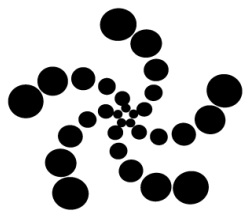# 2019 Load Impact Evaluation for Pacific Gas & Electric Company's SmartRate™ Program

Convergence
Data Analytics

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DRMEC workshop
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CALMAC Study ID PGE0445

Program background

Program description

- SmartRate™ is a voluntary critical peak pricing program that overlays a standard electric rate, active May through October

- **Summer non-event hours:** credit of $0.024 / kWh*

- **SmartDays™ 2 - 7 pm:** peak-price of $0.60 / kWh

- Minimum of 9 and a maximum of 15 SmartDays™ in a year: 9 in 2019

- Day-ahead notification via phone, text and/or email

- First year bill protection

- 2018 and prior "Dual enrollment" customers

* These credits are adjusted slightly for customers on an E-TOU rate.

Customer characteristics

- 2018 and prior Dual Enrolled customers
- CARE customers
- TOU rates: opt-in, default-in, not in
- LCAs (seven in PG&E's territory)
  - Humboldt
  - North Coast/North Bay,
  - Greater Bay Area, Sierra
  - Stockton
  - Greater Fresno
  - Kern
  - Other – uncongested locations

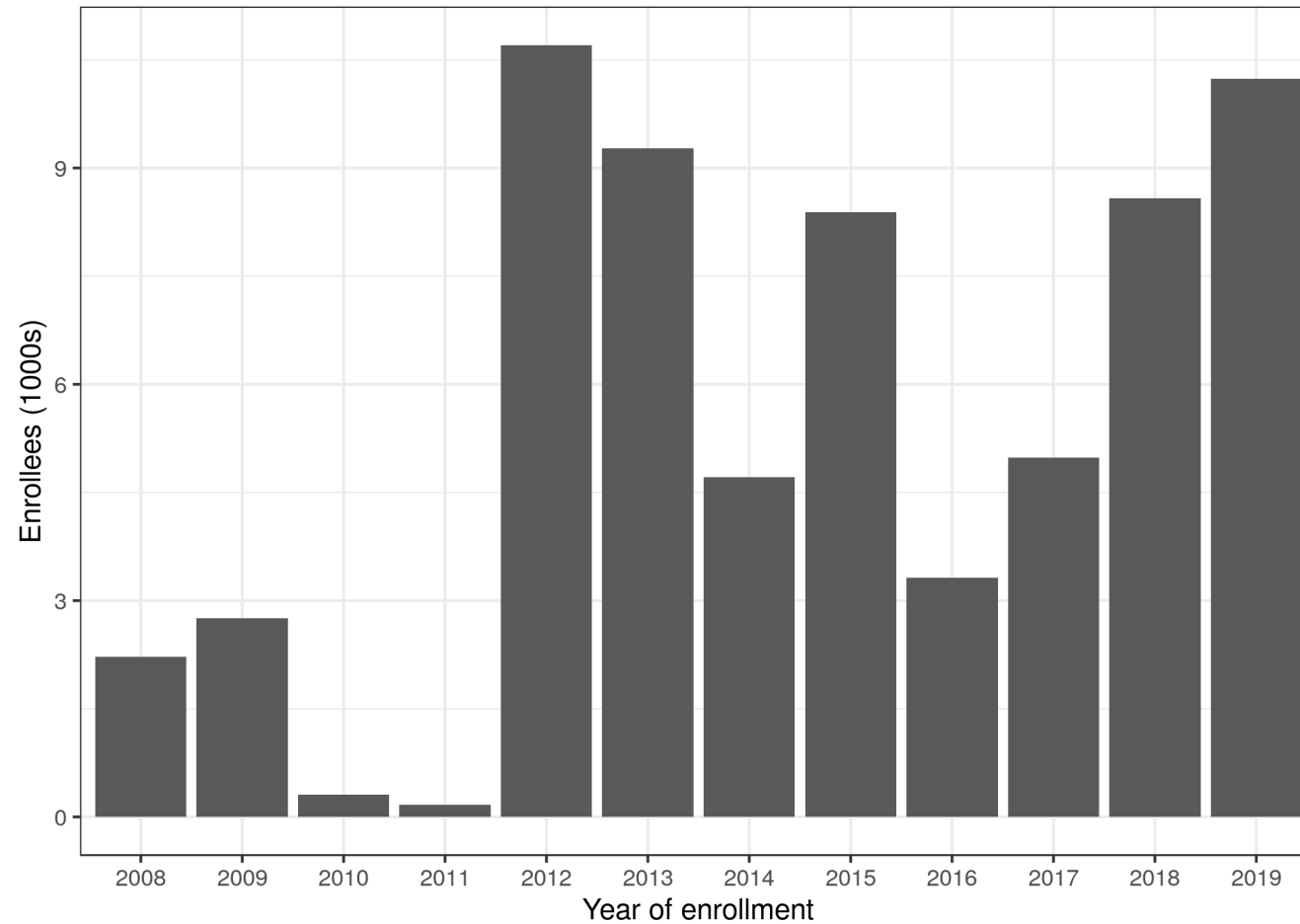California Local Reliability Areas (LRA)
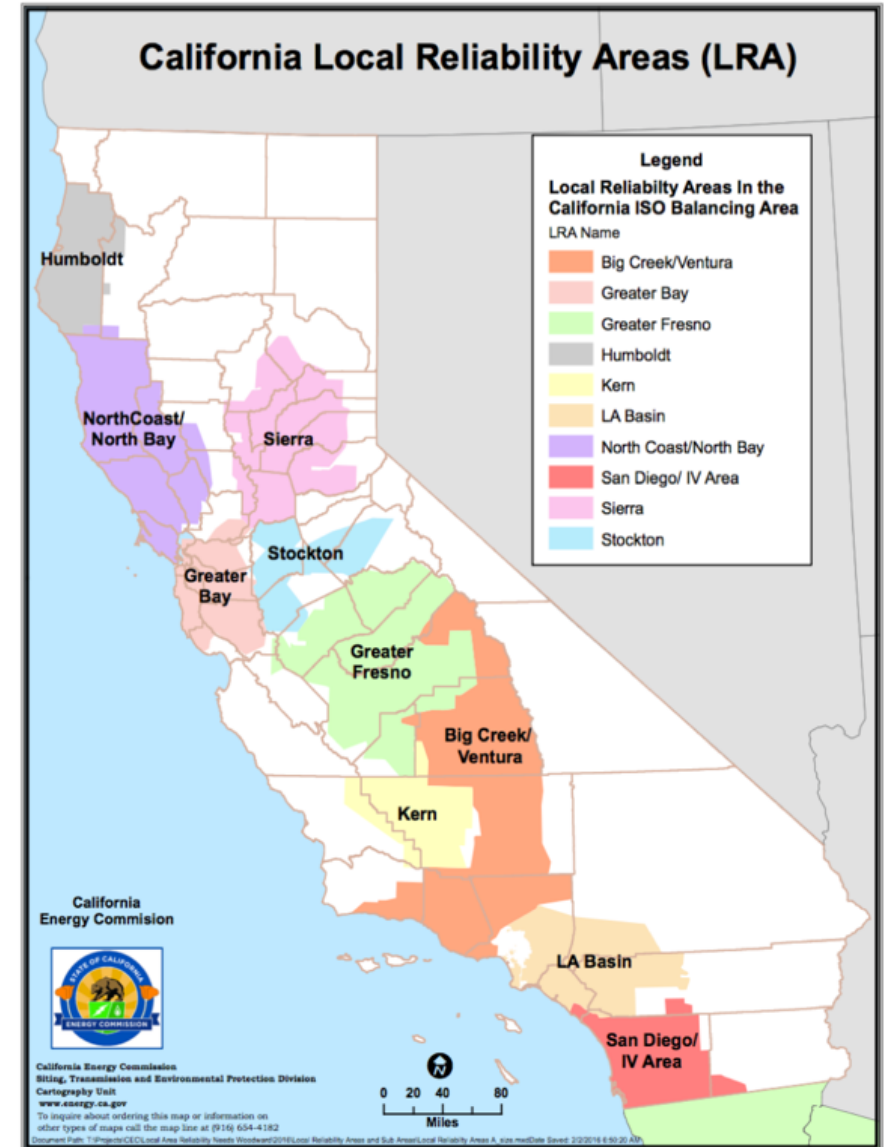
2019 enrollment changes: CCAs

- 66,500 customers in a typical event during 2019

- CCA de-enrollment
  - East Bay Community Energy
  - San Jose Community Energy
  - Clean Power San Francisco

- Down approximately 44,000 customers between the end of the 2018 season and start of the 2019 season
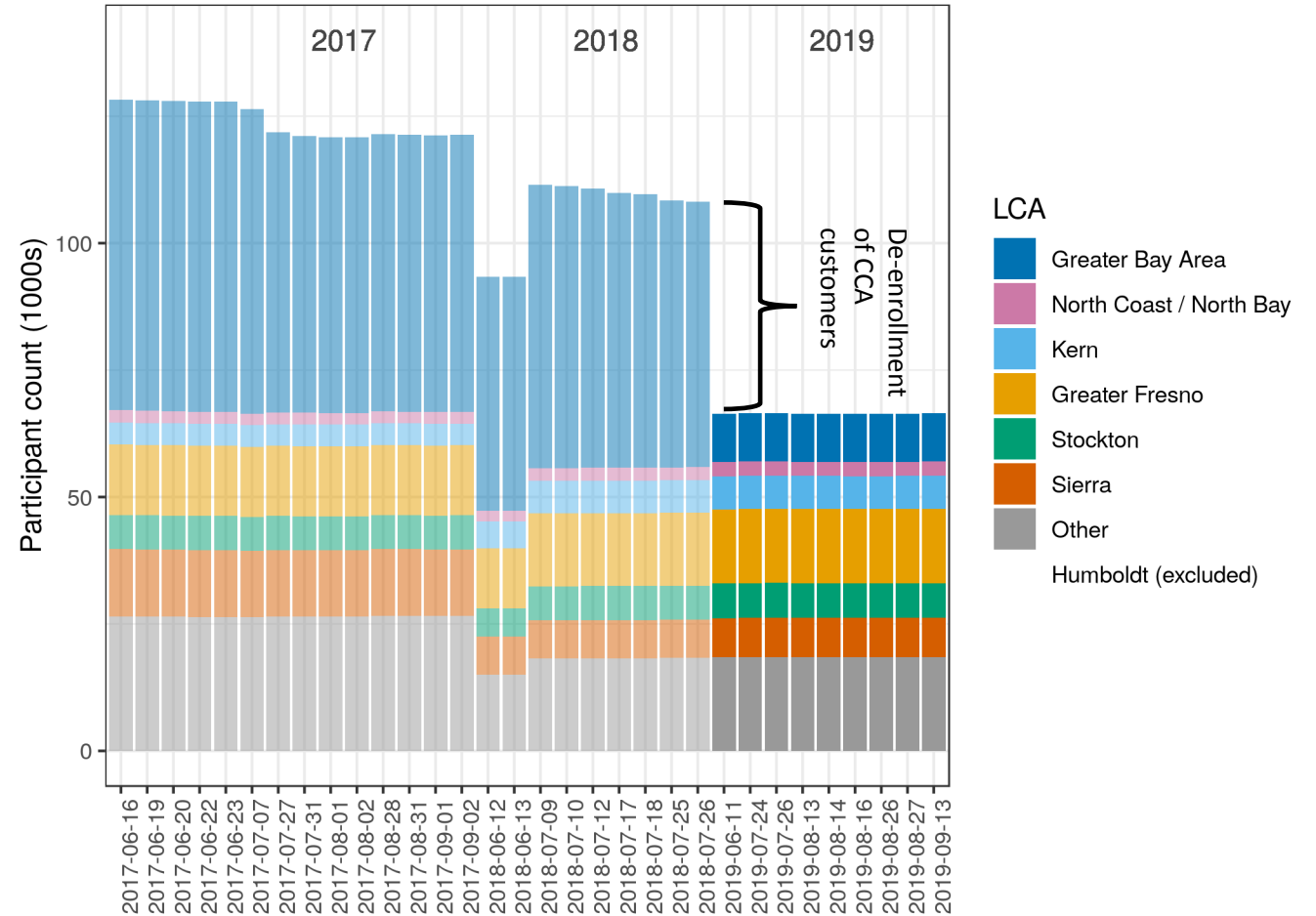
New enrollments as high as ever

2019 vs. 2018

	Enrollment	Event avg. Temp (F)	CDH	Per-customer Reference load (kW)	Per-customer Impact (kW)	Impact (%)	Aggregate impact (MW)
2019	66,447	97	421	2.16	0.22	11	14.9
2018	109,972	88	267	1.51	0.16	10	17.8
Difference ('18-'19)	-43,524	9	154	0.58	0.06	1	-2.9
% Difference	-40%	10%	58%	38%	38%	10%	-16%
Table note: Humboldt numbers are not included.							

Ex post results

Ex post methods
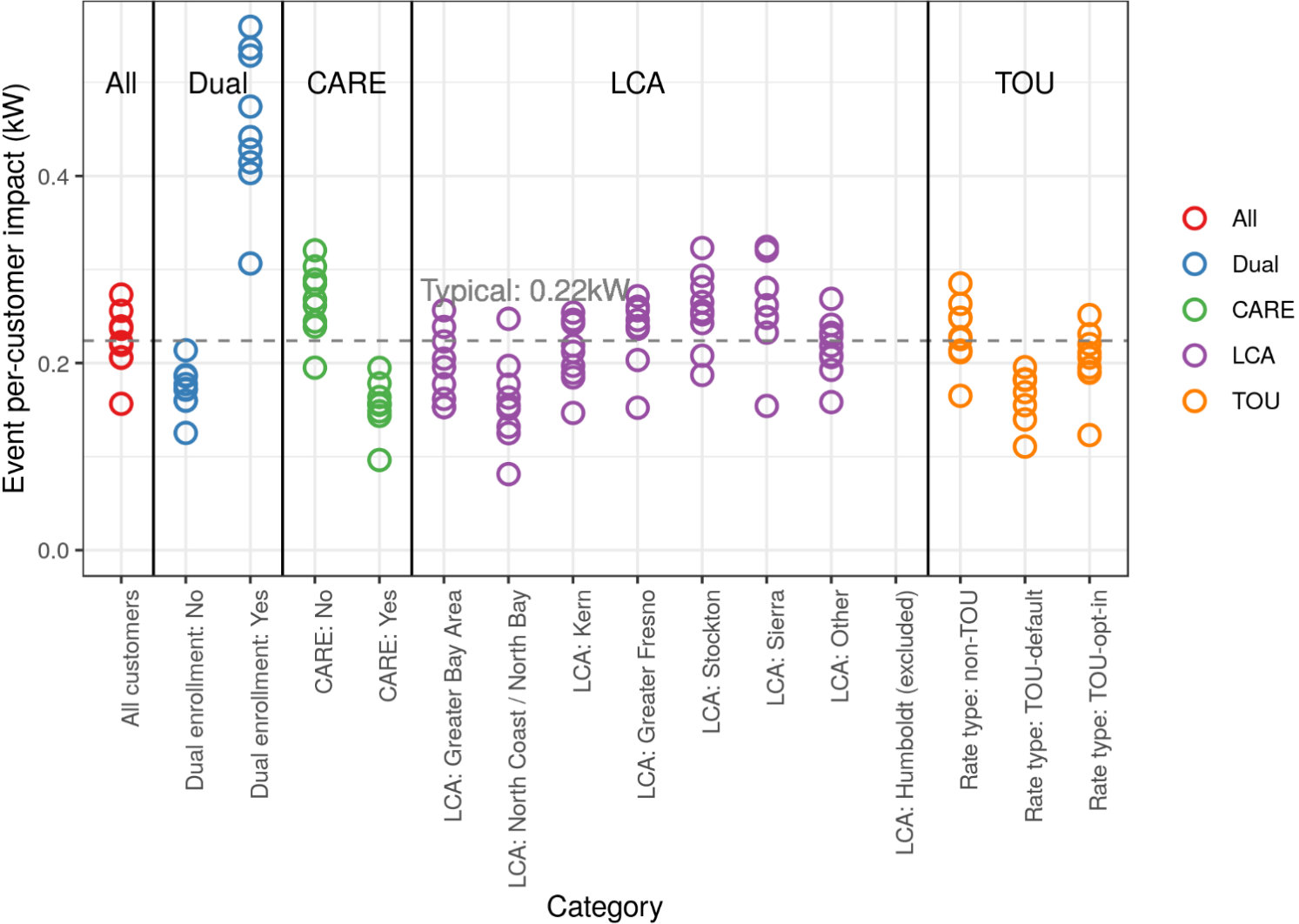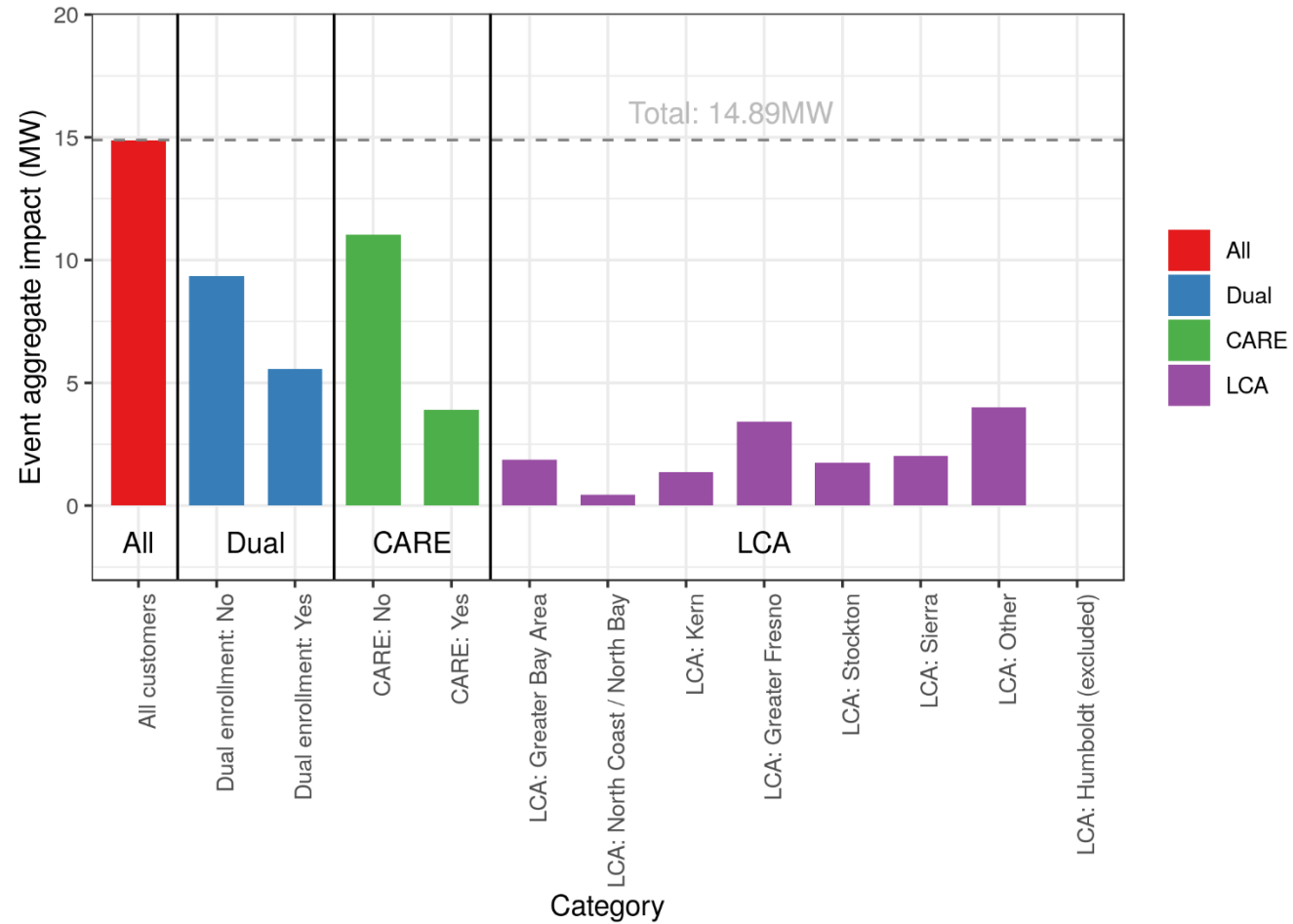
- Synthetic control customers not enrolled in the program
  - Stratified by LCA, CARE, and TOU rate type
  - Matched on monthly total and hourly load shape
- Temperature matched comparison days
- Difference in differences regression model, with temperature correction
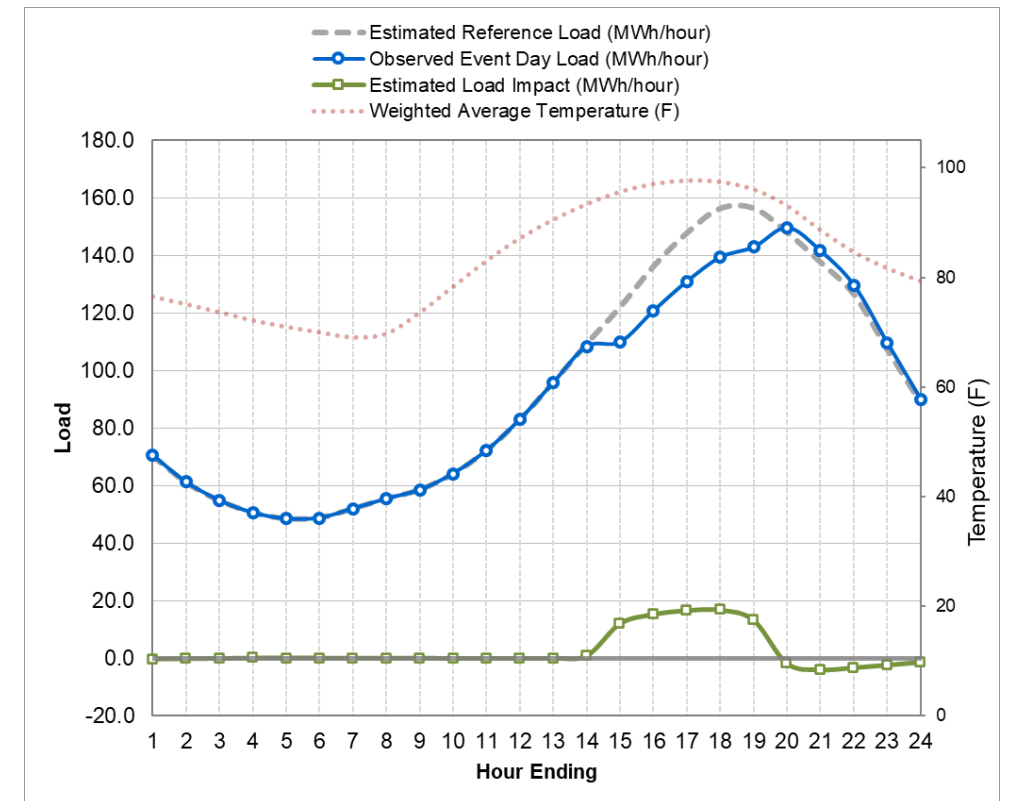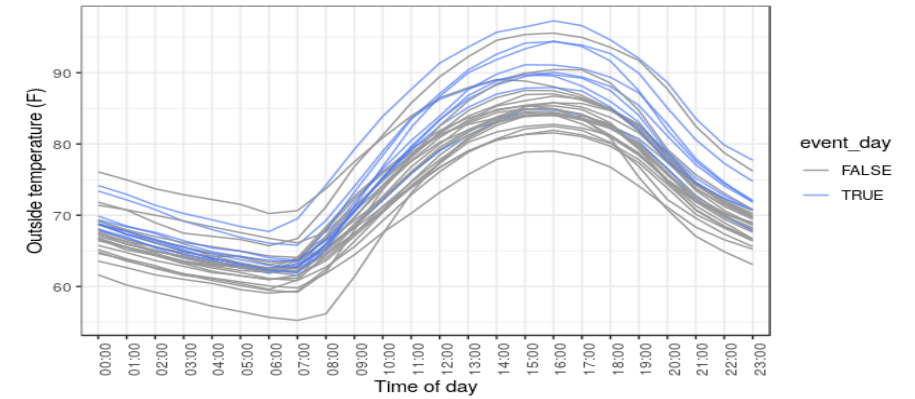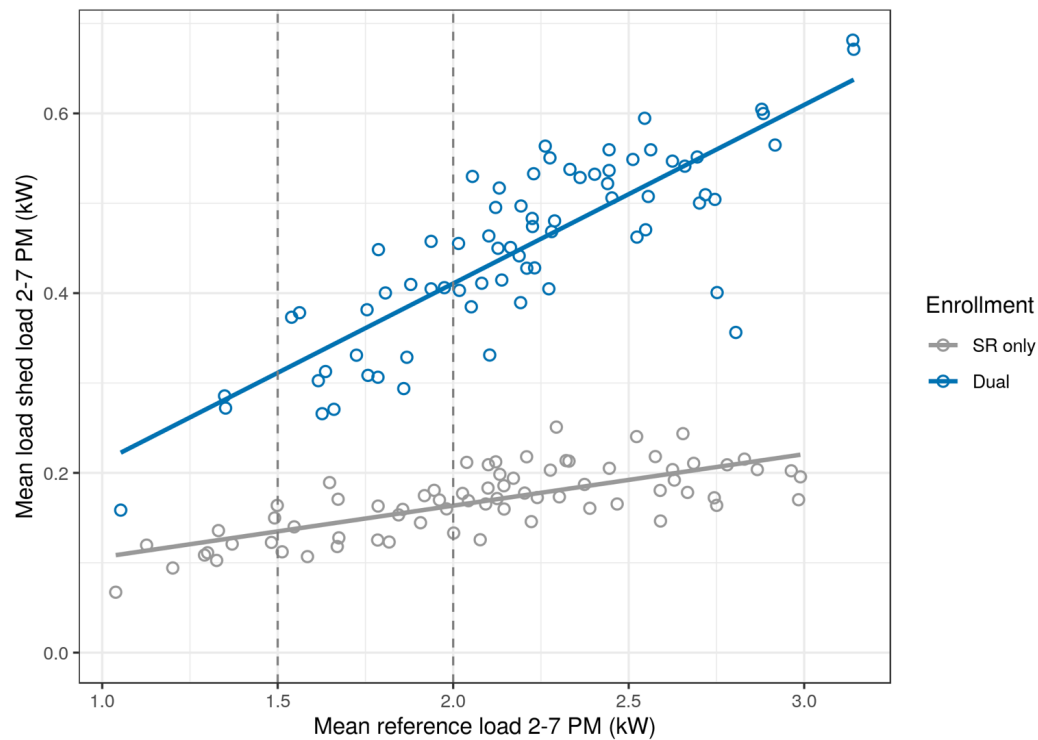
Ex post event impacts by customer categories

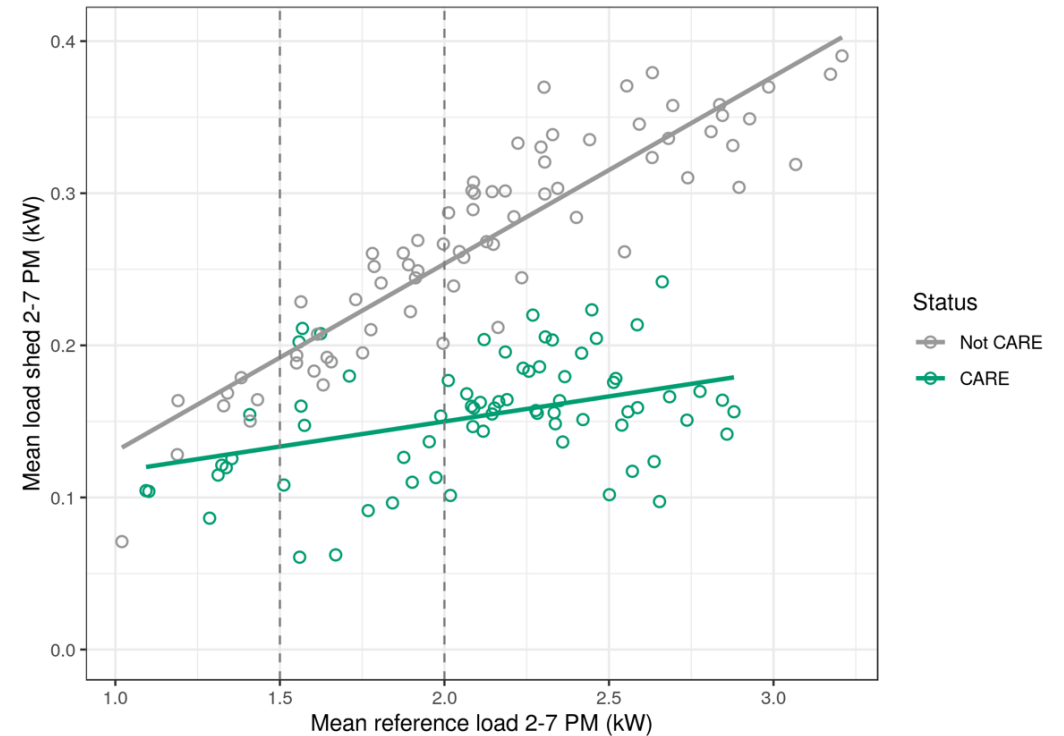# Aggregate impacts by customer category

Impacts vs. reference loads

Ex post all event summary

Date	Number enrolled	Per-cust. ref. load (kW)	Per-cust. load impact (kW)	Agg. ref. load (MW)	Agg. load impact (MW)	% Impact (% of ref.)	Average temp. (F)
2019-06-11	66,508	2.35	0.27	156.05	18.17	12	99
2019-07-24	66,555	2.21	0.22	146.77	14.80	10	97
2019-07-26	66,584	2.14	0.21	142.71	13.73	10	94
2019-08-13	66,484	2.00	0.21	132.66	13.67	10	95
2019-08-14	66,489	2.27	0.24	150.60	15.90	11	99
2019-08-16	66,474	2.41	0.26	160.49	17.00	11	98
2019-08-26	66,445	2.16	0.24	143.67	15.72	11	96
2019-08-27	66,467	2.14	0.22	142.06	14.59	10	96
2019-09-13	66,528	1.78	0.16	118.72	10.41	9	95
Typical event	66,503	2.16	0.22	143.75	14.89	10	97

Ex ante results

RA window aggregate impacts ex post to ex ante
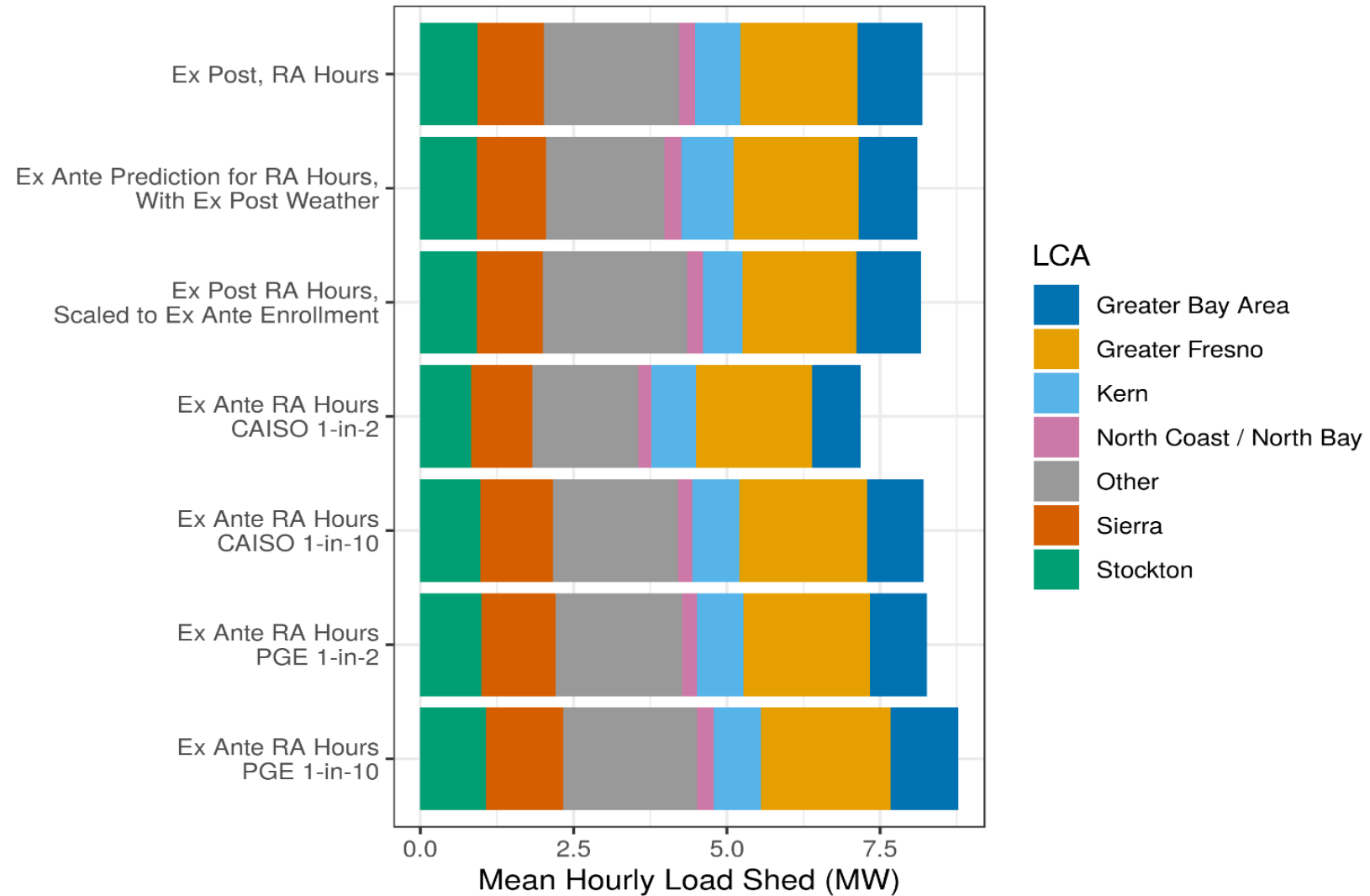
2020 ex ante impact forecast
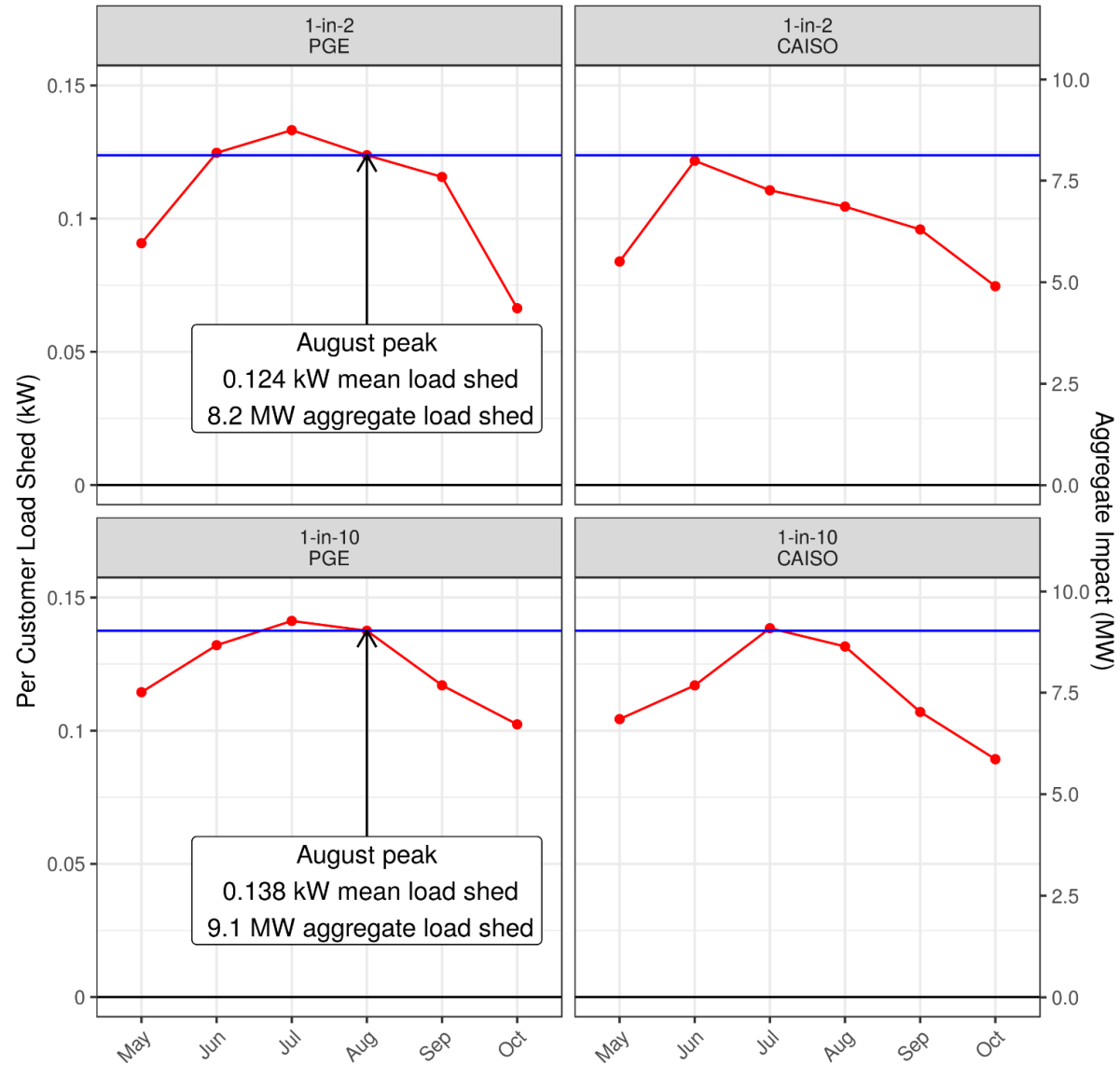
Enrollment and aggregate shed by LCA

Event Hours 2-7 PM, Summarized for RA Window 4-9 PM
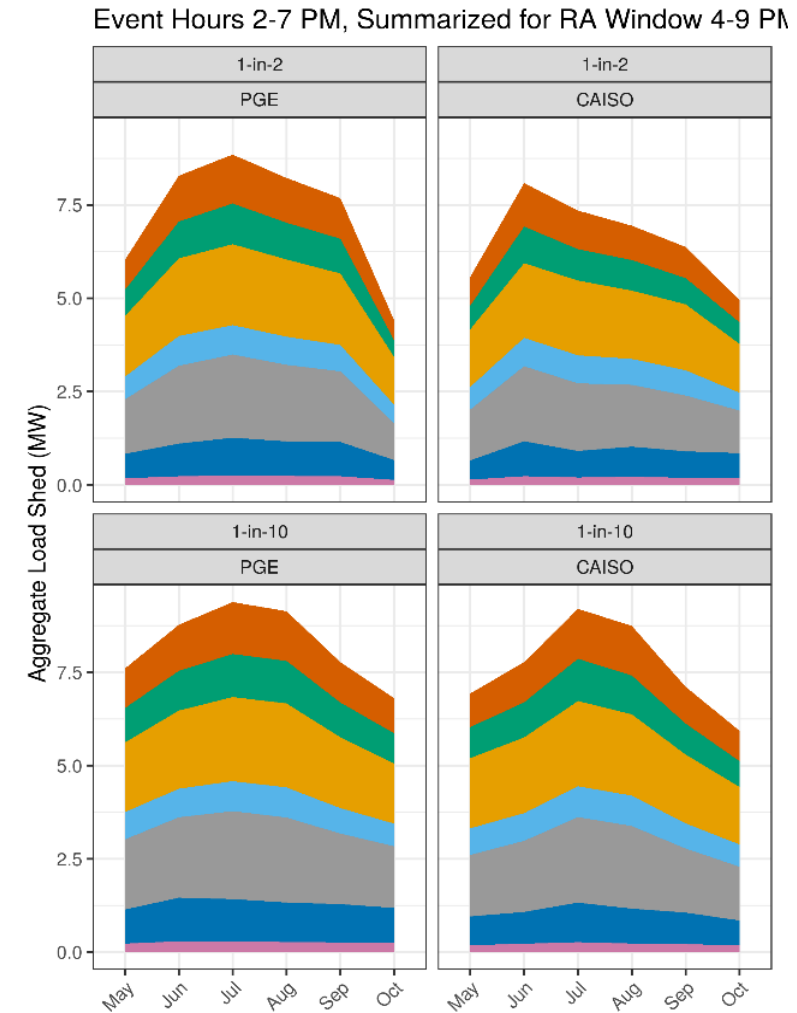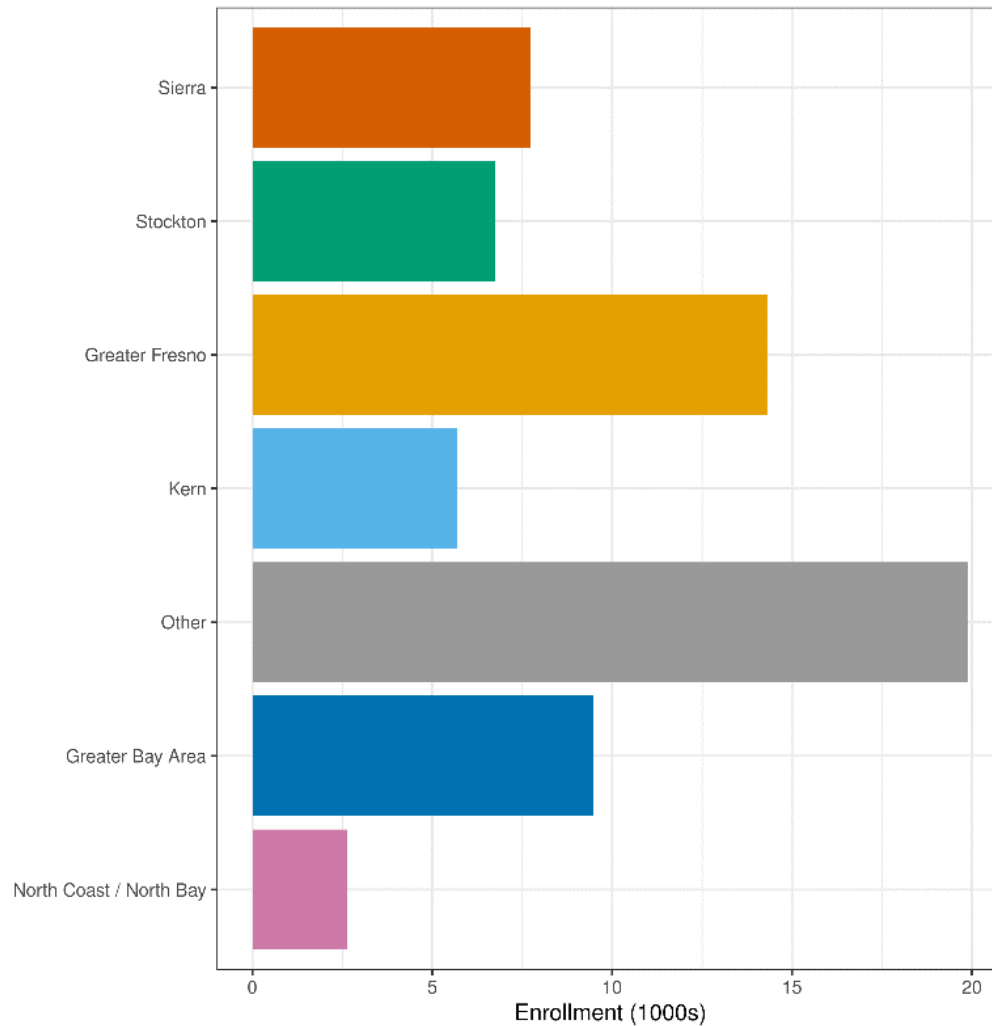
Recommendation for the future

Recommendation
Plan the future of SmartRate in accordance with projections for new CCAs
Try to mitigate the resource impacts of CCA de-enrollments
Embrace behavioral savings from households with lower per-customer impacts to account for fewer dually enrolled customers and target those with higher potential for savings
Leverage the transition to TOU rates to boost enrollment; prepare for a lot of novices
Shift event times to better align with TOU peak periods and the RA window
Prepare to evaluate impacts among TOU customers and account for rate type in choosing potential controls

Questions and discussion

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Comparison to PY2018 Per-Customer Impacts: The 2019 average impacts are higher than in PY2018 due to weather and CCA de-enrollments. The CCAs that came online between PY2081 and PY2019 were largely in the cooler portions of the Greater Bay Area

- **Dual enrollment continues to provide the largest impacts per customer**. While 2019 saw significantly fewer dually-enrolled customers (due to de-enrollment of existing customers and the fact that new customers can no longer be dually enrolled), they still offer the largest impacts per customer. Their automated event-day air conditioner (AC) load curtailment is responsible for most of their performance boost, but dually enrolled customers also tend to live in hotter climates with larger reference loads than SmartRate™ only customers.

- **CARE customers tend to produce smaller impacts than customers not on CARE**. This is the case despite the fact that CARE customers tend to live in hotter climates and have larger reference loads than customers not enrolled in CARE. Their load shed as a percentage of their reference load is the smallest of any examined subgroup.

- **LCA continues to be a source of variability in load curtailment**. The cooler coastal LCAs such as the Greater Bay Area and the North Coast tend to offer lower per customer impacts, and the hotter inland LCAs such as Sierra and Stockton offer higher per customer impacts; however, there was less variability across LCAs in PY2019 than in PY2018, most likely due to the shift in the geography of program enrollment caused by CCA de-enrollments.

- **Customers not on TOU rates shed more load than those on TOU, with opt-in TOU customers shedding more than those who defaulted in.** TOU opt-in customers made up 18% of the enrolled population in PY2019; default TOU customers made up just under 5% of the population

LCA	SmartRate™ only	Dually enrolled	Total
All	5.91	2.32	8.24
Sierra	0.83	0.37	1.20
Stockton	0.64	0.34	0.98
Greater Fresno	1.61	0.46	2.07
Kern	0.62	0.14	0.75
Other	1.41	0.64	2.05
Greater Bay Area	0.61	0.32	0.92
North Coast / North Bay	0.19	0.05	0.2

Table note: Shown in order to match the figure above.

Category		Enrollment	Temp. (F)	Per-cust. Ref. (kW)	Per-cust. Impact (kW)	Agg. Impact (MW)	Agg. Ref. (MW)	% Impact per cust. (% of ref.)
All	**All customers**	66,504	97	2.09	0.22	14.89	143.75	10.4%
LCA	**Humboldt (excluded)**							
	Greater Bay Area	9,482	91	1.53	0.20	1.86	15.55	**12.0%**
	Greater Fresno	14,635	102	2.55	0.23	3.42	**38.36**	8.9%
	Kern	6,523	101	2.60	0.21	1.37	17.41	7.9%
	North Coast / North Bay	2,816	94	1.31	0.16	0.45	3.94	11.3%
	Other	18,454	94	1.90	0.22	**4.01**	36.27	11.0%
	Sierra	7,760	97	2.06	**0.26**	2.03	16.49	12.3%
	Stockton	6,778	98	2.23	**0.26**	1.74	15.59	11.1%
Dual	**SmartRate™ only**	54,272	97	2.08	0.17	9.36	113.08	8.0%
	Dually enrolled	12,232	98	2.10	**0.46**	5.57	25.64	**20.5%**
CARE	**Non-CARE**	41,281	96	2.00	**0.27**	11.04	82.55	**12.8%**
	CARE	25,223	99	2.23	0.16	3.90	56.26	6.8%

	Estimate	Enrolled	Agg. load impact (MW)	Agg. Ref. load (MW)	Per-cust. load impact (kW)	Per-cust. Ref. load (kW)	% Load Impact	Avg. Event Temp (F)
All	2019 Ex Post	66,504	14.9	143.7	0.22	2.16	10.4%	97
	2018 Ex Post	109,972	17.8	166.0	0.16	1.51	10.7%	88
	2017 Ex Post	124,049	28.1	226.0	0.23	1.82	12.4%	98
Dually Enrolled	2019 Ex Post	12,232	5.6	27.1	0.46	2.22	20.5%	98
	2018 Ex Post	18,456	7.0	35.4	0.38	1.92	19.7%	94
	2017 Ex Post	28,923	14.3	69.5	0.50	2.40	20.6%	100
SR only	2019 Ex Post	54,272	9.4	116.5	0.17	2.15	8.0%	97
	2018 Ex Post	91,515	10.9	130.6	0.12	1.43	8.3%	87
	2017 Ex Post	95,126	13.8	156.5	0.14	1.64	8.8%	97
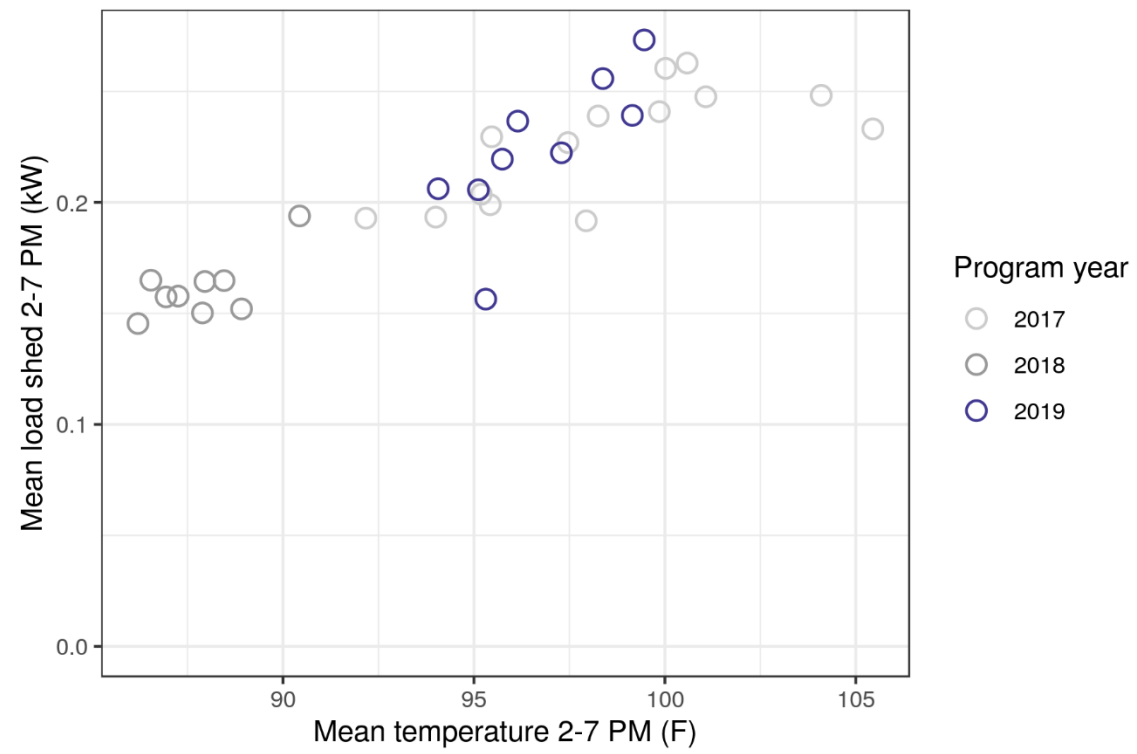
- kWh ~ case + event + case_event + cdh + case_cdh + early_aft_kWh