California Statewide Critical Peak Pricing Evaluation

DRMEC 2017 Spring Workshop

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Agenda

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- Program Description
- Ex Post Load Impacts
  - Methodology
  - PG&E Impacts
  - SCE Impacts
  - SDG&E Impacts
- Ex Ante Load Impacts
  - Methodology
  - PG&E Impacts
  - SCE Impacts
  - SDG&E Impacts
- Conclusions & Recommendations

Program Description

- Critical Peak Pricing (CPP) is an electric rate in which a utility charges a higher price for consumption of electricity during peak hours on selected days, referred to as critical peak days or event days
  - Typically, CPP **hours** coincide with the utility's peak demand—**SDG&E**'s events last from **11 AM to 6 PM** while **PG&E**'s and **SCE**'s last from **2 to 6 PM**
    - SDG&E requested to change the on peak period from 11am to 6pm to 4pm-9pm in the last GRP2 filing. The CPP period would change to be 2pm - 6pm consistent with the other IOUs
  - The higher price during peak hours on critical event days is designed to **encourage reductions in demand** and reflects the fact that electric demand during those hours drives a substantial portion of electric infrastructure costs
  - Each utility typically calls **event days 5 to 15 times a year** based on their **system conditions** when demand is high and supply is short
  - System load patterns across utilities are not always coincidental, particularly between Northern and Southern California
  - Comparisons of impacts between the utilities should be made with caution
  - No event dates were common to all utilities, though 3 days were common between PG&E and SCE, and 1 day was common between PG&E and SDG&E

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Program Description

- CPP is the default rate for large customers, and is offered to small and medium customers on a voluntary basis
  - PG&E began defaulting small and medium business (SMB) customers onto CPP in 2014—defaulting will continue in large batches each November through 2016
  - SDG&E defaulted all small and medium customers to CPP from November 2015 through April 2016. SDG&E's small commercial CPP evaluation was handled under a separate evaluation and results are not included here.
- CPP enrollment[1] by utility and customer size

Utility	Large >200 kW	Medium 20 kW to 199 kW	Small <20 kW
PG&E	2,018	35,891	172,558
SCE	2,545	520	525
SDG&E	1,299	11,237	-

- Hours of Availability and Actual Use

Utility	Hours of Availability	Hours of Actual Use	No. of Available Dispatches	No. of Actual Dispatches
PG&E	60	48	15	12
SCE	60	48	15	12
SDG&E	126	6	18	1

[1] Enrollment from average event day in 2016.

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Ex Post Methodology

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Methodology for large default customers consistent across utilities

- Large C&I Customers, SCE & SDG&E Medium C&I Customers
  - Used matched control groups with difference-in-differences panel regressions
  - Yields unbiased results for average event
  - Matches evaluated using out-of-sample testing
  - Load impacts for customers that are large or idiosyncratic for which matching was not successful were estimated using individual customer regressions (0% at PG&E, 12% at SCE, 1% at SDG&E)
- PG&E SMB
  - SMB Customers Methodology same as above but all customers successfully matched
  - Homogeneous population and availability of large control group facilitated finding similar control group counterparts for all customers
  - SCE does not yet have default SMB customers

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PG&E Ex Post Results

Large C&I Customers

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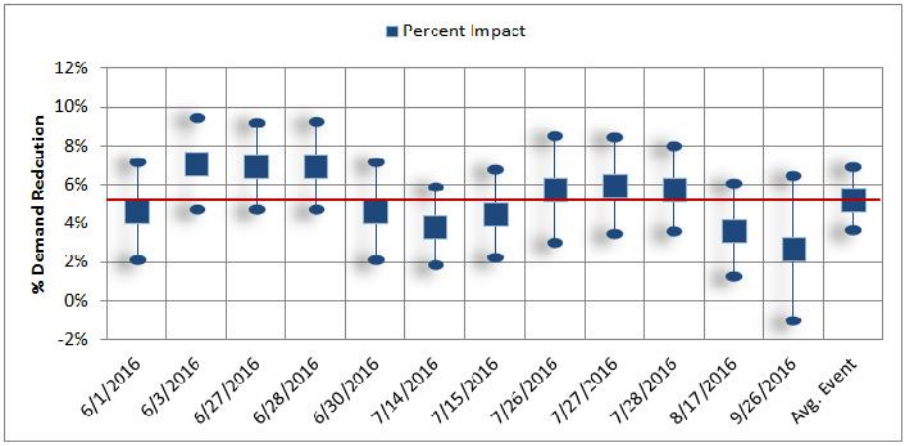
PG&E's average load reduction for large C&I customers was 5.2%, or 30.7 MW across the 12 event days in June-September 2016



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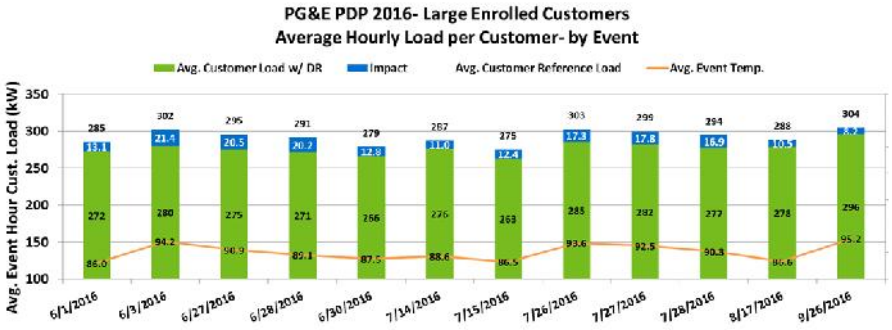
Event Summary

- PDP was called for 12 events in 2016, compared to 15 in 2015
- Significant differences between 2015 and 2016
  - 2015: events were distributed more evenly from June through September
  - 2016: events were more front loaded in June and July, with only single events in August and September



PG&E detailed event load impacts- Large C&I

Event Date	Day of Week	Accounts	Avg. Customer Reference Load	Avg. Customer Load w/ DR	Impact	Aggregate Impact	% Reduction	Avg. Event Temp.	Daily Max. Temp.
			(kW)	(kW)	(kW)	(MW)	(%)	(°F)	(°F)
6/1/2016	Wed	2,060	285.2	272.1	13.1	27.1	4.6%	86.0	86.8
6/3/2016	Fri	2,060	301.8	280.4	21.4	44.0	7.1%	94.2	94.9
6/27/2016	Mon	2,039	295.3	274.8	20.5	41.8	6.9%	90.9	91.5
6/28/2016	Tue	2,038	291.1	270.9	20.2	41.3	7.0%	89.1	89.9
6/30/2016	Thu	2,038	278.7	265.9	12.8	26.0	4.6%	87.5	88.1
7/14/2016	Thu	2,028	286.9	275.9	11.0	22.2	3.8%	88.6	89.0
7/15/2016	Fri	2,028	275.0	262.7	12.4	25.1	4.5%	86.5	87.1
7/26/2016	Tue	2,019	302.5	285.2	17.3	34.9	5.7%	93.6	94.1
7/27/2016	Wed	2,016	299.5	281.7	17.8	35.8	5.9%	92.5	93.3
7/28/2016	Thu	2,015	294.2	277.3	16.9	34.0	5.7%	90.3	90.9
8/17/2016	Wed	1,977	288.5	278.0	10.5	20.7	3.6%	86.6	87.3
9/26/2016	Mon	1,902	304.5	296.2	8.2	15.6	2.7%	95.2	95.8
Avg. Event		2,018	291.9	276.6	15.2	**30.7**	5.2%	90.1	90.6
Utility System Peak Hr.		2,016	284.2	263.9	20.3	**40.9**	7.1%	91.4	93.3
Statewide System Peak Hr.		2,016	297.6	277.9	19.7	**39.8**	6.6%	92.9	93.3

- Utility system peak hour: 40.9 MW (July 27, HE18)
- Statewide system peak hour: 39.8 MW (July 27, HE17)
- Average event hour: 30.7 MW

Average event temperature shown for event hours 2-6 PM and for single hour for utility and system peak hour.

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PG&E Ex Post Results

SMB Customers

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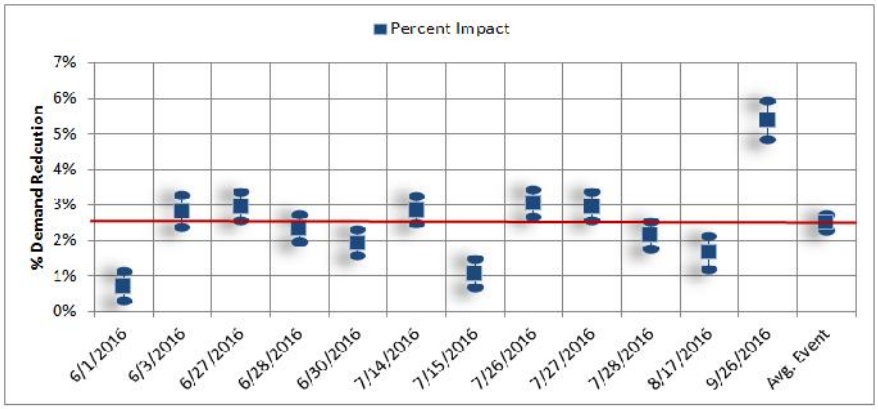
PG&E's average load reduction for SMB customers was 2.5%, or 25.4 MW across the 12 event days in June-September 2016



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PG&E detailed event load impacts- SMB Customers

Event Date	Day of Week	Accounts	Avg. Customer Reference Load	Avg. Customer Load w/ DR	Impact	Aggregate Impact	% Reduction	Avg. Event Temp.	Daily Max. Temp.
			(kW)	(kW)	(kW)	(MW)	(%)	(°F)	(°F)
6/1/2016	Wed	209,807	4.7	4.7	0.0	7.1	0.7%	84.5	85.3
6/3/2016	Fri	209,791	5.0	4.9	0.1	29.6	2.8%	92.9	93.5
6/27/2016	Mon	208,711	5.0	4.8	0.1	30.5	3.0%	90.0	90.7
6/28/2016	Tue	208,646	5.0	4.9	0.1	24.1	2.3%	88.1	89.0
6/30/2016	Thu	208,465	4.8	4.7	0.1	19.2	1.9%	86.3	86.9
7/14/2016	Thu	207,284	4.9	4.7	0.1	28.7	2.8%	87.5	87.9
7/15/2016	Fri	207,231	4.5	4.5	0.0	10.0	1.1%	85.2	85.9
7/26/2016	Tue	206,607	5.1	5.0	0.2	32.1	3.0%	92.3	92.8
7/27/2016	Wed	206,550	5.2	5.0	0.2	31.5	3.0%	91.3	92.1
7/28/2016	Thu	206,495	5.0	4.9	0.1	22.0	2.1%	89.1	89.7
8/17/2016	Wed	203,127	4.8	4.7	0.1	16.1	1.7%	85.3	85.9
9/26/2016	Mon	198,723	5.0	4.8	0.3	53.9	5.4%	94.5	95.1
Avg. Event		206,786	4.9	4.8	0.1	**25.4**	2.5%	88.9	89.5
Utility System Peak Hr.		206,550	4.6	4.5	0.1	**25.1**	2.6%	90.1	92.1
Statewide System Peak Hr.		206,550	5.2	5.0	0.2	**32.4**	3.0%	91.7	92.1

- Utility system peak hour: 25.1 MW (July 27, HE18)
- Statewide system peak hour: 32.4 MW (July 27, HE17)
- Average event hour: 25.4 MW

Average event temperature shown for event hours 2-6 PM and for single hour for utility and system peak hour

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PG&E Ex Post Results

All Customers

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PG&E detailed event load impacts- All Customers

Event Date	Day of Week	Accounts	Avg. Customer Reference Load	Avg. Customer Load w/ DR	Impact	Aggregate Impact	% Reduction	Avg. Event Temp.	Daily Max. Temp.
			(kW)	(kW)	(kW)	(MW)	(%)	(°F)	(°F)
6/1/2016	Wed	213,385	7.6	7.4	0.2	35.3	2.2%	73.0	86.8
6/3/2016	Fri	212,452	7.9	7.6	0.4	74.5	4.4%	76.7	91.5
6/27/2016	Mon	212,389	7.9	7.6	0.3	68.0	4.1%	76.1	89.9
6/28/2016	Tue	213,398	8.0	7.7	0.3	71.9	4.2%	77.5	94.9
6/30/2016	Thu	212,218	7.6	7.4	0.2	46.6	2.9%	73.0	88.1
7/14/2016	Thu	211,089	7.8	7.5	0.3	53.4	3.3%	75.0	89.0
7/15/2016	Fri	211,042	7.3	7.2	0.2	34.1	2.2%	72.9	87.1
7/26/2016	Tue	210,460	8.2	7.9	0.3	67.4	3.9%	77.4	94.1
7/27/2016	Wed	210,403	8.2	7.9	0.3	69.8	4.0%	78.1	93.3
7/28/2016	Thu	210,354	8.0	7.7	0.3	59.2	3.5%	76.2	90.9
8/17/2016	Wed	207,009	7.7	7.5	0.2	37.3	2.3%	73.0	87.3
9/26/2016	Mon	202,643	8.1	7.8	0.3	70.0	4.2%	78.2	95.8
Avg. Event		210,569	7.9	7.6	0.3	**57.3**	3.5%	75.6	90.6
Utility System Peak Hr.		210,403	7.5	7.2	0.3	**70.4**	4.5%	90.1	93.3
Statewide System Peak Hr.		210,403	8.2	7.8	0.4	**75.0**	4.4%	91.7	93.3

- Utility system peak hour: 70.4 MW (July 27, HE18)
- Statewide system peak hour: 75.0 MW (July 27, HE17)
- Average event hour: 57.3 MW

Average event temperature shown for event hours 2-6 PM and for single hour for utility and system peak hour.

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SCE Ex Post Results

Large C&I Customers

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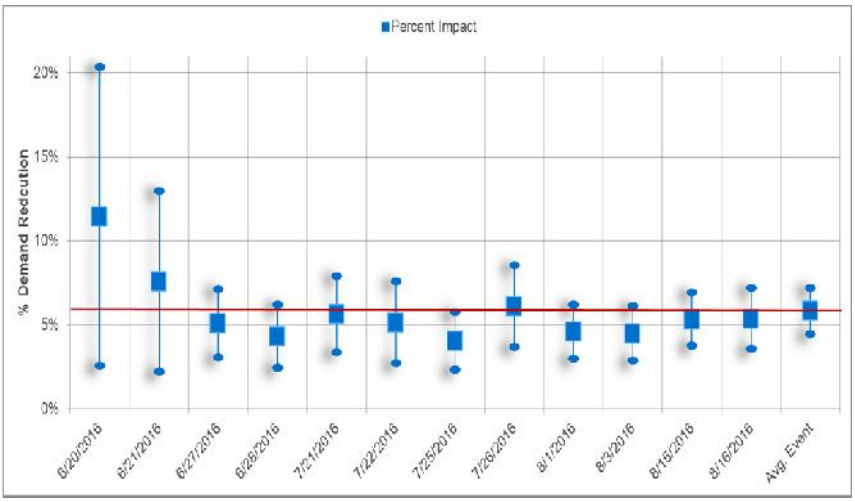
SCE's average load reduction was 5.8%, or 34.4 MW across the 12 event days in June-August 2016



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SCE detailed event load impacts- Large C&I

Event Date	Day of Week	Accounts	Avg. Customer Reference Load	Avg. Customer Load w/ DR	Impact	Aggregate Impact	% Reduction	Avg. Event Temp.	Daily Max. Temp.
			(kW)	(kW)	(kW)	(MW)	(%)	(°F)	(°F)
6/20/2016	Monday	2,551	252.3	223.5	28.8	73.6	11.4%	101.3	102.9
6/21/2016	Tuesday	2,551	231.0	213.5	17.5	44.6	7.6%	84.1	87.0
6/27/2016	Monday	2,554	227.9	216.3	11.5	29.4	5.1%	88.0	91.9
6/28/2016	Tuesday	2,553	227.4	217.6	9.8	25.0	4.3%	86.7	89.2
7/21/2016	Thursday	2,544	234.8	221.6	13.1	33.4	5.6%	93.0	95.4
7/22/2016	Friday	2,546	231.2	219.4	11.8	30.1	5.1%	96.5	98.5
7/25/2016	Monday	2,544	232.3	223.0	9.4	23.8	4.0%	89.8	92.7
7/26/2016	Tuesday	2,545	237.1	222.7	14.4	36.7	6.1%	90.8	93.4
8/1/2016	Monday	2,539	227.2	216.8	10.4	26.3	4.6%	85.3	88.0
8/3/2016	Thursday	2,538	227.9	217.7	10.2	25.8	4.5%	84.1	86.5
8/15/2016	Monday	2,544	238.4	225.7	12.7	32.2	5.3%	92.4	95.1
8/16/2016	Tuesday	2,542	237.6	224.9	12.7	32.3	5.3%	90.9	93.5
Avg. Event		2,545	233.8	220.2	13.5	**34.4**	5.8%	90.2	92.7
Utility System Peak Hr.		2,551	248.14	218.73	29.42	**75.04**	11.9%	102.0	102.9
Statewide System Peak Hr.		-	-	-	-	**-**	-	-	-

- Utility system peak hour: 75.0 MW (June 20, HE 17 – very hot day)
- Statewide system peak hour: 0 MW (no event on July 27, HE17)
- Average event hour: 34.4 MW

Average event temperature shown for event hours 2-6 PM and for single hour for utility and system peak hour.

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SDG&E Ex Post Results

Large C&I Customers

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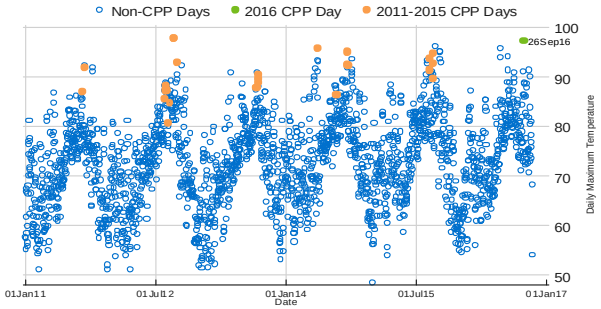
2016 event in comparison with previous event days



Date	Avg Event Temp	Mean17	Avg Event % Impact
08/27/15	88.7	80	7.3
08/28/15	91.4	82.5	8.8
9/9/2015	94.8	86.1	11
9/10/2015	92.7	85.2	8.6
9/11/2015	87.5	82.5	5.5
09/26/16	97.8	81.7	2.6

The 2016 event produced lower average impacts per customer than prior years, likely attributable to several factors:

- One of the hottest days for SDG&E in the past five years
- Only the third Monday event in that period
- Event notifications went out late on Sunday evening
- First event for a large portion of the customers
- Significant change in the mix of customers

SDG&E ex post impacts delivered 21.7MW on the only 2016 event day

Size	Event Date	Day of Week	Accounts	Avg. Customer Reference Load	Avg. Customer Load w/ DR	Impact	Aggregate Impact	% Reduction	Avg. Event Temp.	Daily Max. Temp.
				(kW)	(kW)	(kW)	(MW)	(%)	(°F)	(°F)
>200kW	9/26/2016	Monday	1,299	283.4	273.8	9.6	12.4	3.4%	98	100
	Utility System Peak Hr.			258.5	252.4	6.1	7.9	2.3%	98	100
	Statewide System Peak Hr.			-	-	-	-	-	-	-
20kW-200kW	9/26/2016	Monday	11,237	40.2	39.4	0.8	9.3	1.7%	98	100
	Utility System Peak Hr.			36.8	36.2	0.6	6.7	1.3%	98	100
	Statewide System Peak Hr.			-	-	-	-	-	-	-

- Utility system peak hour: 14.6 MW (September 26, HE18)
  - Impacts declined by hour, so despite system peak between 5-6pm, CPP only delivered 14.6 MW
- Statewide system peak hour: 0 MW (July 27, HE17)
  - CPP was not dispatched on the statewide system peak
- Small (<20kW) Commercial CPP was handled under a separate evaluation and results are not included here

Notes:
1. Average event temperature shown for event hours 11AM-6 PM and for single hour for utility and system peak hour.
2. Customers on the A6-TOU, AY-TOU, AL-TOU and AD-TOU rates enrolled in CPP are in the statewide CPP report. Smaller customers on the TOU-A rates (below 20 kW annual maximum demand) are contained in a separate evaluation report. A very small amount of customers on the A6, AY, AL and AD rates were below 20 kW annual max demand, and are included with the medium 20 kW to 200 kW customers.

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Ex Ante Methodology

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Ex ante estimates relied on available historical data

- The steps involved in the analysis are as follows:

1. Calculate Percent Impacts

Utility	Size	Years Included	Segments Impacts Estimated By
PG&E	Large	2016	LCA/Transmission Planning Area
	SMB	2016	LCA/Transmission Planning Area
SCE	Large	2015 + 2016	LCA/Transmission Planning Area
	Medium	2015 + 2016	LCA/Transmission Planning Area
SDG&E	Large	2015 + 2016 when available, 2016 otherwise	Dual Enrollment Status, Existing vs New
	Medium	2016	Dual Enrollment Status

   - PG&E SMB results used for projected SMB impacts at SCE;

2. Model reference load as a function of temperature, by geographic area;
3. Apply reference load model to ex ante weather conditions;
4. Combine percent impacts and reference load for each set of ex ante conditions to get kW impacts for the average customer; and
5. Multiply average customer impacts by ex ante enrollment.

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PG&E Ex Ante Results

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PG&E Enrollment Projections by Size, Forecast Year and Month

Size	Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Large: Greater than 200 kW	2017	2,239	2,239	2,646	2,646	2,646	2,646	2,646	2,646	2,646	2,646	3,128	3,128
	2018	3,128	3,128	3,387	3,387	3,387	3,387	3,387	3,387	3,387	3,387	3,478	3,478
	2027	3,518	3,518	3,523	3,523	3,523	3,523	3,523	3,523	3,523	3,523	3,523	3,523
Medium: 20 kW to 199.99 kW	2017	51,132	51,132	51,132	51,132	51,132	51,132	51,132	51,132	51,132	51,132	66,756	66,756
	2018	66,756	66,756	66,756	66,756	66,756	66,756	66,756	66,756	66,756	66,756	68,451	68,451
	2027	73,393	73,393	73,393	73,393	73,393	73,393	73,393	73,393	73,393	73,393	73,873	73,873
Small: Less than 20 kW	2017	174,522	174,522	174,522	174,522	174,522	174,522	174,522	174,522	174,522	174,522	230,616	230,616
	2018	230,616	230,616	230,616	230,616	230,616	230,616	230,616	230,616	230,616	230,616	236,605	236,605
	2027	261,606	261,606	261,606	261,606	261,606	261,606	261,606	261,606	261,606	261,606	263,374	263,374
All Customers	2017	227,893	227,893	228,300	228,300	228,300	228,300	228,300	228,300	228,300	228,300	300,500	300,500
	2018	300,500	300,500	300,759	300,759	300,759	300,759	300,759	300,759	300,759	300,759	308,534	308,534
	2027	338,517	338,517	338,522	338,522	338,522	338,522	338,522	338,522	338,522	338,522	340,770	340,770

- Due to additional large customers that are scheduled to be defaulted onto CPP, PG&E projects that large C&I CPP enrollment will grow to 3,478 by November 2018 and will then remain essentially flat
- For medium and small customers, an additional wave of customers with at least 24 months of experience on TOU will be defaulted in November 2017

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Note: 2015 values are actual from the average event; 2016 and beyond are forecasted.

PG&E Ex Ante Impacts: August 1-in-2 PG&E Weather

Demand Size	Year	Enrollment Forecast	Avg. Load Impact (kW)	Aggregate Load Impact (MW)	Percent Impact (%)
Large: Greater than 200 kW	2018	3,387	14.9	50.4	5.0%
	2027	3,523	14.8	52.3	5.0%
Medium: 20 kW to 199.99 kW	2018	66,756	0.4	28.6	1.8%
	2027	73,393	0.4	31.8	1.8%
Small: Less than 20 kW	2018	230,616	0.1	15.9	3.3%
	2027	261,606	0.1	18.0	3.3%
All Customers	2018	300,759	0.3	94.9	3.0%
	2027	338,522	0.3	102.1	3.0%

- Ex ante impacts use RA window of 1-6 PM, yielding slightly lower impacts and percent reductions than program operating hours
- On the average ex post event day, all customers yielded:
  - Avg. load impact of 0.3 kW, similar to ex ante impact of 0.3 kW
  - Aggregate load impact of 57.3 MW, smaller than ex ante 2018 impact of 94.9 MW, with difference due to higher future enrollment

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Comparison of 2016 PG&E ex ante year estimates to prior year estimates

Demand Size	Weather Year	Year	Accounts		Reference Loads (MW)		Percent Reductions		Aggregate Impacts (MW)	
			2015 Estimates	2016 Estimates	2015 Estimates	2016 Estimates	2015 Estimates	2016 Estimates	2015 Load Impact (MW)	2016 Load Impact (MW)
Large: Greater than 200kW	1-in-10	2018	3,112	3,387	936	1,056	4.9%	4.9%	46.3	51.9
	1-in-2	2018	3,112	3,387	903	1,014	5.0%	5.0%	45.0	50.4
Medium: 20 kW to 199.99 kW	1-in-10	2018	64,334	66,756	1,755	1,671	0.7%	1.8%	12.9	30.7
	1-in-2	2018	64,334	66,756	1,650	1,559	0.7%	1.8%	12.1	28.6
Small: Less than 20kW	1-in-10	2018	260,751	230,616	610	529	0.4%	3.3%	2.4	17.5
	1-in-2	2018	260,751	230,616	557	482	0.4%	3.3%	2.2	15.9
All Customers	1-in-10	2018	328,198	300,759	3,302	3,255	1.9%	3.1%	61.6	100.1
	1-in-2	2018	328,198	300,759	3,110	3,055	1.9%	3.1%	59.3	95.0

- Large:
  - Percent reductions similar between years
  - Enrollment slightly higher
- SMB:
  - Percent reductions improved significantly between years for small and medium
  - Enrollment is slightly higher for medium and significantly lower for small
- Net effect is 62% increase for August 2018 driven by improved SMB performance

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SCE Ex Ante Results

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SCE enrollment projections by size, forecast year and month

Size	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Large: Greater than 200 kW	2016	2,545	2,545	2,545	2,545	2,545	2,545	2,545	2,545	2,545	2,545	2,545	2,545
	2017	2,591	2,591	2,591	2,591	2,591	2,591	2,591	2,591	2,591	2,591	2,591	2,591
	2018	2,591	2,591	2,591	2,591	2,591	2,591	2,591	2,599	2,599	2,607	2,607	2,607
	2027	2,662	2,662	2,662	2,662	2,662	2,662	2,662	2,670	2,670	2,670	2,670	2,670
Medium: 20 kW to 199.99 kW	2016	520	520	520	520	520	520	520	520	520	520	520	520
	2017	536	536	536	536	536	536	536	536	536	536	536	536
	2018	536	536	536	536	536	536	536	536	536	35,334	35,334	35,334
	2027	14,468	14,468	14,468	14,468	14,468	14,468	14,468	14,468	14,468	14,470	14,470	14,470
Small: Less than 20 kW	2016	525	525	525	525	525	525	525	525	525	525	525	525
	2017	523	523	523	523	523	523	523	523	523	523	523	523
	2018	523	523	523	523	523	523	523	523	523	215,731	215,731	215,731
	2027	86,619	86,619	86,619	86,619	86,619	86,619	86,619	86,619	86,619	86,621	86,621	86,621
All Customers	2016	3,590	3,590	3,590	3,590	3,590	3,590	3,590	3,590	3,590	3,590	3,590	3,590
	2017	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650
	2018	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,658	3,658	253,672	253,672	253,672
	2027	103,750	103,750	103,750	103,750	103,750	103,750	103,750	103,758	103,758	103,761	103,761	103,761

- SCE expects that large C&I CPP enrollment will grow by 0.3% per year to approximately 2,670 customers by December 2027.
- SMB customers on a TOU rate will be defaulted onto CPP in October 2018.

Note: 2016 values are actual from the average event; 2017 and beyond are forecasted.

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SCE ex ante impacts: August 1-in-2 SCE weather

Size	Year	Enrollment Forecast	Avg. Load Impact (kW)	Aggregate Load Impact (MW)	Percent Impact (%)
Large: Greater than 200 kW	2018	2,599	11.88	30.88	4.9%
	2027	2,670	11.88	31.73	4.9%
Medium: 20 kW to 199.99 kW	2018	536	0.26	0.14	1.6%
	2027	14,468	0.30	4.33	1.8%
Small: Less than 20 kW	2018	523	0.12	0.06	11.5%
	2027	86,619	0.04	3.04	3.3%
All Customers	2018	3,658	8.50	31.09	4.9%
	2027	103,758	0.38	39.10	4.0%

- Ex ante impacts use RA window of 1-6 PM, yielding slightly lower impacts and percent reductions than program operating hours.
- On average, ex post event day, large customers yielded:
  - Avg. load impact of 13.53 kW, larger than the ex ante impact of 11.88 kW in 2018
  - Aggregate load impact of 34.43 MW, larger than the ex ante impact of 30.88 MW in 2018

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Comparison of 2016 SCE ex ante year estimates to prior year estimates

Demand Size	Weather Year	Year	Accounts		Reference Loads (MW)		Percent Reductions		Aggregate Impacts (MW)	
			2015 Estimates	2016 Estimates	2015 Estimates	2016 Estimates	2015 Estimates	2016 Estimates	2015 Load Impact (MW)	2016 Load Impact (MW)
Large: Greater than 200kW	1-in-10	2018	2,746	2,599	644.3	639.8	4.4%	4.6%	28.6	29.5
	1-in-2	2018	2,746	2,599	630.1	629.0	4.4%	4.9%	28.0	30.9
Medium: 20 kW to 199.99 kW	1-in-10	2018	34,795	536	1,176.7	9.0	0.7%	1.6%	8.6	0.1
	1-in-2	2018	34,795	536	1,130.8	8.7	0.7%	1.6%	8.3	0.1
Small: Less than 20kW	1-in-10	2018	215,205	523	521.1	0.6	0.4%	11.5%	2.0	0.1
	1-in-2	2018	215,205	523	493.1	0.6	0.4%	11.5%	1.9	0.1
All Customers	1-in-10	2018	252,746	3,658	2,342.2	649.4	1.7%	4.6%	39.2	29.7
	1-in-2	2018	252,746	3,658	2,254.0	638.3	1.7%	4.9%	38.2	31.1

- Large C&I:
  - Ex post impacts in 2016 (5.8%) were larger than in 2015 (5%)
  - Ex ante percent reductions in 2016 (4.6-4.9%) were higher than in 2015 (4.4%)
  - 2016 enrollment forecast is about 5% lower than in 2015: due to the reallocation of customers who were defaulted as large but became small and medium for PY 2016.
  - Net effect in 2016 year forecast:
    - 3.1% higher than last year's forecast for 1-in-10 weather conditions
    - 10.4% higher than last year's forecast for 1-in-2 weather conditions
- SMB default was delayed to October 2018

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SDG&E Ex Ante Results

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SDG&E enrollment projections by size, forecast year and month

Size	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Large: Greater than 200 kW	2016	1,299	1,299	1,299	1,299	1,299	1,299	1,299	1,299	1,299	1,299	1,299	1,299
	2017	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425
	2018	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437
	2027	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620
Medium: Between 20kW and 199.99 kW	2016	11,237	11,237	11,237	11,237	11,237	11,237	11,237	11,237	11,237	11,237	11,237	11,237
	2017	11,320	11,320	11,320	11,320	11,320	11,320	11,320	11,320	11,320	11,320	11,320	11,320
	2018	11,221	11,221	11,221	11,221	11,221	11,221	11,221	11,221	11,221	11,221	11,221	11,221
	2027	8,526	8,526	8,526	8,526	8,526	8,526	8,526	8,526	8,526	8,526	8,526	8,526
All Customers	2016	12,536	12,536	12,536	12,536	12,536	12,536	12,536	12,536	12,536	12,536	12,536	12,536
	2017	12,745	12,745	12,745	12,745	12,745	12,745	12,745	12,745	12,745	12,745	12,745	12,745
	2018	12,658	12,658	12,658	12,658	12,658	12,658	12,658	12,658	12,658	12,658	12,658	12,658
	2027	10,146	10,146	10,146	10,146	10,146	10,146	10,146	10,146	10,146	10,146	10,146	10,146

- Large C&I forecast simply reflects the expected growth of SDG&E large customer population
- Medium customer forecast declines over the forecast horizon as customers opt out of CPP

Notes:
1. 2016 values are actual from the average event; 2017 and beyond are forecasted.
2. Customers on the A6-TOU, AY-TOU, AL-TOU and AD-TOU rates enrolled in CPP are in the statewide CPP report. Smaller customers on the TOU-A rates (below 20 kW annual maximum demand) are contained in a separate evaluation report. A very small amount of customers on the A6, AY, AL and AD rates were below 20 kW annual max demand, and are included with the medium 20 kW to 200 kW customers.

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SDG&E ex ante impacts: August 1-in-2 SDG&E weather

Size	Year	Enrollment Forecast	Avg. Load Impact (kW)	Aggregate Load Impact (MW)	Percent Impact (%)
Large: Greater than 200 kW	2018	1,437	23.3	33.5	8.2%
	2027	1,620	23.6	38.2	8.4%
Medium: Between 20kW and 199.99 kW	2018	11,221	0.3	2.9	0.7%
	2027	8,526	0.3	2.2	0.7%
All Customers	2018	12,658	2.9	36.4	4.3%
	2027	10,146	4.0	40.4	5.1%

- Ex ante impacts use RA window of 1-6 PM, which is shorter than SDG&E's CPP program window of 11AM – 6PM
- Lower ex post impacts in 2016 drove smaller ex ante impacts for customers with only one event from which to model ex ante performance
- Additional analysis of the ex ante impacts is underway

Note: Customers on the A6-TOU, AY-TOU, AL-TOU and AD-TOU rates enrolled in CPP are in the statewide CPP report. Smaller customers on the TOU-A rates (below 20 kW annual maximum demand) are contained in a separate evaluation report. A very small amount of customers on the A6, AY, AL and AD rates were below 20 kW annual max demand, and are included with the medium 20 kW to 200 kW customers.

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Comparison of 2016 SDG&E ex ante year estimates to prior year estimates

Demand Size	Weather Year	Year	Accounts		Reference Loads (MW)		Percent Reductions		Aggregate Impacts (MW)	
			2015 Estimates	2016 Estimates	2015 Estimates	2016 Estimates	2015 Estimates	2016 Estimates	2015 Load Impact (MW)	2016 Load Impact (MW)
Large: Greater than 200kW	1-in-10	2018	1,295	1,437	292.3	409.6	7.7%	8.1%	22.5	33.4
	1-in-2	2018	1,295	1,437	307.7	406.8	8.3%	8.2%	25.5	33.5
Medium: Between 20kW and 199.99 kW	1-in-10	2018	16,260	11,221	531.9	445.6	0.9%	0.7%	4.9	3.0
	1-in-2	2018	16,260	11,221	569.4	441.4	0.9%	0.7%	5.2	2.9
All Customers	1-in-10	2018	17,555	12,658	824.1	855.2	3.3%	4.3%	27.4	36.4
	1-in-2	2018	17,555	12,658	877.2	848.2	3.5%	4.3%	30.8	36.4

- Large:
  - Higher forecasted enrollment than in 2015 evaluation
  - Larger customers relative to 2015 drove higher reference loads, producing higher impacts despite similar percent reductions
- Medium:
  - Lower enrollment than in the 2015 evaluation drove smaller aggregate impacts despite per-customer reference loads being slightly higher in the 2016 evaluation.
- Net effect is an increase of 5-9MW for an August monthly peak day between the 2015 and 2016 evaluation.

Note: Customers on the A6-TOU, AY-TOU, AL-TOU and AD-TOU rates enrolled in CPP are in the statewide CPP report. Smaller customers on the TOU-A rates (below 20 kW annual maximum demand) are contained in a separate evaluation report. A very small amount of customers on the A6, AY, AL and AD rates were below 20 kW annual max demand, and are included with the medium 20 kW to 200 kW customers.

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Conclusions and Recommendations

- PG&E and SCE large customers exhibited similar performance to 2015
- Large customers at SDG&E provided significantly smaller average kW impacts in 2016 compared to 2015, likely due to several factors including extreme temperature conditions, a Monday event, and notifications being sent late on Sunday
- PG&E SMB average impacts per customer increased significantly in 2016, possibly due to a learning curve or a greater awareness
- SDG&E newly defaulted medium customer performance was generally comparable to PG&E medium customer performance
- Recommendations
  - SDG&E should call more events in the 2017 season across a variety of day types to help provide supporting evidence that the 2016 impacts were an anomaly and not indicative of a trend
  - Consider developing an experimental design to vary the number and timing of event dispatches across customers for the 2017 event season to learn more about the PG&E SMB segment. Absent a proper experiment, additional quasi-experimental research may be warranted to better understand whether impacts are affected by a learning curve.

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