

Slice of Day – Load Forecast Process Update and Loss of Load Studies Translation for RA proceeding Update

October 6, 2022



California Public
Utilities Commission

Slice of Day Load Forecast Dry-Run – Update

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California Energy Commission

Load Forecast Dry Run Update

- LSEs submitted hourly forecasts for 2023 in August. Most LSE submitted a 24 hours per month forecast (not the optional 8760).
- CEC staff are evaluating the submitted forecasts and comparing to the CEC hourly forecast.
- Staff expects to provide discussion of initial results and issues for the workshop report, including magnitude of LSE v. CEC forecast deviation by hour and month.
- Refinement and testing of forecast adjustment and calibration methodologies to allocate load appropriately in all hours will require additional time. CEC staff will share more detailed results and methodology for stakeholder consideration before forecast submittals are due for RA 2024.
- Any decisional items may need additional CPUC process.

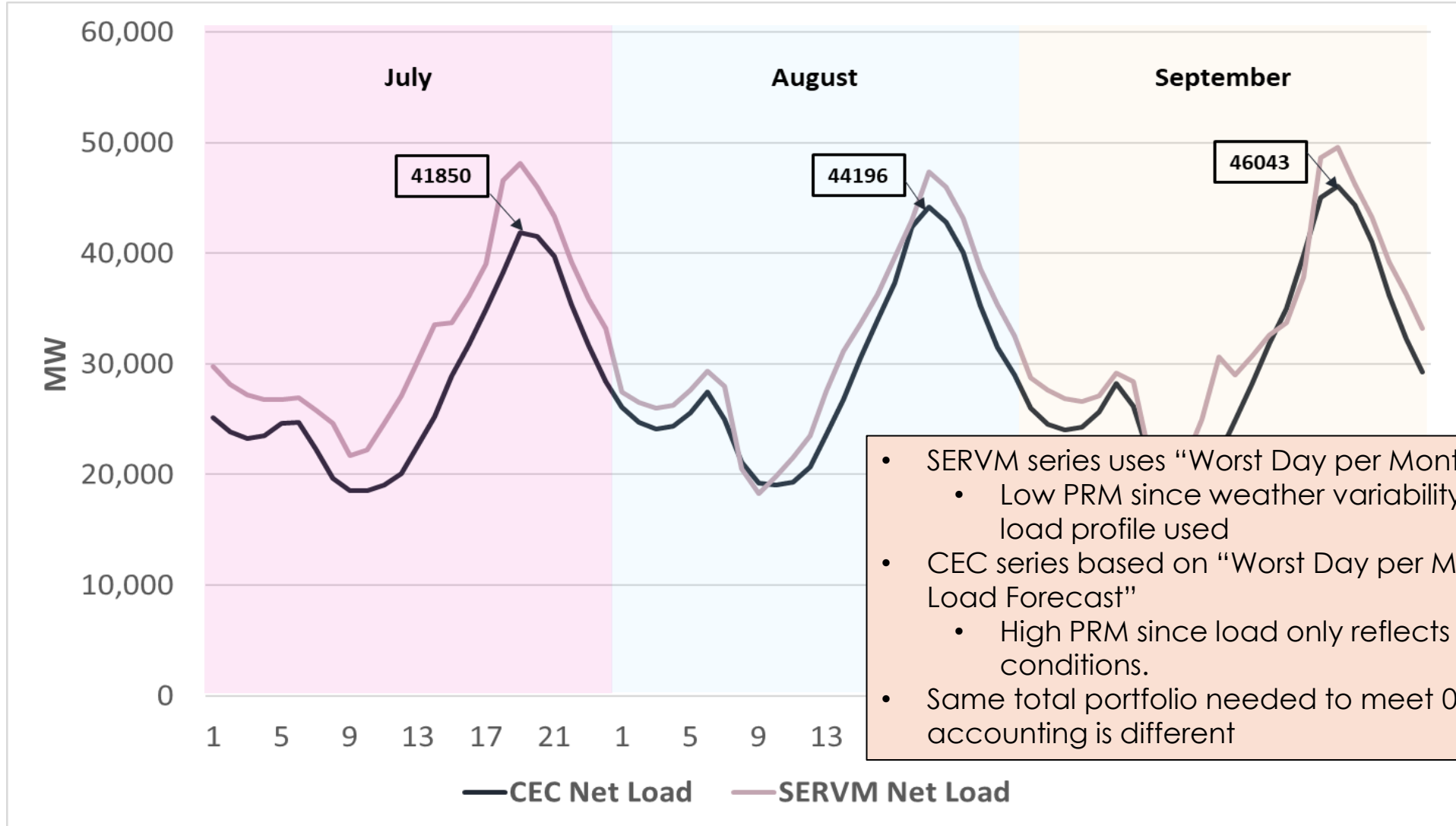
Demonstration of PRM Calculation for SOD construct from LOLE study

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Astrapé Consulting

Translating SERVM Portfolio to Slice of Day

- Construct SERVM portfolio that meets 0.1 LOLE (*Currently based on 2024 PSP Portfolio*)
 - Use neighbor import assumption to calibrate to 0.1 LOLE
- Define the SERVM resources in a slice of day tool (*convert to slice of day accounting methodologies*). For the calibration example the following assumptions were made:
 - Conventional resources input at nameplate
 - Storage resources' capacity input at nameplate
 - Energy constraint aggregated
 - Wind/Solar profiles input via exceedance method
- Input managed load (*used SERVM and CEC for this calibration example*)
 - Peak day of every month
- Solve for the highest monthly load multiplier that the reliability compliant portfolio can support
- Test system reliability by applying minimum monthly reserves in all months

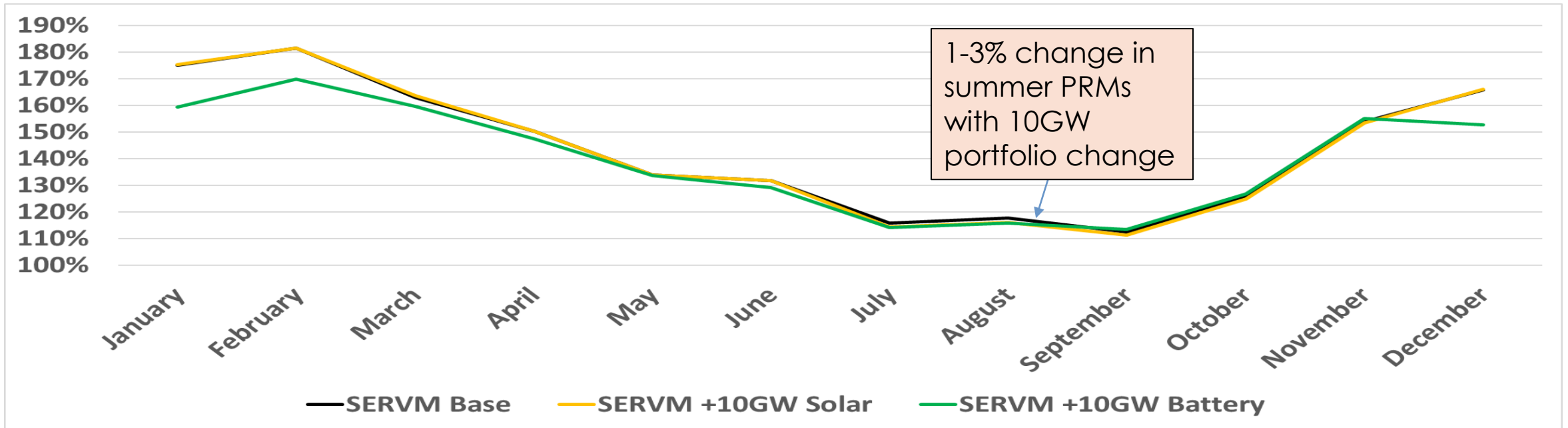
Translating SERVUM Portfolio to Slice of Day



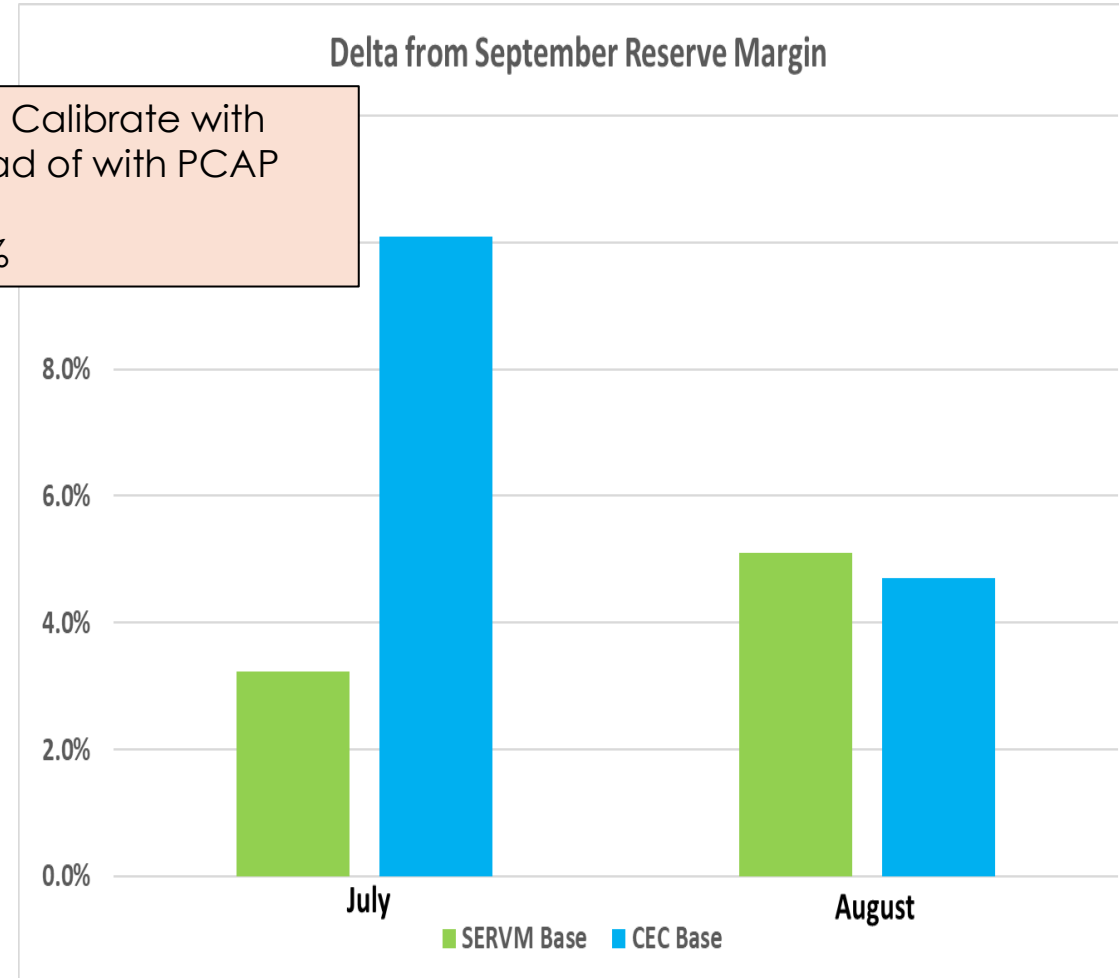
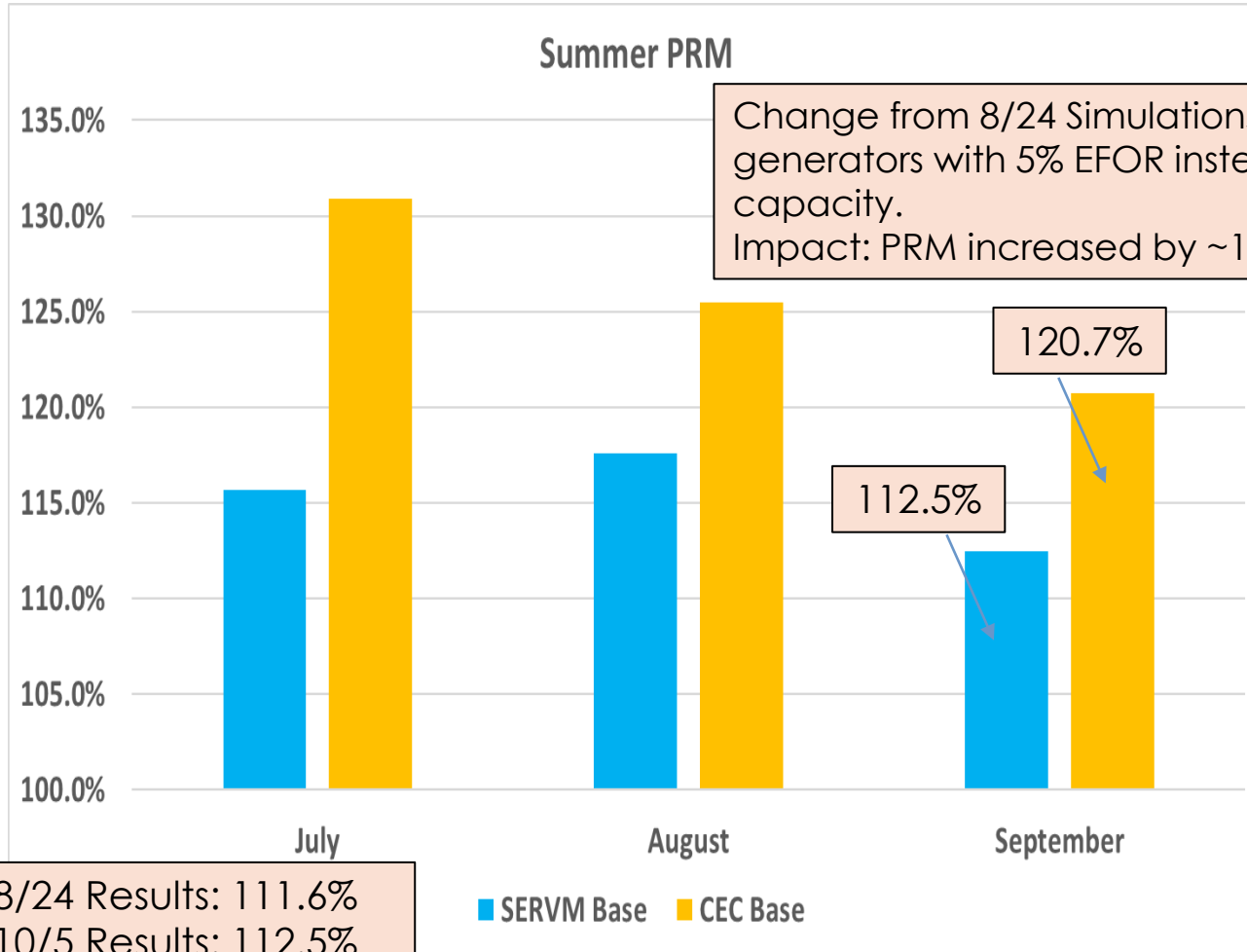
- SERVUM series uses "Worst Day per Month in 23 Years"
 - Low PRM since weather variability included in load profile used
- CEC series based on "Worst Day per Month in 50/50 Load Forecast"
 - High PRM since load only reflects median conditions.
- Same total portfolio needed to meet 0.1 LOLE; only accounting is different

Alternate Portfolios Tested in SERVM and SoD

- 2024 Expected Case Tuned to 0.1 LOLE
- High Solar (+10GW utility scale solar)
- High Battery (+10GW 4-hr battery)



Impact of CEC vs SERVVM Net Load Profiles



SERVVM September PRM would be identical to CEC PRM if median forecast used instead of "worst day"

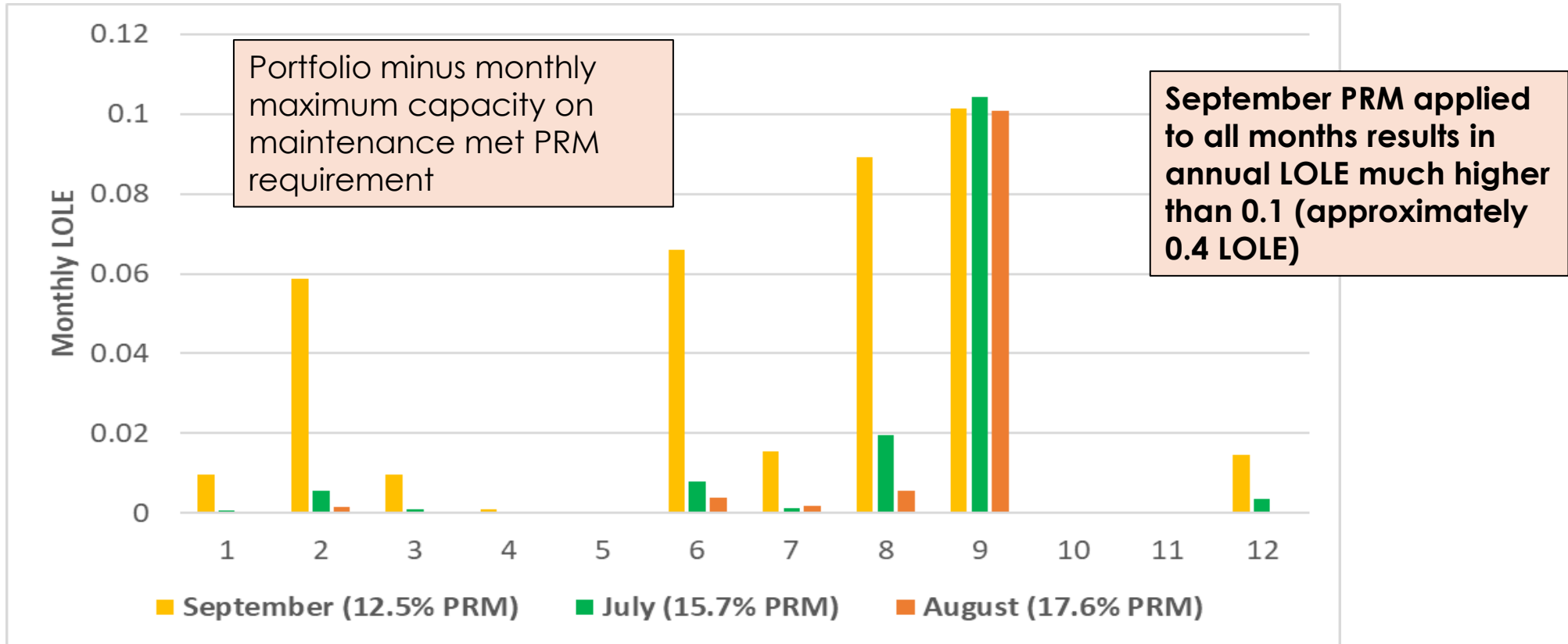
Slice of Day Stress Tests

- SERVM 0.1 LOLE compliant portfolio presumes year-round availability
- Astrapé and CPUC designed tests to analyze reliability if fewer resources are available in other months.
- Stress Test 1
 - Impose the September PRM in all months
 - Finding: Annual LOLE increases dramatically
 - Any month with reserves equivalent to the reserves available in September is likely to have LOLE even if the peak load for that month is much lower than September peak load.
- Stress Test 2
 - Impose the September PRM in September and either July or August PRM in all other months
 - Finding: Since July and August had minimal LOLE in the base case, the organic reserve margins for those months applied to all other months does not surface material LOLE
- Stress Test 3
 - Impose the same PRM in all months and increase PRM until annual LOLE = 0.1
 - Finding: the annual PRM that meets 0.1 LOLE will be 2-3% higher than the September PRM identified in the base case SERVM runs.

Stress Testing (Test 1)

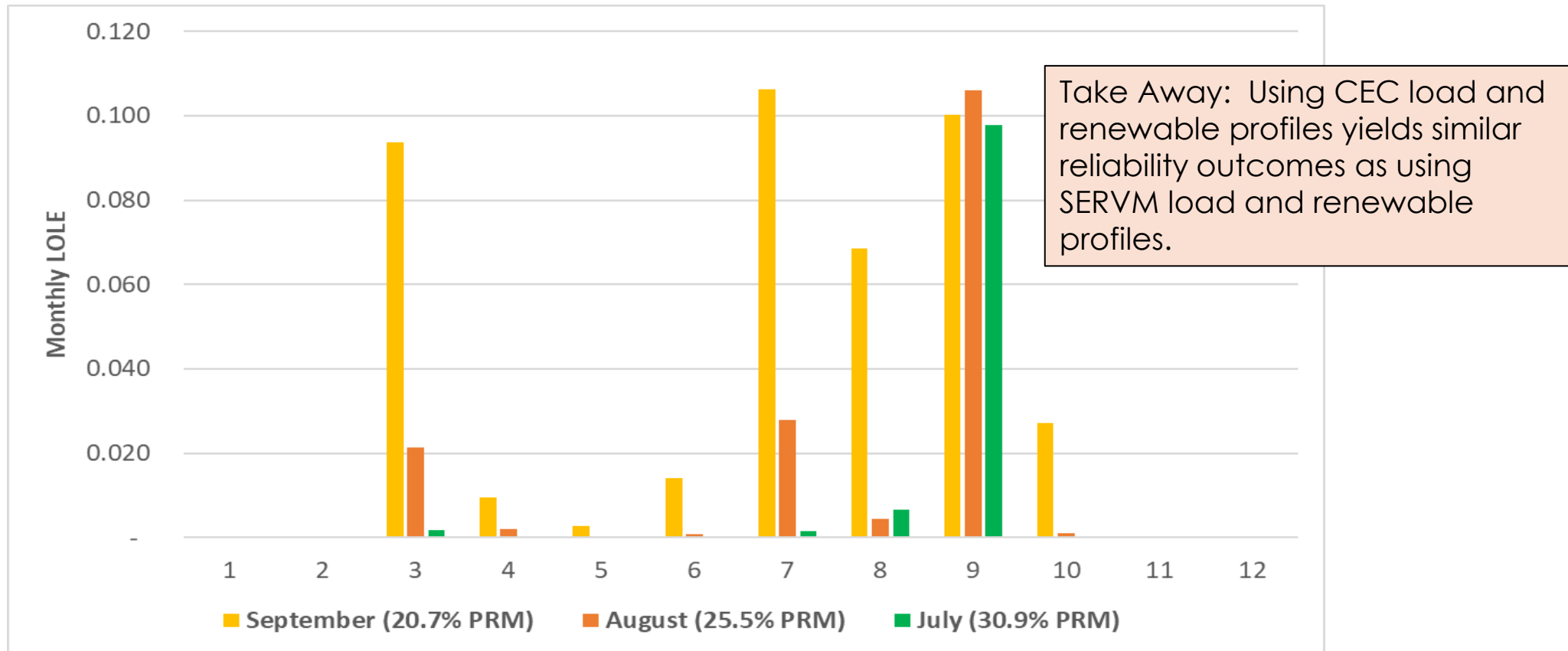
No allowance for planned maintenance in the monthly PRM obligations.

- Apply September PRM to all months
- Apply July or August PRM to all other months



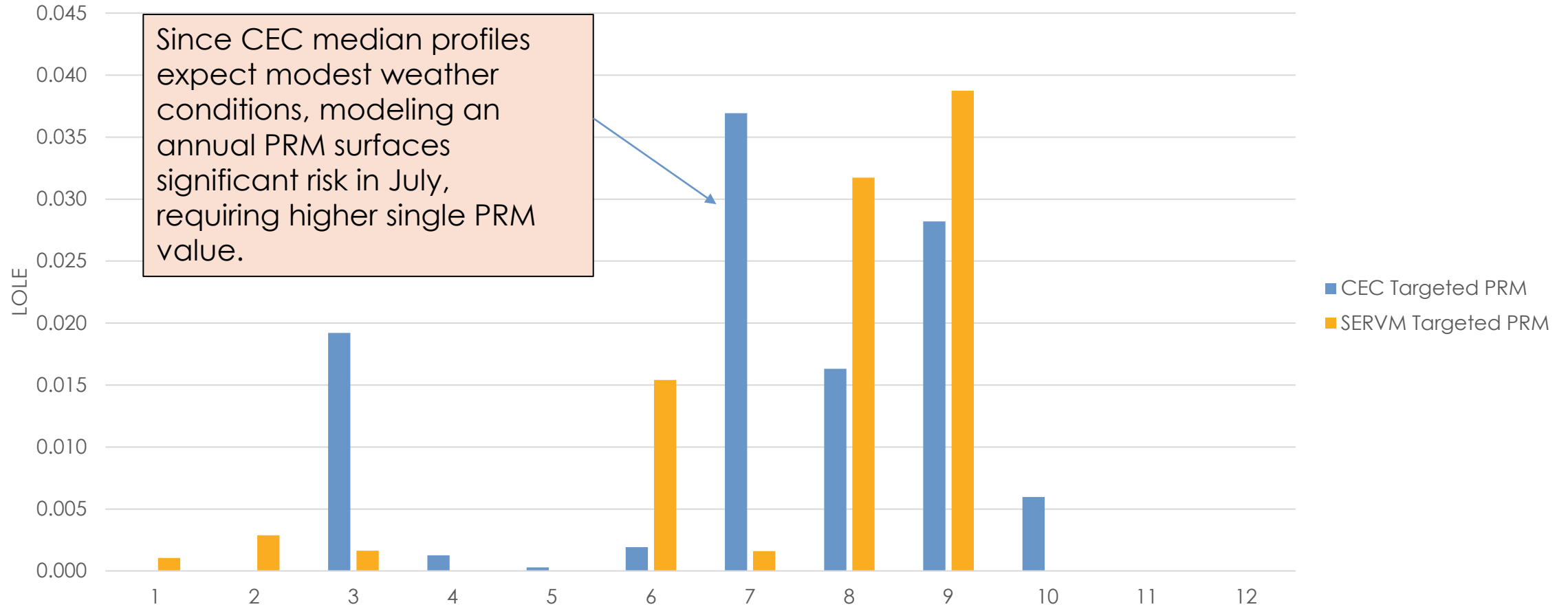
Stress Testing (Test 2)

- Apply CEC-Based September PRM to all months
- Apply CEC-Based July or August PRM to all other months



Single PRM Analysis (Test 3)

CEC-Based PRM: 123.3% (+3.3% from September PRM)
SERVM-Based PRM: 114.9% (+2.4%)



Next Steps

- Calibration of CEC and SERVM load forecasts (DONE)
- Treatment of perfect capacity in SERVM to SoD translation (DONE)
- Exploring implications of multiple reserve margin obligations (DONE)

2024 RA Data Updates

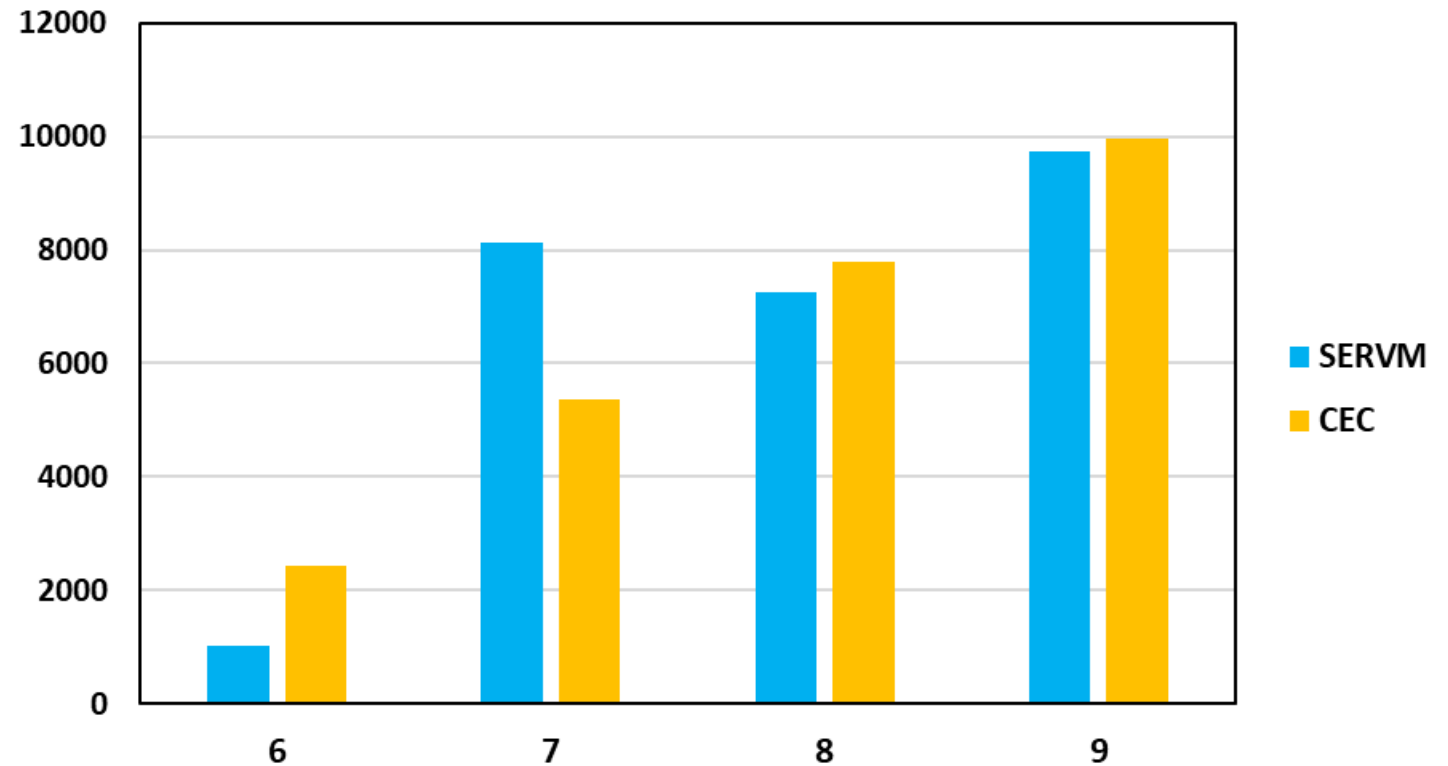
Energy Division

Import Sensitivity

- Instead of using perfect or hypothetical capacity to achieve 0.1 LOLE, tune the import assumption.
- Each month's import magnitude is based on meeting a single annual PRM value.

Base Import MW Requirement to meet 0.1 LOLE = 8.8GW

Import MW Levels for 0.1 Annual LOLE



Key data updates since PSP

- Staff updated baseline with new units since PSP (BaselineReconcile)
 - Staff used latest public CAISO information (CAISO Master Generating Capability List) and LSE August 1 IRP filings to add/update the existing Baseline in SERVIM and in RESOLVE.
 - BASELINE includes resources that are ONLINE or DEVELOPMENT in the LSE's IRP filings, not including PLANNED_NEW or REVIEW.
 - Staff also performed updates such replacing generic names with actual CAISO IDs and updated inservice dates as well as other updates. Several resources increased their capacity this year as well.
 - **Increases in dispatchable capacity for 2024 are >5GW**
- 2022 Baseline List will be posted to the PUC website here:

[Unified RA and IRP Modeling Datasets 2022 \(ca.gov\)](#)

Unit Category	PSP Capacity (MW)	2022 Baseline Capacity (MW)	Delta
Battery Storage	2,113	6,458	4,345
Biogas	290	313	23
Biomass/Wood	521	597	76
Cogen	2,292	2,212	(80)
CT	8,686	8,546	(140)
Geothermal	1,479	1,643	164
Hybrid_BattStorage	370	1,540	1,170
Hybrid_Solar_1Axis	148	1,919	1,771
Hybrid_Solar_Fixed	450	200	(250)
Paired_BattStorage	1,249	1,138	(111)
Paired_Solar_1Axis	1,690	1,301	(389)
Solar_1Axis	7,483	8,960	1,477
Solar_Fixed	3,584	4,640	1,056
Wind	6,654	7,524	871
Total			9,982