Day-Ahead Sufficiency
Issue Paper

Stakeholder Meeting

December 18, 2023

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  - Please remember to state your name and affiliation before making your comment.

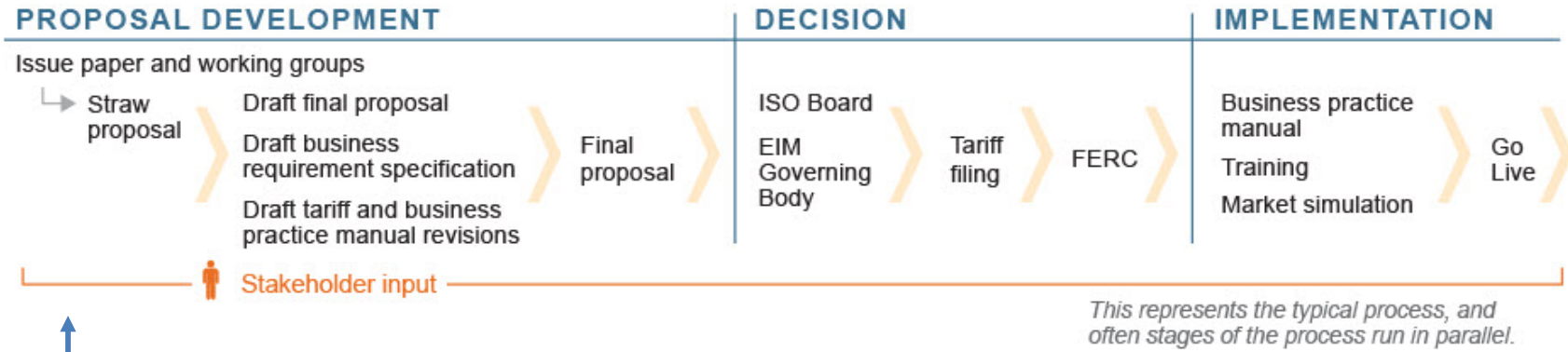
- You may also send your question via chat to either Yelena Kopylov-Alford or to all panelists.

Today's agenda*

Time	Topic	Presenters
1:00 – 1:05	Welcome + today's agenda	Yelena Kopylov-Alford
1:05 – 1:25	Initiative objectives and background	CB Hall
1:25 – 3:40 *(10 minute break included)*	**Processes to help the CAISO BAA meet its day-ahead resource sufficiency evaluation (RSE) obligations** • Advisory RSE results and complementary information • Accounting for reliability demand response resources • Accounting for strategic reliability reserve resources • Curing remaining upward RSE shortfalls, using existing CAISO authority	CB Hall Danny Johnson Abdul Mohammed-Ali Jill Powers Michael Martin Heather Curlee Bob Kott
3:40 – 3:55	Remaining in the WEIM RSE Pool: Incentives for tagging day-ahead imports	CB Hall Danny Johnson
3:55 – 4:00	Wrap-Up + next steps	Yelena Kopylov-Alford

**The ISO will schedule a subsequent stakeholder call in early 2024, if we run out of time today. Let's not rush through these important topics*

CAISO Policy Initiative Stakeholder Process



We are here

Initiative Objectives and Background

Day-Ahead Sufficiency: objectives

- To help the CAISO prepare for its role as an extended day-ahead market (EDAM) participating balancing authority area (BAA).

- More specifically, to establish processes that will help the CAISO BAA meet its day-ahead resource sufficiency evaluation (RSE) obligations

Note: the day-ahead sufficiency initiative replaces and renames track A2 of the EDAM ISO BAA participation rules initiative.

Background on Resource Sufficiency Evaluation, applied to CAISO BAA

The day-ahead RSE will test whether the CAISO BAA has sufficient resources to meet its own obligations, prior to engaging in day-ahead transfers with other EDAM BAAs

RSE Obligations

- Demand forecast (accounts for load-modifying DR)
- Imbalance reserve requirements
- Ancillary services requirements
- High priority exports to non-EDAM BAAs

Day-Ahead RSE

- Conducted at 10am, prior to day-ahead market
- Evaluates RSE obligations against available RSE-eligible supply offered into the day-ahead market
- Uses full VER forecast for VERs that submit offers
- Unit commitment optimization across 24 hours, with no transmission constraints

RSE-Eligible Supply

- Includes CAISO BAA-located resources, unless contracted with an EDAM BAA
- Includes forward-contracted intertie resources.
- Includes proxy DR resources and voluntarily submitted RDRRs

RSE Results

Relaxation quantities (MW)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Power balance constraint: up																								
Power balance constraint: down																								
Imbalance reserves constraint: up																								
Imbalance reserves constraint: down																								
Regulation reserves constraint: up																								
Regulation reserves constraint: down																								
Spinning reserves constraint: up																								
Non-spinning reserves constraint: up																								

The CAISO BAA will pass the RSE if the optimization can solve without relaxing any of the constraints in any of the hours.

Potential RSE failure revenues

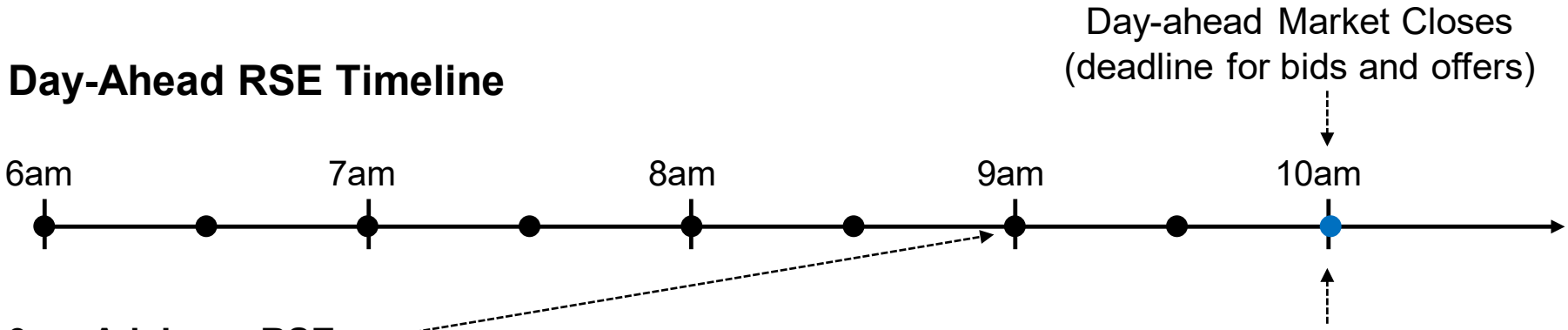
pass

fail

Potential RSE failure surcharges + potential loss of diversity benefits

Background on RSE timeline, applied to CAISO BAA

Day-Ahead RSE Timeline



9am Advisory RSE

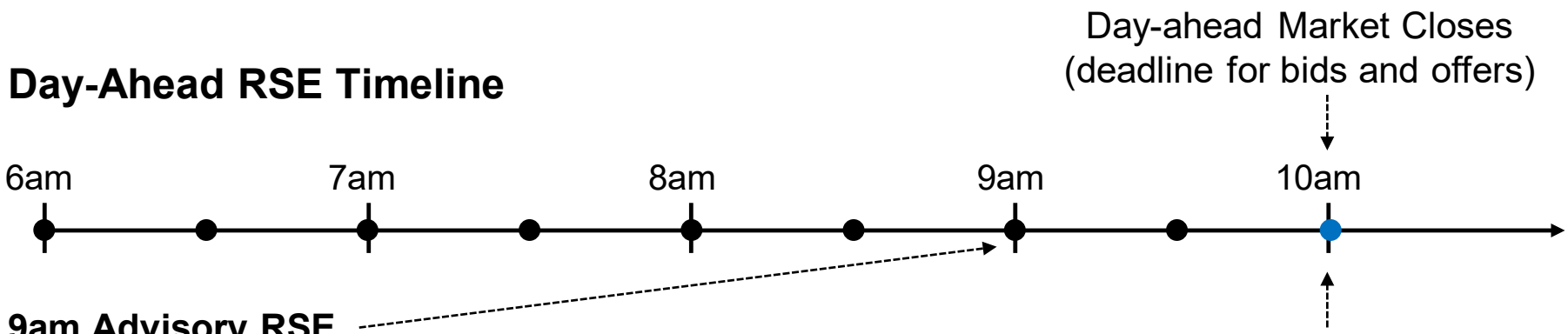
- ✓ Based on final demand forecast, imbalance reserve requirements and ancillary services requirements
- ✓ Uses final VER forecasts
- ✓ Still time for the CAISO BAA to address shortfalls, if needed
- ✗ Does not reflect supply offers submitted after 9am, potentially failing to reflect required volumes from RA resources
- ✗ Does not reflect high priority exports to non-EDAM BAAs submitted after 9am. These self-scheduled volumes will impact the RSE obligations

● Advisory RSE ● Binding RSE

Advisory RSE Results and Complementary Information

Background on RSE timeline, applied to CAISO BAA

Day-Ahead RSE Timeline



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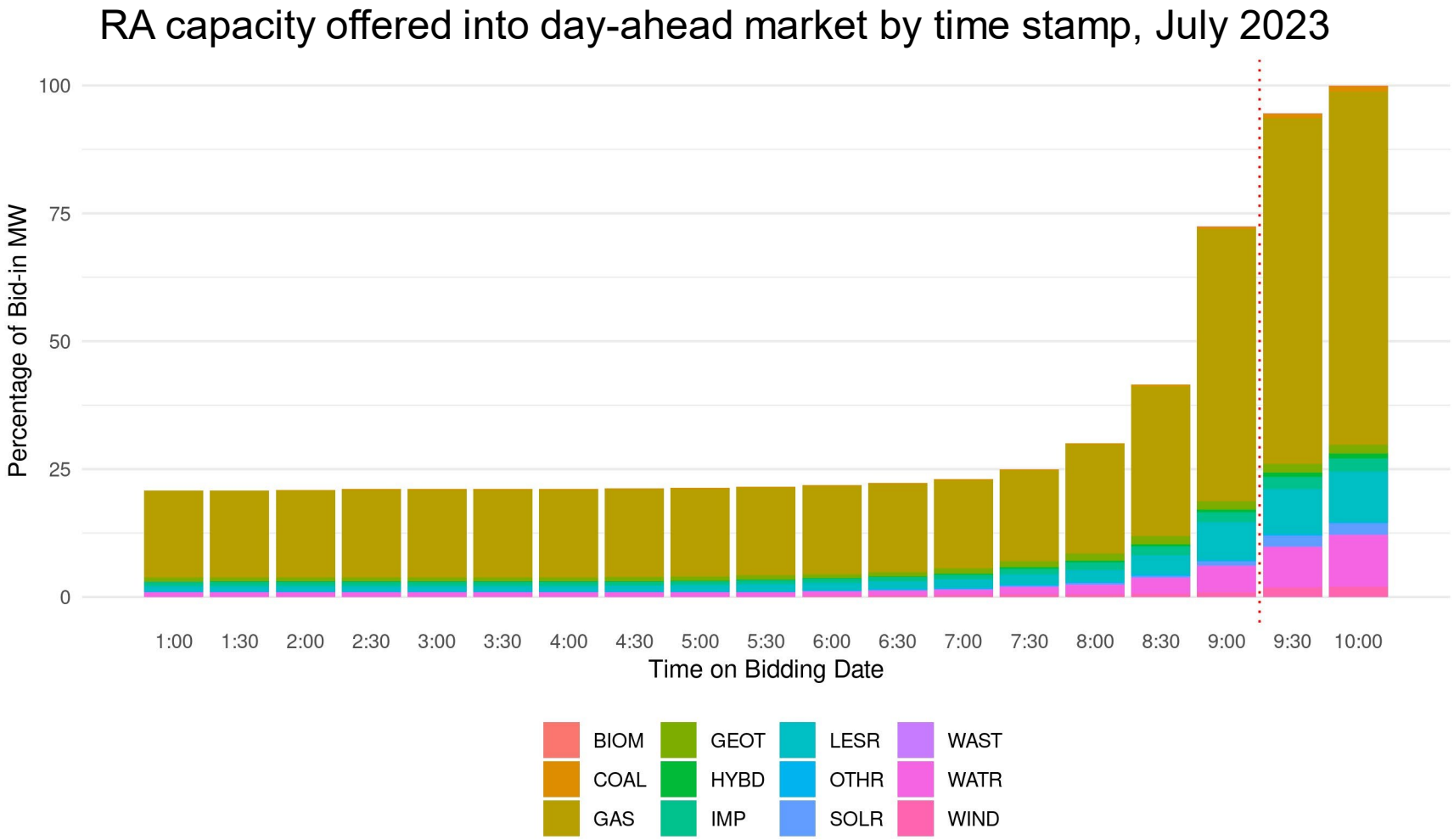
How big of an issue is this? What portion of RA capacity submits offers after 9am? See the following slide for an example month

● Advisory RSE ● Binding RSE

What portion of RA capacity submits offers after 9am?



Ideas to Mitigate Shortcomings of 9am Advisory RSE

1. RA resource scheduling coordinators (SCs) submit day-ahead offers by 9am, with ability to make updates until 10am

2. CAISO BAA inserts bids for RA resources at 9am. Ability for SCs to overwrite until 10am

3. CAISO BAA quantifies volumes expected from RA resources between 9am and 10am, and uses such estimates to supplement advisory RSE results[1]

4. Other ideas?

[1] It may also be helpful to estimate the volume of high priority exports to non-EDAM BAAs expected between 9am and 10am

Supplement Advisory RSE Results with Volumes Expected from RA Resources

Hourly approach (recommended)

- Use the advisory RSE results to calculate upward shortfalls, if any, for each specific hour
- Supplement such results with the volumes expected from RA resources for each specific hour.[1]
- Calculate net hourly upward shortfalls

Key Challenge

Producing hourly estimates of volumes expected from RA resources, especially energy-limited resources

[1] These volumes would be an estimate of awards, not offers, to align with the outputs of the advisory RSE

Supplement Advisory RSE Results with Volumes Expected from RA Resources

Daily approach (not recommended)

- Use the advisory RSE results to calculate an upward shortfall, if there is one, across the entire day. Do this by adding the upward hourly shortfalls, if any, across all of the intervals.
- Supplement this result with the total daily volume expected from RA resources
- Calculate net daily upward shortfall (MWh)
- Derive an implied capacity shortfall (MW)

Key Challenge

Deriving an implied capacity shortfall requires dividing the net daily upward shortfall by an appropriate number of hours. What is this number?

Supplement Advisory RSE Results with Volumes Expected from RA Resources

Hourly approach: key steps

1. Take the advisory RSE results and calculate gross hourly upward shortfalls, if any, in each hour. Do this by summing the upward constraint relaxation quantities[1]
2. Take the list of shown RA capacity and filter out any capacity that has already submitted a day-ahead offer
3. Using the filtered list (from step 2), produce estimates of upward hourly volumes for each RA resource type (see the following slide for ideas)
4. Subtract the estimates of upward hourly volumes (from step 3) from the gross hourly upward shortfalls (from step 1). The result is net hourly upward shortfalls, if any.

[1] It is reasonable to take the sum of the relaxation quantities for the purpose of calculating an RSE position. The awarded supply for one type of obligation will likely free up supply for another type of obligation in the co-optimization

Ideas for Quantifying Expected Hourly Volumes from RA Resources

Resource Type	Methodology
Thermal	Shown RA, net of hourly outage volumes
Hydro with reservoir	Shown RA, net of hourly outage volumes
Hydro run of river	Yesterday's day-ahead self-schedule
Hydro pumped storage	Shown RA, net of hourly outage volumes
Wind[1]	Hourly VER forecast, net of hourly outage volumes
Solar[1]	Hourly VER forecast, net of hourly outage volumes
Proxy DR	Shown RA, distributed to a limited number of hours
Registered RSE-eligible imports	Daily shown RA
Energy storage (Idea A)	(Shown RA x 4), distributed using recent discharge award profile, net of hourly outage volumes
Energy storage (Idea B)	(Shown RA x 4), distributed to hours with upward shortfall in advisory RSE, net of hourly outage volumes
Energy storage (Idea C)	Use D+2 residual unit commitment (RUC) results

[1] The ISO is assuming that VERs will provide day-ahead offers by 10 a.m., despite the fact that they are exempt from RA day-ahead must offer obligations

Accounting for Reliability Demand Response Resources

Introduction: reliability demand response resources (RDRRs)

Relevant Characteristics

- RDRRs are supply-side demand response resources. Not reflected in the CAISO BAA's demand forecast
- RDRRs are RA resources and are managed by CPUC-jurisdictional investor-owned utilities (IOUs)
- RDRRs may voluntarily submit day-ahead offers. If submitted, this supply will be counted in the day-ahead RSE
- RDRRs are required to submit real-time offers, but such offers may only be released into the ISO's real-time market in conjunction with a transmission emergency, energy emergency alert (EEA) watch or other EEA notice

Idea: accounting for unoffered RDRRs in the day-ahead RSE

If the CAISO BAA at 9am expects an upward RSE shortfall in a particular interval

- Based on 9am advisory RSE results,
- Net of volumes expected from RA resources
- Adjusted for expected high priority export volumes (if needed)

And

If the CAISO BAA is expecting EEA conditions in real-time

Then the CAISO BAA will reduce its RSE obligation for that interval by an amount equal to the minimum of (A,B), where:

A = the expected upward shortfall
B = the quantity of available RDRR capacity that has not voluntarily submitted a day-ahead offers as of 9am

Then CAISO IOUs will reduce their integrated forward market (IFM) load bids in aggregate by an amount equal to the RSE reduction quantity

Then CAISO BAA will reduce its residual unit commitment (RUC) procurement target by an amount equal to the RSE reduction quantity

Accounting for unoffered RDRRs: potential drawbacks / complications

1. Reliability risks associated with reduced load bids and demand forecasts (in IFM and RUC, respectively) during tight conditions, unless there is certainty that the RDRRs will be dispatched in real-time

2. Day-ahead expectations of real-time EEA conditions

3. Obtaining information to calculate the quantity of available RDRR capacity that has not voluntarily submitted a day-ahead offer as of 9am

4. Confirming that RDRR scheduling coordinators, when voluntarily submitting day-ahead offers, will continue to do so before 9 a.m. This would prevent RDRR capacity from being inadvertently double-counted as both RSE supply and a reduction to the RSE obligation.

5. Reflecting energy limits to RDRR capacity (i.e., max run times) in the RSE adjustment. For example, If the ISO BAA expected upward RSE shortfalls in multiple intervals, for which intervals would the RSE be reduced?

Accounting for Strategic Reliability Reserve Resources

Introduction: strategic reliability reserve (SRR) resources

Relevant Characteristics

- The SRR was established in 2022 to support grid reliability during extreme events and is currently funded until 2026
- The SRR is expected to include 2,886.8 MW of long-start resources and 263.5 MW of short-start resources
- Long-start SRR resources are all located in the CAISO BAA and committed multiple days in advance, if needed. If committed, must submit day-ahead offers
- Short-start SRR resources will not be committed before the day-ahead market and will not submit day-ahead offers. Instead, they may submit real-time offers when any California BAA declares an EEA Watch or more severe EEA condition.

Discussion: accounting for SRR resources

Long-start SRR resources

- If committed, must submit day-ahead offers
- Counted for host BAA's RSE supply?

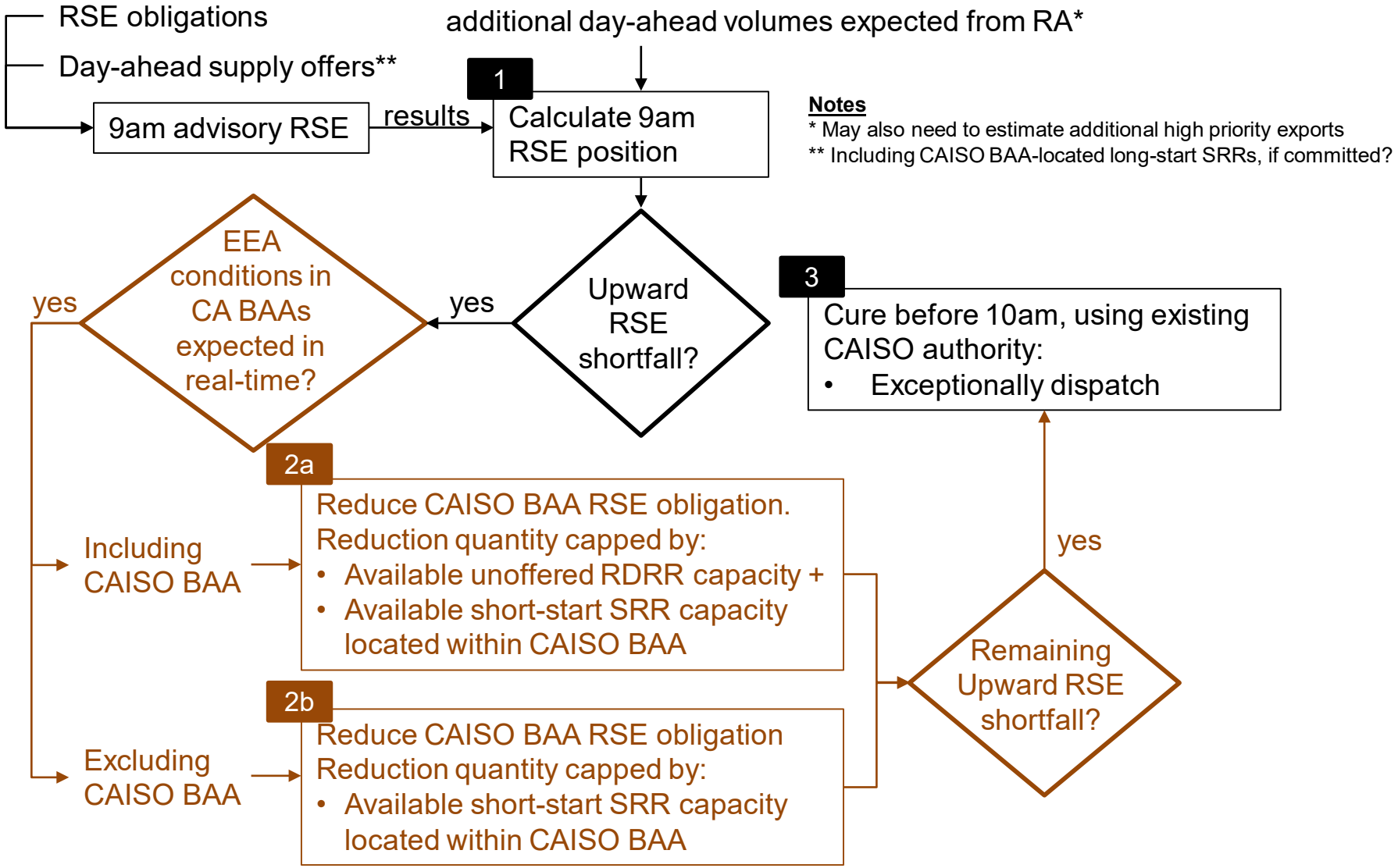
Short-start SRR resources

- Will not submit day-ahead offers
- Appropriate to account for short-start SRRs by adjusting the DA RSE?
  - Probably not, unless the adjustment can be reflected in IFM and RUC

- If a case can be made that it is appropriate to adjust DA RSE:
  - Make adjustment to host BAA's RSE obligation?
  - Adjustment for CAISO BAA would be made if and only if:
    - CAISO BAA expects upward RSE shortfall
    - CAISO expects real-time EEA conditions in one of the CA BAAs?

Curing Remaining Upward RSE Shortfalls

Potential daily process to quantify, adjust and cure RSE position



Note: steps 2a and 2b may not be appropriate or feasible.

Remaining in the WEIM RSE Pool: Incentives for Tagging Day-Ahead Imports

Background on WEIM RSE pool and tagging requirements

- EDAM BAAs that pass the day-ahead RSE will be grouped together and evaluated as a pool for the WEIM RSE
- To remain in the pool, non-source specific imports relied upon to meet the EDAM BAA RSE must meet tagging requirements to provide confidence that this supply will ultimately be available to serve load.
- Scheduling coordinators will have until 5 hours before the start of the operating hour to submit e-tags and/or resupply (i.e., replace the un-tagged imports with other firm schedules or physical resources offered into the real-time market). This ability to resupply acts as a cure to un-tagged imports
- EDAM BAAs that fail to meet these tagging requirements and do not resupply will be removed from the pool, thereby foregoing potential diversity benefits of the WEIM RSE pool

Are additional incentives for tagging day-ahead imports needed?

- In the EDAM ISO BAA participation rules initiative, the CAISO Department of Market Monitoring (DMM) recommended that the CAISO develop incentives to ensure day-ahead imports into the CAISO BAA are tagged by the EDAM deadline.
- Such incentives might help ensure that the CAISO BAA remains within the WEIM RSE pool and does not forego potential diversity benefits.
- One approach to developing such incentives would be to quantify the cost to the CAISO BAA of being removed from the pool (i.e., the lost diversity benefits) and then allocate such costs to scheduling coordinators that fail to tag imports by the EDAM timelines.
- The CAISO requests stakeholder input on whether such additional incentives, beyond the ability to re-supply, are needed for the ISO on EDAM Day 1 or whether this aspect can be monitored with operational experience and based on data evaluated as a future enhancement to ISO EDAM participation.

Next Steps

Next steps

- Comments on the issue paper and stakeholder meeting are due by end of day **January 5, 2024**. Please submit your comments using the comment template available on the initiative webpage: https://stakeholdercenter.caiso.com/StakeholderInitiatives/Day-ahead-sufficiency

- If you have any questions, please contact isostakeholderaffairs@caiso.com