

DOCKETED

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Joint Agency Workshop on Risk of Early Economic Retirement



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April 24, 2017

Resource Adequacy and Procurement Oversight Section

CPUC, Energy Division





Agenda

- **CPUC's Current Forward Procurement Requirements**
- **Early Economic Retirement**
 - Background of the Joint Reliability Plan (JRP) proceeding
 - Planned v. unplanned retirements
 - Energy Division forward contracting data collection efforts
 - Energy Division forward contracting results
- **Forward Procurement: Uncertainties and Challenges**
- **Reliability, Cost and the Changing Structure of the Grid**





Current Resource Adequacy (RA) Program

- RA program developed in response to the 2001 California energy crisis
- The initial program implemented in 2006 (system)
- Local requirements added in 2007
- Flexible capacity requirements added in 2015
- Designed to ensure that CPUC-jurisdictional load serving entities (LSEs) have sufficient capacity to meet:
 - Peak load with a 15% planning reserve margin (PRM)
 - Local area reliability needs
 - Flexible ramping needs associated with renewable integration
- One-year forward requirement





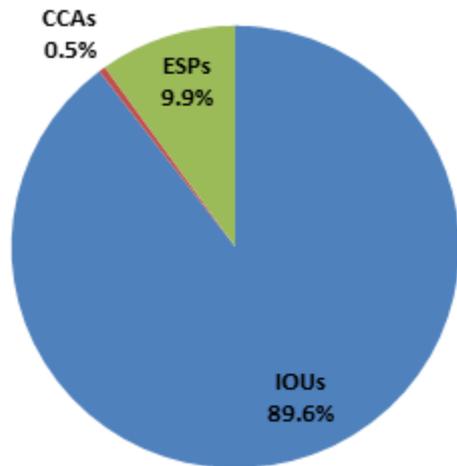
CPUC-Jurisdictional LSEs in the CAISO



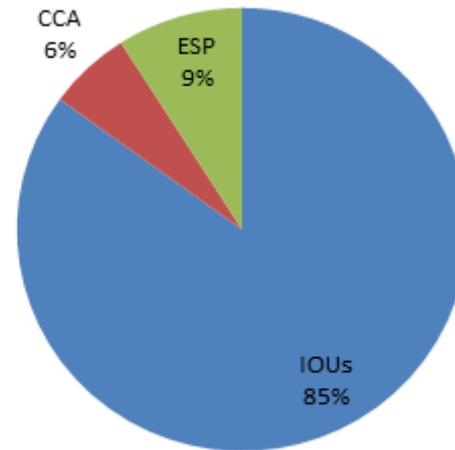
- **CPUC-jurisdictional LSEs serve about 90% of load in CAISO**
- **Currently 26 LSEs**
 - **3 Investor Owned Utilities (IOUs)**
 - **8 Community Choice Aggregators (CCAs)**
 - **15 Electric Service Providers (ESPs)**



CPUC Jurisdictional Breakdown



Based on 2014 year ahead load forecasts (MWs) from the CEC



Based on 2017 August revised load forecasts (MWs) from the CEC





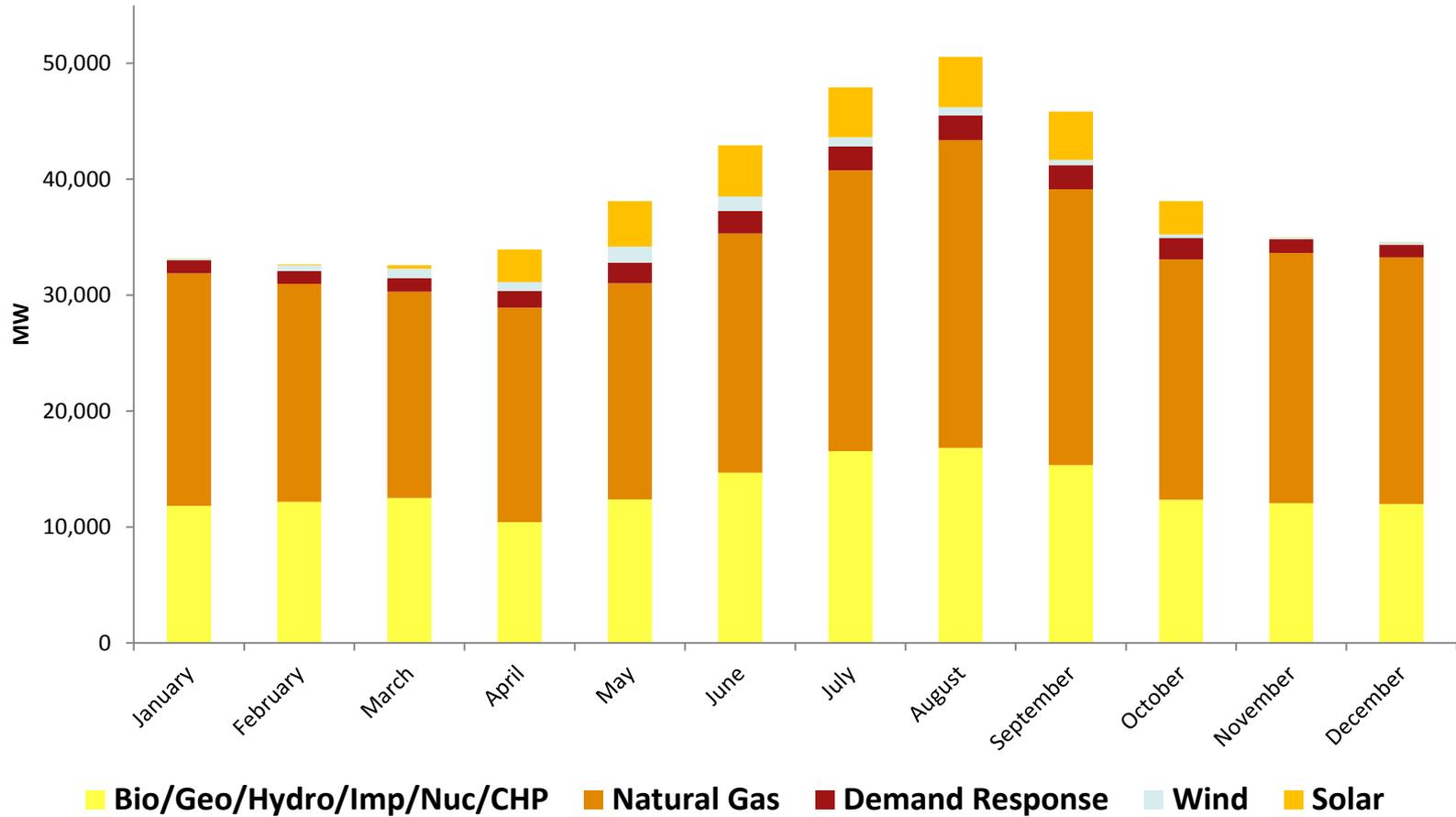
Resource Adequacy Requirements

- **System – Based *monthly* forecasted 1-in-2 load, with a 15% planning reserve margin**
- **Local – Determined *annually* by CAISO and adopted by the CPUC based on 1-in-10 forecast**
- **Flexible – Determined *monthly* based on largest 3-hour net load ramp**



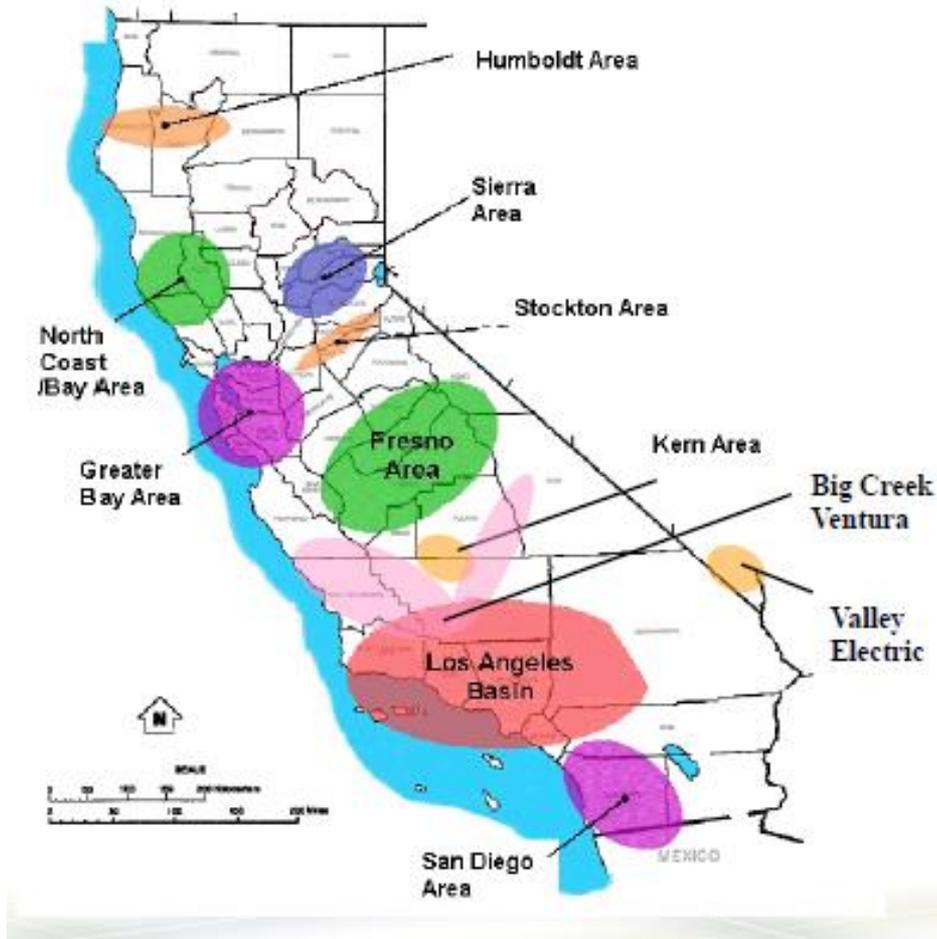


2016 RA Resource Mix





Local Capacity Requirements (LCR)



- CAISO performs an annual LCR study, based on a 1-in-10 weather year and a N-1-1 contingency
- Adopted annually by CPUC decision
- Total of 5 local areas - Bay Area, Other PG&E Areas, LA Basin, Big Creek-Ventura, and San Diego
- Six of the local areas are combined into “PG&E Other Areas” to address market power -
- Sierra, Fresno, Humboldt, North Coast, Stockton, and Kern Local RA
- Allocated based on CPUC-juridical load share in each TAC area



2017 LCR Requirements

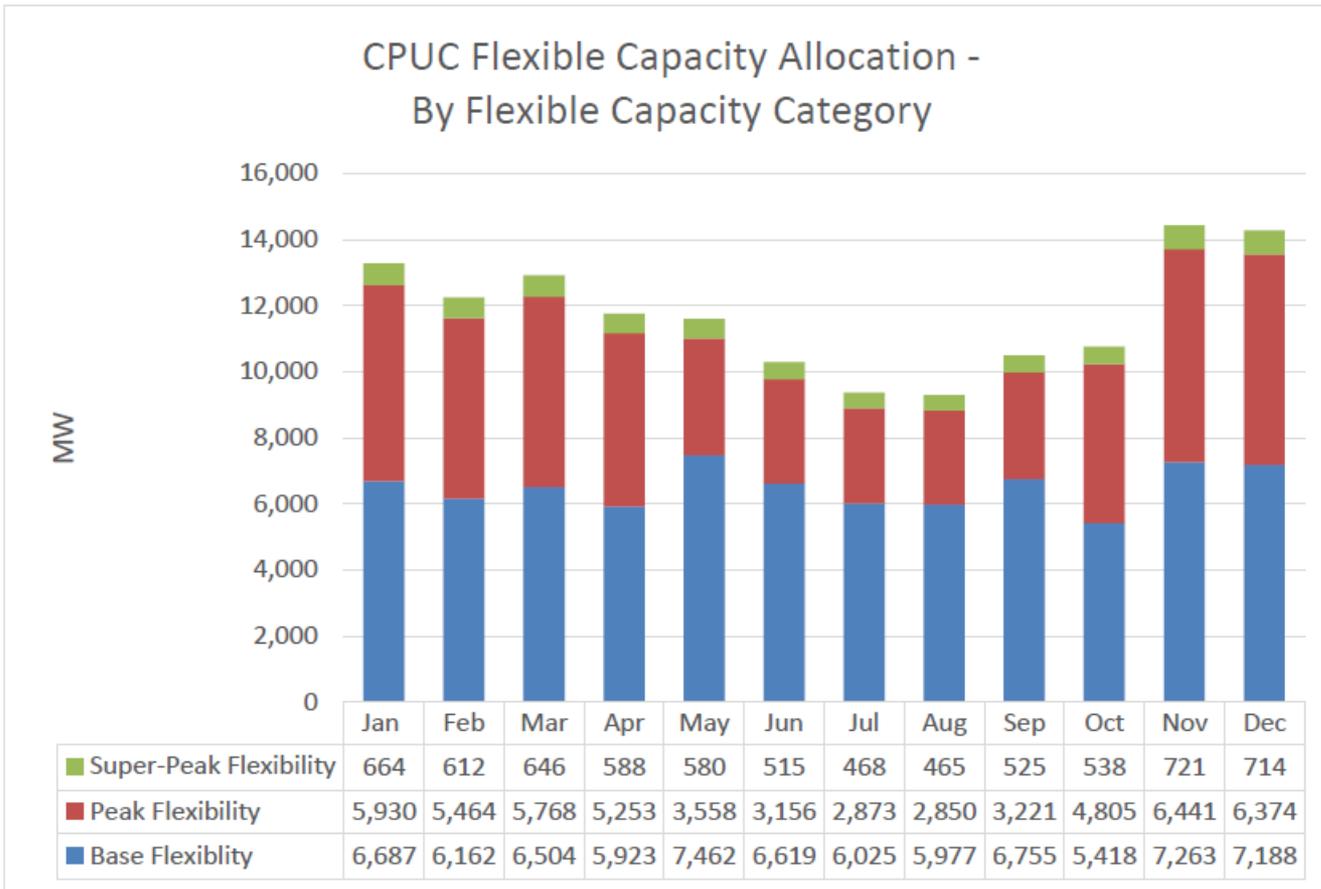
	2017 Total LCR (MW)	Peak Load (1 in10) (MW)	2017 LCR as % of Peak Load	Total Dependable Local Area Resources (MW)	2017 LCR as % of Total Area Resources
Humboldt	157	188	84%	218	72%
North Coast/North Bay	721	1311	55%	850	85%
Sierra	2043	1757	116%	2066	99%**
Stockton	745	1157	64%	598	125%**
Greater Bay	5617	10477	54%	9862	57%**
Greater Fresno	1779	2964	60%	3303	54%**
Kern	492	1139	43%	551	89%
LA Basin	7368	18890	39%	10575	70%
Big Creek/Ventura	2057	4719	44%	5463	38%
San Diego/Imperial Valley	3570	4840	74%	5310	67%
Total	24549	47442*	52%*	38796	63%

Source: CAISO 2017 Local Capacity Technical Analysis, Final Report and Study Results





2017 Flexible Requirements



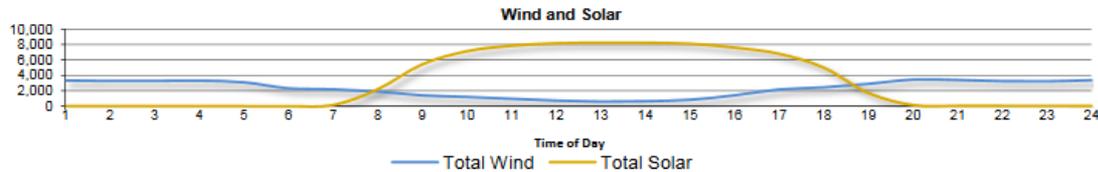
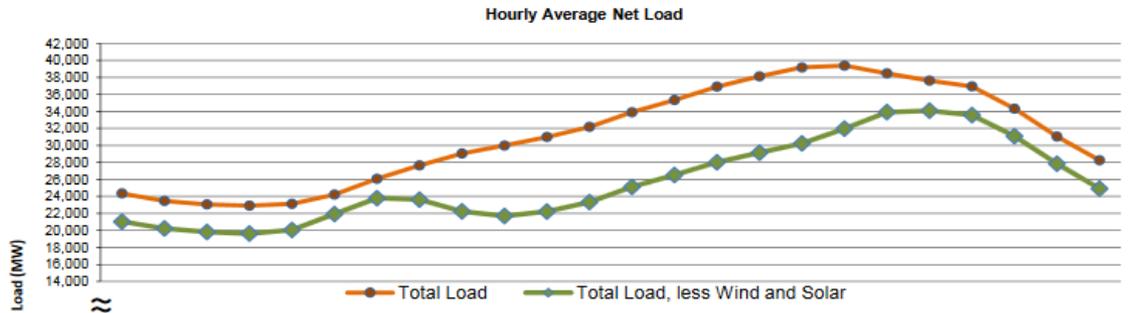
Source: CAISO Final Flexible Capacity Needs Assessment for 2017



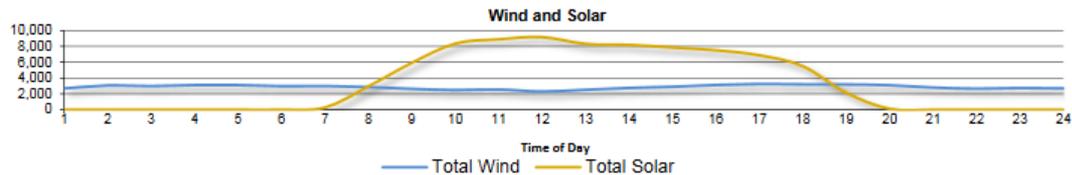
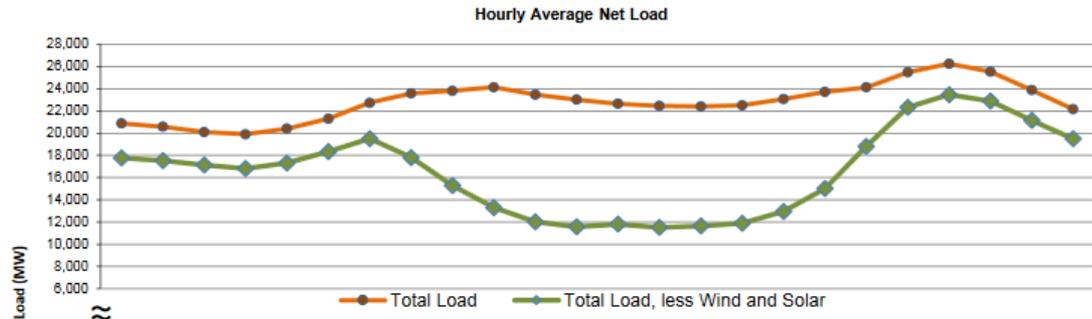


Net Ramps Differ by Season

Monday, Aug. 29, 2016



Friday, April 14, 2017



Source: CAISO, Renewable Watch





Net Load Ramp Drivers

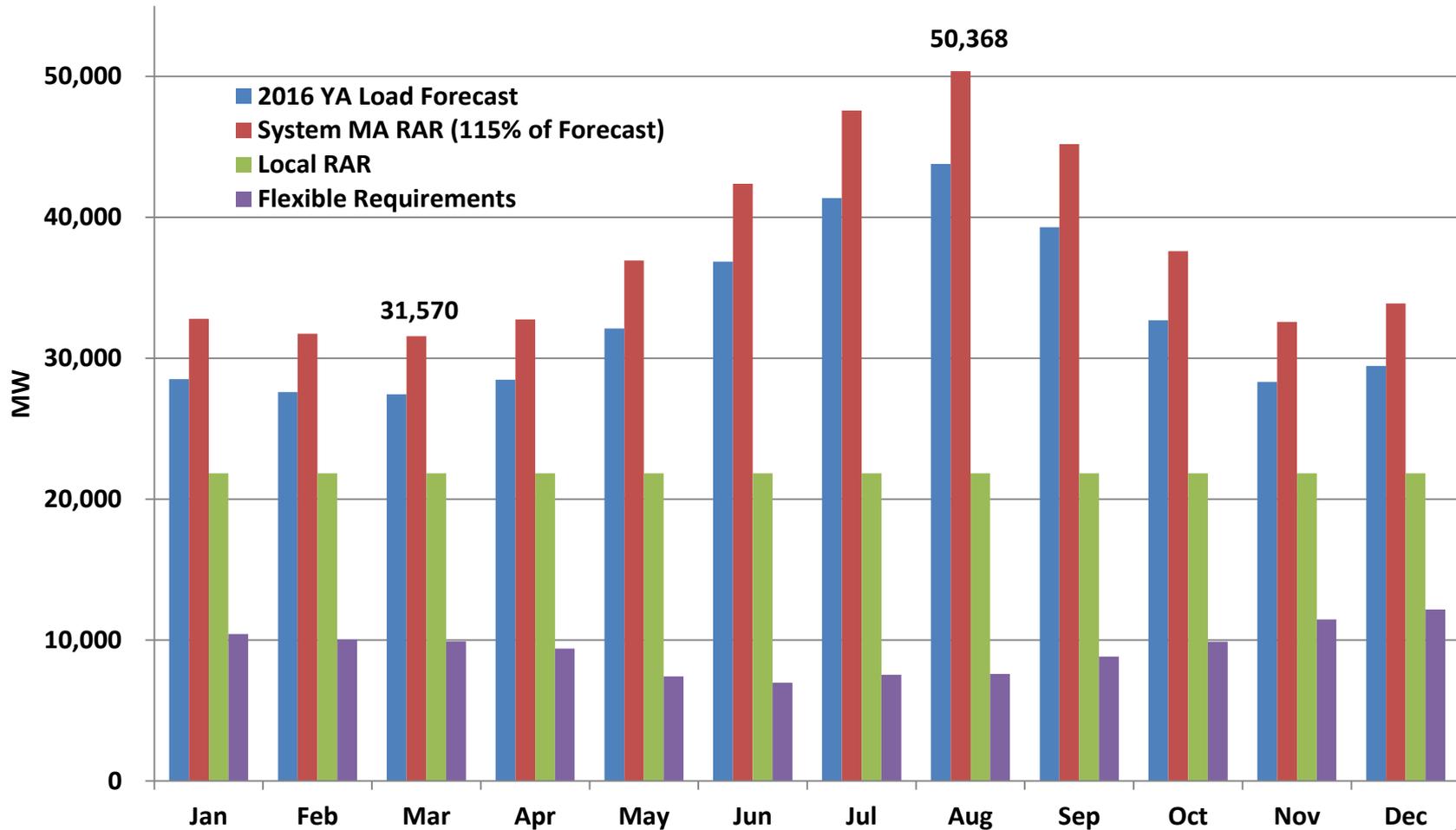
Month	Average of Load contribution 2017	Average of solar PV contribution 2017	Average of BTM Solar contribution 2017	Average of Wind contribution 2017	Average of OOS Wind contribution 2017	Total percent 2017
January	49.09%	-47.68%	-2.66%	-0.52%	-0.05%	100%
February	31.99%	-63.00%	-3.77%	-0.77%	-0.47%	100%
March	27.28%	-63.69%	-8.15%	-1.28%	0.40%	100%
April	23.01%	-68.11%	-9.61%	0.71%	0.02%	100%
May	23.87%	-64.15%	-9.83%	-1.65%	-0.50%	100%
June	8.76%	-79.58%	-11.52%	-0.55%	0.41%	100%
July	11.66%	-78.87%	-11.11%	1.47%	0.17%	100%
August	-0.72%	-94.04%	-12.81%	5.93%	0.21%	100%
September	6.27%	-82.42%	-10.82%	-0.28%	-0.21%	100%
October	18.23%	-72.80%	-11.45%	1.61%	0.86%	100%
November	34.75%	-55.91%	-8.69%	-0.51%	-0.15%	100%
December	42.28%	-48.62%	-6.05%	-2.02%	-1.04%	100%

Source: CAISO Final Flexible Capacity Needs Assessment for 2017



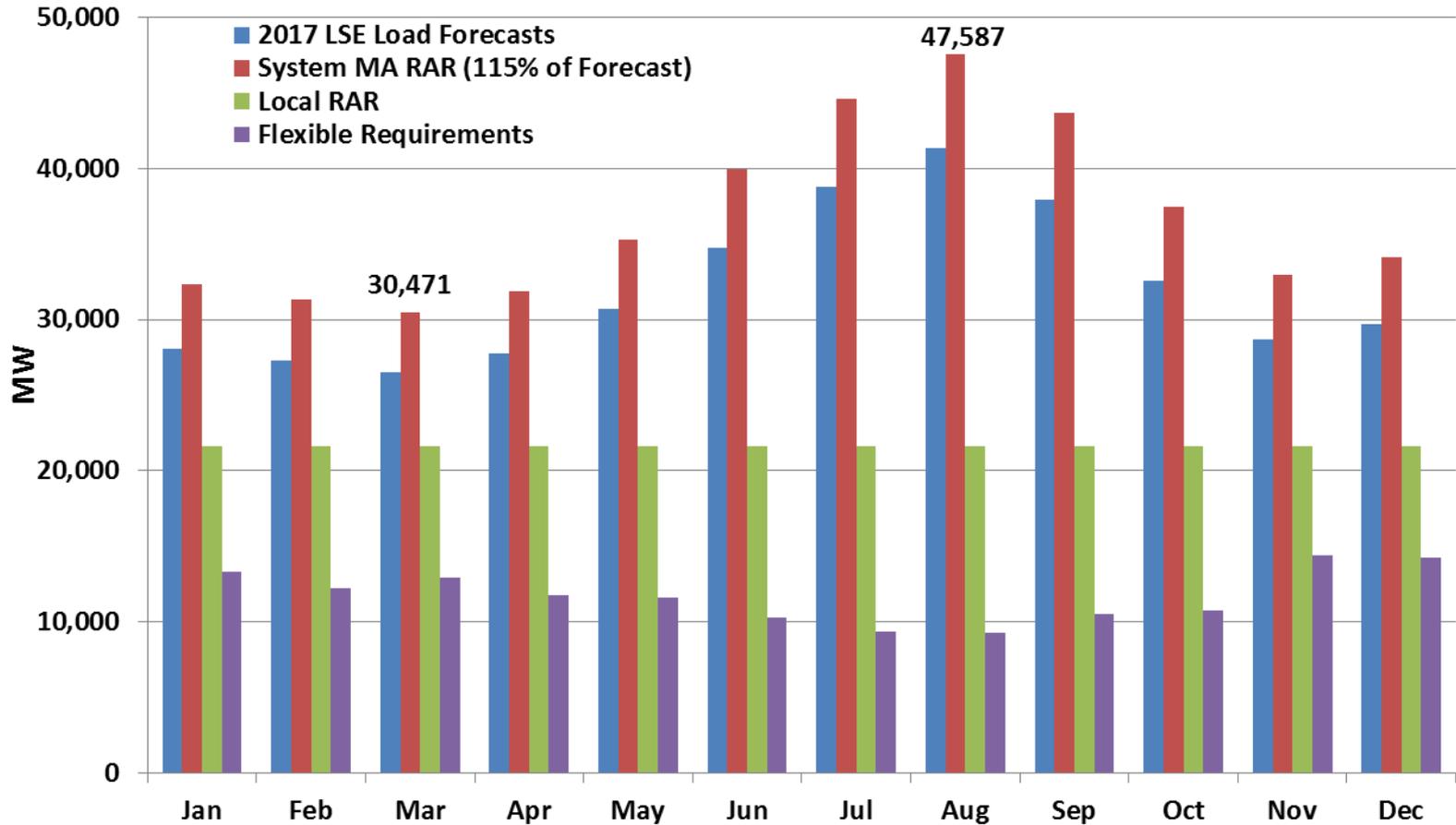


2016 RA Requirements (CPUC LSEs)





2017 RA Requirements (CPUC LSEs)



Preliminary 2016 RA Price Report

Table 7. Aggregated RA Contract Prices, 2016-2020

	All RA Capacity Contracts			Local RA Capacity Contracts			CAISO System RA Capacity Contracts		
	Total	NP-26	SP-26	Subtotal	NP26	SP26	Subtotal	NP26	SP26
Contracted Capacity (MW)	304,684	118,907	185,777	263,908	85,801	178,107	40,776	33,106	7,670
Percentage of Total Capacity in Data Set	100%	39%	61%	87%	33%	67%	13%	81%	19%
Number of Monthly Values	2,241	986	1255	1,944	727	1,217	297	259	38
Weighted Average Price (\$/kW-month)	\$3.10	\$2.32	\$3.60	\$3.20	\$2.19	\$3.69	\$2.44	\$2.64	\$1.57
Average Price (\$/kW-month)	\$2.77	\$2.02	\$3.35	\$2.91	\$2.06	\$3.42	\$1.82	\$1.89	\$1.37
Minimum Price (\$/kW-month)	\$0.15	\$0.60	\$0.15	\$0.27	\$0.63	\$0.27	\$0.15	\$0.60	\$0.15
Maximum Price (\$/kW-month)	\$26.54	\$5.80	\$26.54	\$26.54	\$4.81	\$26.54	\$5.80	\$5.80	\$2.12
85% of MW at or below (\$/kW-month)	\$4.19	\$3.00	\$4.25	\$4.19	\$3.00	\$4.25	\$3.00	\$3.50	\$1.89

Source: Preliminary CPUC Data





How Much do these Requirements Cost?

- **At \$3.10/kW-month: ~\$1.5 billion, annually**
- **At CPM cap, \$6.31/kW-month: ~\$3.0 billion, annually**
- **At CONE, ~\$14/kW-month: ~\$6.5 billion, annually**



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Background and History

- **Joint Reliability Proceeding (R.14-02-001) opened to:**
 - Consider policy proposals to refine California’s existing reliability framework for electric procurement
 - Ensure that California’s electric reliability framework continues to adapt as needed to meet the changing requirements of the grid
- **Closed pending development of a permanent flexible product D.16-01-033**
 - “The RA proceeding has the permanent flexible capacity issue scoped, and that effort needs to be finalized before a two- or three-year RA requirement can be determined.”
 - Ordered Energy Division to gather and disseminate information regarding the expected electric resource availability and the forward contracting of such resources, and to make that information available to the public (OP 4)
- **Issues moved into the CPUC’s RA proceeding, R.14-10-010**



Planned v. Unplanned Retirements

- **Significant planned retirements are expected through 2022**
- **CPUC authorized additional procurement to address local reliability needs**

Once Through Cooling	Net Qualifying Capacity (in MW)
Encina 1-5	950
Pittsburg 5-7	1,159
Moss Landing 6-7	1,509
Huntington Beach 1-2	450
Redondo Beach 5-8	1,356
Alamitos 1-6	2,010
Ormond Beach	1,516
Mandalay 1-2	430
Total	9,380



Energy Division Data Collection

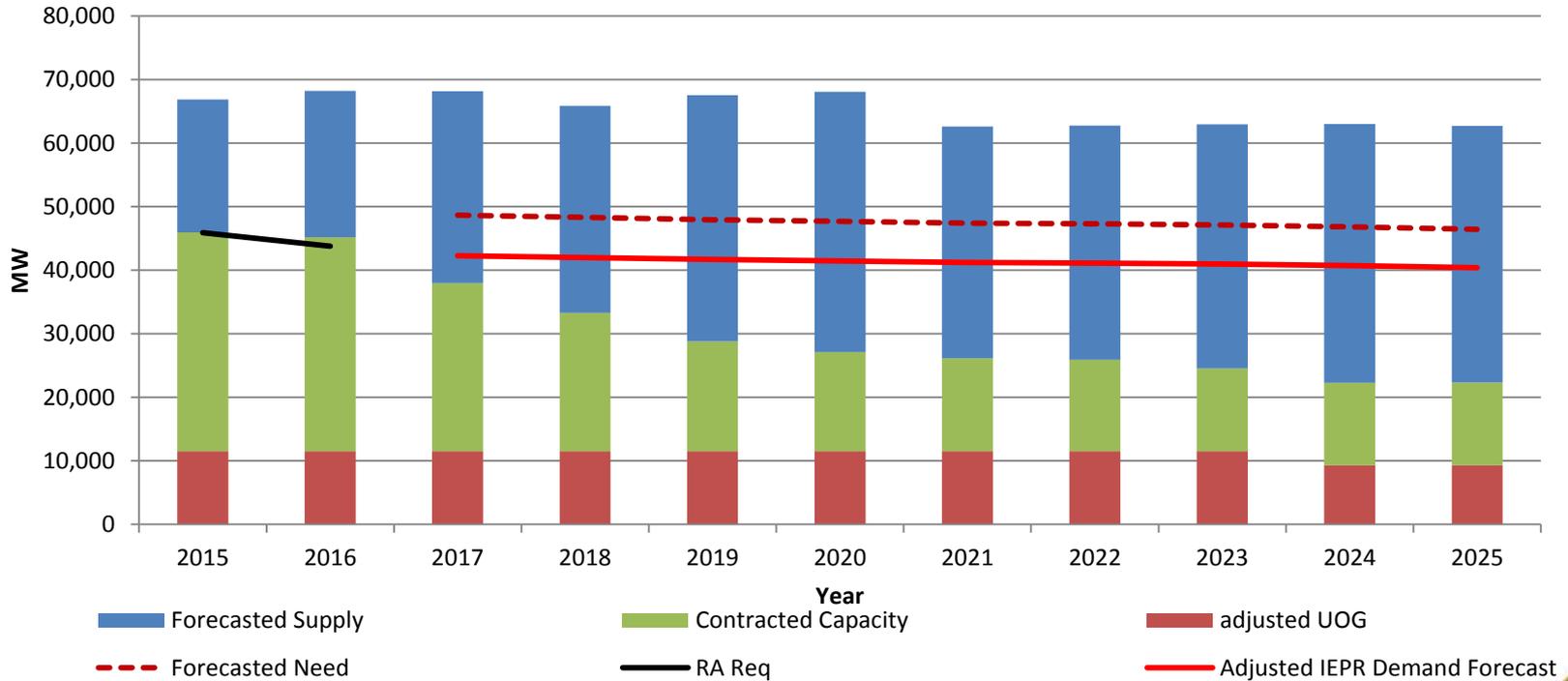
- Issued report in the fall of 2016 regarding contracting
- Issued new data requests and received responses in 2017 on forward contracting practices from IOUs, CCAs and ESPs
- Currently analyzing the data
- Preliminary results available and discussed below





Results from 2016 Contracting Report (data collected Oct. 2015)

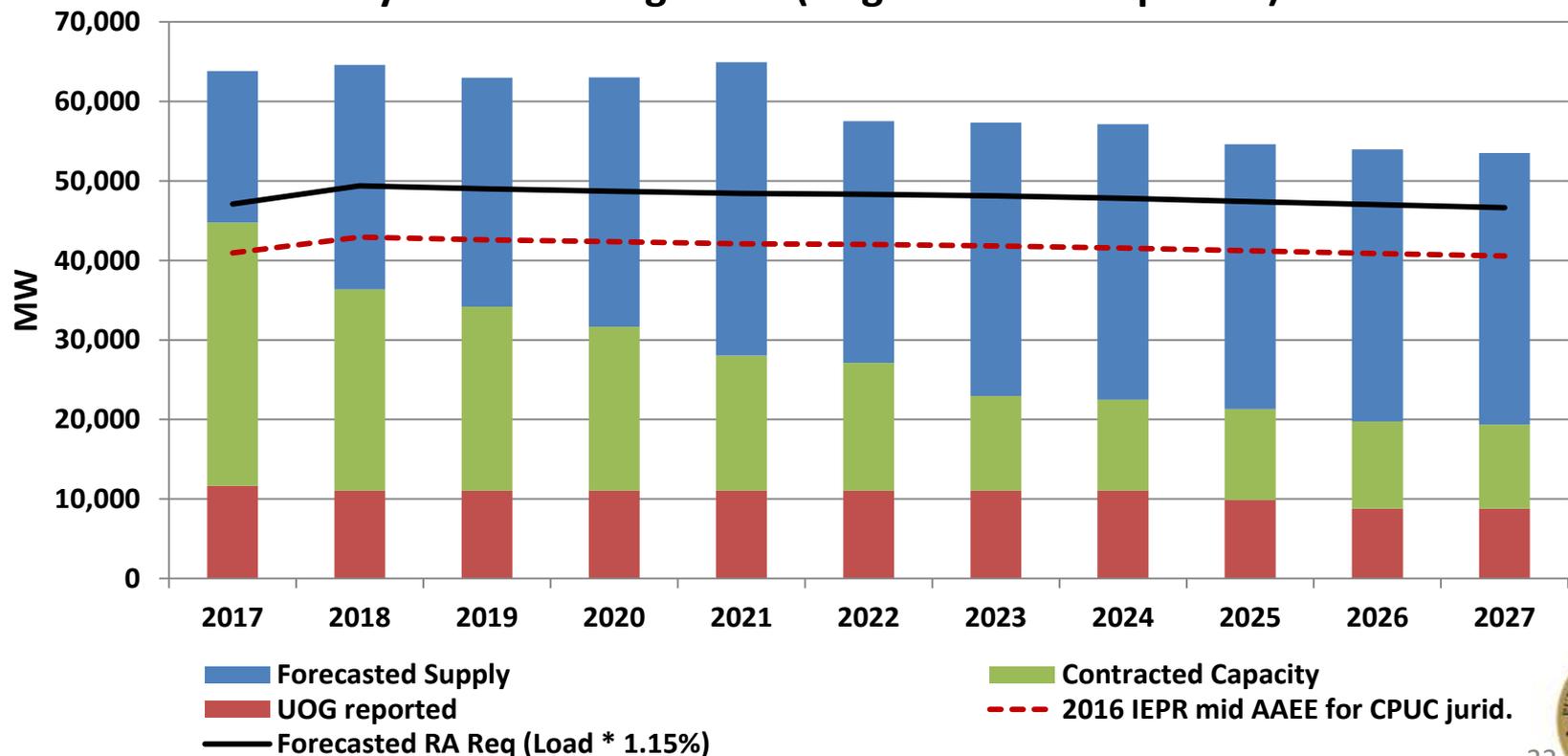
Contracted System Capacity Compared to Forecasted Demand and System RA Obligations (August)





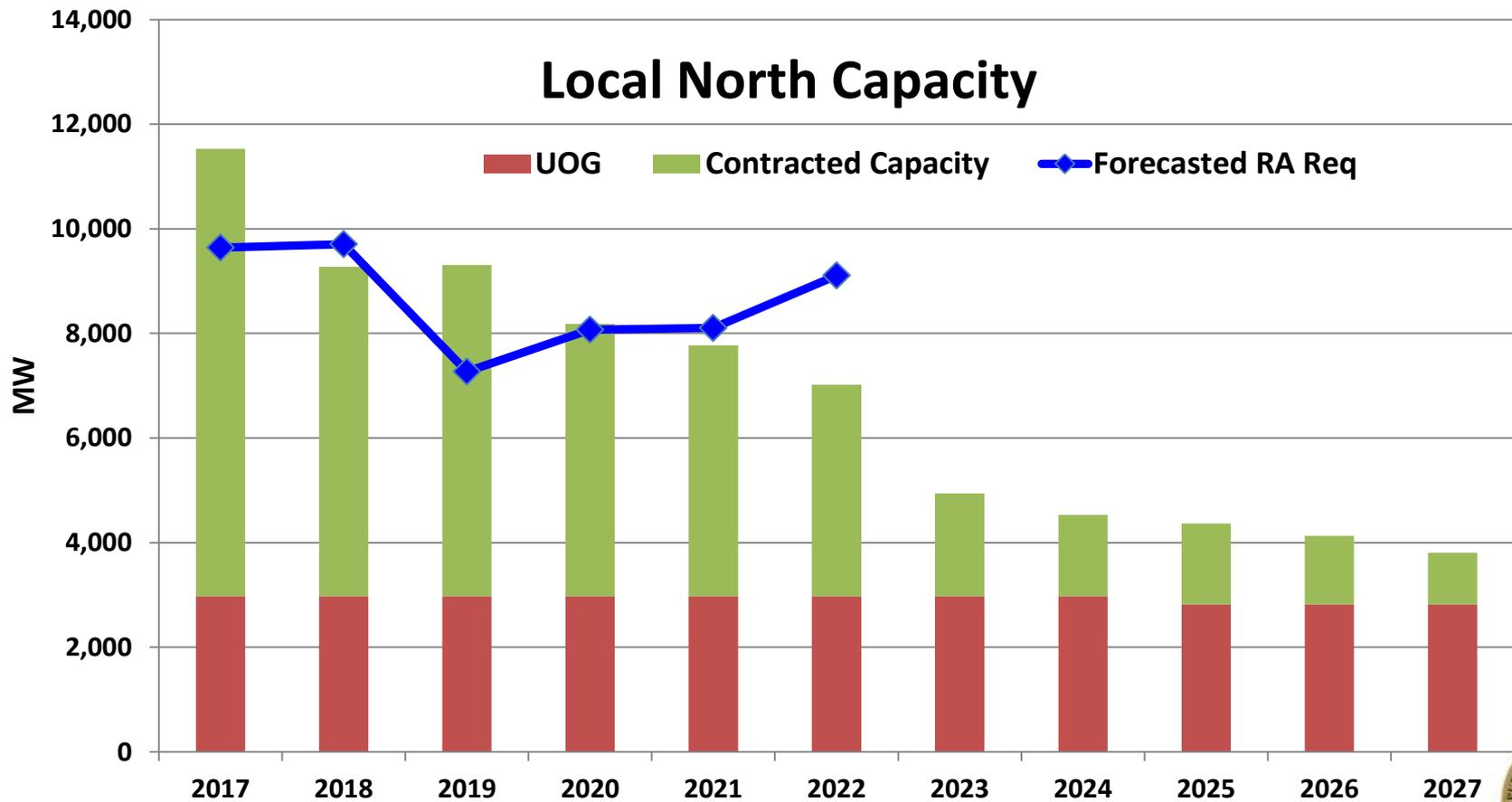
Preliminary Results from 2017 Contracting Data (Data Received April 2017)

Contracted System Capacity Compared to Forecasted Demand and System RA Obligations (August Values Reported)



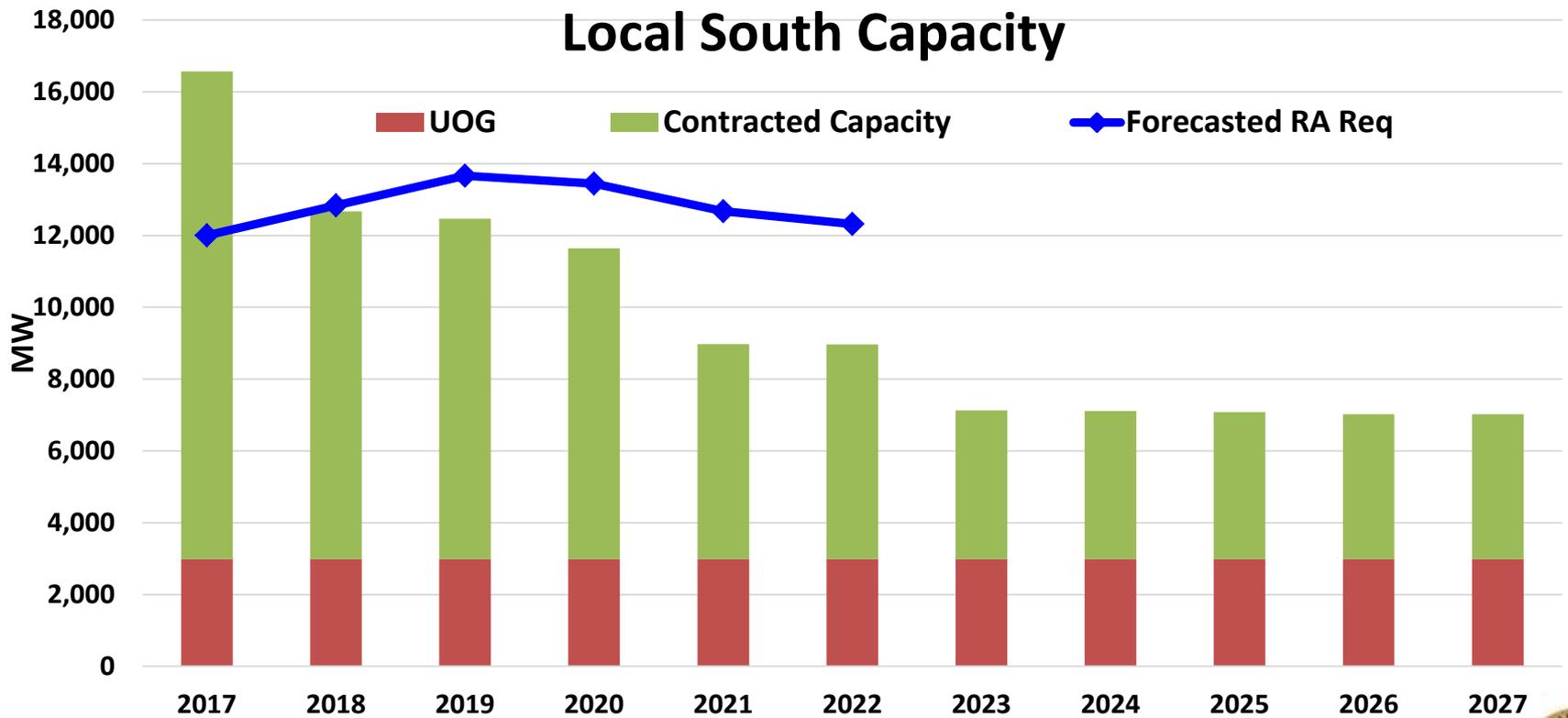


Preliminary Results from 2017 Contracting Data





Preliminary Results from 2017 Contracting Data





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Forward Procurement: Uncertainties and Challenges

➤ System RA

- Load forecast uncertainty for 1-in-2 (economic growth, solar PV and energy efficiency penetration)
- Load migration

➤ Local RA

- Load forecast uncertainty for 1-in-10 (economic growth, solar PV and energy efficiency penetration)
- Changing contingencies, N-1-1
- Load migration
- Changes in topology of the grid (e.g., change in local area boundaries)

➤ Flexible RA

- Not clear what resources are needed to integrate variable resources
- Durable flexible product not yet developed





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Reliability, Costs and the Changing Structure of the Grid

- **CPUC's mandate is to ensure safe and reliable service at just and reasonable rates (PU Code 380)**
- **Requires consideration of reliability and cost**
- **Requires consideration of the changing nature of the grid**
 - Increasing penetration of renewables
 - Retirement of OTC units
 - Gas supply issues
 - Growth of CCAs



Thank you!
For Additional Information:

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