



California Energy Commission

Time of Use Rate Scenarios Demand Analysis Working Group

**2017 Integrated Energy Policy Report
California Energy Commission**

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Overview of Methodology

1. Model Default Pilot Rates – revenue neutral to CEC annual rate forecast
2. Estimate elasticities by forecast zone, building type, month, and day
3. Loads: adjust 2015 load profiles consistent with demand forecast
 - consumption per household and household projections
 - Hourly AAEE
4. Project Households and Participants
5. Estimate per household impact 2020-2030
 - Adjust for default effect based on SMUD SPO Pilot
6. Apply impact/participant to number of participants
7. Apply percentage impact to participant hourly load



Scenario Assumptions

- Mid Case
 - Fixed peak-to-off peak rate differential
 - Moderate “default effect” adjustment 35%
 - Exclude CARE/FERA in hot climate zones
 - Opt-out rate 10% (instead of 5%)
 - Include but delay new CCA customers?
- Low Demand/High Rates/High Engagement
 - peak-to-off peak ratio increases 1.2% annually
 - default effect adjustment = 25%
 - Include CARE/FERA in hot climate zones
 - Opt-out rate 5%
- High Demand/Low Rates/Low Engagement
 - Fixed peak-to-off peak rate differential
 - default effect adjustment = 45%
 - Exclude CARE/FERA in hot climate zones
 - Opt-out rate 10%



Rate Modeling

- Estimated elasticities from Statewide Pricing Pilot (SPP) vary with AC saturations which increase slightly over the forecast, and average cooling or heating degrees per hour
- Summer model excluding AC saturation coefficients appears a better fit for non-summer months than original SPP winter estimates
- SPP CES model is driven by peak/off peak price ratios, but opt-in pilot results illustrate that at the relatively low price ratios of pilot rates, load impacts are often about the same for rates with different ratios
- A peak/offpeak price ratio of about 1.7 (summer) and 1.45 (winter) produces results roughly consistent with the 2016/17 opt-in pilot study



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SDG&E Per Household Impact before reducing for default effect Mean kW Reduction during peak period

	SDG&E Opt-in Pilot Rate 2		CEC Staff Default Pilot Rate 1, 2020	
	Peak (4-9PM)	Off-Peak	Peak (4-9)	Off-Peak
January 2017	0.013	(0.003)	0.007	(0.002)
February 2017	0.009	0.001	0.006	(0.002)
March 2017	0.009	(0.003)	0.003	(0.001)
April 2017	0.005	(0.003)	0.004	(0.001)
May 2017	0.015	(0.006)	0.009	(0.003)
June 2017	0.023	(0.008)	0.025	(0.007)
July 2016	0.022	(0.001)	0.028	(0.008)
August 2016	0.039	0.006	0.035	(0.010)
September 2016	0.035	0.015	0.034	(0.010)
October 2016	0.023	0.008	0.027	(0.008)
November 2016	0.014	(0.003)	0.003	(0.001)
December 2016	0.003	(0.010)	0.008	(0.002)



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PG&E Per Household Impact before reducing for default effect Mean kW Reduction Peak Period

	PG&E Opt-in Pilot Rate 1		CEC Staff Default Pilot Rate 1, 2020	
	Peak (4-9PM)	Off Peak	Peak (4-9)	Off Peak
January 2017	0.024	0.018	0.009	(0.003)
February 2017	0.018	(0.001)	0.008	(0.002)
March 2017	0.016	(0.017)	0.001	(0.002)
April 2017	0.013	(0.008)	0.002	(0.002)
May 2017	0.033	0.001	0.003	(0.002)
June 2017	0.058	0.004	0.048	(0.010)
July 2016	0.070	(0.011)	0.051	(0.010)
August 2016	0.064	(0.007)	0.050	(0.010)
September 2016	0.047	(0.006)	0.041	(0.008)
October 2016	0.034	0.002	0.004	(0.002)
November 2016	0.033	0.017	0.002	(0.002)
December 2016	0.040	0.012	0.010	(0.003)



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SCE Per Household Impact before reducing for default effect Mean kW Reduction during the peak period

	Opt-in Pilot Rate 1	Opt-in Pilot Rate 2	CEC Staff Default Pilot Rate 1
	Peak (2-8 PM)	Peak (5-8PM)	Peak (4-9)
January 2017	0.002	0.005	0.006
February 2017	0.009	0.023	0.006
March 2017	0.006	0.011	0.004
April 2017	0.004	0.008	0.004
May 2017	0.020	0.016	0.004
June 2017	0.034	0.024	0.050
July 2016	0.053	0.060	0.054
August 2016	0.073	0.067	0.065
September 2016	0.040	0.040	0.057
October 2016	0.016	0.019	0.005
November 2016	0.020	0.021	0.004
December 2016	0.005	0.022	0.007



Default Effect Adjustment

- Reduce estimated load impacts based on SMUD SPO to adjust for complacent and unaware participants:

Offer	Average Impact per Customer (kW) 2012-2013	95% CI	95% CI	Reference Load (kW)	Impact as % of Reference Load
Opt-in TOU, No IHD	0.16	0.12	0.21	1.72	9.40%
Default TOU, IHD	0.11	0.08	0.14	1.86	5.80%

Source: SmartPricing Options Final Evaluation, Sept. 2014, Table 4-1, p.33

Percent Difference between Default and Opt-in:	-31%			8%	-38%
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IOU Excluded Customers

Customer Exclusions	PG&E	SCE	SD&E
Medical Baseline, Third-Party Notification, in-person utility visit required before disconnection.	3.7%	2.1%	2.1%
No advanced meter (SmartMeter™).	2.1%	2.1%	2.1%
Customers on TOU rate.	3.9%	1.0%	2.6%
Participants in the Opt-In Pilot and control group (current or former).	0.4%	0.4%	1.0%
Master-metered, vessel or mobile home.	0.4%	0.4%	0.3%
Low quality interval reads.	1.9%	1.9%	1.9%
Non-participating current and planned CCAs and Direct Access customers; existing CCA included but disaggregate by LSE	8.2%	1.6%	0.1%
CARE / FERA customers in Hot Climate zones -reduce for overlap	7.0%	12.4%	0.2%
Less than 12 months of interval data.	15.0%	20.0%	25.0%
MF moves every 3 years; 40% choose TOU			
SF moves every 5 years; 60% choose TOU			



Opt-Out Assumptions

Opt-in Pilot opt-out rates for Rates 1 & 2:

PG&E: 3.5 - 4.5%

SCE: 2-3%

SDGE: 1 - 3.5%

(Source: California Statewide Opt-in Time-of-Use Pricing Pilot, Second Interim Evaluation, November 1, 2017, Nexant, Inc. and Research Into Action)

- These customers have financial incentive to stay enrolled & bill protection
- Assumption for IOU Mid Case 8-10%?
- SMUD 4% because the flat rate will be set higher



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Households on Default TOU Rate (Revised Demand Forecast Household Projections - Exempt - Opt-outs)

		Households	Participants (000s)	Participation Rate
PG&E	2020	4,950	2,860	58%
	2025	5,231	3,086	59%
	2030	5,502	3,313	60%
SCE	2020	4,551	2,401	53%
	2025	4,777	2,602	54%
	2030	4,996	2,802	56%
SDG&E	2020	1,281	747	58%
	2025	1,337	877	66%
	2030	1,388	979	71%
SMUD	2020	587	564	96%
	2025	623	598	96%
	2030	655	629	96%



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Mid Case Average Peak Period Load Reductions (MW) 10% Opt-Out Rate

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PG&E	2020	17	16	2	3	5	94	101	97	81	7	4	19
	2025	18	16	2	3	5	99	105	102	85	7	5	20
	2030	19	17	2	3	6	106	113	109	91	8	5	21
SCE	2020	10	10	7	7	6	82	89	106	93	8	7	11
	2025	11	10	7	7	7	87	95	112	99	8	8	12
	2030	11	11	7	7	7	94	103	122	107	9	8	13
SDG&	2020	3	3	2	2	4	13	14	18	18	14	2	4
	2025	4	4	2	2	5	15	17	21	21	16	2	4
	2030	4	4	2	2	6	17	19	24	24	19	2	5
SMUD	2020	3	3	-	-	-	53	56	53	41	2	3	3
	2025	3	3	-	-	-	57	60	56	44	2	3	3
	2030	3	4	-	-	-	60	63	59	47	3	3	3



Next Steps

- Revise estimates of excluded customers and CCAs by forecast zone as needed
- Evaluating super-off peak modeling (SCE and SMUD)
- Calibrate to final revised forecast and adjust with forthcoming AAEE estimates