DOCKETED	
Docket Number:	24-IEPR-03
Project Title:	Electricity Demand Forecast
TN #:	259391
Document Title:	Presentation - Resource Adequacy Slice-of-Day and Hourly Load Forecasts
Description:	2A. Zoe Draghi, CPUC
Filer:	Raquel Kravitz
Organization:	California Public Utilities Commission
Submitter Role:	Public
Submission Date:	10/1/2024 2:25:18 PM
Docketed Date:	10/1/2024

Resource Adequacy: Slice-of-Day and Hourly Load Forecasts

Zoe Draghi

Senior Public Utilities Regulatory Analyst

October 2, 2024

California Public Utilities Commission

Slice of Day Background and Hourly Load Forecast Process

Slice of Day Overview

The 24-hour Slice of Day Framework aims to ensure that each LSE has enough capacity to satisfy is specific gross load profile plus a planning reserve margin (PRM) in all 24 hours on the CAISO **"worst day"** in each month.

Slice of Day Background:

Designed to address a changing electric system:

- Increased penetration of 4-hour storage resources and use-limited resources that qualify for RA, raises concerns about whether the entire system will have sufficient resources to charge the batteries and meet load in every hour.
- Previous RA program was focused on monthly peak hour and did not include a storage charging requirement.

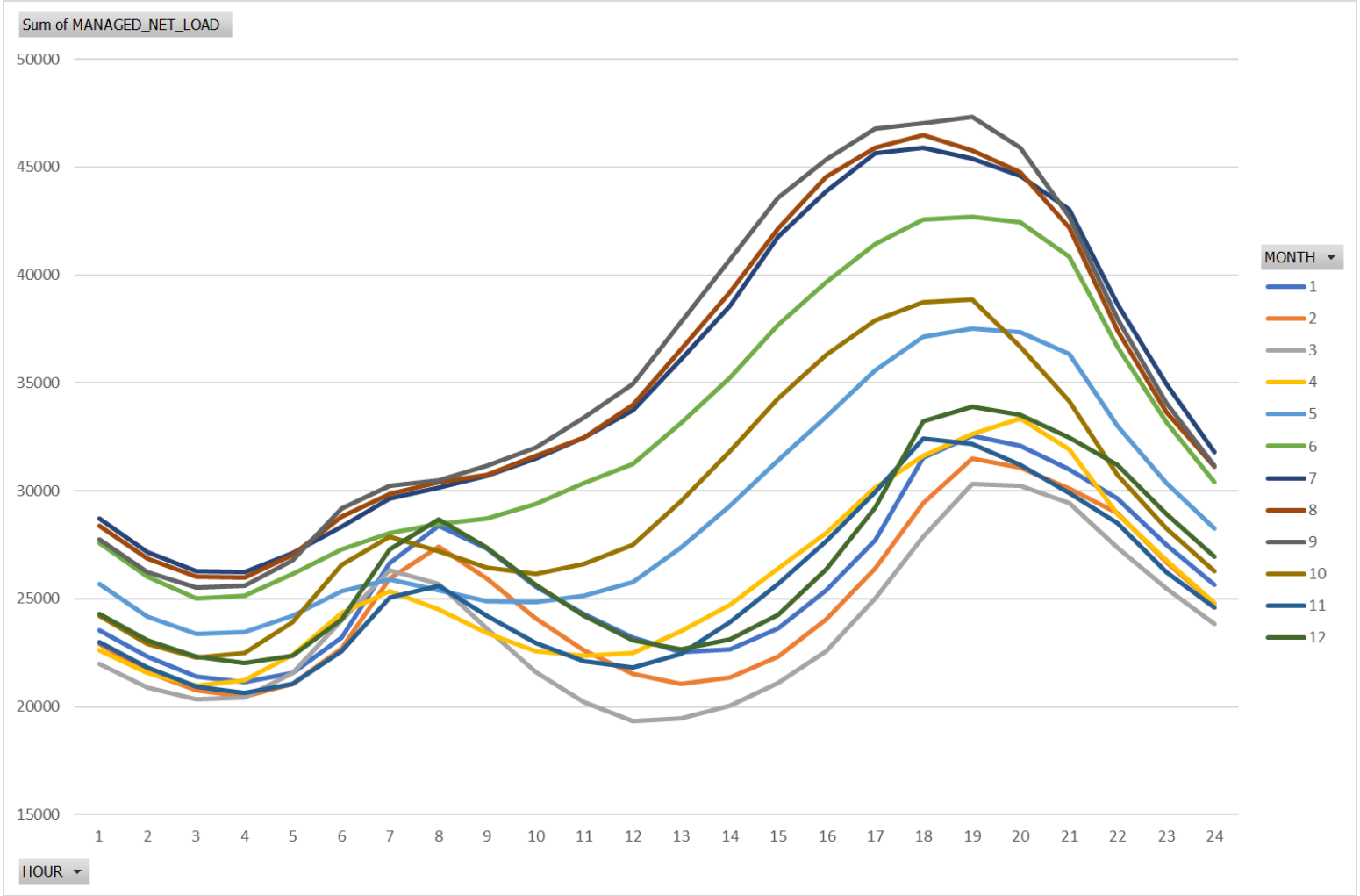
Slice of Day Overview

The IEPR Forecast defines and feeds into several key aspects of the SOD Framework:

- **"Worst day"** – Defined as the day of the month that contains the hour with the highest coincident peak load forecast, as determined in the IEPR forecast
- **Need Determination and Allocation** – CEC load forecast approach adapted to Slice-of-Day Framework, which applies an hour and LSE specific coincidence adjustment to LSE forecasts, based on system peak hours.
- **Planning Reserve Margin** – LSEs must demonstrate sufficient capacity to meet their load requirements plus a PRM percentage in each hour ("Load+PRM"). For initial implementation, one PRM will apply to all hours of the year. For 2025, the hourly PRM is 17 percent.
- **Excess Capacity Required to Offset Storage Usage** – LSEs must demonstrate that it has excess energy, including efficiency losses, to provide charging for storage

Monthly Managed Load on Worst Days- CAISO System

- Worst day hourly will set RARs for LSEs
- Hourly Load Forecast LSE Adjustment Process to be used in establishing individual LSE load shapes



Source: 2021 IEPR Hourly mid-mid

Slice of Day Load Forecast Process Overview

With the adoption of the 24-hour SOD Framework, CEC developed a process to establish individual LSE hourly load forecasts, based on the worst-day load profiles from the IEPR forecast.

Step 1 – Monthly Peak Process

- Develop reference forecast for IOU service areas and direct access
- Develop reference peak demand and peak-day energy estimate for LSEs based on available data. Evaluate need for LSE-specific adjustments
- Estimate hourly coincident peak day load shape using historic loads; compare to LSE submitted shape to derive coincidence adjustment
- Apply adjustments for demand side credits
- Apply pro-rata adjustments to bring the total of the forecasts to within 1% of the CEC service area forecast.

Slice of Day Load Forecast Process Overview

Step 2 – Slice-of-Day Hourly Forecast Process

- Calculate hourly coincidence factors using historical loads, which account for differences between load shapes on the system peak day and the LSE peak day.
- Apply curve-fitting formula to fit LSE's submitted load shape to the adjusted noncoincident monthly peak and energy
- Apply hourly coincidence adjustment; Calibrate to coincident peak hour forecast if needed
- Apply hourly load modifier credit. This includes additional achievable energy efficiency (AAEE), load-modifying demand response (LMDR), and in the SCE TAC area, utility-owned storage (negative in charging hours)

LSE-Specific Adjustments

- LSE forecasts are evaluated against a CEC load forecast benchmark
  - Considering historical loads, temperatures, load factors, respective forecast assumptions, and other factors, CEC will then apply LSE-specific adjustments.

- Final Step – CEC will apply a pro-rata to within 1% of IEPR 1-in-2 hourly forecast for the monthly coincident peak day, by TAC

2024 RA Forecast Adjustments

Final RA 2024 Forecast Adjustments for CPUC-Jurisdictional LSEs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Submitted LSE Forecasts	27,742	26,923	26,228	28,807	30,437	37,136	39,466	41,202	42,476	33,451	26,935	28,170
Coincidence Adjustment	(833)	(800)	(898)	(1,288)	(1,134)	(1,949)	(1,429)	(2,587)	(2,240)	(906)	(664)	(606)
Coincidence Adjustment %	-3.0%	-3.0%	-3.4%	-4.5%	-3.7%	-5.2%	-3.6%	-6.3%	-5.3%	-2.7%	-2.5%	-2.2%
LSE Specific Adjustments	1,996	2,220	1,512	1,927	3,804	2,645	2,481	2,505	2,192	1,925	1,683	2,547
LSE Specific Adjustment % of Coincident Forecast	7.4%	8.5%	6.0%	7.0%	13.0%	7.5%	6.5%	6.5%	5.4%	5.9%	6.4%	9.2%
EE/ LMDR Credit	(443)	(446)	(430)	(412)	(447)	(290)	(371)	(366)	(334)	(284)	(680)	(657)
Pro rata adjustment to match CEC forecast within 1%	573	612	458	515	728	652	911	764	549	652	1,212	538
Pro-Rata Adjustment %	2.0%	2.2%	1.7%	1.8%	2.2%	1.7%	2.3%	1.9%	1.3%	1.9%	4.4%	1.8%
Total Adjusted Forecasts	29,034	28,509	26,869	29,548	33,388	38,194	41,058	41,517	42,643	34,839	28,485	29,993
CEC Coincident Peak Reference Forecast	29,328	28,797	27,141	29,819	33,725	38,573	41,473	41,936	42,967	35,191	28,773	30,296
Adjusted Forecasts % of Reference	99.0%	99.0%	99.0%	99.1%	99.0%	99.0%	99.0%	99.0%	99.2%	99.0%	99.0%	99.0%

Slice of Day System Requirements and Allocations

CEC load forecast establishes load ratios for individual LSEs. Load ratios are a key metric for calculating LSE-specific allocations.

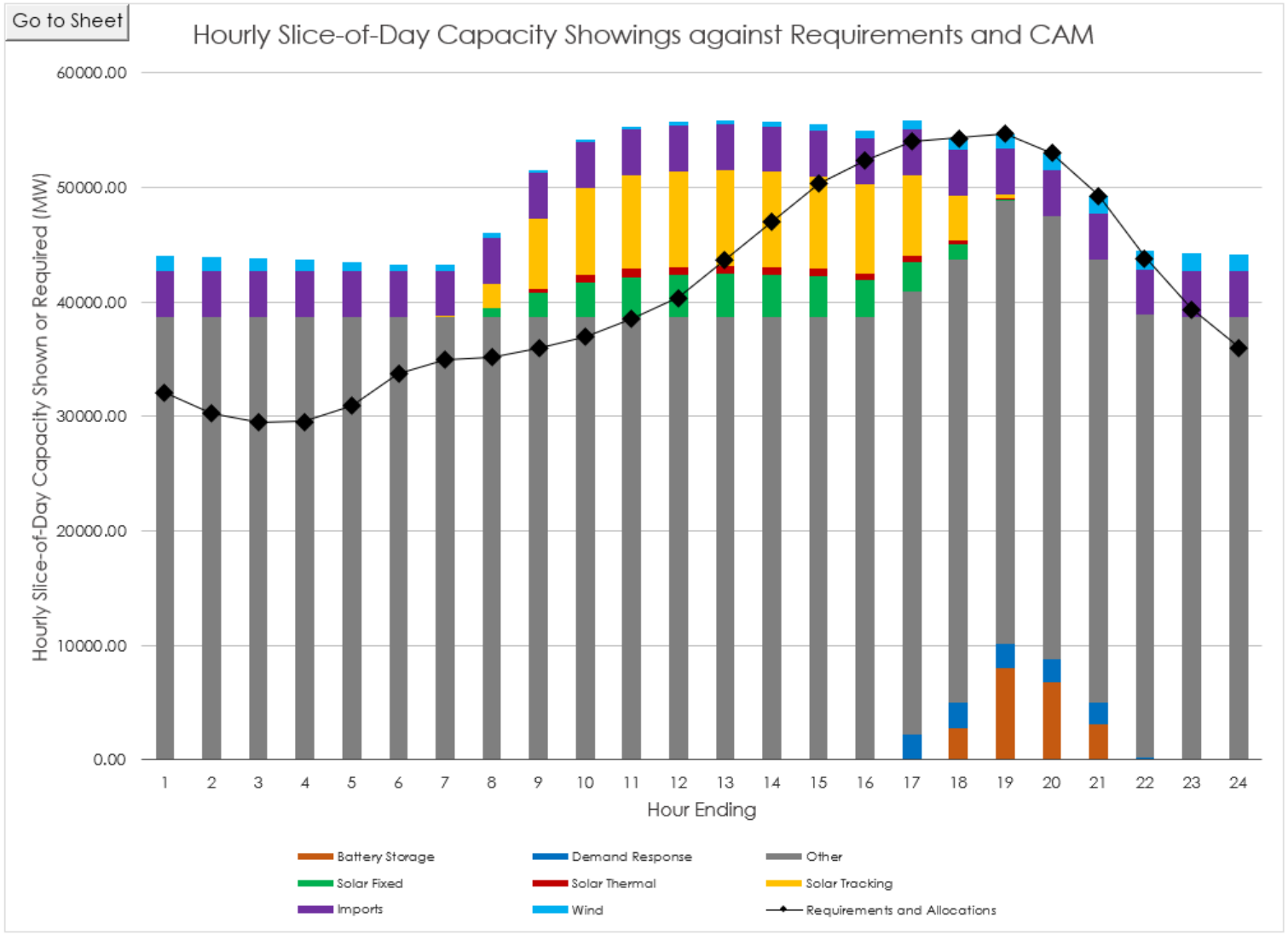
LSE Load Requirement – Aggregate total load forecast for each LSE across TAC areas, specified by CEC forecast

LSE-Specific Allocations

- Cost Allocation Mechanism (CAM) – CAM credits are based on TAC-specific load shares.
- Demand Response (DR) – DR programs procured by IOUs and allocated according to TAC-specific load shares
- Central Procurement Entity (CPE) **–** LSEs in PG&E and SCE TAC-areas are allocated CPE credits according to TAC-specific load shares

- *CAM, DR, and CPE allocations are still allocated to LSEs on a monthly peak load ratio basis under Slice of Day*

Slice of Day System Requirements and Allocations



RA Local and Flexible Requirements

Local RA Requirement – Allocated based the CAISO Local Capacity Requirement study and the September monthly load ratio shares.

- Local requirements are allocated three years forward.
- PG&E and SCE have CPEs and LSEs in those TAC areas therefore do not have a local requirement. Only LSEs in SDG&E's TAC receive a local requirement.

Flexible RA Requirement – Flexible requirements are allocated based on CAISO's flexible capacity study and based on the monthly load ratio shares after taking out the flexible CAM, flexible CPE CAM, and flexible IRP credits.

Load Forecast Adjustment Process

- After Year-Ahead RA compliance filings, LSEs have the opportunity to update load forecasts in February for May – December
- This load forecast adjustment is intended to account for load migration that may occur after load forecasts are finalized in September, to ensure load forecasts and RA requirements are as accurate as possible
- System RA requirements and allocations will be adjusted to updated load ratios, reissued to LSEs, and will be binding for Month-Ahead filings from May – December

Load Forecast Challenges and Opportunities for Development

Load Forecast Challenges and Opportunities for Further Development

- **Hourly load forecasts vary from year to year**
  - To avoid shocks in the market, minimizing variability in load forecasts across years and across hourly slices will contribute to better procurement planning and market predictability

- **Challenges with benchmarking for LSE load forecasts**
  - Further developed guidance from CEC with specific instructions for LSE for their initial load forecasts will help minimize the need for LSE-specific adjustments

- **Engagement from LSEs in IEPR forecast process**
  - Increased LSE engagement in the IEPR forecast process will lead to improved awareness of load forecasts, adjustments in process and assumptions, better understanding to apply to their own load forecasts

California Public Utilities Commission

Resource Adequacy Homepage