Planning Reserve Margin Calibration Methodology

Implementation Track:

- The PRM for the 2024 RA year may be further revised in a June 2023 decision after a review of Energy Division's updates to the Loss of Load Expectation modeling by stakeholders and the Commission
- Amended scoping memo: "Consider modifications to the Planning Reserve Margin ("PRM") for the 2024 RA year and beyond, including Energy Division's recent loss of load expectation (LOLE) study in the Integrated Resource Planning (IRP) proceeding, or a future LOLE study for RA to be submitted into this proceeding no later than January 2023."

RA Reform Track:

- Workstream 2 – (e). Appropriate PRM with single PRM initially for all months and hours informed by LOLE study, including NRDC's calibration tool
- "Converting the results of the LOLE study to the counting rules applicable to the 24-hour framework should await the refreshed LOLE outputs from the IRP proceeding. Once refreshed LOLE outputs are available, conversion of the outputs to the 24-hour framework counting rules need to be completed, and NRDC's "proof of concept" template should be leveraged for the conversion."
- LSEs must demonstrate sufficient capacity to meet their load requirements plus a PRM percentage in each hour ("Load+PRM").

Agenda Items

♦Inputs of LOLE study

♦LOLE methodology and annualized portfolio

♦Iterative calibration

♦Conversion to 24-slices

♦Procedural considerations and questions

Loss of Load Expectation Study

LOLE study provides a statistical analysis of the portfolio necessary to maintain reliability at 1-in-10 year LOLE standard

The resulting portfolio's capacity value establishes the Planning Reserve Margin for the RA program

The current annual PRM does not account for the <u>monthly</u> RA program

The LOLE study requires an iterative process to calibrate a monthly portfolio to meet an annualized PRM and maintain 1-in-10 year LOLE standard at the same time

Additional discussion of the Energy Division's LOLE process is required

Inks

♦Start with the existing and under-construction resources as the starting point for the LOLE analysis (ED's proposed approach)

 –Parties should have ability to review these resources and provide edits/updates

 –Should not include energy-only resources

♦Imports should use monthly averages of shown RA from past five years, available on the CPUC's annual RA report

♦Load forecast scenario should resemble one that will be submitted by LSEs to meet RA compliance

 –Should Commission consider high demand case load forecast rather than mid demand case to prepare for climate change?

♦Forced outage rates and planned outage rates

♦Resource constraints and limitations

♦Identify the types of "perfect" capacity that may need to be added to maintain 0.1 LOLE across the year because the RA program does not use perfect capacity counting methodology

LOLE Methodology and Annualized Portfolio

♦Goal of LOLE study is to identify the portfolio of resources that can maintain 0.1 LOLE across a year

- –Generally accomplished by removing capacity from the portfolio in order to surface loss of load
- –If existing and expected under-construction resources are not sufficient, then additional capacity must be added

♦LOLE study should reflect use limitations and constraints of resources

♦Additional clarifications needed

- –Does the model ensure the BESS is fully charged to provide minimum 4-hour duration daily?

♦LOLE study results in an annualized portfolio of resources necessary to maintain 0.1 LOLE across a year

- –Assumes resources are shown/procured/available for all months of the year
- –This assumption is incompatible with the monthly RA framework construct which utilizes a single PRM value

Resource Totals

Resource Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Thermal	23,939	23,943	23,928	23,893	23,875	23,763	23,725	23,721	23,776	23,885	23,969	23,983
CHP	1,221	1,197	1,199	1,172	1,183	1,212	1,199	1,193	1,171	1,184	1,209	1,224
Nuclear	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915
Biomass/gas	678	676	659	637	652	675	679	682	682	652	646	663
Hydro	5,881	5,753	5,926	6,435	6,587	7,030	7,627	7,329	6,567	5,775	5,563	5,794
Geothermal	1,316	1,316	1,312	1,303	1,304	1,301	1,304	1,305	1,306	1,308	1,316	1,317
DR	975	1,026	991	1,119	1,168	1,295	1,351	1,392	1,405	1,215	1,105	975
Imports	-	-	-	-	4,000	4,000	4,000	4,000	4,000	4,000	-	-
Solar	-	-	0	61	4,244	6,315	10,884	9,016	684	4	-	-
Wind	0	39	176	1,906	2,552	3,005	2,268	1,870	712	21	-	0
Storage	11,287	11,287	11,302	11,341	11,341	11,341	11,341	11,341	11,341	11,341	11,341	11,339
Total	**48,210**	**48,152**	**48,408**	**50,782**	**59,820**	**62,851**	**67,292**	**64,762**	**54,558**	**52,299**	**48,063**	**48,211**

♦Illustrative example of resource inputs for LOLE study

Workshop 4 Presentation – Energy Division, slide 23

Feb 2022 RA LOLE PRM Study Results

Equivalent PRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Calibrated MW	48,210	48,152	48,408	50,782	59,820	62,851	67,292	64,762	54,558	52,299	48,063	48,211
2024 IEPR Peaks	32,538	31,478	30,307	33,366	37,517	42,707	45,908	46,500	47,325	38,861	32,411	33,895
PRM	48%	53%	60%	52%	59%	47%	47%	39%	15%	35%	48%	42%
SERVM Sales Peaks*	33,364	31,957	31,341	32,502	35,180	44,089	47,253	46,380	43,152	36,452	33,359	34,018
PRM	44%	51%	54%	56%	70%	43%	42%	40%	26%	43%	44%	42%

Workshop 4 Presentation – Energy Division, slide 24

♦ Selecting an annualized PRM of 15% **and applying it on a monthly basis**, would reduce the amount of RA shown in other months and create more Expected Unserved Energy events in other months

♦ How do we calibrate the annualized PRM?

LSE Monthly Showings by Year

Data available on annual RA Report
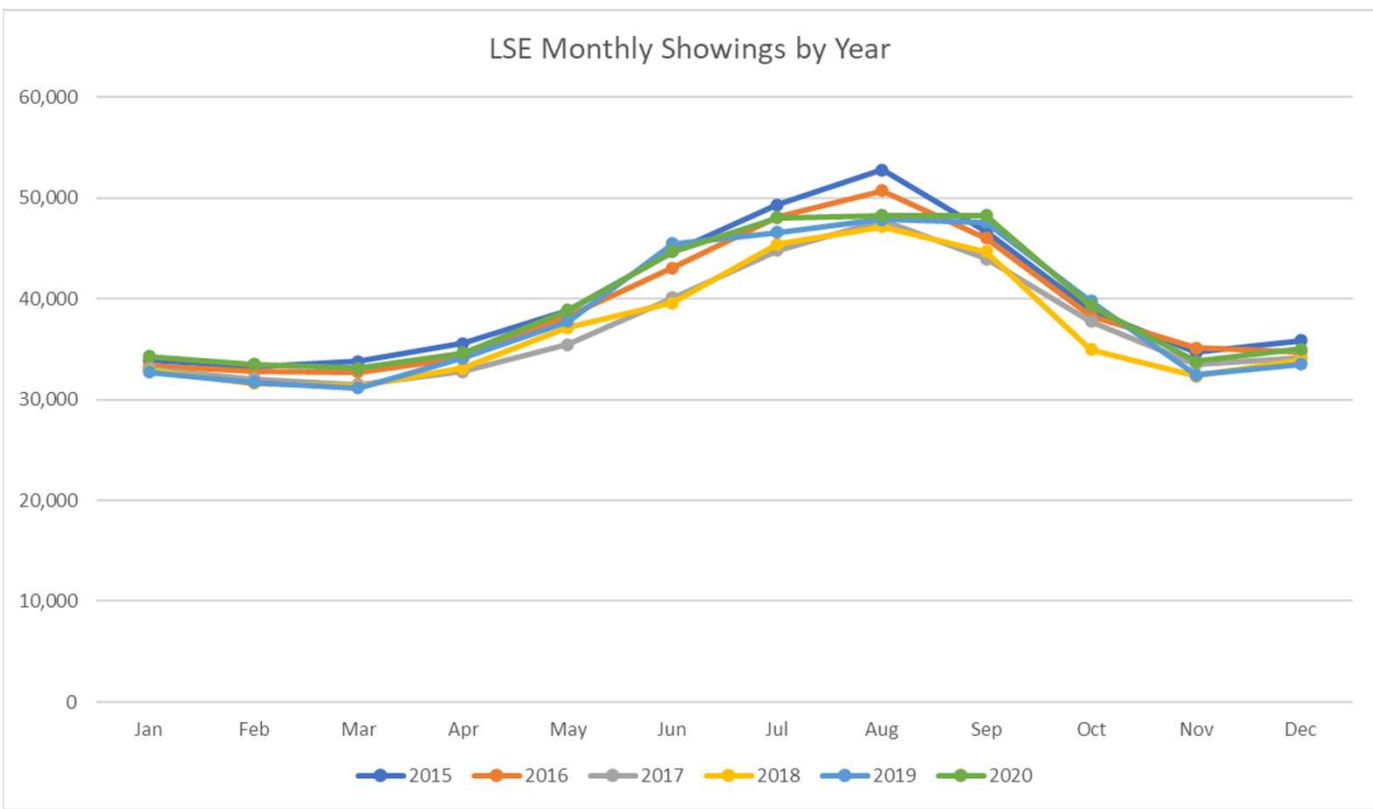
♦ RA showings vary by month and do not "reflect" annualized LOLE portfolio

♦ This is due to the monthly construct of the RA program

♦ Does not conform to the LOLE's portfolio expectations

Iterative Calibration to Achieve an Annualized PRM

♦ The monthly shown RA portfolio will differ from the LOLE portfolio due to the varying monthly demand+PRM

♦ This monthly shown RA portfolio may surface additional loss of load events throughout the year and a recalibration of the annual PRM would be necessary

♦ Iterative steps

– Remove capacity on a monthly basis so as to meet the monthly demand + annual PRM
  • Remove PCAP capacity assuming it was added in the month
  • Remove unspecified imports
  • Remove thermal resources
  • Effectively prioritizes preferred + BESS resources to meet RA requirements

– Run LOLE analysis again for the full year and see if reliability is same or worse
  • If worse, increase annual PRM and add back resources taken out previously and run LOLE analysis again

Resource Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Thermal	13,148	11,991	10,373	11,482	7,200	10,025	9,227	12,434	23,642	16,276	13,179	14,751
CHP	1,221	1,197	1,199	1,172	1,183	1,212	1,199	1,193	1,171	1,184	1,209	1,224
Nuclear	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915	2,915
Biomass/gas	678	676	659	637	652	675	679	682	682	652	646	663
Hydro	5,881	5,753	5,926	6,435	6,587	7,030	7,627	7,329	6,567	5,775	5,563	5,794
Geothermal	1,316	1,316	1,312	1,303	1,304	1,301	1,304	1,305	1,306	1,308	1,316	1,317
DR	975	1,026	991	1,119	1,168	1,295	1,351	1,392	1,405	1,215	1,105	975
Imports	-	-	-	-	4,000	4,000	4,000	4,000	4,000	4,000	-	-
Solar	-	-	0	61	4,244	6,315	10,884	9,016	684	4	-	-
Wind	0	39	176	1,906	2,552	3,005	2,268	1,870	712	21	-	0
Storage	11,287	11,287	11,302	11,341	11,341	11,341	11,341	11,341	11,341	11,341	11,341	11,339
Total	**37,421**	**36,200**	**34,853**	**38,371**	**43,146**	**49,114**	**52,795**	**53,477**	**54,425**	**44,691**	**37,274**	**38,978**
2024 IEPR Peaks	**32,538**	**31,478**	**30,307**	**33,366**	**37,517**	**42,707**	**45,908**	**46,500**	**47,325**	**38,861**	**32,411**	**33,895**
PRM 15%	4,881	4,722	4,546	5,005	5,628	6,406	6,886	6,975	7,099	5,829	4,862	5,084
Total Obligation	**37,419**	**36,200**	**34,853**	**38,371**	**43,145**	**49,113**	**52,794**	**53,475**	**54,424**	**44,690**	**37,273**	**38,979**

♦Removed thermal resources to match the total obligation and run LOLE study

♦If LOLE is higher than 0.1 LOLE, increase PRM and add back capacity to achieve 0.1 LOLE across the year

Conversion to 24-Slice RA Framework

♦More questions than answers

♦Qualifying capacity methodology updates for 24-Slice framework will impact the annual PRM and may require additional iterative calibration to maintain 0.1 LOLE throughout the year

♦Testing the aggregate portfolio and demand+PRM (calibrated) on a monthly basis, does the monthly portfolio pass the capacity and energy sufficiency tests?

– What does it mean if there's insufficient energy to charge batteries **to ensure batteries can discharge at their full RA capability four hours per day** but the calculated annual LOLE is 0.1?

# Procedural Considerations and Questions

MIDDLE RIVER POWER

Ambiguity on next steps

- ED proposed new LOLE study processes, MRP supports a new LOLE study process with the iterative steps described above
- Does the LOLE study process require a Commission decision to begin?
- Does the iterative process require a Commission decision?
- How will parties have sufficient ability to review study progress throughout the iterative study process?

Other Questions

- Based on recent events, should Commission consider high load scenario rather than mid load scenario?

CEC Forecast Scenarios Compared

Actual Load vs CEC Mid Baseline Forecast

Actual Load vs CEC High Demand IEPR Case
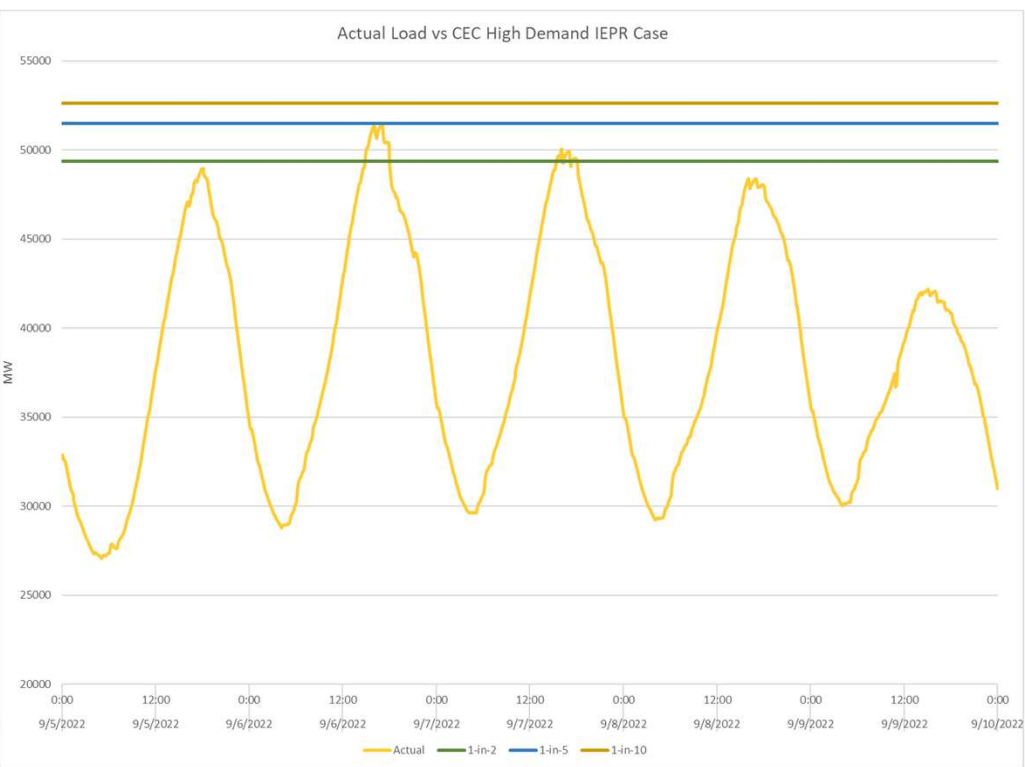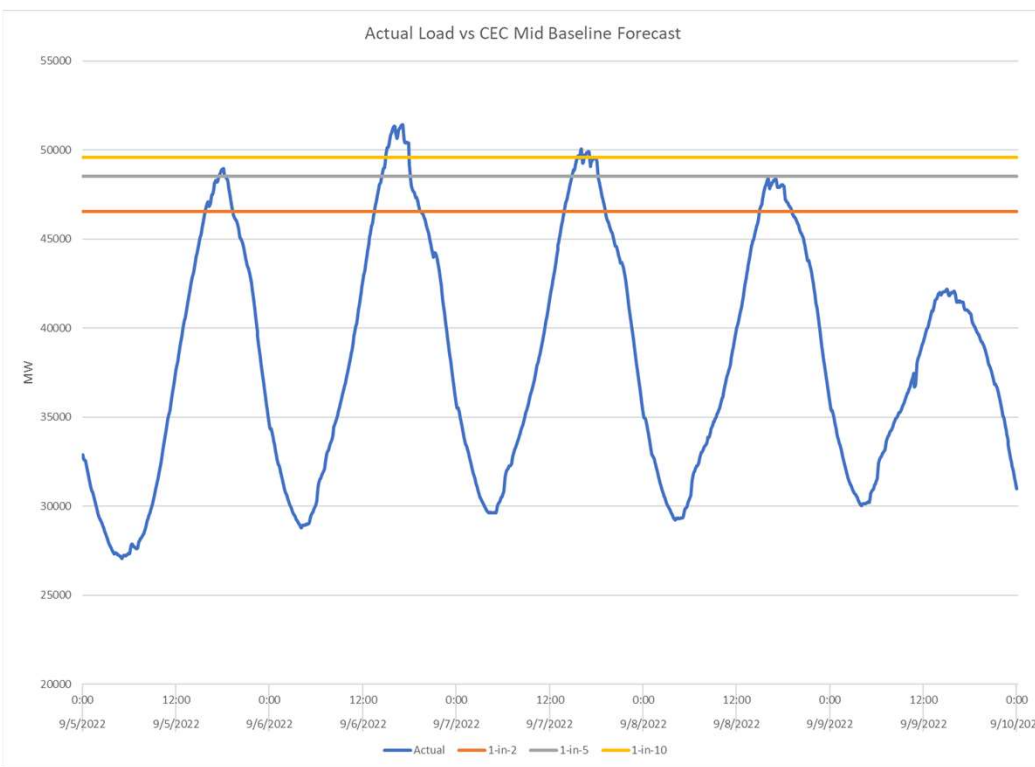
Should the RA program utilize a different Demand Forecast?

Next Steps…

♦ED should provide timeline of LOLE study process

♦ED and parties should agree on process and determine which issues may require ALJ ruling prior to start of LOLE study

♦ED should provide inputs to parties for review and comment prior to running LOLE study

♦ED should provide results and review iterative calibration with parties