



California ISO

Resource Adequacy Modeling & Program Design Track 1

Straw Proposal Meeting

June 11, 2025

1:00 – 4:00 pm

Housekeeping reminders

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- These collaborative working groups are intended to stimulate open dialogue and engage different perspectives.
- Please keep comments professional and respectful.

Instructions for raising your hand to ask a question

- Open the Participant and Chat panels from the bottom right corner of Webex.
- If you are connected to audio through your computer or used the “call me” option, select the raise hand icon 🖐 located on the bottom of the participant panel.
 - **Note:** If you connected by phone outside of Webex, dial *3 to get into the question queue.
- Please remember to state your name and affiliation before making your comment.
- You may send your question via chat to all panelists.
- If you need technical assistance during the meeting, please send a chat to the event producer @Intellor Events.

Today's agenda

Time	Topic	Presenters
1:00 – 1:05 pm	Welcome + today's agenda	Christina Guimera
1:05 – 1:15 pm	Opening comments	Ansel Lundberg Partha Malvadkar Mark Kootstra
1:15 – 3:45 pm	Straw proposal discussion <ul style="list-style-type: none">• Updating CAISO's Default RA Rules• Accounting for RA Resource Capabilities during Peak Conditions	
3:45 – 4:00 pm	Next steps	Christina Guimera

RAMPD Track 1: Straw proposal overview

1. New CAISO default counting rules & PRM should stand alone as a holistic accreditation program that can be adopted “off the shelf” by an LRA, and if implemented, would achieve a 0.1 LOLE
2. Ambient derates: produce capability values to ensure RA resource capabilities during median peak load conditions are accounted for in NQC value

Modeling & default QC/PRM

- Updated CAISO default RA rules serve two purposes: default values in case of no methodology provided and as a tool for LRAs to adopt if they choose
- Based on robust probabilistic modeling with transparent and best available inputs & assumptions

Accounting for resource capabilities

- Account for RA resource capabilities during peak conditions (ambient derates) through NQC process

RAMPD Track 1 straw proposal objectives mirror those in CAISO's issue paper based on working group discussions with stakeholders

Updated default QC methodology/PRM

- Counting rules included in the CAISO tariff should reflect the relative contribution of different resource types—and individual resources—to maintain BAA-wide and local reliability
- The PRM methodology in the CAISO tariff should be designed alongside such counting rules to create a coherent set of RA standards
- If these standards were adopted by all LRAs within the BAA, the resulting compliant LSE capacity portfolios could reasonably be expected to meet at least a 0.1 LOLE

Accounting for RA resource capabilities during peak conditions

- Minimum requirements should be adopted such that CAISO can rely on capacity to perform consistent with its RA value during peak load conditions in a given season, i.e., resources' NQC values should reflect their expected ability to perform in peak load conditions
- Such requirements should account for ambient derates due to temperature and thereby minimize the difference between shown capacity and available capacity during peak load conditions

Resource Adequacy Modeling & Program Design – Track 1

Timeline reflected in 2025 Roadmap

2025 Revised California ISO Policy Initiatives Roadmap					
2025					
		Q1	Q2	Q3	Q4
Resource Adequacy Modeling and Program Design					
	Track 1: Modeling, Defaults, and Accreditation	Policy development			Decision (Default Counting Rules/PRM)

Straw Proposal: Resource Adequacy Modeling & Program Design Track 1

UPDATING CAISO'S DEFAULT RESOURCE ADEQUACY RULES

The November 2024 RA Issue Paper contained problem statements CAISO developed with stakeholders

- *There is a need for additional information regarding the sufficiency of the LRA RA programs to meet 0.1 LOLE.*
- *The CAISO default PRM should be assessed in light of changes in the RA resource mix and evolving reliability needs within the CAISO BAA. CAISO's default PRM and default counting rules should meet at least a 0.1 LOLE at the CAISO BAA level.*
- *CAISO needs consistent, transparent, and timely information on the sufficiency of the RA fleet in the CAISO BAA. Without this information, the ISO faces challenges in assessing and communicating the system-wide sufficiency of the CAISO BAA in light of the contracted RA fleet.*
- *A stakeholder initiative should evaluate how well current LRA-established PRMs and counting rules reflect forced outage rates, performance, and availability. In response to potentially changing regulatory structures at the CPUC (including the scoping of UCAP), CAISO has an opportunity to establish alternatives to the current resource counting design and eliminate/redefine availability and performance incentives while acknowledging LRA authority to establish counting rules.*

Review: stakeholder input on updating default rules

Stakeholder	Position on Default Rules	Key Comments / Concerns
LRAs	Support current policy	CAISO default rules apply only if LRA doesn't provide QC/PRM; value autonomy in setting QCs
Non-CPUC LRAs	Prefer single monthly value	Oppose 24-hour showings; support continuation of monthly default counting rules
Six Cities & CDWR	Open to updated defaults	View updated rules as useful references for LRA program development
NCPA	Supports Proposal 1	Favors mix of average ELCC and resource-specific UCAP QC

Review: stakeholder input on updating default rules

Stakeholder	Position on Default Rules	Key Comments / Concerns
CPUC Energy Division	Supports Proposal 4	Aligns with CPUC's Slice of Day; concerned with Proposals 1–3 due to PRM vs. peak risk mismatch. Suggests dual QC values for peak and high-risk hours if using Proposal 1
RA Suppliers & CPUC-jurisdictional LSEs	Support alignment with CPUC	Prefer CAISO default rules achieving 0.1 LOLE; support Proposals 1 & 4 for alignment with CPUC's Slice of Day
General Stakeholder Sentiment	UCAP as default	Apprehension about UCAP derate via NQC; more open to resource-specific UCAP as default QC

Proposal for **default** qualifying capacity rules and planning reserve margin

Resource types	Proposed methodology
Thermal	Last 3-years of operations data using a supply cushion method UCAP
Renewable Thermal and Other	
Pumped Hydro	
Supply Side Demand Response	Performance based UCAP
Battery Storage (includes hybrid and co-located)	Average ELCC
Hydro + Run-of-River	Average ELCC based on average hydro (Adjust within the year if conditions are drastically different)
Wind	Average ELCC
Solar (including solar thermal)	

PRM to be measured against the managed peak load forecast

Proposed default rules will use three different approaches to assigning qualifying capacity

- Resource average **ELCC** – wind, solar, hydro, battery energy storage.
 - The QC for batteries will now take into account interactive effects with other resources and the energy storage capacity limitations of the resource, rather than just the power capacity limitations.
- **UCAP** – thermal resources, including gas, nuclear, biomass, and geothermal. This does not include solar thermal. This will also be used for pumped hydro.
- Demand response will rely on historical **performance-based** accreditation method during hours the resource was called.

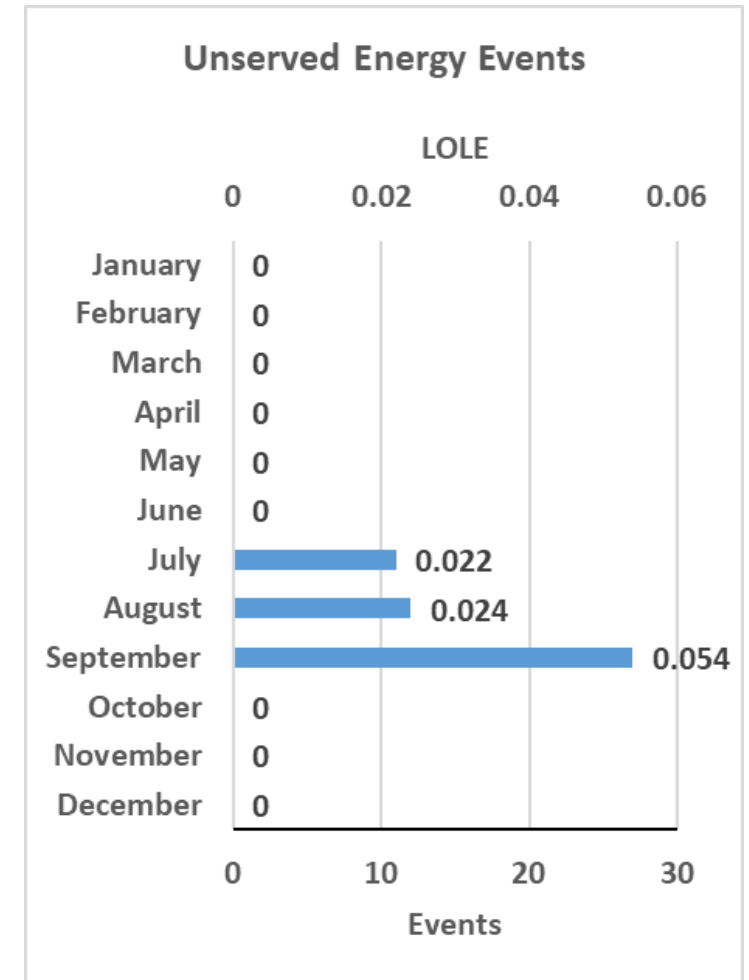
The default planning reserve margin will be based on the qualifying capacity necessary to achieve 0.1 LOLE in each month

$$PRM_{month} = \left(\frac{\sum QC \text{ of the monthly portfolio}}{Peak_{month}} - 1 \right) \times 100\%$$

- The model will be calibrated independently for each month to provide the QC necessary to reach an annual 0.1 LOLE.
- The peak load will be the highest managed load hour in the CEC's 1-in-2 CED forecast.
- The result will be a monthly PRM and QC values for resources.

The base portfolio and monthly unserved energy events will be taken from the summer assessment, using the system calibrated to 0.1 LOLE

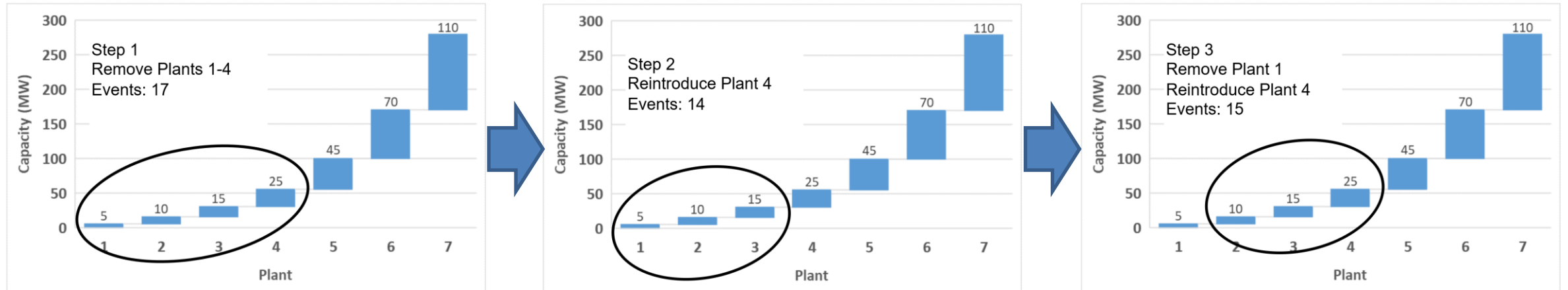
- Provides us with a reasonable distribution of unserved energy events across the year with the available RA fleet that meets a 0.1 LOLE.
- Allows for monthly QC and PRM values that reflect changing system conditions across the year.



The Planned outages will be removed from the base portfolio to align the model with planned outage substitution requirements for RA

- This will better align the portfolio being studied with an acceptable shown portfolio that would meet the 0.1 LOLE requirements.
- The removed gas capacity will be a proxy for what RA eligible capacity can be on planned outage while still showing sufficient capacity to meet reliability targets.
- Gas will be credited with UCAP, thus we know the exact QC removed when we remove gas capacity, and this can be factored into the PRM calculation.
- Removing this capacity allows us to understand the reliability of the system with fewer shown gas resources and a greater percentage of variable and duration limited resources.

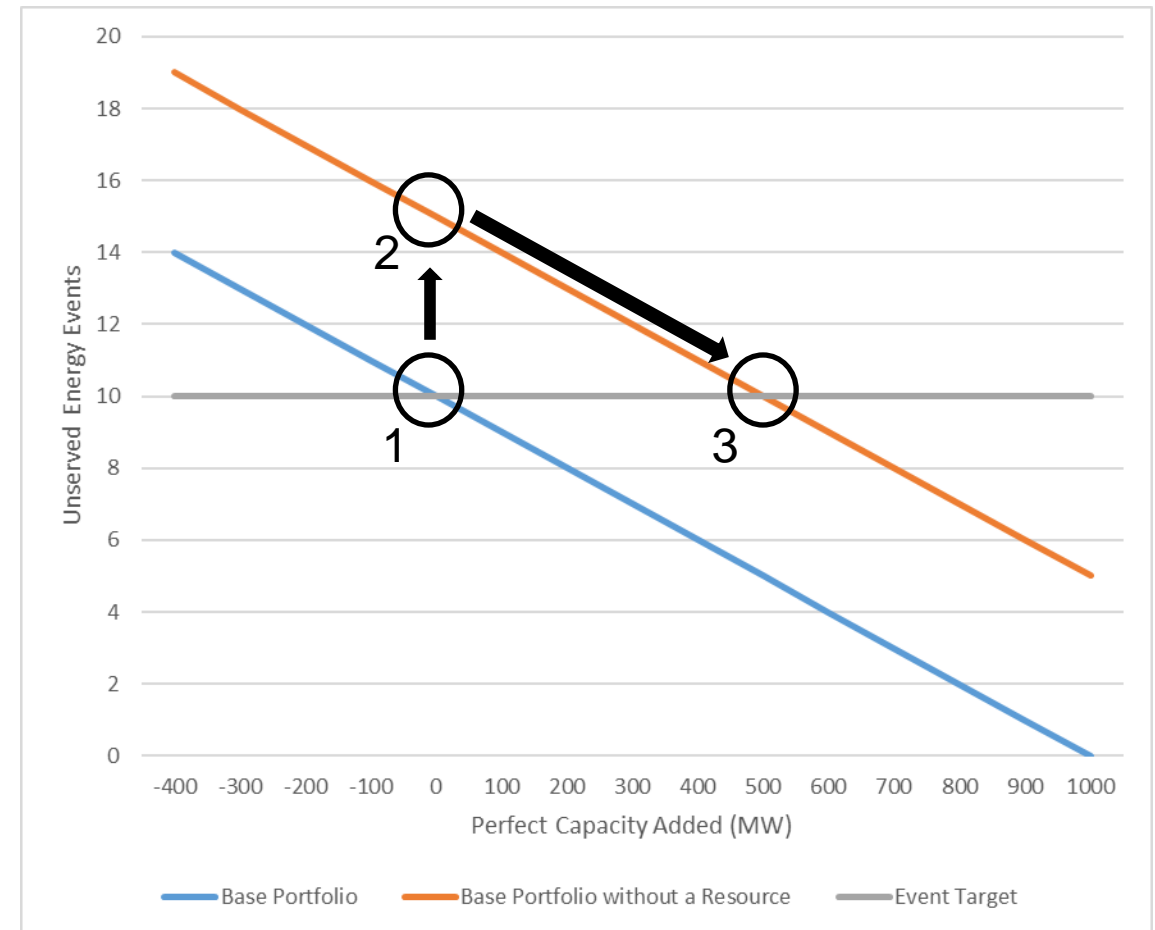
Gas plants will be removed from smallest to largest to until the targeted number of unserved energy events is reached



- For example, in January the number of events is 0, the model will be calibrated to 1 event. Then gas capacity was be added back in until the event disappears.

The resource equivalent PCAP value will be determined by replacing resources with perfect capacity needed to achieve the same reliability

1. Start with the base system with 10 events in a month.
2. The number of events increases when a resource type is removed.
3. Perfect capacity is introduced until the number of events reaches 10.
4. The added capacity is the total PCAP for that resource.
5. Repeat for the next resource



The PCAP of each resource type will be scaled to the QC values so that the credited QC does not exceed the QC provided by ELCC resources

Start by calculating α

$$\alpha = \frac{PCAP_{solar} + PCAP_{wind} + PCAP_{LESR} + PCAP_{hydro}}{PCAP_{ELCC}}$$

Calculate the ELCC value for solar

$$ELCC_{solar} = \frac{PCAP_{solar}}{\alpha \cdot ICAP_{solar}}$$

Where

$PCAP_{ELCC}$ = the total PCAP from all ELCC resources

α = scaling factor

$PCAP_{solar}$ = Perfect capacity needed to replace the solar

$ICAP_{solar}$ = Installed capacity of Solar

$ELCC_{solar}$ = Effective load carrying capability of solar

Supply cushion UCAP approach evaluates the availability of resources during the hours with the least supply cushion.

- UCAP values will be determined for peak and non-peak seasons.
- 20% tightest RA supply cushion hours in each season.
- Consider the past 3 years of operations. With heavier weighting towards the most recent year.
- Outages will be from the OMS, and do not consider outages outside management control

$$UCAP_{year} = P_{max} \cdot \left(1 - \frac{1}{SCH} \sum_{i=1}^n \frac{P_{out,i}}{P_{max}} \right)$$

Where,

SCH = Total number of Supply Cushion Hours

P_{out,i} = Average capacity unavailable during hour i

P_{max} = Installed capacity

Finally,

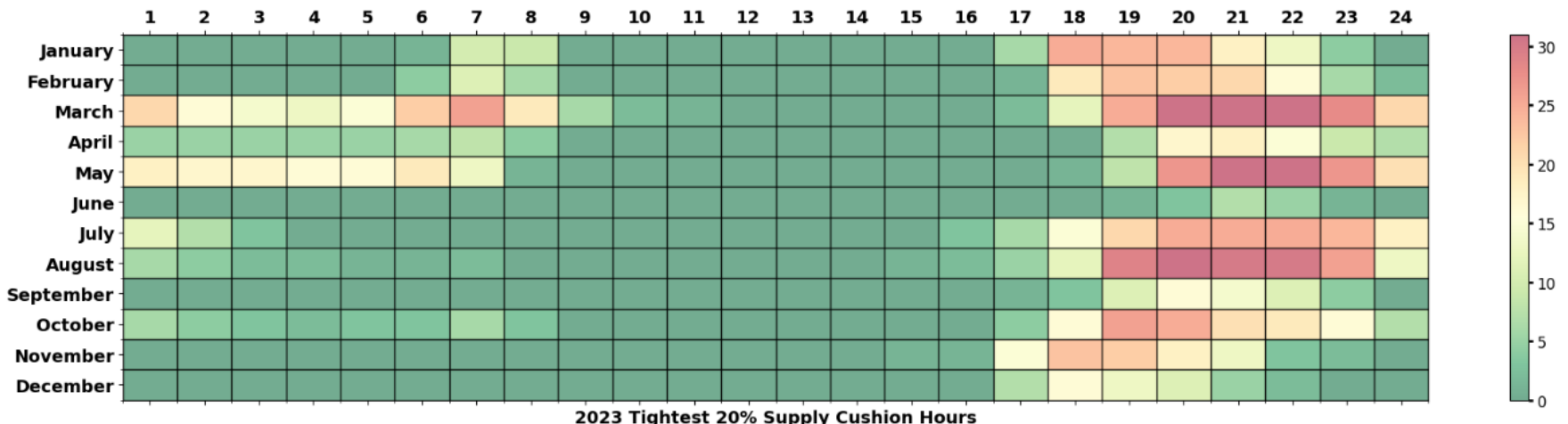
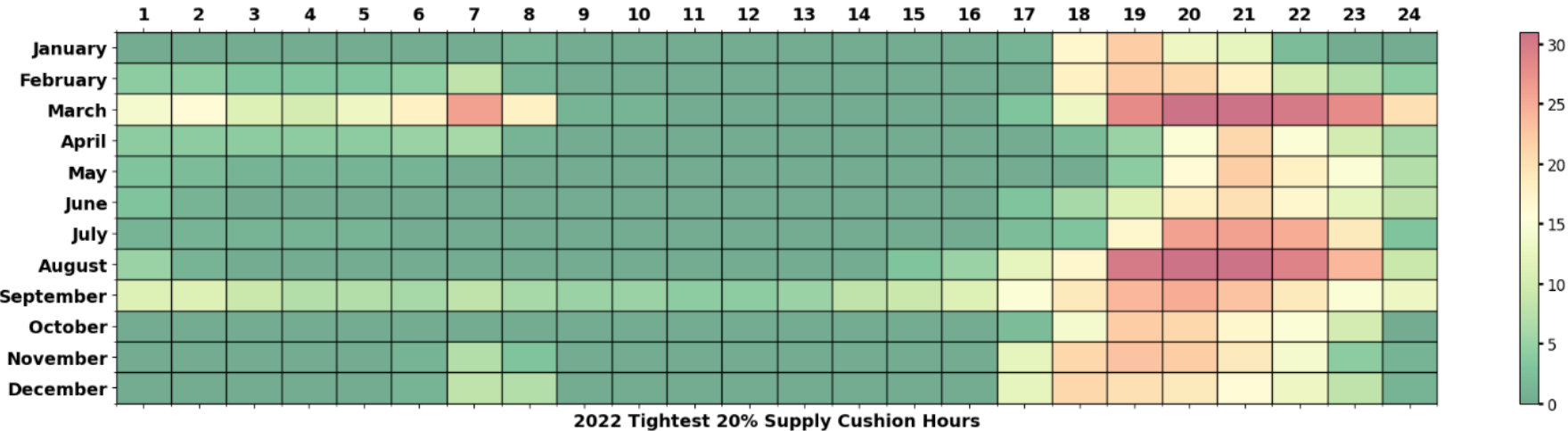
$$UCAP = 0.45(UCAP_{y-1}) + 0.35(UCAP_{y-2}) + 0.20(UCAP_{y-3})$$

Supply cushion hours are the 20% of hours with the lowest calculated supply cushion by season

RA Supply Cushion = Daily Shown RA (excluding wind and solar)
– Planned Outages – Opportunity Outages – Urgent Outages
– Forced Outages – Net Load – Contingency Reserves

- RA Supply cushion represents how much shown RA MWs are leftover after we take into account outages, serving net demand, and covering contingency reserves.
- Contingency Reserves represents Regulation Up, Spin and Non-Spin Reserves.
- Measured in MWs.
- Because net load is a 5 minute measure, to convert the supply cushion into an hourly value we take the mean of the supply cushion across all 12 RTD intervals to represent the supply cushion in each operating hour.

Supply cushion hours change from year to year, but primarily show up during net peak hours



Performance-based UCAP accreditation for supply side demand response

- For supply side DR resources CAISO will evaluate resource performance relative to their dispatch instructions for periods when they received market awards and tests.
- CAISO will track each resource's historical performance over the prior 3 years and compare dispatches and tests to actual performance to establish their UCAP value.
- CAISO proposes to apply this approach at the DR provider level, rather than an individual resource level.
 - Intended to discourage changing or creating a new resource IDs to reset the qualifying capacity calculation.

The PRMs are then a function of the UCAP for resources included in the model and the total QC provided by the ELCC resources

$$PRM_{month} = \left(\frac{\sum QC \text{ of the monthly portfolio } (\sum_i^n UCAP_i, QC_{ELCC}, DR)}{Peak_{month}} - 1 \right) \times 100\%$$

Where,

$Peak_{month}$ = Maximum monthly managed peak 1 – in – 2 load forecast

$\sum_i^n UCAP_i$ = Sum of the UCAP of all resources included in the model

PRM_{month} = The planning reserve margin for the month

Proposal for **default** qualifying capacity rules and planning reserve margin

Advantages

- Aligns with LRA feedback and current CAISO showing process by using a single monthly value per resource.
- Average ELCC for wind, solar, hydro, and storage resources incorporates both capacity and energy contributions through probabilistic modeling.
- Resource-specific UCAP proposed for thermal, pumped hydro, and DR provides performance motivation.
- Proposal allows for iterative study and default PRM/QC value development process.
- Supports alignment with CPUC Energy Division's UCAP design for thermal resources.

Tradeoffs

- Does not provide unit specific performance motivation for wind, solar, hydro, and storage.
- Does not mitigate existing divergence in LRA programs.
- Does not address the existing potential for conflicts when resources are partially shown by multiple LSEs under different LRA programs.
- Cannot provide information for energy sufficiency or net peak hour verification if desired in the future.

Straw Proposal: Resource Adequacy Modeling & Program Design Track 1

ACCOUNTING FOR RA RESOURCE CAPABILITIES DURING PEAK CONDITIONS

The November 2024 RA Issue Paper contained a problem statement we developed with stakeholders

The availability of resources based on varying seasonal ambient derates is not consistently reflected in a resource's net qualifying capacity (NQC) today which creates challenges in reliably operating the grid.

Review: stakeholder input on accounting for RA resource capabilities

Stakeholder	Position	Key Comments / Concerns
American Clean Power – California, NCPA, Six Cities	Concern about double counting	Encouraged CAISO to avoid incorporating historic ambient derates into NQC process in manner already covered by LRA QC process
CalCCA, PG&E, Western Power Trading Forum	Historical lookback	CalCCA recommended allowing SCs to submit unit capability testing results when historical data is disputed or insufficient. PG&E supports NQC-based approach but wants clarity on peak conditions. WPTF described a 'maximum possible capacity' value based on performance during highest load days.

Review: stakeholder input on accounting for RA resource capabilities

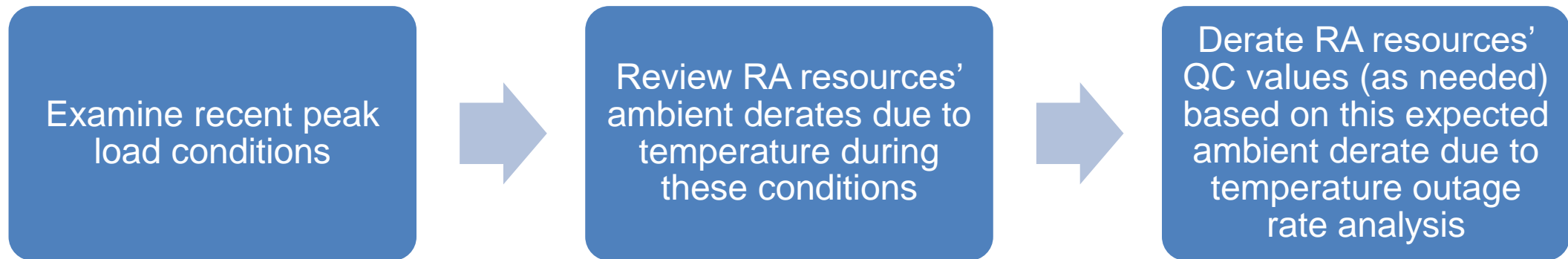
Stakeholder	Position	Key Comments / Concerns
Several stakeholders	Limited value of testing program	Viewed potential benefits of testing program as limited compared to administrative costs.
PG&E, CPUC Energy Division	No reduction in must-offer obligation	Support for <i>not</i> reducing RA resources' MOO based on proposed NQC changes. Calpine noted other markets' expectation to offer full installed capacity value. Six Cities pointed out challenges with changing must offer obligation to greater value than NQC value

RAMPD Track 1 - **Straw proposal overview**

Accounting for RA resource capabilities during peak load conditions

- Other ISOs & WRAP have testing programs to verify RA resources' capabilities during peak load conditions
- However, stakeholders advised proposing an operational data-based approach instead of testing
- No MOO changes proposed

Proposal: Modification to NQC process



Create a capability value that serves as a cap on each RA resource's NQC value

RAMPD Track 1 - **Straw proposal**

Accounting for RA resource capabilities during peak load conditions

1. Examine peak load conditions in recent years to determine assessment days (for all resources)
2. On a resource-specific basis, review impacts from the “ambient derates due to temperature” forced outage nature of work during conditions identified in step 1
3. Produce a “capability value”
4. Compare capability value to each month’s QC value
5. Take the lower of the two values for each month (between the capability value and QC value)
6. If the resource is not subject to full capacity deliverability status, reduce for deliverability through the existing Section 40.4.6 process
7. Result: NQC value

RAMPD Track 1 - **Straw proposal**

Accounting for RA resource capabilities during peak load conditions

For steps 1-3 on the previous slide, the proposal includes this resource-specific methodology:

$$C_f = 1 - \frac{1}{i} \sum_{h=1}^i \frac{ADT_h}{P_{\max}}$$

$$C = C_f \times P_{\max}$$

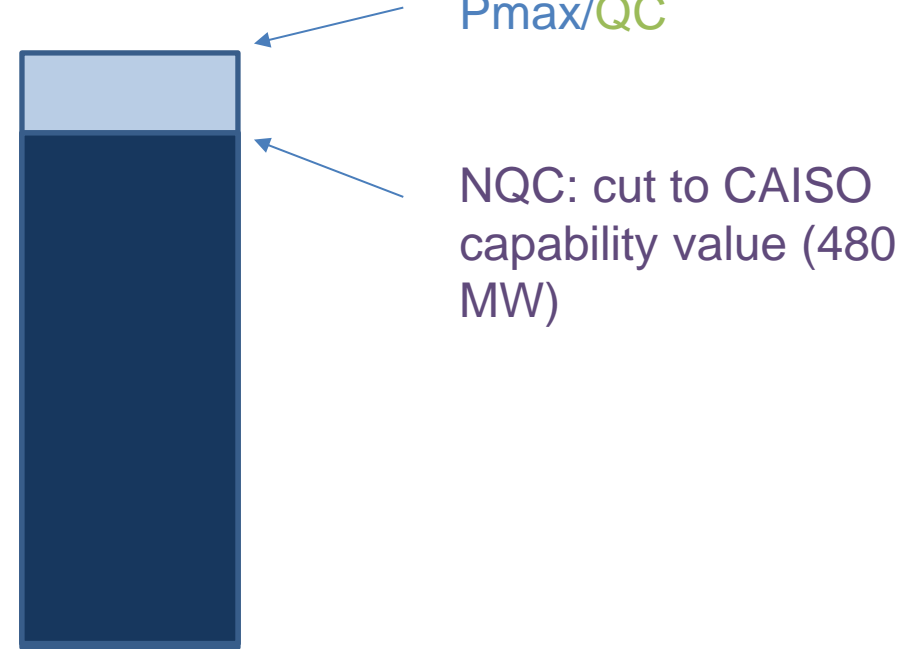
- P_{\max} : RA resource's P_{\max} value in MW
- i : Number of assessment hours over the two-year period (10 x 24)
 - To exclude extreme events, the assessment will first determine the twenty days with the highest hourly peak load over the past two years, and then only use the lowest ten of those twenty days.
- ADT_h : Magnitude (in MW) of ambient derate due to temperature outage during hour h
- C_f : capability factor
- C : capability value

RAMPD Track 1 - Straw proposal

Example 1

- Combined cycle plant - Pmax: 500 MW
- LRA QC: 500 MW
- June capability value: 480 MW
- June NQC: 480 MW
 1. Compare “capability value” to LRA QC value, take the lesser of the two
 2. Then, cut for deliverability (if not full capacity deliverability status)

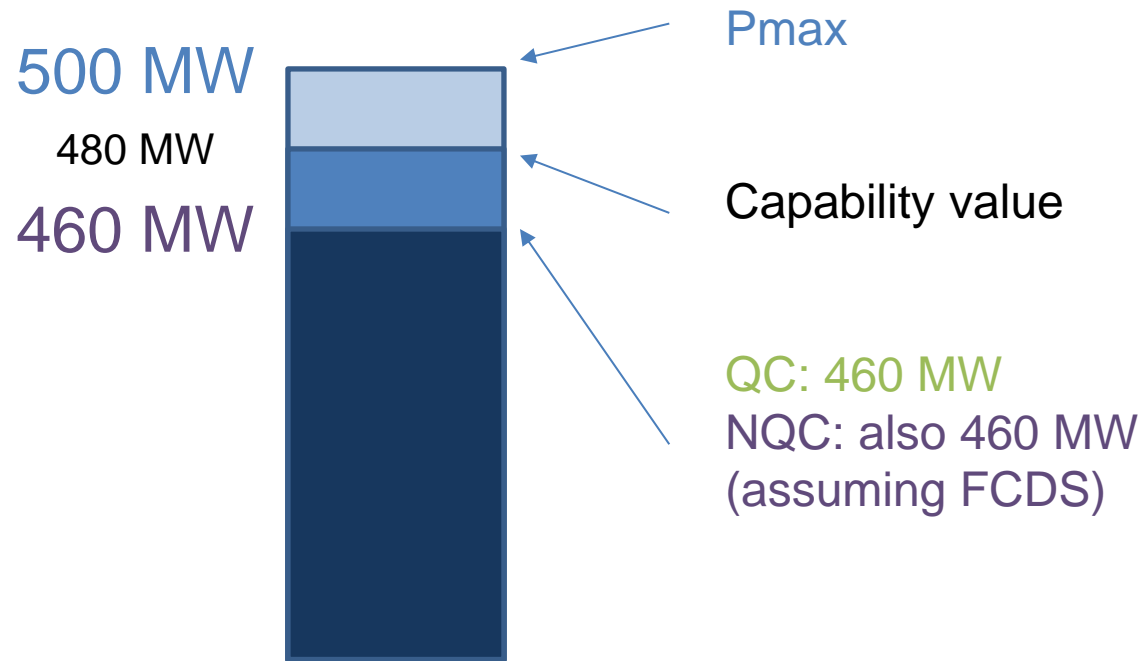
500 MW
480 MW



RAMPD Track 1 - Straw proposal

Example 2 – incorporating LRA UCAP

- Combined cycle plant - Pmax: 500 MW
- LRA QC (UCAP): **460 MW**
- June capability value: 480 MW
- June NQC: **460 MW**
 1. Compare “capability value” to QC value, take lesser of the two
 2. Cut for deliverability (if not full capacity deliverability status)



RAMPD Track 1 - **Straw proposal**

Accounting for RA resource capabilities during peak load conditions

Advantages	Tradeoffs
<ul style="list-style-type: none">• Straightforward calculation method, defers to LRA accreditation methods• Resource-specific analysis• Utilizes CAISO outage management system data	<ul style="list-style-type: none">• Subject to potential inconsistent reporting of ambient derate due to temp forced outages• No seasonal or monthly adjustments—annual capability value

Next Steps

- We welcome stakeholder feedback on this proposal
- Iterations can be developed with stakeholders depending on feedback
- Comments on the Straw Proposal are due June 25th, 2025
- A draft final proposal will be issued for review and input

This Week at the ISO – 06/09/25

Stakeholder Meetings

All public stakeholder meetings are also listed on the ISO [calendar](#):

- Monday, June 9th – [Interconnection Customer User Group](#)
 - 1:00pm - 2:00pm PT ([Registration is Required](#))
- Wednesday, June 11th – [Resource Adequacy Modeling and Program Design Working Group - Track 1](#)
 - 1:00pm - 4:00pm PT ([link](#))
- Thursday, June 12th – [Market Update](#)
 - 10:15am - 1:00am PT ([link](#))
- Thursday, June 12th – [Congestion Revenue Rights \(CRR\) Modeling and Settlement in the Extended Day-Ahead Market \(EDAM\)](#)
 - 1:00pm - 5:00pm PT ([link](#))

Comment Submission Deadlines

- Wednesday, June 11th - [Storage Design and Modeling](#)
- Thursday, June 12th – [Greenhouse Gas Coordination Working Group](#)

Trainings

The ISO encourages market participants to review the new training page on the [Market Participant Portal](#). In addition to the [Learning Center](#), this new training page provides Scheduling Coordinators with a centralized location for accessing computer-based training videos (to learn more, please view the [High-Level Overview](#) video).

- None scheduled this week

Market Simulations

Refer to our [Release Schedule](#) for updates of initiatives scheduled for MAP- and Production- stage market sims.

- Thursday, June 12th – [DAME, EDAM, and EDAM CAISO Balancing Authority PR Market Simulation Meeting](#)
 - 1:00pm - 2:00pm PT (Email marketsim@caiso.com for registration)

This Week at the ISO continued

Business Practice Manual (BPM) Updates

The status of all PRRs and updated BPMs in the [BPM Library](#) are published on the [BPM Change Management Website](#).

The PRRs listed below have an open 10-business day comment or appeal period from June 3, through June 17, 2025.

- **New ISO PRR's**
 - [PRR 1630](#) Reliability Requirements BPM, Emergency PRR, Update regarding generating units' deliverability status
 - [PRR 1631](#) Market Operations BPM, Emergency PRR, Automated logic to achieve a market solution
 - ISO PRR on Hold
 - [PRR 1626](#) Market Operations BPM, Activation of contingency-based flowgates in fifteen-minute market.
- **ISO Recommendations**
 - *PRR 1622 and 1623 Not Used*
 - [PRR 1624](#) Scheduling Coordinator Certification and Termination BPM, updating affiliate information and how they are associated
 - [PRR 1625](#) Transmission Planning Process BPM, Emergency PRR, Competitive solicitation timeline for selection of approved project sponsor.
 - [PRR 1627](#) Market Operations BPM, Emergency PRR, Adding state of charge to flexible ramping awards determination.
 - [PRR 1629](#) Energy Imbalance Market BPM, Addition of seasonal opt-in for CAISO balancing authority.
- **ISO Final Decisions**
 - [PRR 1620](#) Reliability Requirements BPM, Clarification regarding eligible generating units as new use import commitments.
 - [PRR 1621](#) Candidate CRR Holder Registration BPM, Emergency PRR, Updating application with new congestion revenue rights customer types.



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