



Demand Side Analytics

DATA DRIVEN RESEARCH AND INSIGHTS

REPORT

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2021 SCE Agricultural & Pumping Interruptible Demand Response Evaluation



Confidential information is redacted and denoted with black highlighting: [REDACTED]

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1 EXECUTIVE SUMMARY

The Agricultural & Pumping Interruptible (AP-I) program is a longstanding demand response program in Southern California Edison (SCE)'s territory. In exchange for a monthly bill credit, customers agree to participate in DR events with no notice. During an event, a signal is sent to a switch installed on customer pumps and other agricultural loads. Events can be called for CAISO Emergencies, SCE load reduction, system contingencies, or program evaluation. At the end of an event, SCE sends another signal to switch load back on, although a subset of circuits must be restarted manually. Events can be called for up to 6 hours each, up to 40 hours per month, or 150 hours per year. Events cannot be called more than once per day or more than four times in a week. Event participation included 964 enrolled customers for the only event of 2021. For this event day, where all participating customers are dispatched, the program provided an average of 28.77 MW (59.6%) of load shed. Including only the full event hours (6 pm to 8 pm), the aggregate impact was 36.12 MW (74.7%).

Table 1: Ex Post Impacts – All Event Hours vs Full Event Hours

Date	Group	# Dispatched	Reference	Average Customer (kW)			% Impact	Agg. Impact (MW)
				Observed	Impact	95% CI		
7/9/2021 (5:50pm to 8:54pm)	All Hours	964	50.09	20.25	29.84	29.46 – 30.22	59.6	28.77
	Full Hours	964	50.15	12.69	37.47	37.09 – 37.85	74.7	36.12

The event in PY2021 was called for system reliability conditions and as such, does not start and end on the top of the hour. To better reflect the program capability, the majority of tables in this report, such as Table 2, shows results for full dispatch hours only; that is, when the program was in place for the full 60 minutes, excluding partial hours. For the full event hours, the majority of impacts came from the Big Creek/Ventura LCA, which delivered 30.55MW of the 36.12MW in the full hours of the event. This was due the large number of customers in the LCA – 825 of the 964 participants. This is in contrast to the Outside LA Basin LCA where customers were larger – with an average reference load of nearly 68kW and per customer impact of 58.04 kW – but due to the small group size, only delivered an aggregate impact of 2.67MW. The participants in the LA Basin provided significantly lower per-customer impacts than the average participant.

Table 2: Ex Post Impacts by LCA – Full Hours

LCA	# Dispatched	Reference	Observed	Average Customer (kW)			% Impact	Agg. Impact (MW)
				Impact	95% CI			
Outside LA Basin	46	67.85	9.81	58.04	55.99 – 60.09	85.5		2.67
LA Basin	93	42.82	11.63	31.19	30.06 – 32.32	72.8		2.90
Big Creek/Ventura	825	49.99	12.96	37.03	36.62 – 37.44	74.1		30.55
All	964	50.15	12.69	37.47	37.09 – 37.85	74.7		36.12

As shown in Table 3, AP-I enrollment is projected to decrease from the 964 participants enrolled on the 2021 event day to a constant 934 participants for the next ten years, pending any program changes. SCE recently received approval for proposed program changes, such as temporary exemption from the prohibited resources policy, suspension of the reliability cap, and year-round open enrollment. The current enrollment forecast reflects a similar trend to new enrollments received during the 2020 April window. The proposed changes may impact the number of new enrollments received, however the additional interest has not been quantified and is not factored into this forecast.

Table 3: AP-I Ex Ante Enrollment Forecast

Program/Portfolio	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Portfolio	934	934	934	934	934	934	934	934	934	934	934
Program	934	934	934	934	934	934	934	934	934	934	934

AP-I impacts are determined by the percent of installed switches being successfully dispatched. Over the ex ante forecast horizon, the switch paging success rate is expected to grow as shown in Table 4, with additional investment in upgrading switches and improving the paging network during this time.

Table 4: AP-I Ex Ante Switch Paging Success Rate Forecast

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Switch Success Rate (%)	75.0	75.6	76.3	76.9	77.6	78.2	78.8	79.5	80.1	80.8	81.4

As enrollment stays constant and the switch paging success rate increases over the next ten years, aggregate August Peak Day impacts will increase over time, ranging from 29.94MW in 2022 (SCE 1-in-10) to 32.80MW in 2032 (CAISO 1-in-10). In general, 1-in-10 weather conditions produce nearly the same impacts as 1-in-2. SCE 1-in-10 results are slightly lower than SCE 1-in-2 results for two reasons. First, AP-I is not as weather sensitive a program as the Summer Discount Plan or Smart Energy Program. While pumping loads do tend to vary with temperature, seasonality is a bigger driver of loads than hourly temperature. Second, nearly 80% of customers enrolled in this program are mapped to SCE's weather station 51. That station's ex ante weather forecast is slightly lower for the August Peak Day SCE 1-in-10 than 1-in-2¹. Regardless of weather, the aggregate impacts are quite similar across weather scenarios, with the AP-I program delivering at least 30MW of load reduction on August event days.

Table 5: AP-I Aggregate Portfolio Ex Ante Impacts (MW) - August Peak Day

Forecast Year	SCE 1-in-2	SCE 1-in-10	CAISO 1-in-2	CAISO 1-in-10
2022	30.08	29.94	30.13	30.22
2023	30.34	30.19	30.39	30.48
2024	30.59	30.45	30.65	30.74
2025	30.85	30.70	30.90	31.00
2026	31.11	30.96	31.16	31.26
2027	31.36	31.21	31.42	31.51
2028	31.62	31.47	31.67	31.77
2029	31.88	31.72	31.93	32.03
2030	32.13	31.98	32.19	32.29
2031	32.39	32.24	32.44	32.55
2032	32.65	32.49	32.70	32.80

¹ More detail on the weather associated with the ex ante scenarios can be found in Appendix 9