# RA Enhancements – Phase 1 Summer

Cynthia Hinman
Radha Madrigal
Lead Client Trainers
April 21, 2021

- Updated slide 48
- Added slide 52

Updated 10/28/2021

The information contained in these materials is provided for general information only and does not constitute legal or regulatory advice. The ultimate responsibility for complying with the ISO FERC Tariff and other applicable laws, rules or regulations lies with you. In no event shall the ISO or its employees be liable to you or anyone else for any decision made or action taken in reliance on the information in these materials.

# This initiative covers three enhancements:

- Refinements to the existing planned outage process
- A minimum state of charge requirement for storage resources
- Backstop procurement authority for local energy sufficiency (Fall)


ISO PUBLIC – © 2021 CAISO

# Acronyms

| Abbreviation | Definition |
|---|---|
| BOG | Board of Governors |
| CIDI | Customer Inquiry, Dispute and Information system |
| CIRA | CAISO Interface for RA Application |
| CMRI | Customer Market Results Interface |
| CPM | Capacity Procurement Mechanism |
| CV | Cross Validation |
| DAM | Day-Ahead Market |
| EOH | End of Hour |
| HE | Hour-Ending |
| MOO | Must Offer Obligation |
| MSOC | Minimum State of Charge |


ISO PUBLIC – © 2021 CAISO

# Acronyms

| Abbreviation | Definition |
|---|---|
| OASIS | Open Access Same-Time Information System |
| POSO | Planned Outage Substitution Obligation |
| RA | Resource Adequacy |
| RACS | Resource Adequacy Capacity Substitution |
| RTM | Real-Time Market |
| RUC | Residual Unit Commitment |
| SC | Scheduling Coordinator |
| SOC | State of Charge |
| UCAP | Unforced Capacity |


ISO PUBLIC – © 2021 CAISO

# Schedule and Phases

- Phase 1 (BOG - March) – approved
  - Planned Outage Process (POSO) Enhancements (phase 1, summer 2021)
  - Operationalizing Storage (phase 1, Summer 2021)
  - Backstop capacity procurement – CPM for local energy sufficiency (Fall 2021 for RA year 2022)


ISO PUBLIC – © 2021 CAISO

# Schedule and Phases (continued)

- Phase 2A  (BOG - July 2021)
  - RA import requirements
- Phase 2B (BOG – November 2021)
  - Unforced capacity evaluations
  - Determining system RA requirements
  - System RA showings and sufficiency testing – individual assessments
  - Must offer obligations and bid insertion modifications
  - UCAP for local studies
  - Backstop capacity procurement – CPM modifications and availability penalty structure for RMR resources
  - POSO Enhancements (Phase 2)
  - System RA showings and sufficiency testing – portfolio assessment
  - Flexible RA


ISO PUBLIC – © 2021 CAISO

# RESOURCE ADEQUACY CAPACITY SUBSTITUTION (PREVIOUSLY PLANNED OUTAGE SUBSTITUTION)


ISO PUBLIC – © 2021 CAISO

# Key Features

- All planned outages for RA resources must bring full substitute capacity for an outage to be approved

- Requested outage extensions require a new outage card and substitute capacity (if the outage has started)


ISO PUBLIC – © 2021 CAISO

# Benefits

- Provides clarity regarding planned outage requirements for RA capacity

- Ensures that the ISO has adequate RA capacity to maintain reliability, even when resources cannot return to service as originally planned

- Very focused and easily implementable by this summer.
  - An interim solution until a long-term solution is developed


ISO PUBLIC – © 2021 CAISO

# SCENARIOS


ISO PUBLIC – © 2021 CAISO

# Scenario 1 – Planned outage submitted by 30 days before the RA month with a substitute resource

- SC A's resource has an RA Obligation of 20 MW and submits the supply plan in CIRA 45 days in advance of the RA month

- SC A has a 20 MW planned outage. They:
  - submit an outage request in OMS by 30 days before the RA month
  - submit a substitute resource that covers 100% of the RA impact in CIRA within 24 hours after 30 days before RA month (last day to update supply plan)

- ISO validates that the substitution has been provided

ISO PUBLIC – © 2021 CAISO

# Scenario 2 – Planned outage by 30 days before the RA month without a substitute resource

- SC B's resource has an RA Obligation of 20 MW and submits the supply plan in CIRA 45 days in advance of the RA month

- SC B has a 20 MW planned outage. They:
  - submit an outage request in OMS by 30 before the RA month
  - ~~submit a substitute resource that covers 100% days of the RA impact in CIRA~~ within 24 hours after 30 days before RA month ~~(last day to update supply plan)~~

- ISO validates that the substitution has been provided

ISO PUBLIC – © 2021 CAISO

# Scenario 3 – Submit a partial substitution for a planned outage

- SC C's resource has an RA Obligation of 20 MW and submits the supply plan in CIRA 45 days in advance of the RA month

- SC C has a 20 MW planned outage. They:
  - submit an outage request in OMS by 30 days before the RA month
  - submit a substitute resource that covers 90% of the RA impact

- ISO validates that the substitution has been provided

ISO PUBLIC – © 2021 CAISO

# Questions


ISO PUBLIC – © 2021 CAISO

# Scenario 4 – Planned outage submitted with a substitute resource after T-30

- SC D's resource has an RA Obligation of 20 MW and submits the supply plan in CIRA 45 days in advance of the RA month of its obligation

- SC D has a 20 MW planned outage. They:
  - submit an outage request in OMS 28 days before the RA month
  - submit a substitute resource covering 100% of the RA impact in CIRA within 24 hours of the first RA substitute capacity validation run after the outage was submitted

ISO PUBLIC – © 2021 CAISO

# Scenario 4 – RA Capacity Substitution Validation Run

- Example
  - The RA capacity substitution validation run is at 8:00 am each day
  - SC C submits a planned outage at 9:00 am on Monday
  - SC C will have to submit a substitution by 24 hours after the next validation run, which will occur at 8:00 am on Tuesday
  - Substitution deadline is 8:00 am on Wednesday

- The substitution deadline is no less than 24 hours and no more than 47 hours.


ISO PUBLIC – © 2021 CAISO

# Questions


ISO PUBLIC – © 2021 CAISO

# Scenario 5 – Submitting multiple resources to substitute for one outage

- SC E:
  - submits a planned outage request in OMS for 20 MW
  - Offers 3 resources to cover 100% of the RA impact in CIRA
    - Resource 1 = 10 MW
    - Resource 2 = 7 MW
    - Resource 3 = 3 MW

Resource and MW value are specific

- ISO validates that the substitution has been provided

ISO PUBLIC – © 2021 CAISO

# Scenario 6 – Extend an outage

- SC F's resource is on an outage that ends on September 21. They have a substitute resource covering the outage
- SC F finds that the outage is going to take 3 additional days after September 21
- SC F submits a new outage request in OMS through September 24 and submits a substitute resource in CIRA

ISO PUBLIC – © 2021 CAISO

# Questions


ISO PUBLIC – © 2021 CAISO

# Scenario 7a – A planned outage that spans more than one month is submitted after T-30 for second RA month

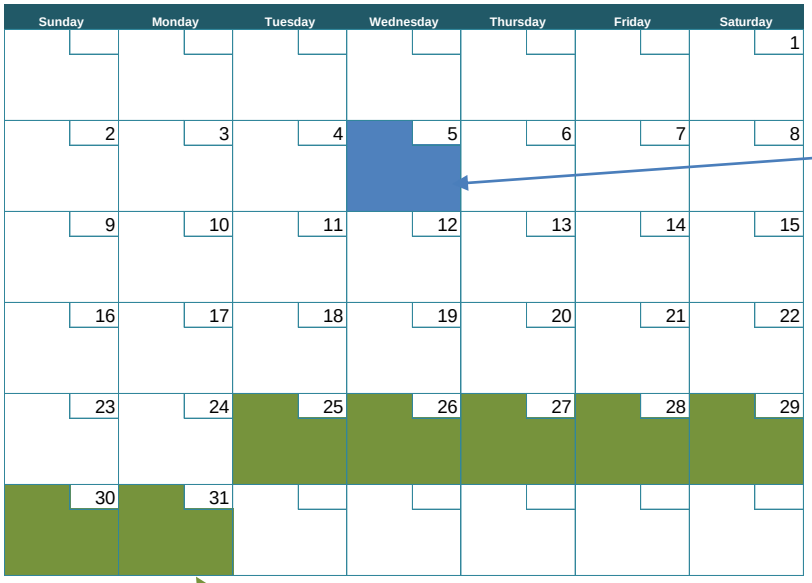
- SC G submits a supply plan for the January RA month
  - Resource G will be used for RA in January and February

- SC G submits a planned outage on January 5 that will span January 25 through February 5

- SC G submits a substitute resource that covers 100% of the RA impact by the outage for all the dates of the outage.

ISO PUBLIC – © 2021 CAISO

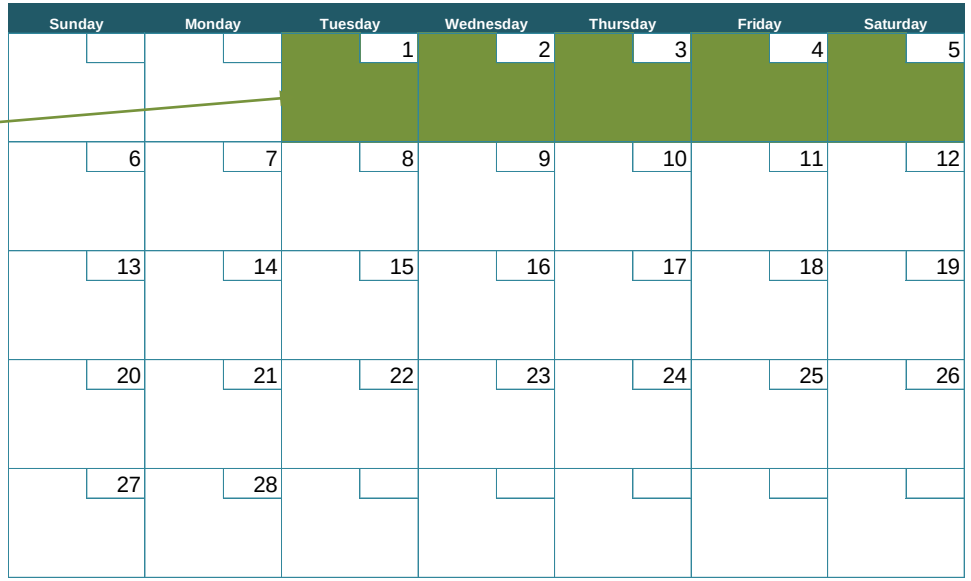
January




Planned Outage Submitted within 30 days of the start of February (RA Month)

Date of Outage

Februrary




The planned outage and substitution are submitted in a timely manner for January and February RA months

ISO PUBLIC – © 2021 CAISO

# Scenario 7b – A planned outage spans more than one month is submitted after T-30 for initial RA month

- SC H submits a supply plan for the January RA month
  - Resource H will be used for RA in January and February

- SC H submits a planned outage on December 14 that will span January 25 through February 5

- SC H will need to submit:
  - a substitute resource for January 25 through January 31 within 24 hours of the outage submission (covers 100%)
  - A substitute resource for February 1 through February 5 within 24 hours after T-30 for the February RA month (covers 100%)

ISO PUBLIC – © 2021 CAISO

December

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

Planned Outage Submitted with 30 days of the RA month (January)

January

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | | | | | |

Date of Outage

Februrary

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | | | | | |

The planned outage and full substitution are submitted in a timely manner for January. Also a full substitution will be submitted for February in a timely manner

ISO PUBLIC – © 2021 CAISO

# Scenario 7c – A planned outage that spans more than one month, submitted after T-30, with a partial substitution

- SC I submits a supply plan for the January RA month
  - Resource I will be used for RA in January and February
- SC I submits a planned outage on December 14 that will span January 25 through February 5
- SC I submits
  - a substitute resource for January 25 through January 31 within 24 hours of the outage submission (100%)
  - A substitute resource for February 1 through February 5 within 24 hours after T-30 for the February RA month (70%)
- ISO will deny the outage

ISO PUBLIC – © 2021 CAISO

December

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

Planned Outage Submitted with 30 days of the RA month (January)

January

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | | | | | |

Date of Outage

Februrary

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | | | | | |

The planned outage and full substitution are submitted in a timely manner for January. Also a partial substitution will be submitted for February in a timely manner

ISO PUBLIC – © 2021 CAISO

# Scenario 7d – A planned outage that spans more than one month, submitted before T-30, with a partial substitution

- SC J submits a supply plan for the January RA month
  - Resource I will be used for RA in January and February
- SC J submits a planned outage on December 14 that will span January 1 through February 5
- SC J submits
  - a substitute resource for January 1 through January 31 within 24 hours of the outage submission (100%)
  - A substitute resource for February 1 through February 5 within 24 hours after T-30 for the February RA month (70%)
- ISO will not deny the outage but subject to RAAIM penalties

ISO PUBLIC – © 2021 CAISO

December

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

Planned Outage Submitted 30 days before the start of the 1st RA month (January)

January

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | | | | | |

Date of Outage

Februrary

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | | | | | |

The planned outage and full substitution are submitted in a timely manner for January. Also a partial substitution will be submitted for February in a timely manner, which occurs while the outage is in effect.

# Questions

# Scenario 8 – A substitute resource takes a planned outage

- Resource K has a 20 MW planned outage
- Resource L is the approved substitute resource to cover Resource K's RA obligation
  - SC L is now responsible for the RA Obligation
- Resource L needs to take a planned outage
  - SC L submits the outage in OMS
  - SC L submit a substitute resource in CIRA to cover 100% of its obligation

ISO PUBLIC – © 2021 CAISO

# Questions


ISO PUBLIC – © 2021 CAISO

# Other Key Points

- This initiative covers planned outages only, not forced
- Definitions of planned and forced have not changed
- Resources taking outages due to transmission outages and off-peak opportunity outages are exempt

ISO PUBLIC – © 2021 CAISO

# Other Key Points

- Substitutions are made in CIRA by the SC for the resource.  They will not impact the LSE SC's RA showing

- Only internal generators can be used as planned outage substitutes (no imports)

- Settlements – if outage is denied and resource does not meet its MOO, RAAIM penalties

ISO PUBLIC – © 2021 CAISO

# Reminders…

- If planned outage is only partially covered by substitution, the outage will be denied
- Once a resource is shown as a substitute it its subject to all the same obligations as any RA resource, including substitution requirements.


ISO PUBLIC – © 2021 CAISO

# Questions

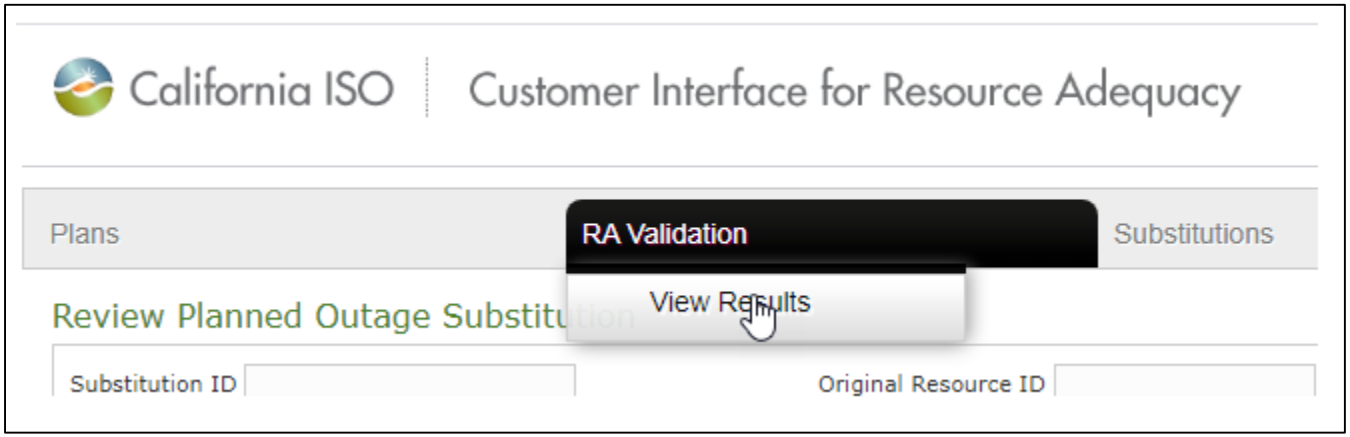

ISO PUBLIC – © 2021 CAISO

# CIRA SCREENS

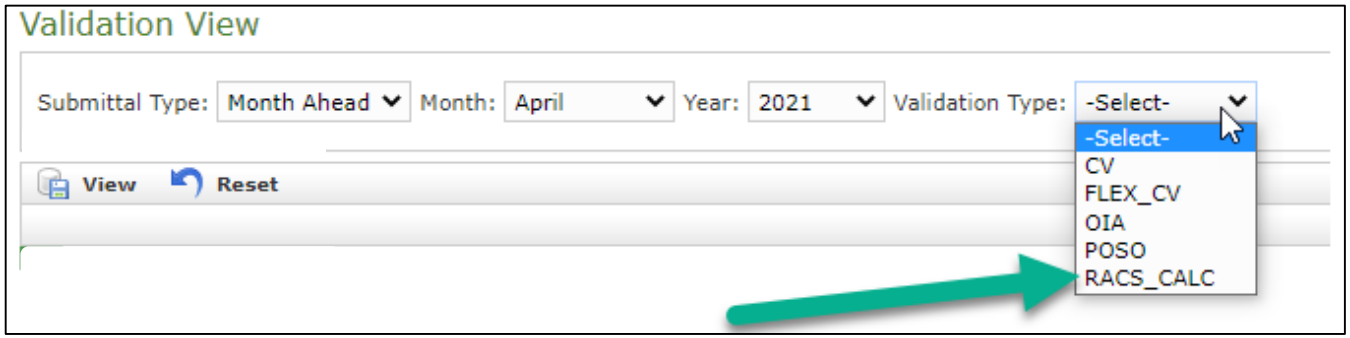

ISO PUBLIC – © 2021 CAISO

# CIRA

Use the existing planned outage substitution screens to submit substitutions



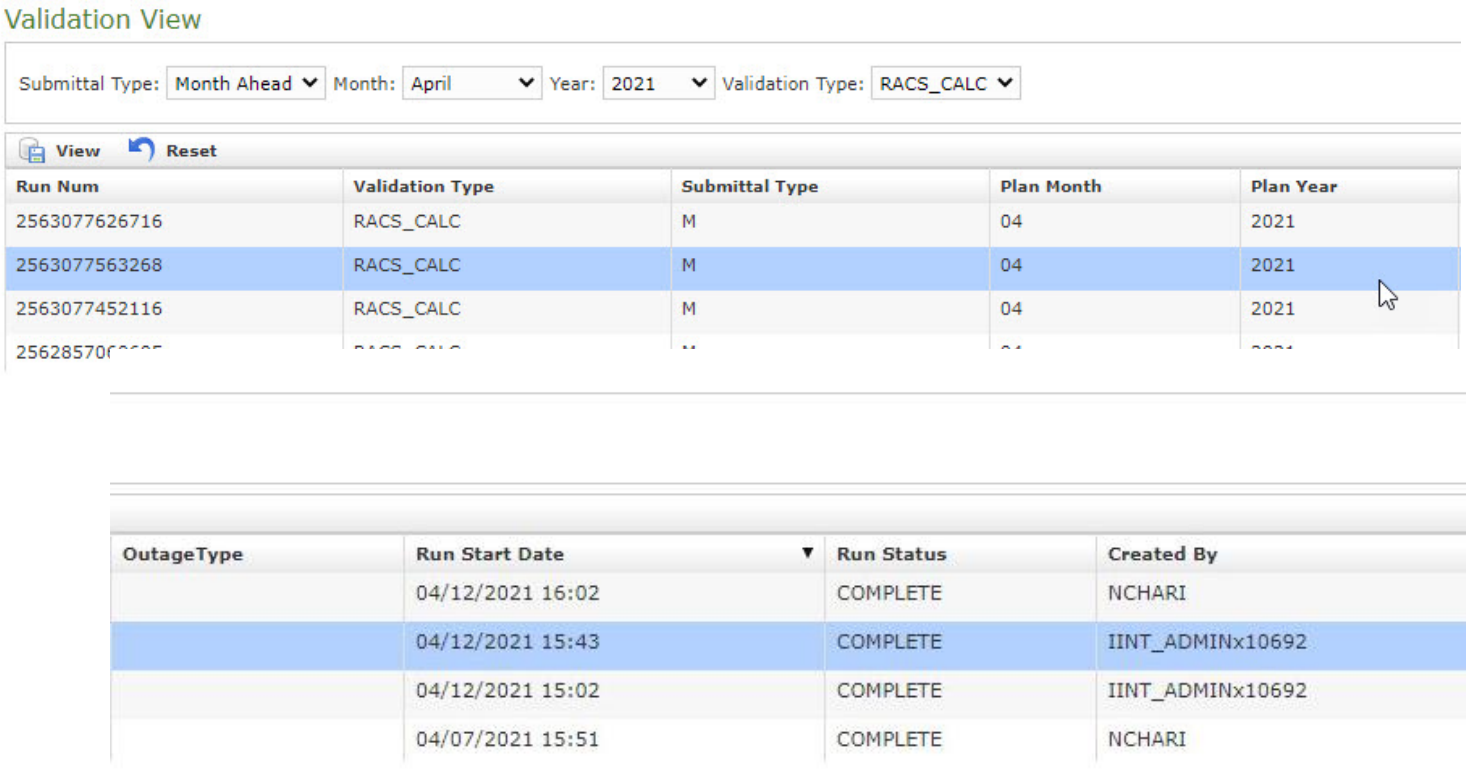

1. Choose “View Results”




2. Select “RACS_CALC”


ISO PUBLIC – © 2021 CAISO

# CIRA




3. Click on View results to see the details of the RAC assignments

# CIRA

**RACS Assignments Details**

Showing 1 to 31 of 31 entries

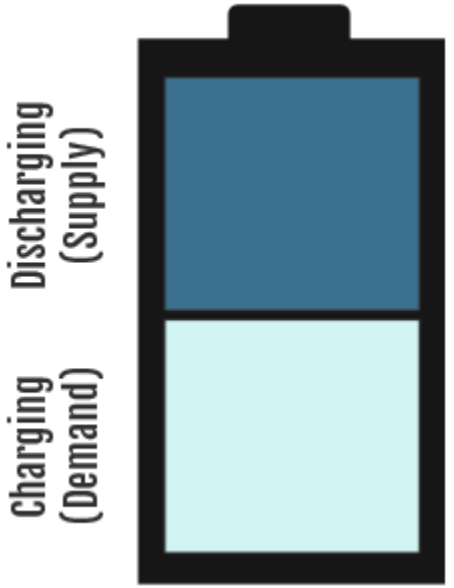
| Run Num | Run Date | Date | SCID | Resource Id | Outage Id | PMAX |
|---|---|---|---|---|---|---|
| 2563077626716 | 04/12/2021 16:03:55 | 04/01/2021 00:00:00 | SDG3 | MIDWD_7_CORAMB | 9767300 | 7.5 |
| 2563077626716 | 04/12/2021 16:03:55 | 04/02/2021 00:00:00 | SDG3 | MIDWD_7_CORAMB | 9767300 | 7.5 |
| 2563077626716 | 04/12/2021 16:03:55 | 04/03/2021 00:00:00 | SDG3 | MIDWD_7_CORAMB | 9767300 | 7.5 |
| 2563077626716 | 04/12/2021 16:03:55 | 04/04/2021 00:00:00 | SDG3 | MIDWD_7_CORAMB | 9767300 | 7.5 |
| 2563077626716 | 04/12/2021 16:03:55 | 04/05/2021 00:00:00 | SDG3 | MIDWD_7_CORAMB | 9767300 | 7.5 |
| 2563077626716 | 04/12/2021 16:03:55 | 04/06/2021 00:00:00 | SDG3 | MIDWD_7_CORAMB | 9767300 | 7.5 |
| 2563077626716 | 04/12/2021 16:03:56 | 04/07/2021 00:00:00 | SDG3 | MIDWD_7_CORAMB | 9767300 | 7.5 |

| Curt. Mw | Avail. Mw | Poso Mw | SubMw | Nature Of Work | Status | ShowPeriodEnd |
|---|---|---|---|---|---|---|
| 7.5 | 0 | 0.2 | 0 | PLANT_MAINTENANCE | NOT_COVERED | 04/12/2021 17:03:00 |
| 7.5 | 0 | 0.2 | 0 | PLANT_MAINTENANCE | NOT_COVERED | 04/12/2021 17:03:00 |
| 7.5 | 0 | 0.2 | 0 | PLANT_MAINTENANCE | NOT_COVERED | 04/12/2021 17:03:00 |
| 7.5 | 0 | 0.2 | 0 | PLANT_MAINTENANCE | NOT_COVERED | 04/12/2021 17:03:00 |
| 7.5 | 0 | 0.2 | 0 | PLANT_MAINTENANCE | NOT_COVERED | 04/12/2021 17:03:00 |
| 7.5 | 0 | 0.2 | 0 | PLANT_MAINTENANCE | NOT_COVERED | 04/12/2021 17:03:00 |
| 7.5 | 0 | 0.2 | 0 | PLANT_MAINTENANCE | NOT_COVERED | 04/12/2021 17:03:00 |

4. View RACS assignments details. This will show the assigned RACS MW as well as the current status of their substitution. Status will update automatically as soon as substitution is provided.

# Questions


ISO PUBLIC – © 2021 CAISO




# MINIMUM STATE OF CHARGE REQUIREMENT


ISO PUBLIC – © 2021 CAISO

# Key Points

- Restrictions on state of charge managed through a new tool called the minimum state of charge (MSOC) requirement
  - Applies to RA resources only
- MSOC requirement is a temporary solution with a sunset date of two years after implementation to be replaced by a market-based solution
- Will only be used under certain conditions
  - Residual Unit Commitment (RUC) under-gen infeasibility


ISO PUBLIC – © 2021 CAISO

# Background

- ISO expects about 1800 MW of storage capacity available to provide RA by August 2021
  - Currently there are about 550 MW of storage available for RA capacity
- MSOC requirement will ensure state of charge availability for evening peak periods
  - This requirement will not be permanent
- A new energy storage enhancements initiative will begin in Q2 2021 to develop a market-based tool to procure state of charge from storage resources and provide compensation for that product


ISO PUBLIC – © 2021 CAISO

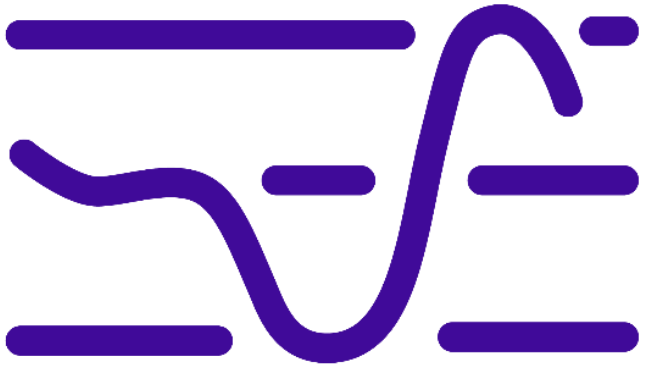
# What is the purpose of the MSOC requirement?

- Day-Ahead Market (DAM) commitments are not immutable and can be adjusted and undone by the Real-Time Market (RTM) optimization
  - The RTM sends dispatch instructions to resources based on prevailing market prices and resource bids and does not consider day-ahead schedules
- The ISO's current 5-minute RTM looks ahead 65 minutes, but most storage resources take several hours to fully charge
  - In contrast, the DAM optimizes the use of resources across the full 24-hour planning horizon


ISO PUBLIC – © 2021 CAISO

# What is the purpose of the MSOC requirement?

- MSOC requirement ensures storage resources providing RA capacity are sufficiently charged in the RTM to meet DAM discharge schedules when storage resources are needed to meet evening net-load peak




ISO PUBLIC – © 2021 CAISO

# MSOC requirement will only be applied on days where needs are critical

- ISO will use the results from the DA RUC process to determine days when minimum state of charge will be required
- Minimums will only be imposed on days when RUC is under-gen infeasible
  - This happens very infrequently, but indicates tight system conditions
- Operators will have further opportunity to drop requirements in real-time if conditions are different in the RTM


ISO PUBLIC – © 2021 CAISO

# Requirements are designed to reduce impact to storage

- MSOC requirement will be implemented in the RTM to set a minimum threshold state of charge for each RA storage resource with a DA discharge award
  - A series of “critical hours” will be determined by operations, which will be the only hours that the requirement is imposed
  - Minimums will be imposed on hours directly prior to discharge schedules, and not in hours earlier in the day
  - The RTM will optimally schedule storage resources to charge or hold state of charge to meet these requirements


ISO PUBLIC – © 2021 CAISO

# Public reporting via OASIS

- The ISO will report the following for the next trade day, **only** for trade days that have non-zero RUC under-gen infeasibility for at least one trade hour:
  - Critical hours used to calculate the minimum end-of-hour (EOH) SOC requirements
  - RUC under-gen infeasibility hours and MW amounts

ISO PUBLIC – © 2021 CAISO

# Sample OASIS Report Mockup: RUC Under Supply Infeasibility and Enforced Constraints

| Trade Date | Trade Hour | Under-Gen Infeasibility MW | Critical Hour Flag | Time Stamp of Min SOC Deactivation in RTM |
|---|---|---|---|---|
| 7/30/2021 | 1 | 0.00 | N | |
| 7/30/2021 | 2 | 0.00 | N | |
| 7/30/2021 | 3 | 0.00 | N | |
| 7/30/2021 | 4 | 0.00 | N | |
| 7/30/2021 | 5 | 0.00 | N | |
| 7/30/2021 | 6 | 0.00 | N | |
| 7/30/2021 | 7 | 0.00 | N | |
| 7/30/2021 | 8 | 0.00 | N | |
| 7/30/2021 | 9 | 0.00 | N | |
| 7/30/2021 | 10 | 0.00 | N | |
| 7/30/2021 | 11 | 0.00 | N | |
| 7/30/2021 | 12 | 0.00 | N | |
| 7/30/2021 | 13 | 0.00 | N | |
| 7/30/2021 | 14 | 0.00 | N | |
| 7/30/2021 | 15 | 0.00 | N | |
| 7/30/2021 | 16 | 0.00 | N | |
| 7/30/2021 | 17 | 0.00 | N | |
| 7/30/2021 | 18 | 10.00 | N | |
| 7/30/2021 | 19 | 0.00 | Y | |
| 7/30/2021 | 20 | 9.00 | Y | |
| 7/30/2021 | 21 | 8.00 | Y | |
| 7/30/2021 | 22 | 7.00 | Y | |
| 7/30/2021 | 23 | 0.00 | Y | |
| 7/30/2021 | 24 | 0.00 | N | |

Note that critical hours may be different from RUC under-gen infeasibility hours

OASIS

(This is a preliminary report mockup. The final report may vary.)


ISO PUBLIC – © 2021 CAISO

# Public reporting via OASIS

- The ISO will report the following for the current trade day **only** if deactivation of MSOC enforcement event occurred in a trade day:
  - Date/time of global deactivation of enforcement of binding MSOC in RTM

OASIS


ISO PUBLIC – © 2021 CAISO

# Sample OASIS Report Mockup: RUC Under Supply Infeasibility and Enforced Constraints

| Trade Date | Trade Hour | Under-Gen Infeasibility MW | Critical Hour Flag | Time Stamp of Min SOC Deactivation in RTM |
|---|---|---|---|---|
| 7/31/2021 | 1 | 0.00 | N | |
| 7/31/2021 | 2 | 0.00 | N | |
| 7/31/2021 | 3 | 0.00 | N | |
| 7/31/2021 | 4 | 0.00 | N | |
| 7/31/2021 | 5 | 0.00 | N | |
| 7/31/2021 | 6 | 0.00 | N | |
| 7/31/2021 | 7 | 0.00 | N | |
| 7/31/2021 | 8 | 0.00 | N | |
| 7/31/2021 | 9 | 0.00 | N | |
| 7/31/2021 | 10 | 0.00 | N | |
| 7/31/2021 | 11 | 0.00 | N | |
| 7/31/2021 | 12 | 0.00 | N | |
| 7/31/2021 | 13 | 0.00 | N | |
| 7/31/2021 | 14 | 0.00 | N | 7/31/2021 13:57 |
| 7/31/2021 | 15 | 0.00 | N | 7/31/2021 13:57 |
| 7/31/2021 | 16 | 0.00 | N | 7/31/2021 13:57 |
| 7/31/2021 | 17 | 0.00 | N | 7/31/2021 13:57 |
| 7/31/2021 | 18 | 10.00 | N | 7/31/2021 13:57 |
| 7/31/2021 | 19 | 0.00 | Y | 7/31/2021 13:57 |
| 7/31/2021 | 20 | 9.00 | Y | 7/31/2021 13:57 |
| 7/31/2021 | 21 | 8.00 | Y | 7/31/2021 13:57 |
| 7/31/2021 | 22 | 7.00 | Y | 7/31/2021 13:57 |
| 7/31/2021 | 23 | 0.00 | Y | 7/31/2021 13:57 |
| 7/31/2021 | 24 | 0.00 | N | 7/31/2021 13:57 |

- The MSOC requirement was cancelled for HE 14
- The report is updated with the date/time of deactivation
- The RUC infeasibility and critical hours remain the same to preserve historical data

OASIS

(This is a preliminary report mockup. The final report may vary.)

# Summary: Public reporting via OASIS

- Market participants can use the OASIS report to identify which days the ISO enforced the MSOC constraint
- The ISO reports the RUC “Under-Supply Infeasibility” and the “Critical Hour” for each trade date
  - Only on those days when the under-gen infeasibility is greater than zero will the ISO enforce the MSOC
- The MSOC constraint is enforced in the critical hour, which may include additional hours than the RUC under-supply infeasibility
- Report navigation path: OASIS > Energy > System > RUC Under Supply Infeasibility and Enforced Constraints


ISO PUBLIC – © 2021 CAISO

# Resource-specific reporting via CMRI

- The ISO will publish the following for the next trade day:
  - Binding minimum EOH SOC requirements that are generated by DAM and are more restrictive than lower SOC limits listed in Master File + any existing outages
- This report will publish on a similar timeline as the DAM results
- This report is **not** updated if the MSOC requirement is deactivated in real-time

CMRI


ISO PUBLIC – © 2021 CAISO

# CMRI Report Mockup: Binding Minimum EOH SOC Requirements

| Trade Date | Trade Hour | Resource ID | Market Type | Min EOH SOC (MWh) |
|---|---|---|---|---|
| 7/30/2021 | 16 | ABC | DAM | 30.00 |
| 7/30/2021 | 17 | ABC | DAM | 80.00 |
| 7/30/2021 | 18 | ABC | DAM | 180.00 |
| 7/30/2021 | 19 | ABC | DAM | 160.00 |
| 7/30/2021 | 20 | ABC | DAM | 130.00 |
| 7/30/2021 | 21 | ABC | DAM | 80.00 |
| 7/30/2021 | 22 | ABC | DAM | 30.00 |
| 7/30/2021 | 23 | ABC | DAM | 30.00 |
| 7/31/2021 | 16 | ABC | DAM | 30.00 |
| 7/31/2021 | 17 | ABC | DAM | 80.00 |
| 7/31/2021 | 18 | ABC | DAM | 180.00 |
| 7/31/2021 | 19 | ABC | DAM | 160.00 |
| 7/31/2021 | 20 | ABC | DAM | 130.00 |
| 7/31/2021 | 21 | ABC | DAM | 80.00 |
| 7/31/2021 | 22 | ABC | DAM | 30.00 |
| 7/31/2021 | 23 | ABC | DAM | 30.00 |

- If 30 MWh is your existing lower SOC limit, this trade hour would not be shown.
- The report only shows when the SOC is more restrictive than current parameters.

CMRI

(This is a preliminary report mockup. The final report may vary.)


ISO PUBLIC – © 2021 CAISO

# Questions

# MARKET SIMULATION


ISO PUBLIC – © 2021 CAISO

# Market participant pre-market simulation actions

- Market simulation structured scenarios provide customers with the ability to preview and test new functionality from bid to bill
- Complete registration for structured scenarios by **April 26, 2021**
- Market participants will need to register their request with the ISO to participate in the **Resource Adequacy Enhancements: Track 1** project simulation via the MarketSim@caiso.com mailbox


ISO PUBLIC – © 2021 CAISO

# Market Sim Scenarios

| Scenario Number | Scenario Execution Trade Date: TBD | |
|---|---|---|
| 1 | Description | Fully covered substitution |
| | ISO Actions | 1. Copy all references from Production<br>2. Run the cross validation, new POSO |
| | EIM Market Participant Actions | N/A |
| | ISO Market Participant Actions | 1. Upload Supply Plans<br>2. Verify in CIRA for CV & new POSO result<br>3. Submit Outage card<br>4. Validate in CIRA for CV & new POSO result<br>5. Submit the fully covered substitution |
| | Expected Outcome | Outage is not denied |
| | Anticipated Settlement Outcome | *N/A* |


ISO PUBLIC – © 2021 CAISO

# Market Sim Scenarios

| Scenario Number | Scenario Execution Trade Date: TBD | |
|---|---|---|
| 2 | Description | Less than full substitution |
| | ISO Actions | 1. Copy all references from Production<br>2. Run the cross validation, new POSO |
| | EIM Market Participant Actions | N/A |
| | ISO Market Participant Actions | 1. Upload Supply Plans<br>2. Verify in CIRA for CV & new POSO result<br>3. Submit Outage card<br>4. Validate in CIRA for CV & new POSO result |
| | | 5. Submit the fully covered substitution |
| | Expected Outcome | Outage is denied |
| | Anticipated Settlement Outcome | N/A |


ISO PUBLIC – © 2021 CAISO

# Market Sim Scenarios

**This scenario will be tested as unstructured*

| Scenario Number | Scenario Execution Trade Date: TBD | |
|---|---|---|
| 3 | Description | Outages already started cannot be extended |
| | ISO Actions | N/A |
| | EIM Market Participant Actions | N/A |
| | ISO Market Participant Actions | 1. Submit an Outage that starts next day/next hour<br>2. After Outage has started, Market Participant to extend the outage |
| | Expected Outcome | Outages already started cannot be extended |
| | Anticipated Settlement Outcome | N/A |


ISO PUBLIC – © 2021 CAISO

# Market Sim Scenarios

| Scenario Number | Scenario Execution Trade Date: TBD | |
|---|---|---|
| 4 | Description | Binding Min EOH SOC Requirements |
| | ISO Actions | CAISO will setup a scenario where RUC under-gen infeasibility is triggered for at least 1 hour in trade day T+1 |
| | EIM Market Participant Actions | N/A |
| | ISO Market Participant Actions | *N/A* |
| | Expected Outcome | Verify that DAM binding Min SOC requirements is published for trade date T+1 (CMRI)<br>Verify that RUC undergen infeasibility is published for trade date T+1. (OASIS)<br>Verify that Critical Hours are published for trade date T+1. (OASIS)<br>Verify enforcement of binding min end-of-hour SOC requirements for RA storage resources in RTM during trade date T+1. |
| | Anticipated Settlement Outcome | • CAISO will execute settlements calculations.<br>• SCs will validate their statements. |


ISO PUBLIC – © 2021 CAISO

# Market Sim Scenarios

| Scenario Number | Scenario Execution Trade Date: TBD | |
|---|---|---|
| 5 | Description | Deactivation of Enforcement of Binding Min EOH SOC Requirements in RTM |
| | ISO Actions | CAISO will setup a scenario where RUC under-gen infeasibility is triggered for at least 1 hour of trade day T+1.<br>CAISO operator deactivates enforcement of binding Min EOH SOC requirements in RTM before noon of Trade day T+1. |
| | EIM Market Participant Actions | N/A |
| | ISO Market Participant Actions | *N/A* |
| | Expected Outcome | Verify that DAM binding Min SOC requirements is published for trade date T+1 (CMRI).<br>Verify that RUC undergen infeasibility is published for trade date T+1. (OASIS).<br>Verify that Critical Hours are published for trade date T+1. (OASIS).<br>Verify that time stamp when CAISO operator deactivated enforcement of binding Min EOH SOC requirements in RTM is published for trade date T+1. (OASIS).<br>Verify enforcement of binding min end-of-hour SOC requirements for RA storage resources STOPS in RTM during trade date T+1 from time of deactivation onwards. |
| | Anticipated Settlement Outcome | • CAISO will execute settlements calculations.<br>• SCs will validate their statements. |


ISO PUBLIC – © 2021 CAISO

# Final Questions


ISO PUBLIC – © 2021 CAISO

For more detailed information on anything presented, please visit our website at:

www.caiso.com

Or send an email to:
CustomerReadiness@caiso.com


ISO PUBLIC – © 2021 CAISO