

A wide-angle photograph of the San Diego skyline at night, viewed from across the water. The city lights are reflected on the water's surface. The skyline includes several prominent skyscrapers, some with unique architectural features like the pointed top of the San Diego-Coronado Center. The sky is dark, and the overall scene is illuminated by the warm and cool lights of the city.

2018 SDG&E AC Saver Day Ahead (Residential)

4/26/2019

PROGRAM OVERVIEW – AC SAVER DA

- » First year the program is marketed as AC Saver DA
 - Previously Reduce Your Use Thermostat (PTR)
- » Two Options for Participation
 - Free Thermostat – ecobee thermostat (closed to new enrollments)
 - Bring Your Own Thermostat (BYOT) - Nest or ecobee thermostat
- » 4 degree set back for ecobee thermostats
- » Proprietary signaling algorithm for Nest (includes pre-cooling)
- » Participants receive
 - \$50 e-gift card for each thermostat enrolled (limit two)
 - \$20 for staying enrolled and connected through the end of the event season



PROGRAM OVERVIEW – AC SAVER DA

» Program Availability

- Can be called from noon to 9 p.m.
- Maximum event length of 4 hours
- No maximum number of dispatches

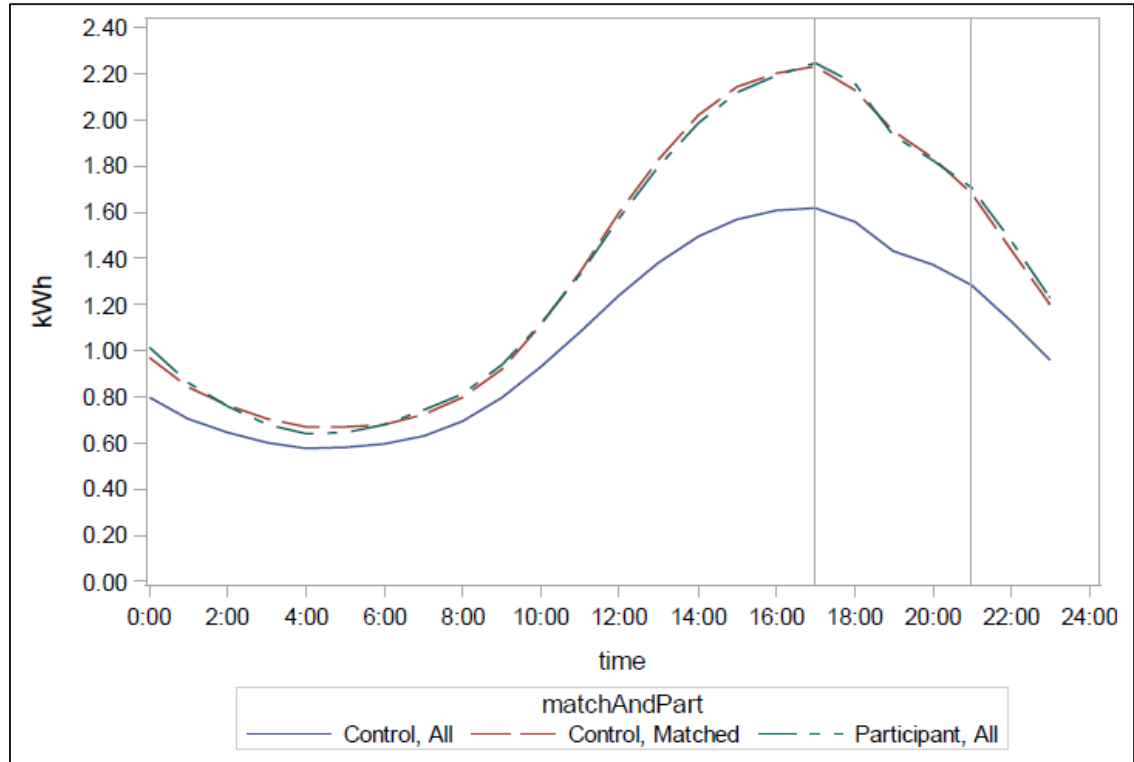
» Eighteen dispatches in 2018 season

- First event on June 11th
- Last event on September 27th
- Forty-one hours of use



METHODOLOGY

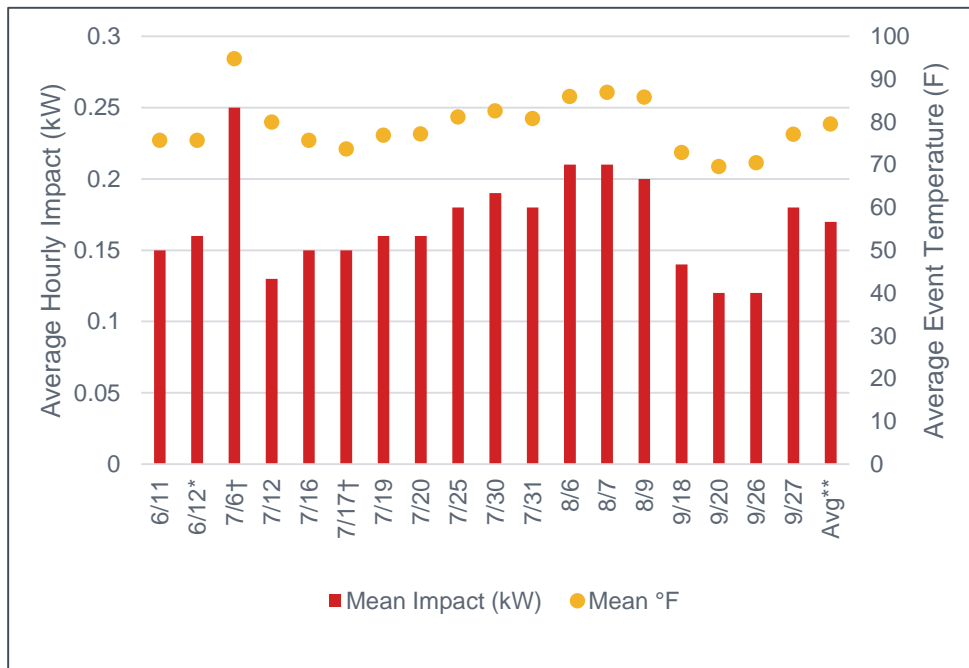
- » Compared participant and reference hourly residential loads
- » Reference loads calculated from matched control groups of non-program participants
- » Control groups selected via Stratified Propensity Score Matching
 - One stage of matching using interval data
- » Logistic regression model to estimate probability of participation



METHODOLOGY

- » Impact models based on aggregate hourly residential loads for opt-in matched controls
- » Final model specifications included variables for hour, day of the week, month, cooling degree hours (CDH65), event indicators, enrollment status, dummy variables for event days, event hours and band hours
- » The program impacts were modeled for each hour separately using six variables:
 - The ***dummy variable*** that indicates ***event days***.
 - The ***dummy variable*** that indicates ***event hours***.
 - The ***dummy variable*** that indicates ***band hours***.
 - The ***interaction*** of ***cooling degree hours*** with ***event day dummy variables***.
 - The ***interaction*** of ***cooling degree hours*** with ***event hour dummy variables***.
 - The ***interaction*** of ***cooling degree hours*** with ***band hour dummy variables***.

EX-POST AVERAGE PARTICIPANT IMPACT



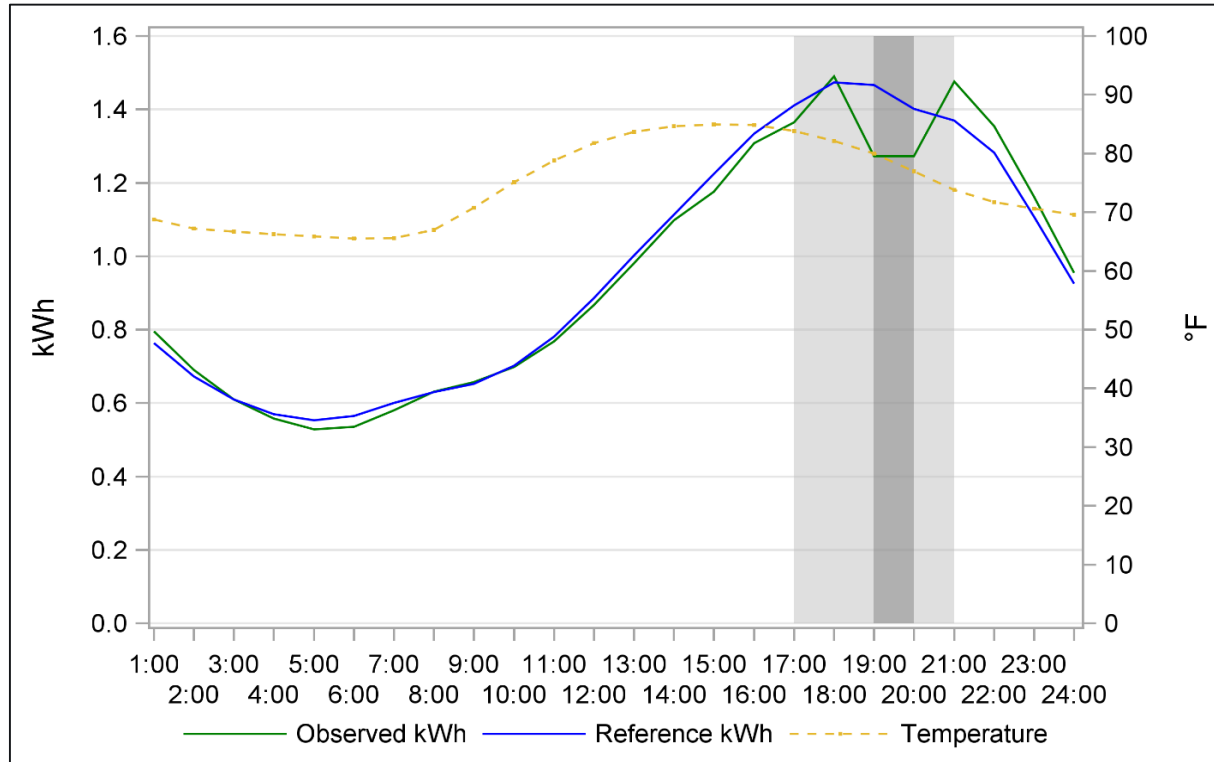
- » Average participant level impacts ranged from **0.12 kW to 0.25 kW** and temperatures ranging from **69.6F to 94.8F**
- » On average, 10,007 participants achieved **1.7 MW** in load reductions **per event hour**
- » **Majority of events from 6pm-8pm**

* Three-hour event starting at 5:00pm and ending at 8:00pm

† Four-hour event: the July 6th event started at 4:00pm and ended at 8:00pm, the July 17th event started at 5:00pm and ended at 9:00pm

**Averages represent the average of all event hours

RESULTS – 2018 AVERAGE EVENT



» Overall, the **average event hour impact** was **0.17 kw per hour** across all events with an **average of 10,007 active participants** during an event.

RESULTS – 2018 AVERAGE BY EVENT DURATION

Two Hour Event

Hour	Mean °F	Mean Reference Load (kW)	Mean Observed Load (kW)	Mean Impact (kW)	% Load Reduction	Mean Active Participants	Mean Aggregate Load Reduction (kW)	Number of Events*
Pre-Hour	81.9	1.47	1.54	-0.07	-5.30%	10,135	-737	15
Hour 1	79.9	1.44	1.25	0.19	13.90%	10,135	1,973	15
Hour 2	77	1.39	1.25	0.14	10.30%	10,135	1,424	15
Post Hour 1	73.8	1.37	1.49	-0.12	-7.70%	10,135	-1,178	15
Post Hour 2	71.8	1.28	1.35	-0.07	-4.70%	10,135	-701	15
Event Average	78.5	1.42	1.25	0.17	12.10%	10,135	1,699	15

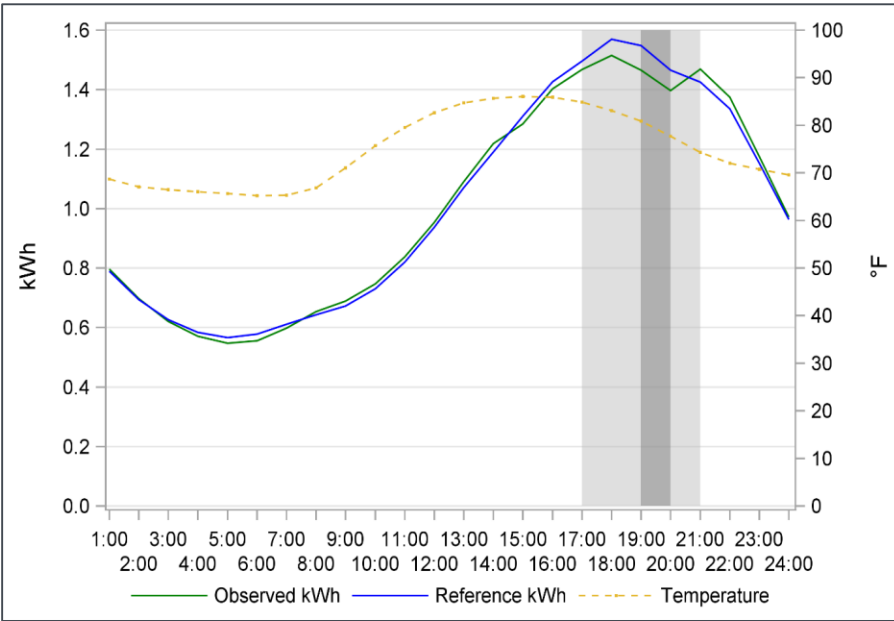
Events Longer than Two Hours

Hour	Mean °F	Mean Reference Load (kW)	Mean Observed Load (kW)	Mean Impact (kW)	% Load Reduction	Mean Active Participants	Mean Aggregate Load Reduction (kW)	Number of Events*
Pre-Hour	86.1	1.39	1.47	-0.08	-5.3%	9,366	-739	3
Hour 1	85.0	1.45	1.20	0.25	17.5%	9,366	2,375	3
Hour 2	82.7	1.50	1.33	0.17	12.3%	9,366	1,573	3
Hour 3	79.3	1.54	1.37	0.17	11.1%	9,366	1,604	3
Hour 4	80.2	1.71	1.56	0.15	9.0%	9,495	1,440	2
Post Hour 1	74.5	1.35	1.49	-0.14	-9.1%	9,366	-1,295	3
Post Hour 2	72.0	1.26	1.33	-0.07	-4.5%	9,366	-666	3
Event Average	81.9	1.53	1.34	0.19	12.8%	9,389	1,776	3

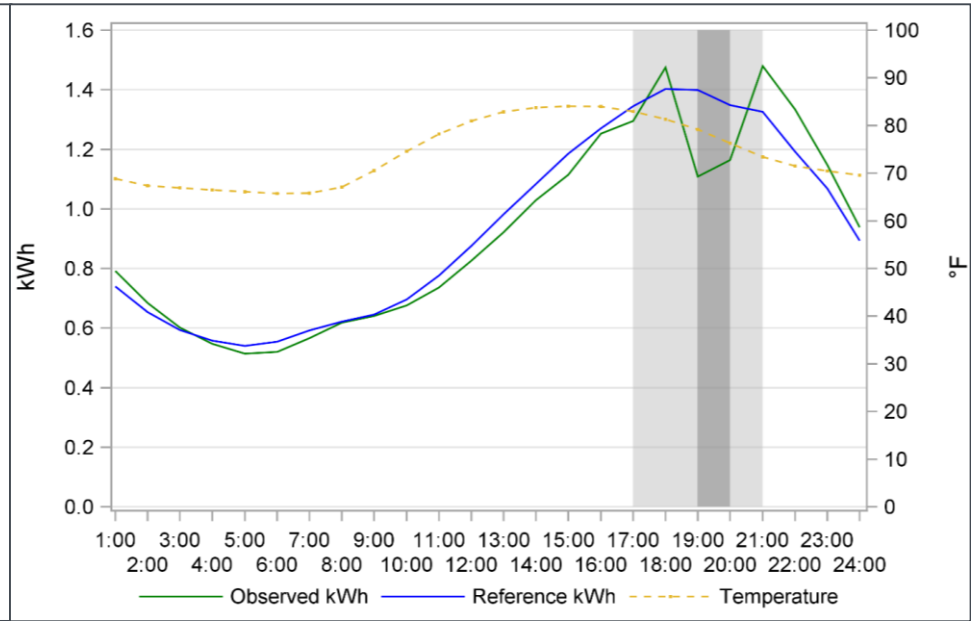
* Events included in this “Events Longer than two hours” are June 12th, July 6th, and July 17th, events

RESULTS – 2018 AVERAGE BY THERMOSTAT SOURCE

Free Thermostats



BYOTs



RESULTS – 2018 AVERAGE BY THERMOSTAT SOURCE

- » On average, **BYOT** participants **out performed Free** participants, despite slightly higher average temperatures

Customer Category	Active Participants	Mean Reference Load (kW)	Mean Observed Load (kW)	Mean Impact (kW)	% Load Reduction	Aggregate Load Reduction (MW)	Mean °F
All	10,007	1.45	1.28	0.17	12.1%	1.70	79.5
Free	4,217	1.52	1.44	0.08	6.4%	0.35	80.3
BYOT	5,536	1.38	1.14	0.24	17.1%	1.35	78.8

EX ANTE METHODOLOGY

» Data sources

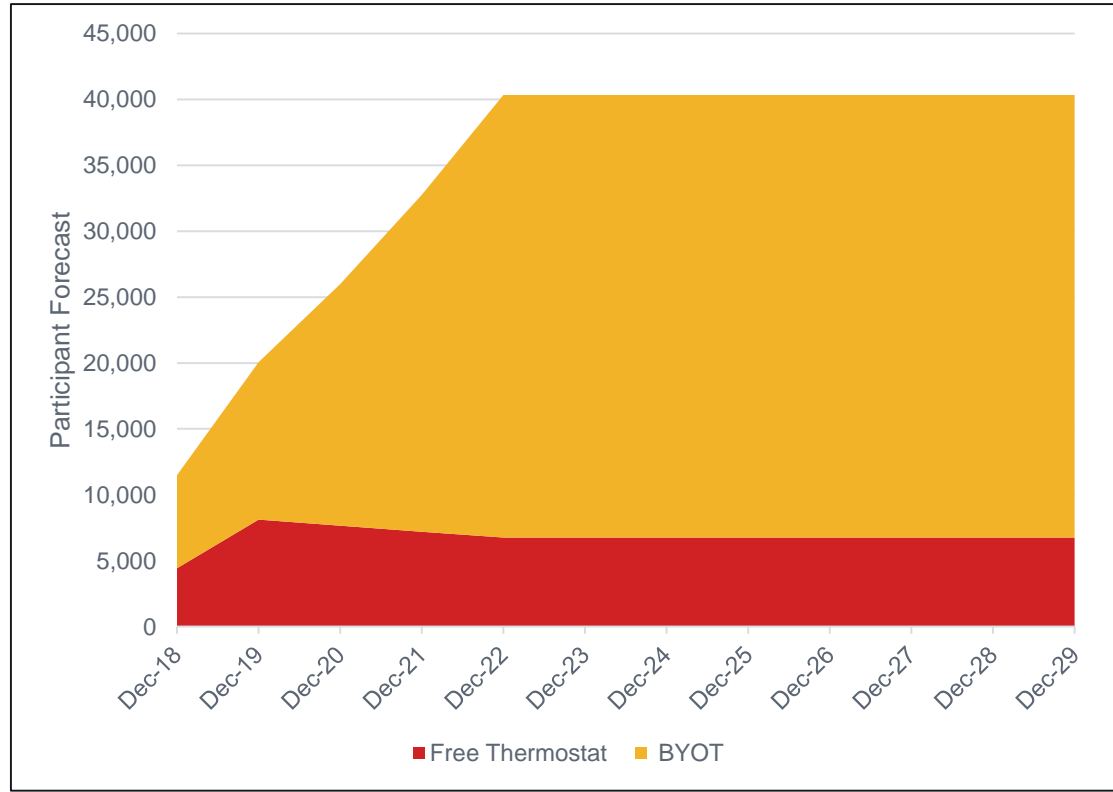
- 2018 ex post regression model results
- 10-year residential AC Saver DA enrollment forecast
- SDG&E and CAISO weather scenarios

1. Calculate per participant average reference loads, observed loads, and load impacts

- Ex Ante Adjustments
 - Event hour 16 (4 p.m. to 5 p.m.) uses estimation results from hour 17 (5 p.m. to 6 p.m.)
 - Event hour 20 (8 p.m. to 9 p.m.) uses estimation results from hour 19 (7 p.m. to 8 p.m.)

2. Combine results for the different weather scenarios with forecast of enrolled participants to generate the total program impacts

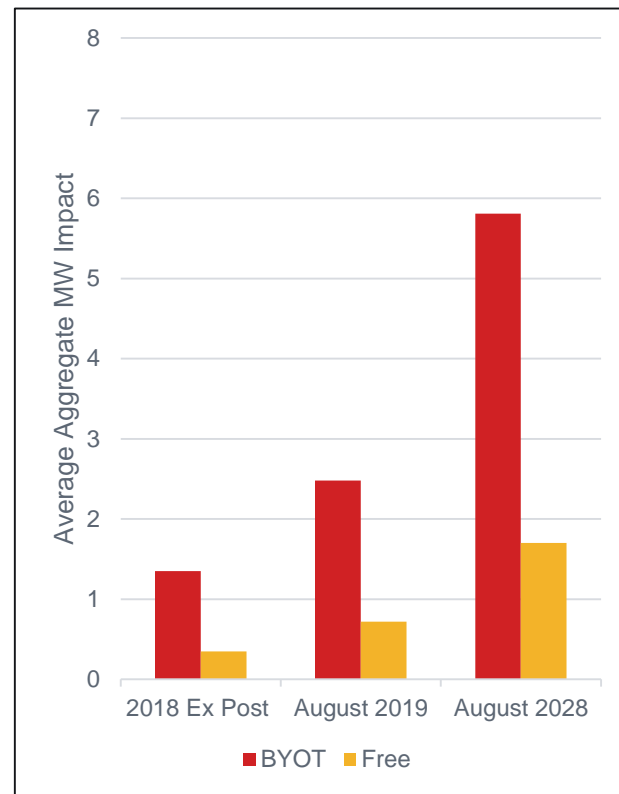
EX ANTE ENROLLMENT FORECAST



- » The program is estimated to **increase to 20,053** participants **by the end of 2019**
- » **By 2022**, the program is estimated to have **roughly 40,000 thousand participants** and maintain a constant participant population through 2029

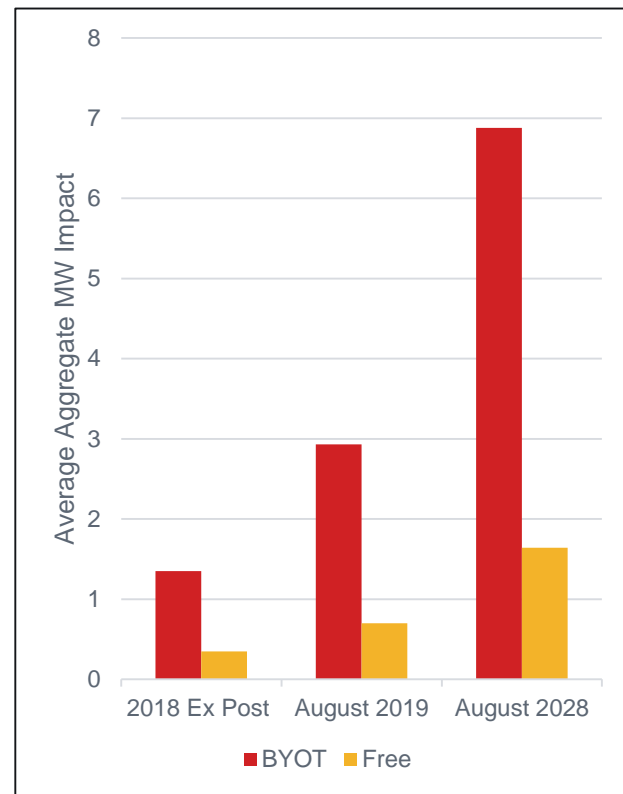
EX ANTE – SDG&E 1-IN-2 WEATHER SCENARIO

Control Strategy	Day / Type	Month	SDG&E 1-in-2			
			Avg. Hourly Impact (kWh)	Percent Load Reduction	Enrollment Forecast	Avg. Total Hourly Impact (MWh)
BYOT	Typical Event Day	Aug 2019	0.226	14.3%	10,965	2.48
		Aug 2028	0.226	14.3%	25,707	5.81
Free	Typical Event Day	Aug 2019	0.116	6.8%	6,236	0.72
		Aug 2028	0.116	6.8%	14,620	1.70
All	Typical Event Day	Aug 2019	0.172	10.5%	17,202	2.96
		Aug 2028	0.172	10.5%	40,327	6.94



EX ANTE – SDG&E 1-IN-10 WEATHER SCENARIO

Control Strategy	Day / Type	Month	SDG&E 1-in-10			
			Avg. Hourly Impact (kWh)	Percent Load Reduction	Enrollment Forecast	Avg. Total Hourly Impact (MWh)
BYOT	Typical Event Day	Aug 2019	0.267	14.5%	10,965	2.93
		Aug 2028	0.267	14.5%	25,707	6.88
Free	Typical Event Day	Aug 2019	0.112	5.6%	6,236	0.70
		Aug 2028	0.112	5.6%	14,620	1.64
All	Typical Event Day	Aug 2019	0.185	9.7%	17,202	3.18
		Aug 2028	0.185	9.7%	40,327	7.46



EX ANTE / EX POST SDG&E 1-IN-2 COMPARISON

Participant Segment	Control Strategy	Weather Year	Day / Type	Average Hourly Reference Load (kW)	Average Hourly Observed Load (kW)	Average Hourly Impact (kW)	Percent Load Reduction	Average °F
AC Saver DA	BYOT	SDG&E 1-In-2	August System Peak Day	1.69	1.45	0.24	14.5%	83.58
		Ex Post	Ex Post Average Event Day	1.36	1.12	0.25	18.1%	77.98
	Free	SDG&E 1-In-2	August System Peak Day	1.87	1.76	0.11	6.1%	85.18
		Ex Post	Ex Post Average Event Day	1.54	1.46	0.08	5.0%	79.31
	ALL	SDG&E 1-In-2	August System Peak Day	1.77	1.59	0.18	10.1%	84.16
		Ex Post	Ex Post Average Event Day	1.44	1.28	0.17	11.6%	78.59

Note: The Ex Post results for comparison to ex ante are from 34 out of 43 event hours. These 34 hours represent events that ran from hour 18 and 19 only between June 11th and Sep 26th, 2018.

EX ANTE / EX POST SDG&E 1-IN-10 COMPARISON

Participant Segment	Control Strategy	Weather Year	Day / Type	Average Hourly Reference Load (kW)	Average Hourly Observed Load (kW)	Average Hourly Impact (kW)	Percent Load Reduction	Average °F
AC Saver DA	BYOT	SDG&E 1-In-10	August System Peak Day	1.86	1.60	0.27	14.3%	86.86
		Ex Post	Ex Post Average Event Day	1.36	1.12	0.25	18.1%	77.98
	Free	SDG&E 1-In-10	August System Peak Day	2.01	1.90	0.11	5.7%	87.79
		Ex Post	Ex Post Average Event Day	1.54	1.46	0.08	5.0%	79.31
	ALL	SDG&E 1-In-10	August System Peak Day	2.01	1.90	0.11	5.7%	87.79
		Ex Post	Ex Post Average Event Day	1.44	1.28	0.17	11.6%	78.59

Note: The Ex Post results for comparison to ex ante are from 34 out of 43 event hours. These 34 hours represent events that ran from hour 18 and 19 only between June 11th and Sep 26th, 2018.

THANK YOU



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