Resource Adequacy Working Group

Updated Discussion Paper & Draft Recommendation Plan

April 29, 2024

California Independent System Operator

Table of Contents

Executive Summary

The California Independent System Operator (ISO) initiated a stakeholder-guided working group in October 2023 to collaborate on enhancements to its Resource Adequacy (RA) program amid an evolving generation mix, variable supply conditions, and changes to resource planning frameworks in California and the West. The intent of the working group was to give stakeholders a more active role in formulating proposals.

Using an earlier version of this paper as a springboard for discussion, the working group focused on three key areas: principles, problem statements, and prioritization of issues. Working group members were encouraged to bring and present their own problem statements, principles, goals, and processes for the RA working group. The problem statements the working group focused on dealt with three areas:

- Overall system reliability information
- Requirements for RA capacity and program tools
- Local regulatory authority (LRA) cost causation and cost allocation

The RA working group held eight meetings from October 2023 to April 2024 to reach consensus on the problem statements, priorities, and recommendations for ISO policy development. This discussion paper summarizes prioritized recommendations ready to advance to the policy development stage. It also suggests additional discussion needed on certain subtopics prior to recommending these topics move into policy development.

Of the many critical topics discussed in these working group meetings, the most urgent issue as prioritized by stakeholders was the anticipated impacts from the CPUC's Slice of Day (SOD) RA framework on the ISO's RA processes and procedures. ISO staff recognized the timeliness of this issue and in response held a workshop, published a whitepaper, and hosted a question-and-answer session jointly with CPUC staff to review the SOD framework and its impacts. The working group determined that there was no need to make ISO system or process changes in advance of CPUC SOD implementation. Stakeholders were encouraged to offer observations or suggest longer-term changes to future policy discussions.

The purpose of this paper is to provide a vision and articulate the additional issues that the ISO needs to address to adapt to a changing grid. Tackling these challenges will allow the ISO to more efficiently maintain grid reliability and retain harmony between LRAs' resource adequacy programs and the ISO's processes and procedures. Below are the working group's recommendations, divided into four tracks.

Track 1: Modeling and Default Standards[1]

This track will conduct Loss of Load Expectation (LOLE) modeling to provide visibility into the reliability of the ISO BAA in the short, medium, and long term timeframes. Using this modeling, the ISO will work with stakeholders to update the ISO's default Planning Reserve Margin (PRM). In a parallel policy initiative, the ISO will consider an Unforced Capacity Evaluation

[1] The ISO's default PRM and default counting rules apply when a LRA has not set either an express PRM target or counting rules.

(UCAP) proposal in collaboration with the CPUC and consider the potential use of UCAP as the basis for default counting rules. Lastly, this initiative will address how and where to account for the derating of generation resources seasonally due to temperature.

Track 2: Outage and Substitution and RAAIM Reform

This policy track will focus on reforming the ISO's outage and substitution processes to improve incentives to ensure capacity is available when and where needed. This track will seek to 1.) remove incentives for LSEs to refrain from showing all contracted RA capacity, and 2.) consider when and how to provide more time for resources owners to perform required maintenance. Relatedly, this track will assess if the ISO's current RA availability and incentive mechanism (RAAIM) should be reformed or removed when considering outage and substitution incentives and updates to resource counting rules.

Track 3: Backstop Reform (To Be Updated Based on April 29th Working Group)

Based on preliminary feedback, the ISO anticipates an initial capacity procurement mechanism (CPM) effort focused on transparency into available backstop capacity and backstop inputs and decision making by the ISO. When the working group has the chance to fully vet the backstop topics, the ISO could open a more comprehensive initiative focused on backstop capacity to seek options for updating the current backstop product to better reflect RA market dynamics and reliability needs.

Track 4: Day Ahead Sufficiency in EDAM for the ISO BAA

Depending on the discussion on April 29, this initiative will examine medium and longer term solutions associated with the ISO BAA Resource Sufficiency Evaluation (RSE), including curing potential Extended Day Ahead Market (EDAM) RSE deficiencies in the CAISO BA and more accurately assigning costs associated with ISO BA RSE failures.

Future RA Working Group Topics

Not all topics are ready for policy development. Working group efforts should continue to:

- Discuss reforms to the requirements for RA capacity (including Flex RA).
- Assess if and how the ISO should look at capacity and energy across the day.
- Discuss any evolution to the ISO's deliverability methodology.
- Continue to assess interoperability with existing and emerging RA programs.

Indicators of success as the working group develops policy solutions will include:

- Greater clarity, less complexity and better coordination and harmonization between the ISO and state-level resource adequacy programs.
- Improved processes to measure reliability impacts of resource planning, procurement, and resource counting decisions.
- Reduced reliance on extraordinary measures to balance grid needs via more efficient processes to achieve reliability goals.
- Improved incentives for availability and performance.
- Greater stakeholder and market participant satisfaction related to interacting with the ISO's resource adequacy rules.

Recommendations for Policy Development

Below is a summary of the proposed problem statements and recommendations for policy development, a brief background of the issue, a summary of the process the ISO could take with the modeling and/or policy, and a synthesis of stakeholder comments and requests for analysis related to each of the tracks.

Track 1: Modeling, Default PRM, Default Counting, UCAP, and Ambient Derates

Proposed Problem Statement

Current processes and procedures do not provide sufficient visibility into the generation fleet to enable CAISO to ensure system reliability. There is a need for additional consistent, transparent, and timely information on the sufficiency of the RA fleet in the CAISO Balancing Authority Area (BAA). Without this, there are challenges in:

- Assessing and communicating the system-wide sufficiency of the CAISO BAA in light of the contracted RA fleet.
- Anticipating the amount of RA imports that the CAISO can expect and the amount of RA-eligible resources within CAISO that will be contracted to entities outside the state.
- Addressing such concerns around CAISO BAA system-wide RA sufficiency in a timely and efficient manner.

Sub-issues:

- A comprehensive evaluation of the sufficiency of the current or expected CAISO BAA RA portfolio in forward time frames (e.g., monthly, yearly, multi-year) does not exist today. Such an assessment would provide the ISO and stakeholders an understanding of the overall CAISO BAA level of system-wide reliability, LRA contributions to overall system reliability, and the implications of a growing diverse resource fleet.
- There is a need for additional information regarding the sufficiency of the LRA RA programs to meet 0.1 LOLE.
- The CAISO's default PRM should be assessed in light of changes in the resource mix used to supply RA capacity and evolving reliability needs within the CAISO BAA. The ISO's default PRM and default counting rules should meet at least a 0.1 LOLE at the ISO BAA level.
- A stakeholder initiative should evaluate the extent to which 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), the ISO has an opportunity to consider establishing alternatives to the current resource counting design and eliminate/redefine availability and performance incentives while acknowledging the authority of local regulatory authorities to establish counting rules.
- The availability of resources based on varying seasonal ambient derates is not consistently reflected in resource net qualifying capacity (NQC) today which creates challenges in reliability operating the grid.

Background

RA standards are established to ensure sufficient resources are available under a range of weather, load, and outage conditions, all subject to a standard of the acceptable frequency of loss of load events. For example, in most areas planning reserve margins are determined using a probabilistic analysis[2] to satisfy a LOLE of no more than one day in ten years.[3]

Throughout the working group process, the ISO discussed the need to assess the ISO BAA's reliability and update default PRM and counting rules. First, the ISO shared it currently does not test the sufficiency of the contracted RA fleet to meet a 1-in-10 standard. The working group appeared to largely agree that the ISO BAA should at a minimum be planning meet the 1-in-10 loss of load standard. Second, the ISO shared it has not updated its default PRM since the inception of the RA program.[4] Many LRAs have indicated they rely on the ISO's default PRM and counting rules to set requirements for their LSEs. Based on this feedback, the ISO plans to work with stakeholders to update its default counting rules and default PRM based on results of ISO's probabilistic assessment.

The working group broadly supported exploring a UCAP design to address multiple problem statements. Depending on the design, UCAP can reflect resource availability and create availability and performance incentives. As the ISO's RA working group discussed UCAP, the CPUC separately scoped UCAP into their RA rulemaking[5] and PG&E included the ISO's past UCAP proposal into the CPUC's proceeding. In light of stakeholder feedback, this track will also include a policy initiative to develop a UCAP methodology in coordination with the CPUC and other LRAs. The ISO's default counting rules could also include this UCAP methodology, to the extent it addresses problem statements and is supported by stakeholders.

Related to developing a default counting method that reflects availability, the policy track will also address accounting for ambient derates due to temperature. It appears that some SCs adjust how much of their resources' NQC is shown as RA capacity during different seasons

[2] Probabilistic analysis typically applies a statistical technique to compare available generation and load to across hundreds of simulated years. The results are used to establish a PRM. The PRM is the amount of capacity above the expected peak load forecast required to meet a specific reliability target.

[3] Many power systems in the United States are planned based on a standard of "1-day-in-10-years". This standard requires that there be sufficient generation and transmission resources to serve load during all but one day every ten years. When implemented it is frequently expressed as requiring LOLE of 0.1 days per year.

[4] When the RA program was established in the early 2000s after the 2000-01 California energy crisis, the CPUC worked collaboratively with the ISO and parties to arrive at a 15-17% PRM based on a 0.1 LOLE (D.04-01-050). In 2008, the CPUC opened another proceeding to modify the PRM for both the RA program and the Long-Term Procurement Planning (LTPP) process, the predecessor to the IRP proceeding. In this proceeding the CPUC collaborated with the ISO's Planning Reserve Requirement Study (PRRS) to run its Multi-Area Reliability Simulation Software (MARS). In the end, there was no change to the 15-17% PRM. More recently, however, the CPUC increased the PRM from 15% to 16% in 2023 and to 17% in 2024. Starting in 2021, the CPUC also adopted an "effective" PRM currently set in the 20-22.5% range.

[5] CPUC Rulemaking (R.) 23-10-011, Order Instituting Rulemaking to Oversee the Resource Adequacy Program, Consider Program Reforms and Refinements, and Establish Forward Resource Adequacy Procurement Obligations.

based on expected ambient derates while others appear not to do so. This policy track will address accounting for ambient derates, which could be reflected in the NQC made available to the ISO or in the UCAP design.

Process

The ISO plans to conduct a probabilistic assessment of the adequacy of the ISO BAA to meet a 0.1 LOLE target, based on contracted RA. This assessment will utilize the results from surveys sent to LSEs on projected RA-eligible resources to cover 100% of LSE's load plus PRM established by the LRA. The ISO will then quantify the amount of resources required to achieve a 0.1 LOLE, using LSE survey results as a base. The ISO will then determine UCAP values based on the methodology developed in the policy phase and apply counting rules to determine the PRM of the portfolio that meets a 0.1 LOLE metric to create the ISO's default PRM. Lastly the ISO will publish the resulting portfolio reliability target, the surplus or deficit MW quantity, resource-level UCAP values, and the default PRM to meet a 0.1 LOLE in the ISO BAA.

The ISO will open a parallel policy track to update default counting rules (and associated default PRM), to consider the development of UCAP, and to account for ambient derates due to temperature.

Interdependencies

Probabilistic assessments, default counting, default PRM, UCAP, and accounting for ambient derates are grouped together due to the interdependency of these issues. A probabilistic assessment of the CAISO BA will be used to determine the portfolio of resources necessary to meet a 0.1 LOLE. Default counting rules determine the PRM to meet a 0.1 LOLE. Accounting for ambient derates helps the ISO accurately reflect resource capability across different seasons. The ISO plans to launch a modeling-focused policy process this summer.

In a parallel policy track, the ISO will consider a UCAP proposal in collaboration with the CPUC and consider the potential use of UCAP as the basis for default counting rules for some resource types. This track will be closely aligned with the developments in Track 2 as: 1.) UCAP creates an incentive to take planned outages to conduct maintenance so generators can avoid forced outages to ensure their UCAP value remains high, and 2.) Depending on the design of UCAP, it could create a sufficient incentive to be available, potentially removing some of the need for RAAIM.

Stakeholder Feedback and Requests for Analysis

Based on stakeholder discussion and feedback on these issues, a majority of stakeholders have expressed support for moving forward with LOLE modeling to test for the sufficiency of the ISO BA. A majority of working group participants have also supported the development of default counting rules (including UCAP) and default PRM to the policy development phase.

Many stakeholders supported the ISO's modeling efforts. However, multiple stakeholders questioned the LSE survey approach based on contracted RA due to the timing or RA procurement and requested the ISO use data it already has access to. In response to meeting a 0.1 LOLE, some stakeholders strongly supported it while the Public Advocates Office at the California Public Utilities Commission (Cal Advocates) disagreed and requested the ISO first address a holistical LOLE study design proposal including potential inputs and assumptions. Separately, Six Cities urged the ISO not to include a metric in a working group goal. Many stakeholders requested analysis to see if the ISO historically met a 0.1 LOLE. Some stakeholders, such as Middle River Power (MRP) and TerraGen, wanted to tie the probabilistic assessment to backstop. In contrast Pacific Gas & Electric Company (PG&E) raised concerns with any association between modeling and backstop measures and the Western Power Trading Forum (WTPF) raised jurisdictional concerns with any association between modeling and backstop measures.

Working group members did not oppose the update to the ISO's default PRM and default counting rules but routinely emphasized the default nature of the rules and requested the ISO respect LRA jurisdictional authority to set their own standards. Some supported a minimum 15% PRM due to the dependency on assumptions in any LOLE analysis. The ISO also received multiple data requests to publish the PRMs of all LRAs and their associated counting conventions.

Stakeholders also largely supported exploring UCAP and some offered specific suggestions on how to explore UCAP, often tied to availability and performance incentives. The California ISO Department of Market Monitoring (DMM), the Bay Area Municipal Transmission Group (BAMx), the California Community Choice Association (CalCCA), Six Cities, Cal Advocates, PG&E, and Southern California Edison (SCE) all voiced interest in either exploring or pursuing UCAP and removing or modifying RAAIM. Six Cities and NCPA highlighted the need for the full UCAP design before opining. NCPA went further and noted their areas of UCAP misalignment in the past. PG&E, TerraGen, and DMM all requested the ISO address ambient temperature derates that are not accounted for in RA NQC accreditation rules.

Track 2: Outage Substitution and RAAIM Reform

Proposed Problem Statement

Outage and Substitution:

The ISO's existing outage substitution mechanisms should be reassessed. Both initial analysis and working group feedback indicate that the current processes and procedures likely result in:

- Inefficiencies as multiple SCs hold back RA capacity for outage substitution for a partial-month outage.
- Artificial tightness in the RA bilateral market due to holding back capacity.
- Potential maintenance delays if substitute capacity is not available.
- Higher forced outage rates when planned outages can't be scheduled and turn into forced outages.

Availability and Performance Incentives and Penalties:

- In light of a tight RA market, high RA prices and market incentives, the current CAISO mechanism for incentivizing capacity to be available, the Resource Adequacy Availability Incentive Mechanism (RAAIM) may be insufficient. For example, RAAIM is applied only to a fraction of the RA fleet, the current deadband does not provide an incentive to be available, and the monthly netting process and carry-forward provisions both mute incentives. In some cases this can result in incentivizing less reliable generation to be contracted, discouraging showing of all RA resources to the ISO, not incentivizing actions to increase availability particularly during critical periods. Additionally, it creates operational backstop challenges for the ISO resulting in reliability risks.
- RAAIM should be assessed to see if it is meeting its intended objectives, if its objectives should be revisited, or if a new mechanism is needed to incent availability and/or performance. The need for either RAAIM reform or RAAIM elimination as well as any exploration of a new availability and performance mechanism should be done in concert/consideration of any counting rule changes to encourage all RA-eligible resources to be shown.

Background

To maintain reliability and incent resources to perform when and where needed, all RTOs and ISOs have some version of outage management and performance/availability incentives as elements of their RA program design. Allowing planned outages to occur without substitute capacity or without incorporating those outage impacts resource counting methodology and can leave the grid operator without sufficient capacity to reliably operate the grid.

As discussed in the working group, both the current outage substitution process and RAAIM incentivize resources to not show or offer all RA capacity. RA capacity is held back to mitigate potential penalties and planned outages that the ISO may deny. The working group's feedback

is to correct these withholding behaviors by aligning market incentives with good utility practices, ensuring that there are no consequences for showing all contracted RA capacity.

Focusing first on outage substitution, the ISO and stakeholders appear to be unified on the need to keep some form of effective outage management process. Additionally, the working group recommended examining options to make these processes more efficient and reliable, particularly given the tight RA market and the importance of timely maintenance so resources can remain dependable and fully operational.

While the analysis is not easy to conduct, there is a general consensus, based on the stakeholder discussion, that individual scheduling coordinators (SCs) likely hold back capacity from the bilateral market to perform maintenance lasting less than the full month. If multiple SCs engage in such behavior, there could be artificial tightness created in the bilateral market and an inability for other SCs to obtain capacity required for substitution. The ISO's analysis indicated that such outcomes might lead to an increase in forced outage rates either as generators wait for an imminent risk to perform maintenance or resources grow less dependable because of deferred maintenance.

Second, stakeholders seemed largely aligned that the current availability incentive mechanisms are not performing or sending the right signals as intended. As bilateral prices have increased, generally well above the RAAIM price (set at 60% of the CPM soft offer cap), resources have an incentive to overstate capacity values (e.g. not account for ambient derates, provide capacity with higher forced outage rates, and use forced outage cards for maintenance). Ideally, performance and availability incentives would make suppliers accountable for the costs or reliability risks imposed by their lack of availability. While some markets, such as ISO-NE through its pay for performance mechanism, have high performance incentives, most rely on a combination of incentives and future capacity derates.

Process

The RA working group recommends expediously prioritizing a policy initiative on outage substitution and availability incentive mechanisms. As a first step in the policy phase, and to respond to working group requests, the ISO plans to revisit the objectives of each topic and analyze whether they are meeting their stated objectives.

Interdependencies

These sub-issues are grouped together due to their interdependencies. Ensuring availability through incentives is critical in meeting system reliability needs. Recognizing that planned and forced outages can and do occur, outage substitution rules require that resources on planned outages provide substitute capacity during outage windows.

Track 2 will have interdependencies with both resource accreditation in Track 1 and backstop procurement in Track 3. To the extent that updated default counting rules in Track 1 do not

fully account for the risks of outages and provide a strong performance incentive, there may be a need for a performance and availability mechanism.

Additionally, as recommended by CalCCA, the policy phase may need to couple UCAP updates with clarifications to the definition of outage types (forced, planned, urgent, and opportunity) so that generators are clear about what outage definition they need to select and which outage types UCAP applies to. To the extent Track 2 addresses bid insertion rules, it will have crossover with UCAP in Track 1 insofar as resources are incentivized to properly submit outages when they are unavailable so that UCAP values accurately reflect availability.

The interdependency with Track 3 is based on the CPM soft offer cap's relationship with RAAIM. Because the RAAIM penalty is set at 60% of the CPM soft offer cap, if RAAIM is retained, any changes to a soft offer cap price impact the RAAIM penalty.

Stakeholder Feedback and Requests for Analysis

Based on stakeholder discussion and feedback on these issues, a majority of stakeholders have expressed support for moving the availability and incentives topics, as well as the outage substitution issues, to the policy development phase. Overall, multiple working group members requested the ISO revisit the objectives of both the current outage substitution processes and RAAIM and the provide analysis on whether the current designs are meeting their intended objectives.

Comments on outage and substitution focused on enhancing reporting requirements and process improvements. Cal Advocates, CalCCA, DMM, PG&E all suggested enhancing outage reporting requirements to provide greater clarity into the rationale behind forced outages. Specifically, DMM requested the ISO more clearly require SCs to identify if a forced outage is necessary immediately for plant operation, or if the forced outage is for discretionary plant maintenance that could be postponed in the case of imminent system reliability concerns. Working group members also commented on the timing of processing outage requests and duration of substitution. Specifically, the California Department of Water Resources (CDWR) suggested the ISO allow outage substitution of less than a day and the California Energy Storage Alliance (CESA) requested considering resources scheduled to receive a Commercial Operation Date (COD) prior to the compliance month in its backstop decision making process.

RAAIM feedback focused on assessing its effectiveness against its objectives. Working group members also suggested: evaluating if RAAIM needs to be revisited or if it should be replaced with a new mechanism (particularly if a UCAP counting methodology is developed), providing recommendations for correcting perceived gaps (e.g., penalty amount in comparison to bilateral RA prices, applicability, deadband, carry-forward and netting provisions, etc.), and suggesting that, regardless of the future of RAAIM, bid insertion and must offer obligations remain. Some stakeholders such as DMM, Cal Advocates, and PG&E had a particular interest in further data analysis on outage and substitution rates for RAAIM vs. RAAIM exempt resources.

Track 3: CAISO's Backstop Mechanisms

Proposed Problem Statements

1. The ISO lacks visibility into the contract and availability status of resources not shown as RA, preventing the ISO from efficiently and reliably running its current CPM processes
2. Stakeholder feedback is that there is a lack of visibility into the ISO's CPM decision making processes.
3. In the current tight RA market, the ISO's Capacity Procurement Mechanism may not be producing all of its intended results particularly given the frequent lack of bids into its Competitive Solicitation Processes.
4. As the reliability needs evolve (e.g. to address changing needs for battery storage) the ISO's CPM process may need to evolve to obtain specific attributes necessary for reliability.

Background

Depending on stakeholder feedback at the April 29th working group meeting, there may also need to be tracks on backstop procurement. While backstop holistically includes both intra-day measures such as exceptional dispatch and long term multi-year-forward efforts such as reliability must-run contracts, the focus is on the current CPM.

As covered in the December 6, 2023, working group meeting — and to be discussed in the April 29, 2024, working group — the ISO's CPM is used as a backstop mechanism by the ISO to address six categories including various RA deficiencies and specifically defined reliability concerns. CPM designations rely on capacity willingly offered to the ISO by SCs through annual, monthly and intra-monthly competitive solicitation processes (CSPs). In the ISO's CSPs, SCs may offer their capacity to the ISO at prices up to a soft offer cap, currently set at $6.31/kW-month[6], or a resource-specific cost-based price approved by FERC.[7] The offer cap is meant to mitigate the potential exercise of market power and to avoid distorting the bilateral RA market.

The ISO currently has limited authority to procure backstop capacity to ensure reliability with regards to price and quantity. One important limitation is the soft offer cap, which is currently significantly lower than both bilateral HUB prices and anecdotal reports on the prices that generators offering RA supply.[8] The soft offer cap meets its designed objective of being high

[6] On April 25, 2024 FERC approved CAISO's increase to the CPM soft offer cap from $6.31/kw-month to $7.34/kw-month. This will be implemented in June 2024.

[7] So far no resource has requested a price from FERC.

[8] "LSEs faced with a responsibility to meet their RA obligation at any cost are being met with generators only willing to sell at prices eight to nine times higher than the CAISO soft-offer cap." From CalCCA's white paper, CALIFORNIA'S *CONSTRAINED RESOURCE ADEQUACY MARKET: RATEPAYERS LEFT STANDING IN A GAME OF MUSICAL CHAIRS*. Updated January 16, 2024. Available at: https://cal-cca.org/wp-content/uploads/2024/02/CalCCA-Stack-Analysis-2023-2026-updated-01_16_24-.pdf

enough to cover going-forward fixed costs for marginal resources on the system, and it likely provides a reasonably effective way to mitigate market power, but it is not cost competitive with bilateral market prices. Because of these market dynamics, the ISO hypothesizes that the lack of offers in the CSPs is driven by a combination of most capacity being under contract and sellers of any available capacity having alternatives well above our soft offer cap. If the ISO is unable to procure capacity to CPM, the CAISO BA has the direct risk of not having sufficient capacity to reliably operate the grid. This could also lead to increased instances of either failing the EDAM RSE and/or needing to take additional steps to correct EDAM RSE failure for the CAISO BA. Additionally, outside of assessing local area sufficiency, the ISO can only backstop to deficiencies in LRA portfolios based on a single NQC rather than an assessment of needs across hours or of energy sufficiency.[9]

As noted in the November working group meeting, there is a sharp rise in the amount of battery storage resources interconnecting to the ISO BA grid and being shown as RA, with 15,000 MW planned for in the CPUC's IRP. In turn, the CPUC embarked on an extensive RA reform process which resulted in the adoption of its SOD RA framework in which LSEs have to show sufficient capacity and associated energy to charge battery storage on a 24-hour basis to meet their load profile plus a planning reserve margin. While the ISO does not anticipate modifying its structures to mirror the CPUC's Slice of Day framework, the ISO recognizes there soon may be the need to carefully look at charging energy as a part of the backstop processes to ensure the ISO has sufficient capacity and energy in all hours in the right locations.

The solutions in the current tight RA market will not be simple. In previous initiatives, participants expressed concern that increasing the soft offer cap could both interfere with the front stop trading processes and potentially drive significantly higher deficiency costs, which also would influence the bilateral processes. The CAISO is interested in feedback on what short term approaches the ISO could take to increase reliability in a tight market where many LSEs are challenged to meet their LRA-mandated requirements. The ISO also solicits feedback on what long term approaches it could take to foster a more stable, reliable, and efficient backstop processes.

Finally, with respect to the ISO's current processes, the ISO notes that it lacks visibility into the contracting status of all resources in the CAISO BAA, limiting its ability to make informed decisions on whether a CPM is needed to maintain reliability in a given month. CAISO believes it needs to have a process to ensure it has visibility into the non-RA capacity from generators (i.e. under contract or not, internal or externally). Additionally, multiple working group participants requested visibility and information into the ISO's CPM decision making processes. Based on the purpose of those requests as well as competitive concerns, the ISO anticipates it could likely address those elements fairly quickly through updates to its business practice manuals (BPMs).

[9] In May 2021 in docket ER21-1551, FERC approved ISO tariff amendments adding an energy sufficiency component to the local capacity technical study and expanding the ISO's backstop procurement authority to include addressing local energy sufficiency. These tariff amendments were developed in Phase 1 of the Resource Adequacy Enhancements Initiative.

Process

To be determined based on April 29th discussion.

Interdependencies

- There could be interdependencies between the ISO's EDAM RSE cure processes and the ISO's CPM deficiencies depending on the pathway of each item.
- There could be interdependencies between the CPM and modeling efforts. The purpose of the modeling efforts is to assess the reliability of the ISO BAA. There could be many paths forward using this information: public transparency only, adjustments in procurement targets, or backstop. As policy progresses the working group may want to discuss if there should be a link between modeling results and backstop.
- If future working group efforts result in the ISO looking at the RA product definition across more than the peak hour (including some form of energy sufficiency requirement), the ISO may need to re-visit its CPM authority assessment to look across all hours.

Stakeholder Feedback and Requests for Analysis

While the CPM process is slated for the April 29th working group discussion, existing feedback on backstop and CPM includes:

Requests to prioritize addressing CPM and/or CPM cost allocation. DMM specifically recommended the ISO reassess the cost allocation of the CPM to deficient entities to further incentivize LSEs to procure their requisite capacity requirement. The Alliance for Retail Energy Markets (AReM) and CalCCA were interested in the ISO reexamining its cost allocation to include DR credits. Alternatively, CalCCA indicated they were also open to the CPUC requiring credited DR to be shown on the ISO's supply plan.

The interplay between CPM and forward requirements. MRP highlighted their concern that an overly conservative UCAP may result in limiting MW available, resulting in a need to resort to CPM. They also requested that all LRA PRMs should be evaluated against a 0.1 LOLE to inform CPM decisions. DMM was the only entity that asked to enhance the calculation of the CPM, whereas the Northern California Power Authority (NCPA) explicitly supported the current CPM price.

Transparency and visibility into the CPM process. As a part of the policy development phase, the working group recommended greater transparency into the CPM decision making process and analysis of past CPM decisions. After the December RA working group meeting, which included an overview on showings and the types of CPM, many working group members flagged the need to have greater transparency or adequacy into the CPM decision making process, including: CalCCA, MRP, NCPA, PG&E, Six Cities, SCE, and WPTF. SCE specifically requested analysis on when backstop was needed, how the ISO arrived at that decision, and how costs were allocated. Six Cities supported the use of a discretionary

backstopping. Lastly, at the December working group meeting the ISO shared its concerns that there was inefficiency and artificial tightness as a result of SCs holding back capacity for substitution and a lack of visibility for the ISO into available capacity for backstop procurement.

Track 4: EDAM RSE: Long Term Solutions to Backstop and Cost Allocation

Proposed Problem Statement

While CAISO proposes to utilize its existing exceptional dispatch authority to resolve reliability concerns highlighted by potential capacity shortages identified by the RSE, stakeholders have expressed concern that:

- The cost of the Exceptional Dispatch (including potentially a monthly CPM designation) might make this an inefficient tool to resolve these concerns.
- The option to exceptionally dispatch resources might not be available during critical periods.
- The cost allocation should be reexamined to align better with cost causation, if feasible.

Background

As established in the EDAM design, RSE will be conducted each day at 10 a.m., prior to running the day-ahead market. The RSE will evaluate[10] each BAA's offered supply, including the forecast output for variable energy resources (VERs), against its demand forecast, imbalance reserve requirements[11] and ancillary services requirements across the 24 hourly intervals of the day-ahead market.[12]

BAAs that fail the RSE in any hour of the 24 hour evaluation may incur surcharges. Additionally, deficient BAAs might be removed from the pool of passing entities and could lose

[10] To perform the evaluation, the RSE application will model each BAA's entire load and supply on a single bus (i.e., without transmission constraints) and perform a unit commitment optimization. If the optimization does not relax constraints in order to solve, then the BAA "passes" the RSE. If the optimization is required to relax constraints in order to solve, then the BAA "fails" the RSE. Failures can be in the upward and/or downward direction. An upward failure occurs when the optimization must relax the upward power balance constraint, upward imbalance reserve procurement constraint and/or upward ancillary services procurement constraint. A downward failure occurs when the optimization must relax the downward power balance constraint, downward imbalance reserve procurement constraint and/or downward ancillary services procurement constraint. The optimization will seek to minimize the sum of the constraint relaxation quantities across the 24 intervals. For VERs, the RSE will take into account the full VER forecast. See EDAM Tariff Section 33.31.1. eholdercenter.caiso.com/StakeholderInitiatives/Day-ahead-market-enhancements" day-ahead market enhancements (DAME) initiative. When implemented, the day-ahead market will procure imbalance reserves up and imbalance reserves down to meet the range of expected imbalances between the day-ahead and real-time net load forecasts.

[12] For the CAISO BAA, RSE obligations will also include any self-scheduled volumes of high priority exports to non-EDAM BAAs. For the CAISO BAA, RSE-eligible supply will include forward-contracted intertie resources, pseudo-tie resources and all CAISO-BAA located resources, unless contracted to a non-CAISO EDAM BAA through an EDAM bucket 1 transfer.

diversity benefits in real-time. More specifically, BAAs that are deficient after the integrated forward market (IFM), or that otherwise fail to comply with the tagging requirements, will be evaluated individually in the Western Energy Imbalance Market (WEIM) RSE. BAAs that are sufficient and comply with the tagging requirements will be pooled together and evaluated as a whole.

As an EDAM participating BAA, the CAISO needs to establish a process to evaluate actions to resolve potential reliability issues identified by the EDAM RSE at or before 10 a.m. each morning. As part of this process, the CAISO BA must be able to quantify its RSE position with enough time to take action if there is a projected shortfall. The best opportunity for the CAISO BA to quantify its RSE position is at approximately 9 a.m., when its demand forecast, VER forecasts and reserve requirements are final, day-ahead supply offers have been submitted or expected outstanding offers estimated, and advisory RSE results are published. If there is a projected RSE shortfall at 9 a.m., the CAISO BA will still have approximately one hour to take action to attempt to cure any projected failures.

The CAISO's existing tariff authority provides the ability to cure these potential reliability deficiencies through its exceptional dispatch authority. The CAISO has also expressed a willingness to work with stakeholders to explore alternative methods to resolve potential capacity deficiency identified by the EDAM RSE.

Process

The ISO plans to open a policy initiative with its members on enhancements to tools necessary for EDAM participation as well as potential cost allocation for the use of such tools. This includes the potential development of new capacity products to cure projected next-day capacity shortfalls. For the CAISO BA this means that potential EDAM RSE surcharge revenue allocations, surcharge failure funding allocations, and allocations associated with new capacity products are open to further policy development. The common theme across these various topics is the need for a standardized cost causation based cost allocation for any and all operational decisions and/or new products necessary for EDAM participation.

Interdependencies

Any ISO design will require coordination with other backstop or CPM significant event processes.

Stakeholder Feedback and Requests for Analysis

The introduction of the initiative is slated for the April 29th working group discussion. Feedback is requested in comments to the RA working group discussion paper. The ISO asks that comments inform future design considerations rather than policy discussed in the DA Sufficiency Initiative.

Track 5: Issues for Further Refinement and Discussion

As mentioned above not all topics are ready for policy development. Future working group efforts should continue to discuss reforms to the requirements for RA capacity (including Flex RA) and assess if the ISO should look at capacity and energy sufficiency, any evolution to the ISO's deliverability methodology, and continue to assess the interoperability with existing and emerging RA programs.

In addition some stakeholder suggestions were made but not broadly discussed. In order to determine if any of these issues should be added to the policy phase, removed from discussion, or continue in the working group phase, the April 30th working group meeting will provide a forum to react to the following proposals from stakeholders. The ISO will also accept written comments to react to these proposals. The goal is that the results of the discussion and comments will decide if, when, or in what forum to address the following suggestions.

Theme	**Stakeholder Suggestion**
Showings	Six Cities suggested changing the monthly RA showing process to allow different RA values for internal RA resources for different days of the month, while still being subject to the sum of the monthly requirement.
Showings	MRP suggested the ISO move to 100% annual showings. This was opposed by Six Cities, and Cal Advocates.
Requirements/ Showings	Six Cities suggested recognizing load reducing capacity for in-front-of-the-meter battery resources in an LSE's forecasted monthly peak load. This would be based on the 4-hour continuous energy output of the battery.
Requirements/ Showings	Six Cities suggested allowing locally developed projects to meet some percent of RA needs without deliverability. These projects would still need to meet MOO and telemetry requirements and could be capped (e.g., 15-20% of RA need, not to exceed load in a given area).
Modeling	CEBA and MRP suggested conducting backcast analysis to see if the ISO has met a 0.1 LOLE
RA Requirements, UCAP	MRP suggested Including estimated planned outages into RA requirements and allow CAISO to approve/deny outages based on planned outage buffer.
Resource Accreditation	MRP suggested the ISO should consider unit testing to set QC values

Outage and Availability	BAMx suggested two paths forward for batteries: - If technology is not a challenge, either 1.) Develop a RTM 5 min interval look-ahead window beyond the current 65 min or 2.) Run an hourly market multiple times within the delivery day, instead of running a single DAM. - If technology is a challenge, revisit MOO for Flex RA BESS to allow them to economically bid or self schedule consistent with their DAM awards, subject to availability of co-located gen.
Outage and Substitution	MRP suggested that SCs be able to submit outages and substitutions well in advance and allow for up until T-8 to deny outage if not enough substitution is provided.
Outage and Substitution	Both MRP and the City of Anaheim suggested pools for substitute capacity. The City of Anaheim suggested a voluntary pool of "conditional RA" availability. MRP suggested building a centralized market just for substitution capacity on a daily basis.
Backstop	MRP and Terra Gen suggested the ISO backstop if the ISO has not met a 0.1 LOLE.
Planning	WAPA suggested the ISO explore a capacity market.
Hybrid resources	Terra-Gen suggests the ISO address hybrid resource interaction with the RA MOO, AS, Flex RA, RAAIM, and the use of outage cards and dynamic limits for signaling unavailability to the ISO and operators

Working Group Feedback on Principles and Goals

Principles: Working group discussions yielded the following feedback to the principles originally proposed by the ISO.

Principles: The following principle topics reflect a starting point for the RA working group discussion. Throughout the working group process, stakeholders should consider how problem statements relate to principles to facilitate assessment of prioritization and potential trade-offs. Stakeholders are invited to submit their proposals on the principles, provide feedback on the draft principle topics in working group meetings, and submit comments afterwards on these principles topics (particularly in the context of the goals of the RA program):

- Reliable
- Efficient/Cost-Effective
- Implementable
- Durable

- Adaptable
- Transparent

Stakeholder suggestions on the principles of the RA program included:

- Additions:
    - PG&E requested that “simple” be added
    - AReM suggested that the principle of “consistency” in LRA RA standards to avoid costs shifts between LRAs be added
    - MRP suggested adding “transactable”
    - NCPA suggested adding “LRA legal rights” and “affordable”
    - PGP asked the ISO to include “equity” and “consistency”
    - CDWR requested “cost causation” be added
- Edits:
    - MRP requested “efficiency” be clarified with regards to how it would be measured

Goals: Working group discussions yielded the following feedback to the goals originally proposed by the ISO.

The RA program is reliable, affordable, and implementable. This means:

- The ISO’s established modeling, and visibility enable a reliable overall system.
- The RA portfolio meets at least a 0.1 LOLE planning target.
- Both planning assumptions and outputs are re-visited regularly.
- The CAISO has visibility into both RA and non-RA resources for operational purposes, and the CAISO does not have to rely on out of market actions to maintain a reliable fleet.

1. Procurement and trading is efficient, cost-effective, fungible, and affordable.
    - Incentives are in place for RA capacity to perform.
    - The procurement of RA can meet reliability needs and environmental goals at least cost.
    - Cost allocation rules incent contracting and performance.
    - LSEs and LRAs are able to capture benefits of portfolio diversity within the region.
    - The ISO’s RA Program minimizes the need to procure expensive resources due to timing or informational limitations; allows for efficient trade of capacity products between California and the WRAP; balances standards and requirements for resource eligibility with costs and benefits; and is aligned with the CPUC’s IRP, modeling and assessments, producing consistent results.

2. The RA program is implementable, adaptable, and compatible with different programs.
    - It is automated and efficiently operated in ISO systems.
    - It is adaptable to changing needs, regulatory structures, and fleet.

- It is harmonized between the ISO and LRAs and reliability targets and counting are consistent.
- It is scalable so systems work effectively with EDAM and future regional market structures.

Stakeholder suggestions on the goals of the RA program included:

- Additions: CalCCA requested durable be added
- Subtractions:
  - PGP and SEIA requested "cost effective/least cost/affordable" be removed
  - Six Cities suggested the reference to out of market actions be removed on the basis that RA should not correct operational issues
  - Six Cities requested removing the reference to meeting environmental goals with the rationale that any environmental goals are up to the LRA
- Edits:
  - Six Cities suggested an edit to say, "will allow for efficient trade of capacity products throughout the Western region" to account for PUC and WRAP
  - Six Cities suggested the goals refer to all LRAs, and not just the CPUC
  - MRP requested the "reliable" be defined as meeting a 0.1 LOLE and that implementable should include CAISO system overhauls like CIRA
  - Modify one of the goals to read "It is harmonized between CAISO and LRAs ~~and reliability targets and counting are consistent~~ and reliability targets and counting are consistent with reliability and resource performance."
  - SCE suggested the goals be edited to frame RA as an element of the whole electricity market and that RA (along with the CAISO's energy market prices) provides appropriate price signals. They added that market power mitigation by a properly functioning RA program is a goal to be considered

Working Group Feedback on Problem Statements

Over the course of the working group meetings, participants refined the problem statements and sub-issues initially proposed by the ISO. This section outlines the original problem statements and the revisions developed by the working group. Stakeholder comments and suggested edits related to the problem statements and sub-issues are contained in the tables in Appendix A.

Problem Statement 1: Overall system reliability information

As proposed by ISO staff in September 2023, Problem Statement 1 read:

There is a need for additional consistent, transparent, and timely information on the sufficiency of the RA fleet in the CAISO Balancing Authority Area (BAA). Without this, there are challenges in:

- Assessing and communicating the system-wide sufficiency of the CAISO BAA in light of the contracted RA fleet.
- Addressing such concerns in a timely and efficient manner.

Sub-issues of the original problem statement were as follows:

- RA Portfolio Evaluation: A comprehensive evaluation of the sufficiency of the current or expected CAISO BAA RA portfolio in forward time frames (e.g., monthly, yearly, multi-year) does not exist today. Such an assessment would provide the ISO and stakeholders with an understanding of the overall CAISO BAA level of system-wide reliability, LRA contributions to overall system reliability, and the implications of a growing diverse resource fleet.
- Non-RA Visibility: The CAISO has limited visibility into resources not shown as RA.
- Updating the CAISO's Default Planning Reserve Margin: The CAISO's default PRM, 15% of LSE's peak hour each month, is outdated and has not kept pace with changes in the RA landscape.

Based on the working group discussions and participants' suggested changes, summarized in Appendix A, the ISO proposes that Problem Statement 1 be revised as follows, with additions underlined and deletions struck through.

Current processes and procedures do not provide sufficient visibility into the generation fleet to enable CAISO to ensure system reliability. There is a need for additional consistent, transparent, and timely information on the sufficiency of the RA fleet in the CAISO Balancing Authority Area (BAA).

Without this, there are challenges in:

- Assessing and communicating the system-wide sufficiency of the CAISO BAA in light of the contracted RA fleet.
- Anticipating the amount of RA imports the CAISO can expect and the amount of RA-eligible resources within CAISO that will be contracted to entities outside the state.
- Addressing such concerns around CAISO BAA system-wide RA sufficiency in a timely and efficient manner.

Sub-issues:

- RA Portfolio Evaluation: A comprehensive evaluation of the sufficiency of the current or expected CAISO BAA RA portfolio in forward time frames (e.g., monthly, yearly, multi-year) does not exist today. Such an assessment would provide the ISO and stakeholders an understanding of the overall CAISO BAA level of system-wide reliability, LRA contributions to overall system reliability, and the implications of a growing diverse resource fleet.[13]
- Non-RA Visibility: The CAISO has limited visibility into resources not shown as RA.
- Updating the CAISO's Default Planning Reserve Margin and Default Counting Rules: The CAISO's default PRM[14] ~~is outdated and has not kept pace with~~ should be assessed

[13] The ISO conducts a forward portfolio analysis using the IRP portfolios. However, to date the ISO has not assessed the RA portfolio on a year ahead basis as the entire RA portfolio is only available on a month ahead basis.

[14] CAISO Tariff Section 40.2.2.1. "For the Scheduling Coordinator for a Non-CPUC Load Serving Entity for which the appropriate Local Regulatory Authority or federal agency has not established a Reserve Margin(s) or a CPUC Load Serving Entity subject to Section 40.2.1(b), the Reserve Margin for each month shall be no

in light of changes in the ~~RA landscape~~ resource mix used to supply RA capacity and evolving reliability needs within the CAISO BAA. The ISO's default PRM and default counting rules should meet a 0.1 LOLE at the ISO BAA level.

The availability of resources based on varying seasonal ambient derates is not consistently reflected in resource NQCs today which creates challenges in reliably operating the grid.

During discussions of Problem Statement 1, the working group also suggested an additional problem statement, which participants called Problem Statement "0":

There is a need for the CAISO to ensure the collective ability of the RA programs within its footprint to meet the 0.1 LOLE metric. If the RA programs within the CAISO footprint do not meet this metric, then the CAISO shall engage in backstop procurement, regardless of whether the shown RA fleet is sufficient to meet the LSE requirements.

Sub-issue: There is a need for additional information regarding the sufficiency of the LRA RA programs to meet 0.1 LOLE.

Problem Statement 2: Requirements for RA Capacity and Program Tools

The original Problem Statement 2 read:

The CAISO's current requirements for RA capacity and program tools (*e.g.,* outage, must-offer, bid-insertion, and resource performance and availability rules) have not been updated recently in light of evolving market and regulatory structures, and could result in:

- RA supply not available when and where needed.
- Inefficient procurement and investment (e.g. maintenance and capital upgrade) decision.
- Implementation challenges for the CAISO and market participants.

Sub-issues:

- Requirements for RA Capacity:[15] It is not clear if the current CAISO requirements for RA capacity are sufficient. For example:
  1.) The CAISO does not evaluate the RA fleet for energy sufficiency which could pose a reliability risk to the CAISO BAA, and 2.) as the resource fleet has evolved, the CAISO has not conducted a comprehensive study to assess the overall need for a Flex RA product since the CAISO implemented the Flex RA product in 2015. It is unclear if the currently designed Flexible RA provides reliability benefits commensurate to the administrative burden on stakeholders and the CAISO.
- Incentivizing Availability: In light of current high RA prices, the current CAISO mechanism for incentivizing capacity to be available, the Resource Adequacy

less than fifteen percent (15%) of the LSE's peak hourly Demand for the applicable month, as determined by the Demand Forecasts developed in accordance with Section 40.2.2.3."

[15] "Requirements for RA Capacity" refers to the ability to meet the RA requirements as outlined in the CAISO's tariff.

Availability Incentive Mechanism (RAAIM), may be insufficient and incentivize less reliable generation to be contracted or not provide sufficient signals for maintenance investments.

- Incentivizing Performance: The CAISO lacks a mechanism to incentivize RA performance.
- Outages: Current rules requiring substitute capacity for all planned outages on RA capacity were designed assuming there was excess capacity available at commercially reasonable prices and may require revisiting. Today planned outages often cannot find substitution which risks the health of the resource if this results in potential delays in performing maintenance. In addition, current substitution rules for planned outages may be overly burdensome.
- CPUC's Slice-of-Day: The implementation of the CPUC's Slice-of-Day program will require a continued comprehensive review by the CAISO with stakeholder engagement to ensure continued operational, commercial, and regulatory objectives are met.[16]
- Interoperability with WRAP: The CAISO has not undertaken a comprehensive analysis of translatability and transactability between the WRAP and CAISO's RA program, to evaluate potential friction in trading.

Based on working group suggestions, detailed in Appendix A, CAISO proposes that Problem Statement 2 be revised as follows:

The CAISO's current requirements for RA capacity and program tools (e.g., outage, must-offer, bid-insertion, and resource performance and availability rules) have not been updated recently in light of evolving market and regulatory structures, and could result in:

- RA supply not available when and where needed;
- Inefficient procurement and investment (e.g. maintenance and capital upgrade) decisions; and
- Implementation challenges for the CAISO and market participants.

Sub-issues:

- Requirements for RA Capacity:[17] <u>The stakeholder initiative should</u> <u>evaluate if and to the extent to which</u> the current CAISO requirements for RA capacity are sufficient. For example: 1.) The CAISO does not evaluate the RA fleet for energy sufficiency which could pose a reliability risk to the CAISO BAA, and 2.) As the resource fleet has evolved, the CAISO has not conducted a comprehensive study to assess the overall need for a Flex RA product since the CAISO implemented the Flex RA product in 2015. It is unclear if the currently designed Flexible RA provides reliability benefits commensurate to the administrative burden on stakeholders and the CAISO.

[16] The CAISO recognizes that other LRAs may also update their programs. As the CAISO becomes aware of new LRA RA programs, the CAISO will need to review those programs to ensure continued operational, commercial, and regulatory objectives are met.

[17] "Requirements for RA Capacity" refers to the ability to meet the RA requirements as outlined in the CAISO's tariff.

- ~~Incentivizing~~ Availability and Performance Incentives and Penalties: In light of a tight RA market, ~~current~~ high RA prices and market incentives, the current CAISO mechanism for incentivizing capacity to be available, the Resource Adequacy Availability Incentive Mechanism (RAAIM) may be insufficient. For example, RAAIM is applied only to a fraction of the RA fleet, the current deadband does not provide an incentive to be available, and the monthly netting process and carry-forward provisions both mute incentives. In some cases this can result in incentivizing less reliable generation to be contracted, discouraging showing of all RA resources, not incentivizing actions to increase availability particularly during critical periods. Additionally, it creates operational backstop challenges for the ISO resulting in reliability risks. ~~or not provide sufficient signals for maintenance investments.~~

- ~~Incentivizing Performance: The CAISO lacks a mechanism to incentivize RA performance.~~ RAAIM should be assessed to see if it is meeting its intended objectives, if its objectives should be revisited, or if a new mechanism is needed to incent availability and/or performance. The need for either RAAIM reform or RAAIM elimination as well as any exploration of a new availability and performance mechanism should be done in concert/consideration of any counting rule changes to encourage all RA-eligible resources to be shown.

- ~~Outages: Current rules requiring substitute capacity for all planned outages on RA capacity were designed assuming there was excess capacity available at commercially reasonable prices and may require revisiting. As a result, today planned outages often cannot find substitution which risks the health of the resource if this results in potential delays in performing maintenance. In addition, current substitution rules for planned outages may be overly burdensome.~~
- The ISO's existing outage substitution mechanisms should be reassessed as both initial analysis and working group feedback indicate that the current processes and procedures likely result in:
    - Inefficiencies as multiple SCs holdback capacity for outage substitution for a partial month outage;
    - Artificial tightness in the RA bilateral market due to holding back capacity;
    - Potential maintenance delays if substitute capacity is not available; and
    - Higher forced outage rates as planned outage unable to be scheduled turn into forced outages.

- Resource Accreditation: The stakeholder initiative should evaluate if and the extent to which c~~u~~rrent LRA established PRMs and counting rules ~~may not accurately~~ reflect forced outage rates ~~or~~ and performance and availability ~~which has the potential to result in a less efficient system~~. In response to potentially ~~light of~~ changing regulatory structures at the CPUC (including the scoping of UCAP), the ISO has an opportunity to consider establishing ~~partner with the CPUC, other LRAs and stakeholders to create a more effective~~ alternatives to the current resource counting design and eliminate/redefine availability and performance incentives while acknowledging the authority of local regulatory authorities to establish counting rules.

- CPUC's Slice-of-Day: The implementation of the CPUC's Slice-of-Day program will require a continued comprehensive review by the CAISO with stakeholder engagement to ensure continued operational, commercial, and regulatory objectives are met.[18]

- Interoperability with WRAP: The CAISO has not undertaken a comprehensive analysis of translatability and transactability between the WRAP and CAISO's RA program, to evaluate potential friction in trading.

Problem Statement 3: LRA Resource Adequacy Responsibility and Cost Allocation

Problem Statement 3 originally read:

There is concern about inequitable costs and cost allocation among market participants. There is a need for a transparent and common framework for evaluating reserve margins and counting rules and an understanding of an LRA RA program's contribution to overall system reliability.

Sub-issues:

- Definitions and Requirements: The CAISO lacks a common definition, method of measurement, or standard to ensure that various LRAs bring a portfolio of resources that are accessible in the right place, available at the right time, and provide the right attributes needed to evaluate if LRA programs are reliable.

- EDAM RSE Cost Causation:[19] Stakeholders have expressed the need for a policy that more directly aligns cost and benefit allocation with causation associated with the Extended Day Ahead Market (EDAM) Resource Sufficiency Evaluation (RSE), when the CAISO needs to assign costs accrued as a result of a deficiency or procurement of cure capacity.

Problem Statement 3 has not been discussed to the extent that Problem Statements 1 and 2 have been discussed and debated.

Current Draft Problem Statements for stakeholder discussion on April 30, 2024 include:

Backstop: Visibility and Reform:

[18] The CAISO recognizes that other LRAs may also update their programs. As the CAISO becomes aware of new LRA RA programs, the CAISO will need to review those programs to ensure continued operational, commercial, and regulatory objectives are met.

[19] This has crossover with the EDAM BAA Participation Rules Initiative. https://stakeholdercenter.caiso.com/RecurringStakeholderProcesses/Extended-day-ahead-market-ISO-balancing-authority-area-participation-rules

1. The ISO lacks visibility into the contract and availability status of resources not shown as RA, preventing the ISO from efficiently and reliably running its current CPM processes.
2. Stakeholder feedback is that there is a lack visibility into the ISO's CPM decision making processes.
3. In the current tight RA market, the ISO's Capacity Procurement Mechanism may not be producing all of its intended results particularly given the frequent lack of bids into its Competitive Solicitation Processes.
4. As the reliability needs evolve (e.g. to address changing needs for battery storage) the ISO's CPM process may need to evolve to obtain specific attributes necessary for reliability.

EDAM RSE: Long Term Solutions to Backstop and Cost Allocation

While CAISO proposes to utilize its existing exceptional dispatch authority to resolve reliability concerns highlighted by potential capacity shortages identified by the RSE, stakeholders have expressed concern that:

- The cost of the Exceptional Dispatch (including potentially a monthly CPM designation) might make this an inefficient tool to resolve these concerns.
- The option to exceptionally dispatch resources might not be available during critical periods.
- The cost allocation should be reexamined to align better with cost causation, if feasible.

Next Steps

Comments on both this paper and the April 29th and 30th working group meeting are requested by Friday, May 17, 2024. Please submit your comments through the ISO's commenting tool using the link on the working group webpage:
https//stakeholdercenter.caiso.com/Comments/MyOrgComments

Appendix A: Analysis Requested

The table below summarizes analysis presented and requested.

Table 3: Sub-Issues and Analysis

RA Working Group Meeting	Topic	Analysis Presented	Additional Analysis Requested

November 1, 2023	CAISO Modeling	CAISO Modeling Gaps: 4. Year ahead analysis with enough time to cure 5. Yrs 2-4: No assessment to measure ICAP and authorized capacity 6. Yrs 5-10: No assessment	• Provide information on the PRM for each LRA in the CAISO footprint • Provide information on whether sufficient RA was procured and shown in aggregate to meet monthly requirements • Clarify why CAISO does not have visibility into non-RA resources when they have information on all units physically interconnected to the system • CAISO should articulate what additional information CAISO requires in order to analyze the sufficiency of the current RA fleet • Provide historical values for the annual RA showing and months when the CAISO did not need to conduct any CPM and for months when it did. The same type of historical information should be provided for local and flexible RA • PG&E suggests that CAISO conducts a comprehensive assessment of the effectiveness of the three flex RA categories to understand the necessity and the impact of each category.
November 8, 2023	SOD Presentation	SOD framework interaction with CAISO processes: 1. Deliverability 2. Substitution 3. Bid insertion/RAIMM	• Analysis on whether the RA resources made available to CAISO system-wide in the DAM can meet 24 SOD RA requirements for each of the 12 months in sample years. (Last 5 years) • RAIMM o Need more data around the performance issues under RAIMM o Need support for the CAISO statement that resources are increasingly more willing to accept RAAIM penalty than providing availability o Provide data on types of outages that occur during net peak and peak load hours o Provide data on non-availability and non-performance based on season, time of day, weather, technology)

			○ Thorough analysis covering outages to provide a better understanding to stakeholders. CAISO to provide analysis that categorizes resources into RAIMM penalized and exempt for both summer months and non-summer months
RA WORKING GROUP MEETING	**TOPIC**	**ANALYSIS PRESENTED**	**ADDITIONAL ANALYSIS REQUESTED**
December 6, 2023	RA101 Modeling Study Scope CAISO Metrics	1. Responsibilities 2. LSE requirements 3. Procurement & showings 4. CAISO CPM 1. Short term- Do RA programs meet 0.1 LOLE? 2. Study inputs 3. Study process 4. Portfolio outputs 1. RA showings 2. Performance 3. Monthly/annual reporting	• CAISO perform an LOLE and PRM analysis to determine the minimum amount of capacity that needs to be procured for the next compliance year, and should calculate the annual RA PRM that is needed for the monthly RA program to maintain a 0.1 LOLE on an annual basis
January 11, 2024	CPUC SOD	1. Review SOD document 2. Interaction between CAISO RA process and CPUC's SOD	
January 16, 2024	CAISO RA Processes Outage Substitution	1. Studies & assessments 2. Demonstrations & assessments 3. Backstop 4. Availability & performance 1. Planned 2. Forced 3. Studies & assessments	

February 13, 2024	CAISO 2021 UCAP Proposal	Refresher only – no analysis presented	• More analysis before substituting RAAIM with UCAP? – Has RAAIM incented resource availability? Could UCAP and RAAIM be complementary?
	CPUC Staff Proposal for UCAP Framework	Overview – no analysis presented	• "...it [RAAIM] creates operational backstop challenges for the ISO resulting in reliability risks" – warrants additional context or explanation specifically describing the operational challenges and resulting reliability risks.
	Resource Counting and Availability/Performance Incentives	Panel	
	CAISO Reliability Visibility: Long-Term	1. Long-term: Information needed for stochastic modeling 2. Medium-term: survey information from LSEs	
March 13, 2024	Outage Substitution	1. Mechanics 2. Forced outages for RA resources over 5 years 3. Unsubstituted planned outages since June 2021 4. Percentage of outages for gas resources as compared to RA showings 5. Percentage of outages for storage resources as compared to RA showing 6. Storage RA showings over the years 7. Percentages of RA outages breakdown by fuel type	• CAISO needs to support the statement that "planned outages often cannot find substitution"

		8. Planned to forced outages	
April 23, 2024	LSE Survey Presentation	N/A Overview of survey	
April 29, 2024	Backstop	Collective deficiency/surplus of showings by month going back 5 years CSP offer quantity and average price level by month going back 5 years Trading hub prices (COB and Palo) going back 5 years as compared to CSP offer qty and price	

Appendix B: Suggested Edits to Problem Statements

The following tables represent the suggested edits of stakeholders in the working group.

Table 4: Suggested Edits to Problem Statement 1

STAKEHOLDER	SUGGESTED EDITS TO PROBLEM STATEMENT 1
CalCCA	There is a need for additional consistent, transparent, and timely information on the sufficiency of the RA fleet in the CAISO Balancing Authority Area (BAA) *and in the non-CAISO WECC.* Without this, there are challenges in: • Accessing and communicating the system-wide sufficiency of the CAISO BAA in light of the contracted RA fleet; • *Anticipating the amount of RA imports the CAISO can expect and the amount of RA-eligible resources within CAISO that will be contracted to entities outside the state*; and • Addressing such concerns *around CAISO BAA system-wide RA sufficiency* in a timely and efficient manner.

	Sub-Issue – Lack of non-RA Visibility: Lack of Non-RA Visibility, *where non-RA is defined as RA-eligible resources not shown on a supply plan and not available to the CAISO BAA for its use in meeting RA or CPM needs (e.g., supply contracted outside the state, supply held back for substitution, etc.)*
Middle River Power	Proposes an additional Problem Statement ("0"): *There is a need for the CAISO to ensure the collective ability of the RA programs within its footprint meet the 0.1 LOLE metric. If the RA programs within the CAISO footprint do not meet this metric, then the CAISO shall engage in backstop procurement, regardless of whether the shown RA fleet is sufficient to meet the LSE requirements.* *Sub-issue: There is a need for additional information regarding the sufficiency of the LRA RA programs to meet 0.1 LOLE.*
PG&E	*Current processes and procedures do not provide sufficient visibility into the generation fleet to enable CAISO to ensure system reliability.*
Six Cities	• Sub-issue - Updating the CAISO's Default Planning Reserve Margin: The CAISO's default PRM ~~is outdated and has not kept pace with~~ *should be assessed in light of* changes in the ~~RA~~ ~~landscape~~ *resource mix used to supply RA capacity* and *evolving* reliability needs *within the CAISO BAA.* • Sub-issue - Updating the CAISO's Default Counting Rules: The CAISO's default counting rules *should be reassessed in light of* ~~have not kept pace with~~ changes in the ~~RA~~ resource mix *used to supply RA capacity* and *evolving* reliability needs *within the CAISO BAA.* • Sub-issue: The ISO's default PRM and default counting rules should *be based on planning standards that provide an adequate level of reliability within the ISO BAA* ~~meet a 0.1 LOLE at the ISO BAA level~~.
WAPA	*Problem Statement 1: The primary problem is RA capacity shortage and high RA prices. To reduce net RA capacity demand and increase effective RA capacity supply in the operational timeframe, several sub (or means) problems can be addressed by CAISO market design without encroaching LRA's jurisdictional authority:* *a. Refine the CAISO's local RA requirements according to the month of the year and the time of the day, instead of applying August peak load to all other months of the year.* *b. Consider all available capacity in assessing operational needs and backstop procurement in the operational time frame regardless of whether such capacity is labeled as RA or not according to rules of the LRAs.*

	c. Hold LRAs responsible for bringing sufficient operational capacity to the CAISO (EDAM) by validating and settling the shortage penalties associated with Resource Sufficiency at LRA or LSE level. *d. Recognize use limited (e.g., energy limited) resource in the EDAM footprint in assessing RA capacity and operational capacity eligibility and requirements.* *e. Enhance or overhaul the CAISO's CIRA system to allow all LRAs to show RA capacity to the CAISO according to the LRA's RA plans to improve transparency and CAISO's visibility."*

Table 5: Suggested Edits to Problem Statement 2

STAKEHOLDER	SUGGESTED EDITS TO PROBLEM STATEMENT 2
CPUC – Public Advocates	• Sub-issue – Planned Outage Substitution: Current rules requiring substitute capacity for all planned outages on RA capacity ~~were designed assuming there was excess capacity available at commercially reasonable prices and~~ may require revisiting. *Disallowing a planned outage due to a failure to procure substitution* risks the health of the resource if this results in potential delays in performing maintenance. In addition, current substitution rules for planned outages may be overly burdensome.
Middle River Power	• Sub-issue – Planned Outage Substitution: Current rules requiring substitute capacity for all planned outages on RA capacity were designed assuming there was excess capacity require revisiting. *Substitute capacity is different than RA compliance capacity because substitute capacity may not be needed for all days of the month.* *The bilateral market mechanism does not transact substitute capacity efficiently. As a result, today generator owners* ***taking*** *planned outages often cannot find substitute* ***capacity*** ~~*substitution*~~ *which risks the health of the resource if this results in potential delays in performing maintenance or exposes the generator owner to enforcement action if the generator owner, acting in their best judgment, takes a forced outage to perform the needed maintenance.* In addition, current substitution rules for planned outages may be overly burdensome. • Sub-issue – Availability and Performance Incentives: In light of a tight RA market, high RA prices, and market incentives -- the current CAISO mechanism for incentivizing capacity to be available, the Resource Adequacy Availability Incentive Mechanism (RAAIM), *as it is currently applied only to a fraction of the overall RA fleet,* may be: insufficient and incentivize less reliable generation to be contracted, discourage showing of all RA resources, not reflect/incentivize real time performance/availability and/or actions to increase availability particularly during critical periods.

	Additionally, it creates operational backstop challenges for the ISO resulting in reliability risks.
Six Cities	• Sub-issue – Current Requirements for RA Capacity: *The stakeholder initiative should evaluate if and the extent to which* ~~Current~~ *PRMs and counting rules* ~~may not accurately~~ *reflect forced outage rates* ~~or~~ *and* resource performance and availability ~~which has the potential to result in a less efficient system.~~ *In* ~~light of~~ *response to potentially* changing regulatory structures at the CPUC (including the scoping of UCAP), the ISO has an opportunity to *consider establishing* ~~partner with the CPUC, other LRAs and stakeholders to create a more effective~~ *alternatives to the current resource* counting design and eliminate/redefine availability and performance incentives*, while acknowledging the authority of local regulatory authorities to establish counting rules.* • Sub-issue – Availability and Performance Incentives: RAAIM should be assessed to see if it is meeting its intended objectives, if its objectives should be revisited, or if a new mechanism is needed to incent availability and/or performance. The need for either RAAIM reform or RAAIM elimination as well as any exploration of a new availability and performance mechanism should be done in concert~~,~~ *and in* consideration ~~of~~ *with* any counting rule changes to encourage all RA-eligible resources to be shown. *Potential modifications to RAAIM should consider the current RA market, high RA prices, and market incentives.*