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Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

REPORT

CALMAC ID: PGE0497

2023 Load Impact Evaluation for Pacific Gas & Electric's Emergency Load Reduction Pilot

Prepared for PG&E
By Demand Side Analytics, LLC
April 1, 2024

Internal

ACKNOWLEDGEMENTS

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ABSTRACT

This study quantifies the load impacts of the Residential and Non-Residential Emergency Load Reduction Program pilot. The study focuses on two primary research questions: What were the 2023 demand reductions due to dispatch operations? What is the magnitude of future dispatchable load reduction capability for 1-in-2 and 1-in-10 weather conditions?

The pilot was rolled out in 2021 upon direction by the Commission to expand the state's portfolio of emergency reliability resources beyond those available in CAISO capacity markets and utility specific load modifying resources such as Critical Peak Pricing. Events are triggered by the CAISO in response to extreme grid stress, and event reductions are settled via a $2/kWh payment, determined using baseline settlement rules. Nine non-residential ELRP events were called in PY 2023, with different subgroups being dispatched for specific events. The average PY 2023 weekday 6pm to 9pm event did not produce meaningful load reductions when evaluated across all non-residential ELRP subgroups. Seven A.4 residential ELRP events were called in PY 2023, and the average event produced 18.1 MW of aggregate load reduction. No A.6 residential events were called.

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1 EXECUTIVE SUMMARY

The Emergency Load Reduction Program (ELRP) pilot is a demand response program with direct settlements and performance payments to participant sites designed to access additional incremental load reduction during times of high grid stress and emergencies involving inadequate market resources, with the goal of avoiding rotating outages. The pilot was rolled out in 2021 upon direction by the Commission to expand the state's portfolio of emergency reliability resources beyond those available in CAISO capacity markets and utility specific load modifying resources such as Critical Peak Pricing. Two distinct groups of customers are eligible for ELRP participation: (Group A) directly enrolled residential and non-residential customers and aggregators, and (Group B) third-party demand response providers (DRPs) with market-integrated proxy DR (PDR) resources.

Group A: Direct enrolled residential and non-residential customers and aggregators:

- A.1. Non-Residential Customers (BIP, Non-Res CPP, SCE's RTP, AP-I, SDP-C allowed).
- A.2. Non-Residential Aggregation (BIP + Non-BIP Aggregators).
- A.3. Rule 21 Exporting Distributed Energy Resources (DER).
- A.4. Virtual Power Plant (VPP) Aggregators (AC Cycling allowed when using submetering to determine ILR; includes SCE SDP and SEP, PG&E's Smart AC Switches or BYOT, and SDG&E's AC Saver).
- A.5. Vehicle-Grid-Integration (VGI) Aggregators (AC Cycling Allowed when using submetering to determine ILR; includes SCE SDP, PG&E's Smart AC Switches or BYOT, and SDG&E's AC Saver).
- A.6. Residential Customers (Res CPP allowed).

Group B: Market-integrated PDR resources:

- B.1. Third-party DR Providers.
- B.2. IOU Capacity Bidding Program (CBP) Aggregators.

ELRP A.6 was rolled out in May of 2022 upon direction by the Commission to capture additional residential emergency load reduction resources. ELRP A.6 is a behavioral demand response program with direct settlements and performance payments to participants, which is currently planned to operate through 2025. All other ELRP subgroups are expected to discontinue after 2027. All ELRP groups remunerate participant site performance via a $2/kWh payment, determined using baseline settlement rules specific to each subgroup. However, settlement payments for A.6 will decrease in 2024 and 2025 to $1/kWh. The eligibility, targeting, and rollout of each subgroup are entirely different.

This study analyzes two primary research questions:

- What were the 2023 demand reductions due to dispatch operations?
- What is the magnitude of future dispatchable load reduction capability for 1-in-2 and 1-in-10 weather conditions?

Table 1-1 summarizes the estimated ex post demand reductions for the average weekday ELRP event for each subgroup in which PG&E customers are enrolled (non-residential and residential). All impacts are incremental to other DR program impacts and statistical significance is noted for each subgroup. Subgroup A.4 [redacted] produced statistically significant incremental impacts. Subgroup A.6 was not dispatched in PY 2023. There were no enrollments in groups A.3 or B.1 in PY 2023.

Table 1-1: Summary of 2023 Average Weekday Event Ex Post Demand Reductions[1]

ELRP Group	Sector(s)	Sites	Load without DR (MW)	Load reduction (MW)	% Reduction	Significant (90% CI)	Significant (95% CI)
A.1: Non-Res	Non-Residential	10,474	614.44	5.03	0.8%	No	No
A.1-BIP: Non-Res Customers	Non-Residential	13	[redacted]				
A.2-BIP: Non-Res Aggregators	Non-Residential	29					
A.4: Virtual Power Plants (VPPs)	Non-Residential & Residential	6,158	1.61	17.71	1098.6%	Yes	Yes
A.5: Vehicle-Grid-Integration (VGI) Aggregators	Non-Residential	3	[redacted]				
A.6: Residential Customers	Residential	1,802,984	N/A	N/A	N/A	N/A	N/A
B.2: IOU Capacity Bidding Programs	Non-Residential	601	71.02	-1.82	-2.6%	No	No

Table 1-2 summarizes forecasted site enrollments by subgroup, including the A.6 subgroup which is only approved through 2025. For subgroups A.1-BIP, A.2-BIP, A.5, and B.2 enrollments are expected to remain flat and end after 2027. Subgroups A.1 and A.4 are expected to grow until 2027. Subgroup A.6 enrollment is forecasted to decline until 2025 when it will be either renewed or discontinued.

[1] The average weekday event results incorporate impacts across multiple event windows (e.g. 6 pm to 9 pm and 8pm to 9 pm) as not all groups and events were dispatched for the same event windows.

Table 1-2: Summary of Ex ante Site Enrollments

Year	A.1	A.1-BIP	A.2-BIP	A.4	A.5	A.6	B.2	Total
2023	10,394	13	18	6,125	3	1,610,556	559	1,627,668
2024	11,770	13	18	6,944	3	1,493,633	700	1,513,081
2025	13,502	13	18	7,985	3	1,261,526	700	1,283,747
2026	15,035	13	18	8,681	3	0	700	24,450
2027	16,384	13	18	9,185	3	0	700	26,303

Table 1-3 summarizes portfolio adjusted ELRP dispatchable ex ante reductions under August monthly peaking conditions for a PG&E 1-in-2 weather year. Table 1-4 shows the same for program specific impacts. ELRP load reductions are assumed to be a function of curtailment of weather sensitive load on a percent basis except for exporting subgroups (A.4, A.5) for which reductions are the same for all weather specifications in PY 2023. The results in the table below reflect the reduction capability from 4pm to 9pm, which aligns with resource adequacy requirements. [redacted]

Table 1-3: Summary of Portfolio Adjusted Ex Ante Dispatchable Demand Reductions, August Monthly Peak Day, PG&E 1-in-2 Weather

Year	A.1	A.1-BIP	A.2-BIP	A.4	A.5	A.6	B.2	Total
2023	22.56	2.20	2.41	17.37	[redacted]	50.21	0.82	95.58
2024	26.26	4.88	1.74	19.14	[redacted]	60.70	1.00	113.72
2025	30.28	4.88	1.74	22.01	[redacted]	54.19	1.00	114.10
2026	33.81	4.88	1.74	23.93	[redacted]	0.00	1.00	65.35
2027	36.91	4.88	1.74	25.32	[redacted]	0.00	1.00	69.84

Table 1-4: Summary of Program Specific Ex Ante Dispatchable Demand Reductions, August Monthly Peak Day, PG&E 1-in-2 Weather

Year	A.1	A.1-BIP	A.2-BIP	A.4	A.5	A.6	B.2	Total
2023	22.63	0.00	0.00	17.37	[redacted]	53.75	1.06	94.81
2024	26.26	0.00	0.00	19.14	[redacted]	63.60	1.27	110.27
2025	30.28	0.00	0.00	22.01	[redacted]	55.89	1.27	109.45
2026	33.81	0.00	0.00	23.93	[redacted]	0.00	1.27	59.01
2027	36.91	0.00	0.00	25.32	[redacted]	0.00	1.27	63.49