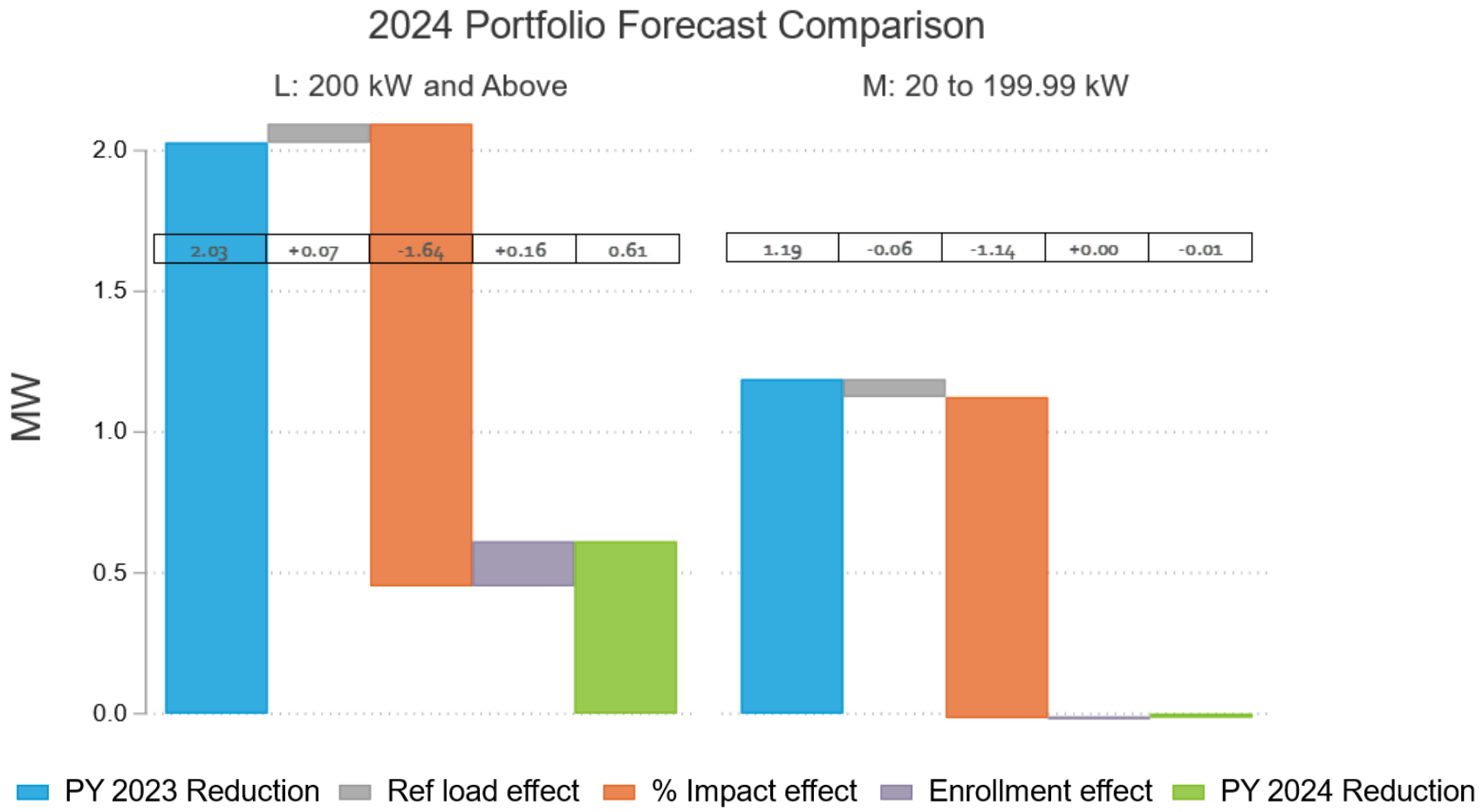
These are the point estimates shown previously in Ex Post section

Result Type	Day Type	Load without DR (avg site kWh/h)	Load Reduction (avg site kWh/h)	% Reduction	Event Avg Temp (F)
Ex Post 2024 (All)	Avg. Weekday Event	222.22	-4.76	-2.1%	84.1
Ex Post- 2023 & 2024 (with insignificant estimates set to zero)	Avg. Weekday Event	302.12	3.54	1.2%	84.3
Ex Ante (CAISO)	Aug. Worst Day, 1-in-2	204.30	2.37	1.2%	82.5
Ex Ante (SDG&E)	Aug. Worst Day, 1-in-2	208.81	2.42	1.2%	84.8

2023, 2024 post estimates likely different since:
1) Only 1 event in 2023
2) Some sites with large savings in 2023 not notified in 2024

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

SDG&E: IMPACTS LOWER THAN PY 2023 FORECAST DUE TO LOWER PERCENT REDUCTIONS



Graphs decompose change from 2023 (blue) to 2024 (green) into changes in 1) Reference Loads, 2) Estimated % impacts, and 3) Enrollments

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

SDG&E: EX ANTE FORECASTS THROUGH 2034 ~1 MW PER YEAR

Enrollments

Year	Large	Medium
2024	245	2,005
2025	253	2,218
2026	265	2,233
2027	267	2,256
2028	270	2,287
2029	275	2,323
2030	280	2,370
2031	288	2,435
2032	298	2,520
2033	312	2,639
2034	335	2,808

Relatively stable over time, subject to program changes, new CCA's

Impacts – Portfolio

Year	Large	Medium	Total
2024	0.6	0.2	**0.8**
2025	0.6	0.2	**0.8**
2026	0.6	0.2	**0.9**
2027	0.7	0.2	**0.9**
2028	0.7	0.2	**0.9**
2029	0.7	0.2	**0.9**
2030	0.7	0.2	**0.9**
2031	0.7	0.2	**0.9**
2032	0.7	0.3	**1.0**
2033	0.8	0.3	**1.0**
2034	0.8	0.3	**1.1**

Large impacts mostly coming from 2023 evaluation

KEY TAKEAWAYS

1

Ex Post: 0-1% impacts in 2024, similar to recent program years – customers not very responsive to CPP price adders

2

Ex Post Model: Simplified in 2024 – Greater uncertainty in estimates (larger standard errors), many impacts set to zero for ex ante (since not statistically significant)

3

Ex ante: PG&E to have 5-7 MW reductions in future, SCE to have 5 MW reductions, SDG&E to have 1 MW reduction (Med./Large only)

4

Decreased ex ante estimates: Compared to 2023, for PG&E Small, SCE Large & Small. SDG&E Large lower due to notification issue.

RECOMMENDATIONS

1

Surveys: IOUs could survey customers to identify or understand barriers to shifting on event days (e.g. time costs, inflexible loads, inelastic demand, etc.)

2

Understand customer turnover: CPP = default rate, so analyze the types of customers remaining on CPP vs. average commercial customers or customers in other DR programs

3

Notifications: SCE could evaluate the delivery and impact of notifications; SDG&E should consider a test event, evaluate delivery of notifications

QUESTIONS?

Tim Larsen
Senior Consultant
Demand Side Analytics
tlarsen@demandsideanalytics.com
801.691.3349

Alana Lemarchand
Partner & Principal
Demand Side Analytics
alana@demandsideanalytics.com
408.454.8158

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS