Resource Adequacy Slice of Day 101

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Resource Adequacy

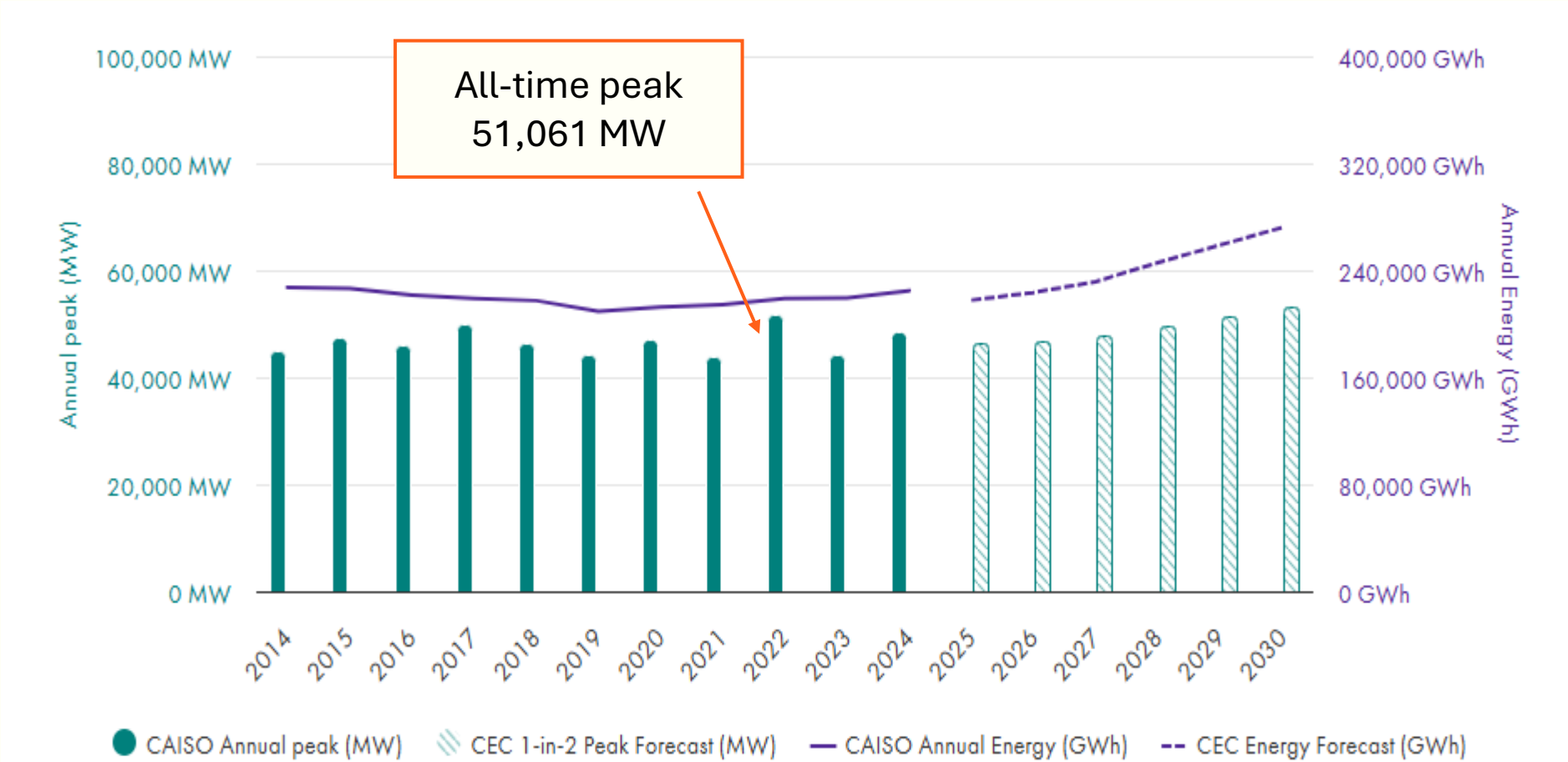
- Resource Adequacy (RA):
  - A compliance product to ensure there is a *plan* for adequate resources to match customer demand with available generation at any hour of the day in the CAISO.
  - Resource Adequacy is purchased as available capacity per month.
  - Capacity is the ability to generate not the generation itself and does not show up on the power content label.

Resource Adequacy and Reliability in CA

Ava in comparison to CAISO:

- Share of the total CA load is about 3% (2025)
- Peak load is about 2,000 MW
- Peak load share is about 10%

CAISO historical and projected annual peak load and energy (2014-2030)



Source: CAISO 2025 Summer Loads and Resources Assessment

Resource Adequacy: Slice of Day

Resource Adequacy: Slice of Day

- Starting in 2025, RA requirements changed to a Slice of Day structure.
- Intent of change to Slice of Day: Minimize customer cost, meet hourly reliability needs, adapt to a changing grid.

Requirement

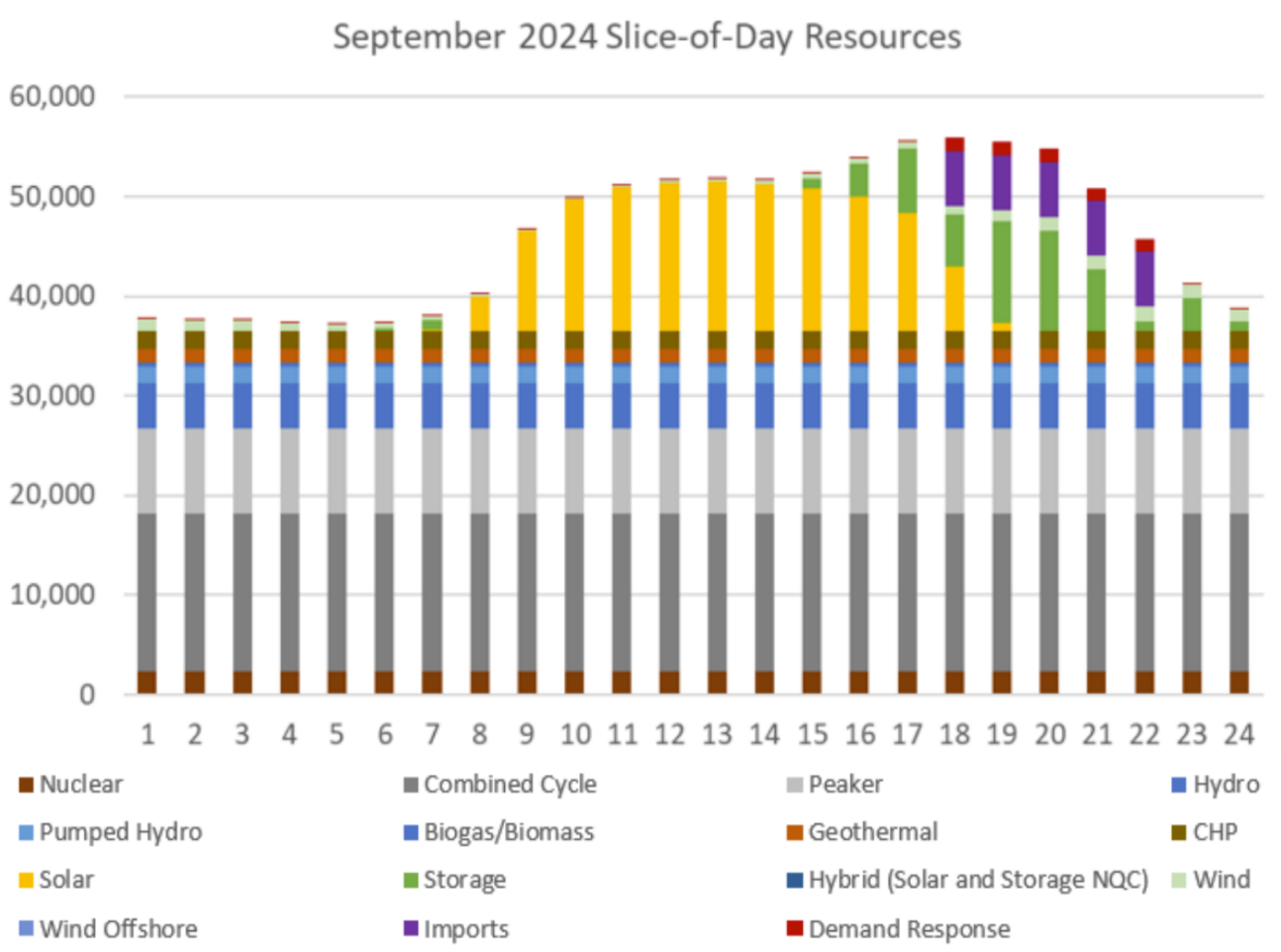
- RA obligations are based on Ava's hourly share of CAISO load for the "worst day" of each month plus a Planning Reserve Margin (PRM).
- LSE's must demonstrate sufficient electricity supply across 24 hours of each month.
- LSE's must procure to their own load shape.

Counting Rules

- Solar and wind resources are based on exceedance profiles, which looks at historic availability each hour of each month based on region and technology.
- Thermal resources are based on Net Qualifying Capacity (NQC), a value that accounts for normal plant operation and is applied to all hours.
- Excess generation is needed to charge batteries/storage. Once charged, storage contributes up to its "nameplate" value, but is limited by "storage efficiency" of ~80%.

Resource Adequacy: Slice of Day Supply Stack

24-hour Monthly Requirement Illustration – CAISO System



Sampling of Supply Stack

Supply Tech	Shape	Capacity (MW)*	Capacity (% of total supply)
Wind	Intermittent	6,360	7
Solar	Intermittent	22,510	25
Large Hydro	Baseload	12,281	14
Nuclear	Baseload	2,280	2.7
Geothermal	Baseload	2,715	3
Natural Gas	Baseload	38,576	43

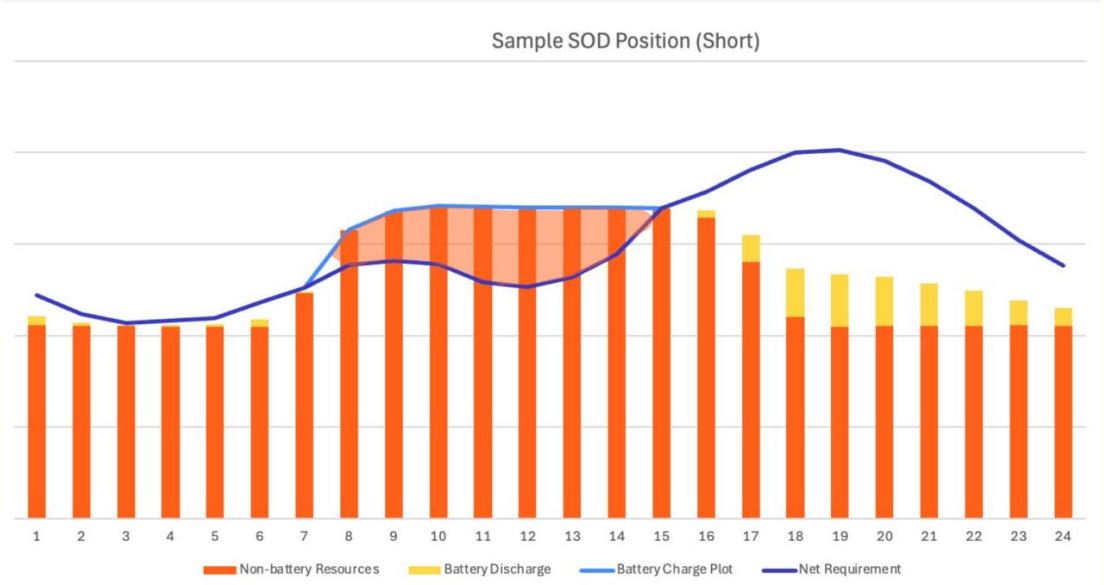
*California has about 61,962 MW of RA net qualifying capacity installed (as of 10/08/25).

Source: Gridwell Consulting

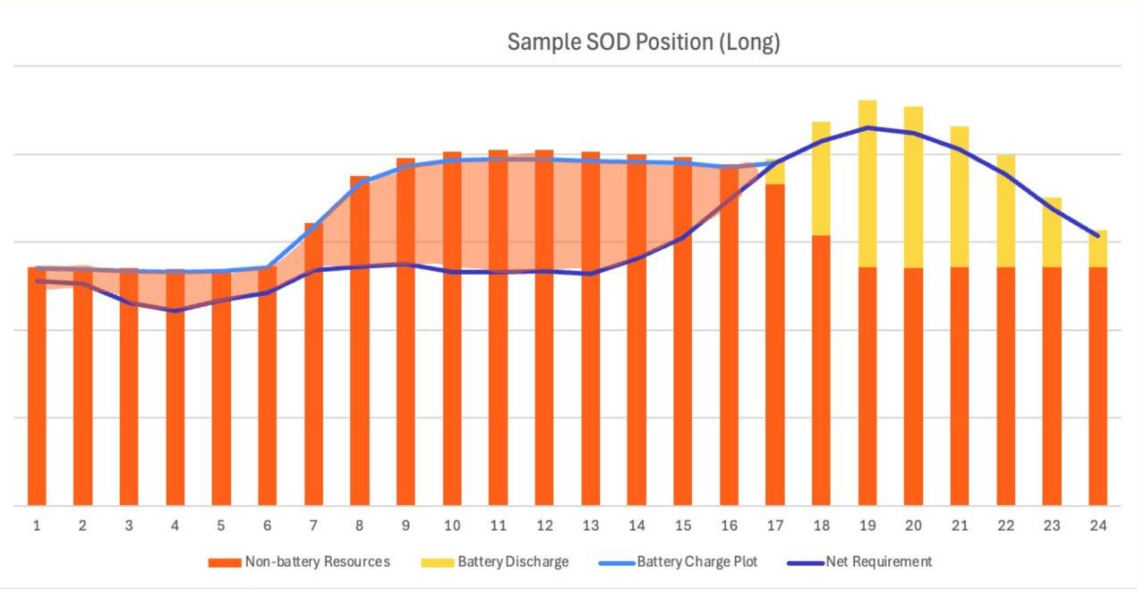
Resource Adequacy: Slice of Day and Storage

- Storage resources in the Slice of Day framework can shift RA from hours of excess to hours of need.
- Excess RA from generating resources is required to charge storage for storage capacity to count toward RA compliance obligation.
- Result: LSEs must procure generation RA **in excess of** RA compliance obligation to "charge" storage for discharge in other hours.

Two hypothetical months under Slice of Day:



charging



charging

Transactability

The Challenge/Problem with Slice of Day:

Compliance is **hourly**; the market is **monthly**

- Unable to transact at the same granularity as the requirement
  - LSEs must purchase more RA than they need to meet their obligations.
  - Creating artificial RA market scarcity by increasing demand for RA and increasing prices.
  - As a System there is sufficient capacity, but individual load serving entities (LSEs) are deficient.
  - If an LSE contracts for a resource, it must do so for the resource's NQC in all 24 hours of the month even if the LSE only has an open position in one hour.
  - Limiting compliance and cost-effective procurement.

Table 2: September 2025 YA System Position and LSE Deficiencies

Hour Ending (HE)	YA Total Requirement (MW)	YA Total Shown Capacity (MW)	YA System Net Position (MW)	YA System Position (% of Requirement)	YA Total Gross LSE Deficiency (MW)
HE 1	19,994.09	29,260.09	9,266.01	46%	-59.87
HE 2	18,198.42	29,152.81	10,954.39	60%	-56.31
HE 3	17,201.48	29,025.93	11,824.45	69%	-54.91
HE 4	16,942.12	28,753.38	11,811.27	70%	-59.94
HE 5	17,751.15	28,598.36	10,847.21	61%	-65.35
HE 6	19,507.69	28,631.24	9,123.56	47%	-78.27
HE 7	20,975.83	32,083.99	11,108.17	53%	-67.59
HE 8	22,146.05	36,294.92	14,148.88	64%	-39.11
HE 9	22,720.85	37,686.05	14,965.21	66%	-36.06
HE 10	23,437.55	38,201.25	14,763.70	63%	-39.22
HE 11	24,586.88	38,328.05	13,741.17	56%	-41.03
HE 12	26,529.68	38,365.61	11,835.93	45%	-42.56
HE 13	29,144.61	38,444.57	9,299.95	32%	-66.14
HE 14	32,588.51	38,770.66	6,182.16	19%	-95.78
HE 15	35,843.13	40,686.15	4,843.02	14%	-124.12
HE 16	**37,179.47**	**41,170.51**	**3,991.05**	**11%**	**-159.41**
HE 17	36,853.45	39,407.19	2,553.74	7%	-130.49
HE 18	**36,908.12**	**38,806.95**	**1,898.83**	**5%**	**-210.01**
HE 19	35,385.24	37,302.72	1,917.48	5%	-161.50
HE 20	32,732.75	35,059.14	2,326.39	7%	-129.80
HE 21	30,949.20	33,481.60	2,532.40	8%	-106.21
HE 22	28,635.54	31,338.74	2,703.20	9%	-109.44
HE 23	25,713.78	30,129.91	4,416.13	17%	-77.20
HE 24	23,023.10	29,809.96	6,786.87	29%	-64.23

In September, gross LSE deficiencies ranged across all hours and peaked at 210 MW in HE 18. However, in all hours, aggregate system surplus exceeded gross LSE deficiencies.

Source: CPUC

The Solution: Load obligation trading

(note: *not* the same as purchasing or trading capacity)

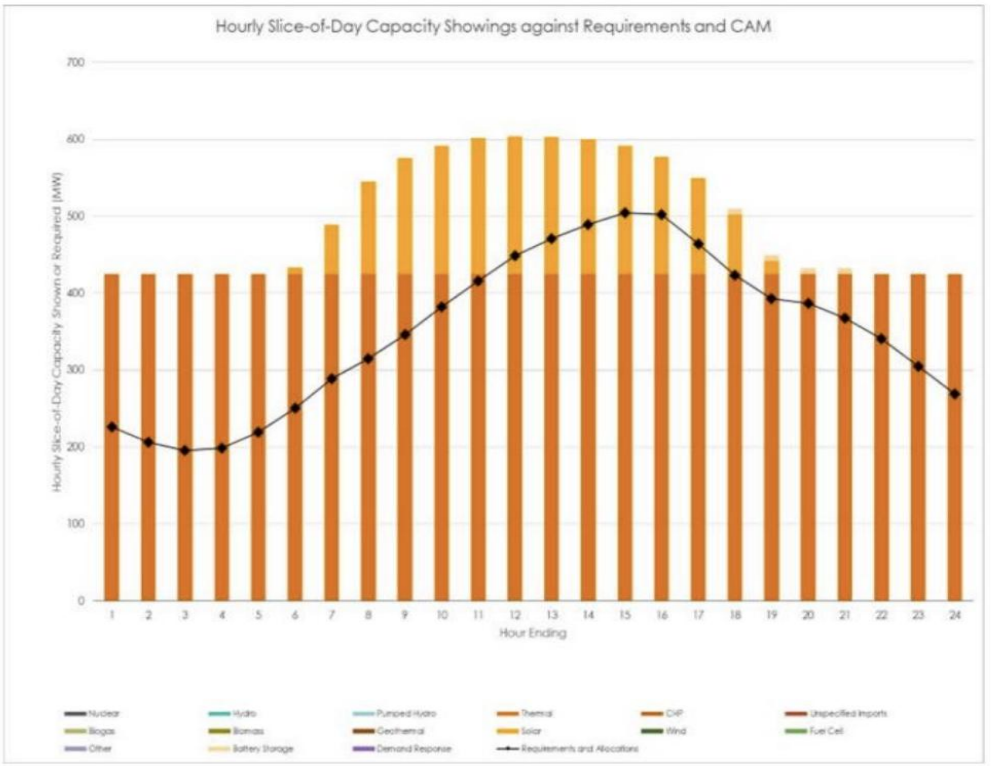
- Concept:
  - LSEs transact load obligations on an hourly basis under the SOD framework.
  - LSEs with open positions in some hours to pay another LSE with long positions to cover these positions.
  - Trading a load obligation would not relieve an LSE of its obligation to serve load.
  - Promote affordability by reducing RA shortages and minimizing over-procurement by allowing LSEs to procure to meet load shapes.
  - Studies by CalCCA and CCPower show that hourly load obligation trading would have increased compliance with year-ahead RA requirements.

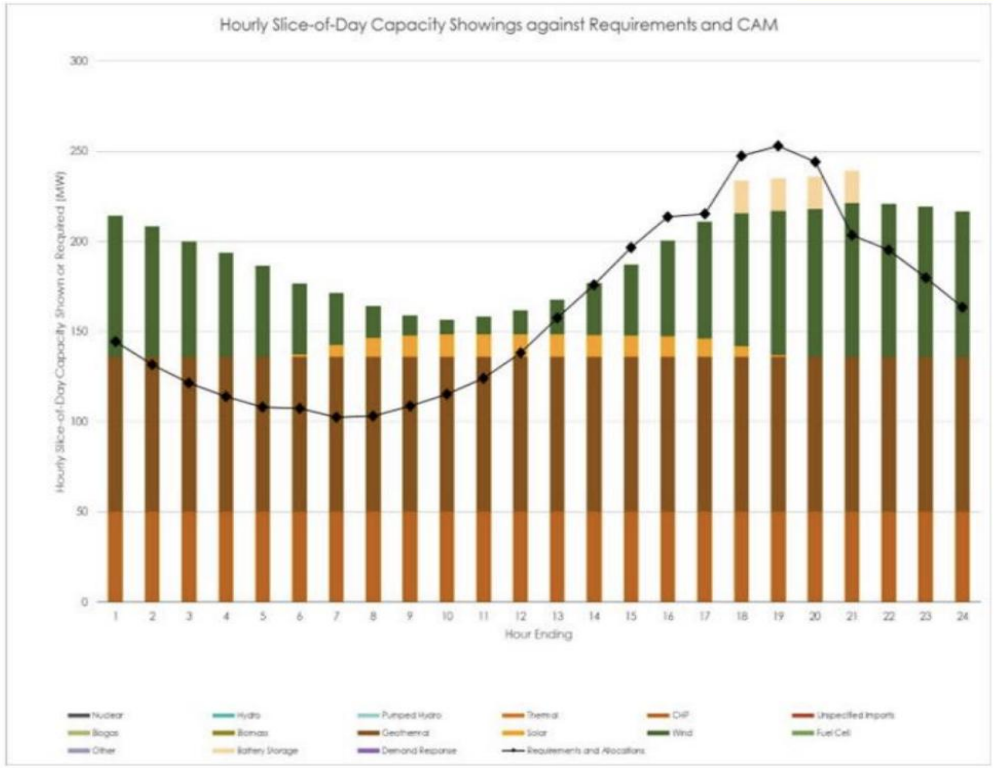
Load obligation trading: An example

Example Showing (Before Trade)

LSE 1 has excess and LSE 2 has open positions in six hours

Hourly Availability Tab





Source: CalCCA

Load obligation trading: An example

Example Showing (Before Trade)

LSE 1 has excess and LSE 2 has open positions in six hours

Check Capacity Tab

LSE 1

Contract ID	Resource ID	MW																							
		HE 1	HE 2	HE 3	HE 4	HE 5	HE 6	HE 7	HE 8	HE 9	HE 10	HE 11	HE 12	HE 13	HE 14	HE 15	HE 16	HE 17	HE 18	HE 19	HE 20	HE 21	HE 22	HE 23	HE 24
Requirements		-302	-282	-271	-274	-295	-326	-365	-391	-422	-458	-491	-525	-547	-569	-585	-582	-564	-523	-492	-485	-464	-422	-381	-345
DR Allocation		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	19	18	17	17	0	0	0
CAM Peakers	CAM Peaker Allocation	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	5	5	5	5	0	0
CAM Storage	CAM Storage Allocation Multi Cycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0	0	0
CAM Storage	CAM Storage Allocation Single Cycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0
Other CAM Allocation		76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
	PALOMR_2_PL1X3	425	425	425	425	425	425	425	425	425	425	425	425	425	425	425	425	425	425	425	425	425	425	425	425
	TOPAZ_2_SOLAR	0	0	0	0	0	9	64	120	151	167	177	179	178	175	167	153	125	77	17	0	0	0	0	0
		199	**219**	**230**	**226**	**206**	**183**	**200**	**230**	**230**	**210**	**187**	**155**	**132**	**111**	**88**	**76**	**86**	**86**	**56**	**46**	**65**	**84**	**120**	**156**

LSE 2

Contract ID	Resource ID	MW																							
		HE 1	HE 2	HE 3	HE 4	HE 5	HE 6	HE 7	HE 8	HE 9	HE 10	HE 11	HE 12	HE 13	HE 14	HE 15	HE 16	HE 17	HE 18	HE 19	HE 20	HE 21	HE 22	HE 23	HE 24
Requirements		-175	-162	-152	-145	-139	-138	-133	-134	-139	-146	-155	-169	-188	-208	-229	-246	-255	-288	-293	-283	-242	-228	-211	-194
DR Allocation		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	7	7	7	0	0	0
CAM Peakers	CAM Peaker Allocation	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0
CAM Storage	CAM Storage Allocation Multi Cycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0
CAM Storage	CAM Storage Allocation Single Cycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	0	0
Other CAM Allocation		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
	ARCOGN_2_UNITS	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	ATHOS_5_AP2X2	0	0	0	0	0	1	7	10	12	12	12	12	12	12	12	11	10	6	1	0	0	0	0	0
	GEYS11_7_UNIT11	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
	JOANEC_2_STABT2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	15	15	0	0	0
	VOYAGR_2_VOYWD2	78	72	64	58	51	39	29	18	11	8	10	14	19	29	39	53	65	74	80	82	85	85	83	81
		70	**77**	**79**	**80**	**78**	**69**	**69**	**61**	**50**	**41**	**34**	**24**	**10**	**1**	**-9**	**-13**	**-4**	**-14**	**-18**	**-8**	**36**	**26**	**39**	**53**

Source: CalCCA

Load obligation trading: An example

Example Showing (Trade)

LSE 1 and LSE 2 enter into a load obligation trade where LSE 2 sells an obligation to LSE 1 (i.e., LSE 2 pays LSE 1 to cover a portion of its obligation)

Resource Custom Profile Tab

LSE 1

Contract ID	Resource ID	Resource SubID	MW																					
			HE 1	HE 2	HE 3	HE 4	HE 5	HE 6	HE 7	HE 8	HE 9	HE 10	HE 11	HE 12	HE 13	HE 14	HE 15	HE 16	HE 17	HE 18	HE 19	HE 20	HE 21	HE 22	HE 23	HE 24
	Load Obligation Purchase		0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	13	5	14	18	8	0	0	0	0

LSE 2

Contract ID	Resource ID	Resource SubID	MW																					
			HE 1	HE 2	HE 3	HE 4	HE 5	HE 6	HE 7	HE 8	HE 9	HE 10	HE 11	HE 12	HE 13	HE 14	HE 15	HE 16	HE 17	HE 18	HE 19	HE 20	HE 21	HE 22	HE 23	HE 24
	Load Obligation Sale		0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	-13	-5	-14	-18	-8	0	0	0	0
CPUC Check for differences			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

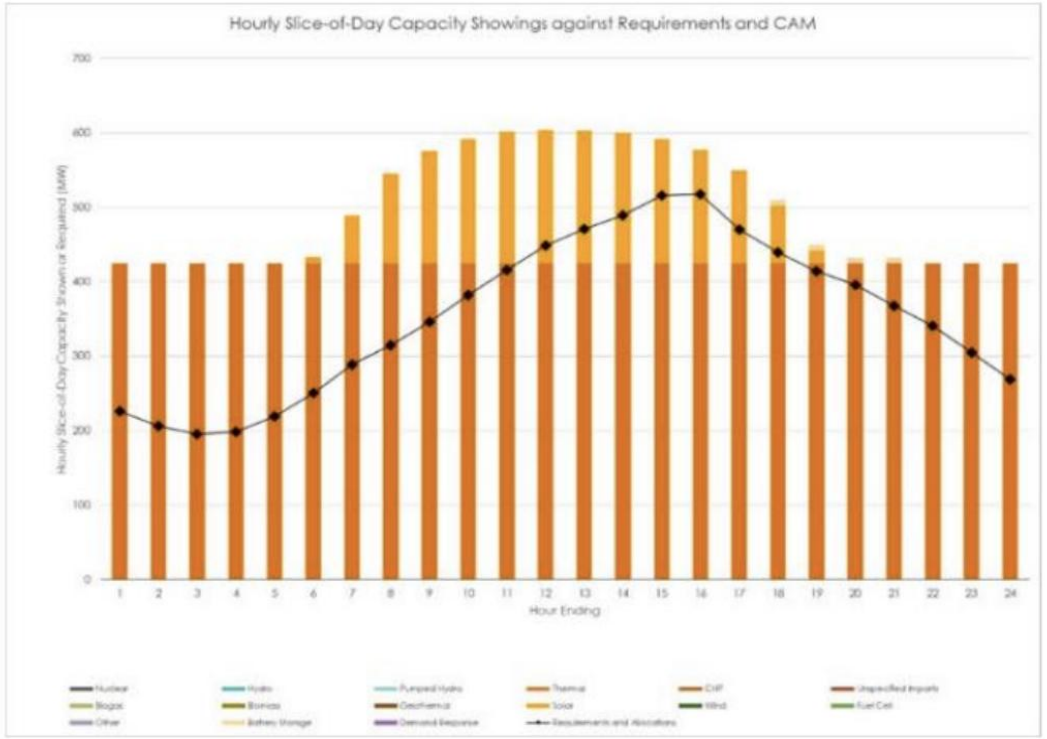
Source: CalCCA

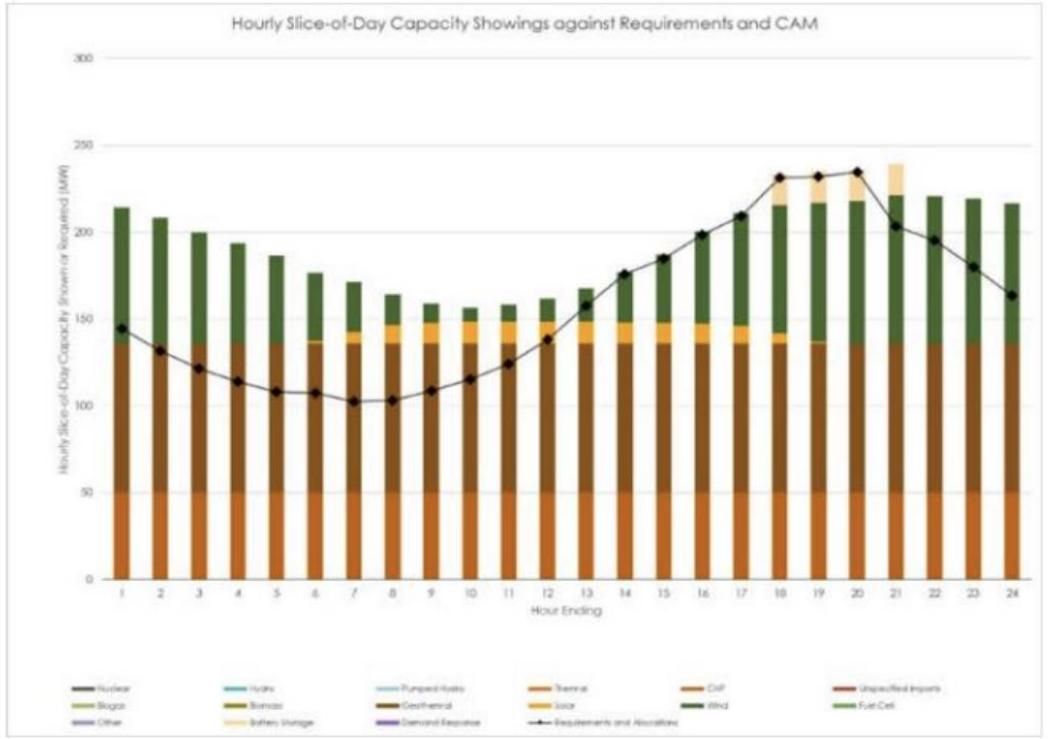
Load obligation trading: An example

Example Showing (After Trade)

Neither LSE 1 nor LSE 2 have open positions

Hourly Availability Tab





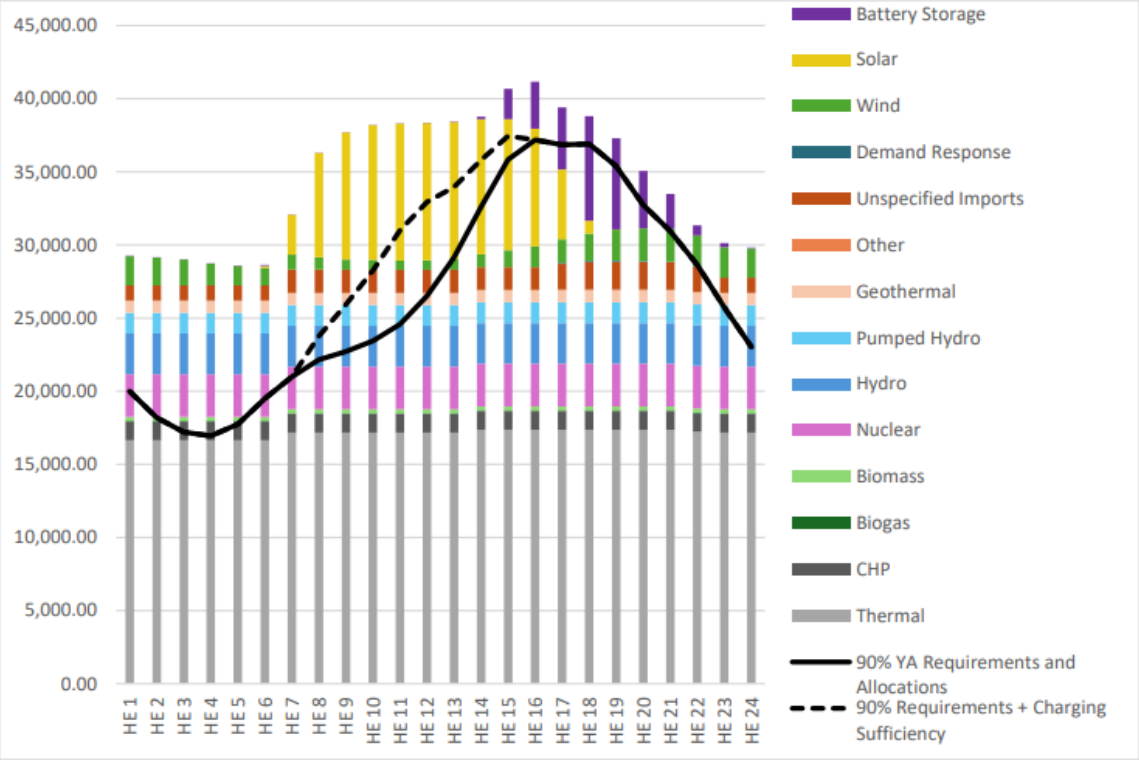
Source: CalCCA


Ava
Community Energy

Appendix (companion to slide 9)

Report on Hourly Transactability within The Slice of Day Resource Adequacy

Figure 2: September 2025 YA Aggregate LSE Showings



Individual LSE Deficiencies in YA Filings

While the system was long in aggregate, September YA filings also exhibited individual LSE deficiencies across all hours. A total of nine LSEs were deficient in at least one hour relative to their September YA requirement.

Source: CPUC