



California ISO

# Release User Group Agenda

October 17, 2023

10:00 a.m.–11:00 a.m. (Pacific Time)

Web Conference Information	Conference Call Information
<p>Web Address: <a href="https://caiso.webex.com/caiso/j.php?MTID=m8f4dee2c7059898b3609c46be3cd2c20">https://caiso.webex.com/caiso/j.php?MTID=m8f4dee2c7059898b3609c46be3cd2c20</a></p> <p>Audio connection instructions will be available after connecting to the web conference. When prompted, select "Call me" and enter the phone number you will use during the call. You will be called by the conference shortly.</p>	<p><i>1-844-621-3956 United States Toll Free</i> <i>+1-650-479-3208 United States Toll</i> <i>Meeting number (access code): 2491 042 7352</i></p>
<p>Calls and webinars are recorded for stakeholder convenience, allowing those who are unable to attend to listen to the recordings after the meetings. The recordings will be publicly available on the ISO web page for a limited time following the meetings. The recordings, and any related transcriptions, should not be reprinted without the ISO's permission.</p>	
<p><a href="https://www.caiso.com/informed/Pages/MeetingsEvents/UserGroupsRecurringMeetings/Default.aspx#RUG">https://www.caiso.com/informed/Pages/MeetingsEvents/UserGroupsRecurringMeetings/Default.aspx#RUG</a></p>	
<p><a href="http://www.caiso.com/informed/Pages/ReleasePlanning/Default.aspx">http://www.caiso.com/informed/Pages/ReleasePlanning/Default.aspx</a></p>	

# ISO Training Schedule

Training Course	Date and time
Transmission Registry Upgrade Training	TBD

Are you looking for more training?

The ISO Learning Center has computer based training available for lots of topics. Check out the Learning Center: <http://www.caiso.com/participate/Pages/LearningCenter/default.aspx>

**New!**

- Welcome to the ISO
- Resource Performance Expectations of Dispatch and Operating Instructions



# Release Plan Summary

## Release Communication

### Fall 2023 Release

- Maximum Import Capability Enhancements
- Washington WEIM Greenhouse Gas Enhancements & Interim Solution Effective May 1, 2023
- WEIM Resource Sufficiency Evaluation Enhancements Phase 2 Track 2 – Post HASP Curtailments
- Energy Storage Enhancements Track 2
- Energy Storage Enhancements – SOC Impacts from Regulation
- Hybrid Resources 2C – Metered Quantities

### Independent 2023 Releases

- Variable Operations & Maintenance Cost Review
- URL & IP Changes – Application Delivery Resiliency
- Operations Notification System
- Transmission Registry System Upgrade

### 2024 Releases

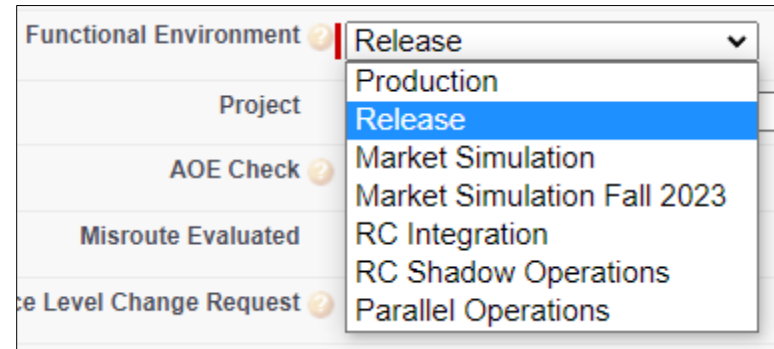
- Transmission Service & Market Scheduling Priorities Phase 2
- Transmission Exchange Agreement
- WEIM Resource Sufficiency Evaluation Enhancements Phase 2 Track 3 – DR Inclusion
- Hybrid Resources Phase 2C – RIMS
- Congestion Revenue Rights System Upgrade

### Future Releases

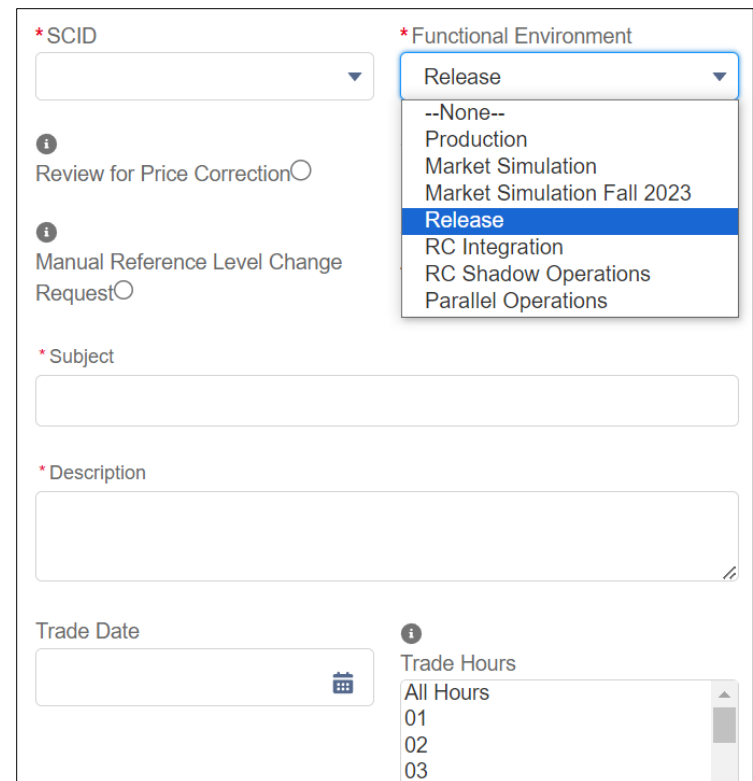
- Day-Ahead Market Enhancements
- Extended Day-Ahead Market

# Release Communication

- CIDI cases
  - **No Environment – Release:** (New option)
    - Inquiries that are related to releases, that are not directly related to Market Simulation issues.
    - Includes business requirements specifications (BRS) comments, implementation questions and feedback, etc.
  - **Market Simulation:**
    - Inquires that are related to the MAP-Stage environments (non-production).
  - **Market Simulation Fall 2023:**
    - Inquires that are related to the MAP-Stage environments (non-production) for the Fall 2023 Release Market Simulation for MIC Enhancements, Hybrid Resources 2C Metered Quantities, WA WEIM GHG Enhancements, RSEE2T2, and ESE2. \*Following Fall 2023 Release, only the option of 'Market Simulation' will remain as we are removing the seasonal options.
- Contact: [release@caiso.com](mailto:release@caiso.com)



A screenshot of a web application interface showing a dropdown menu for 'Functional Environment'. The menu is open, displaying several options: 'Release' (highlighted in blue), 'Production', 'Market Simulation', 'Market Simulation Fall 2023', 'RC Integration', 'RC Shadow Operations', and 'Parallel Operations'. The background shows a table with columns for 'Project', 'AOE Check', 'Misroute Evaluated', and 'Reference Level Change Request'.



A screenshot of a form for creating a release. The form includes several fields and a dropdown menu. The 'Functional Environment' dropdown is open, showing options: 'Release' (highlighted in blue), '--None--', 'Production', 'Market Simulation', 'Market Simulation Fall 2023', 'RC Integration', 'RC Shadow Operations', and 'Parallel Operations'. Other fields include: '\* SCID' (dropdown), '\* Subject' (text input), '\* Description' (text area), 'Trade Date' (calendar icon), and 'Trade Hours' (dropdown with options: 'All Hours', '01', '02', '03'). There are also informational icons and labels for 'Review for Price Correction' and 'Manual Reference Level Change Request'.

# Fall 2023 Release

# Fall 2023 Release Overview

Project	BOG	Tariff	BRS	Settlements CG	Settlements Effective Date	Technical Specifications	Market Simulation	Production Activation
MIC Enhancements	Nov 2022 – Approved	<ul style="list-style-type: none"> <li>Accepted 5/28/21</li> <li>Accepted 3/18/22</li> </ul>	<ul style="list-style-type: none"> <li>04/11/22</li> <li>08/21/23 1.1</li> <li>09/06/23 1.2</li> </ul>	NA	NA	OASIS 7.4.0 7/17/23	8/14/23 – 10/13/23	11/1/23
Washington WEIM Greenhouse Gas Enhancements	Oct 2022 - Approved	<ul style="list-style-type: none"> <li>Filed 11/21/22</li> <li>Accepted 02/10/23</li> <li>Filed Amendment 03/13/23</li> <li>Amendment Accepted 04/20/23</li> <li>Waiver Accepted 08/24/23</li> </ul>	02/06/23	NA	NA	<ul style="list-style-type: none"> <li>MFRDT 8.4 8/10/23</li> <li>MF GRDT 18</li> <li>RDT 8/22/23</li> <li>Definitions 18 8/29/23</li> <li>OASIS 7.4.0 7/17/23</li> </ul>	9/7/23 – 9/29/23	11/1/23
WEIM Resource Sufficiency Evaluation Enhancements Phase 2 Track 2	Approved 12/14/22	NA	<ul style="list-style-type: none"> <li>02/10/23</li> <li>03/31/23 1.1</li> <li>06/27/23 1.2</li> <li>09/05/23 1.3</li> <li>09/20/23 1.4</li> <li>09/22/23 1.41</li> </ul>	NA	NA	<ul style="list-style-type: none"> <li>ADS 8/10/23</li> <li>CMRI 6.4.1 8/10/23</li> <li>MFRDT 8.4 8/10/23</li> <li>MF GRDT 18</li> <li>RDT 8/22/23</li> <li>Definitions 18 8/29/23</li> </ul>	9/25/23 – 10/13/23  Nov – Dec 2023	February 2024
Energy Storage Enhancements Track 2	Approved 12/14/22	<ul style="list-style-type: none"> <li>Draft 02/10/23</li> <li>Revised DTL 03/15/23</li> <li>Filed 03/31/23</li> <li>Accepted 06/01/23</li> <li>Track 2 Filed 08/01/23</li> <li>Accepted 09/29/23</li> </ul>	<ul style="list-style-type: none"> <li>05/25/23</li> <li>06/29/23 1.1</li> <li>08/08/23 1.2</li> <li>08/18/23 1.3</li> <li>09/12/23 1.4</li> <li>10/13/23 1.5</li> </ul>	<ul style="list-style-type: none"> <li>02/17/23: Tech Doc</li> <li>1st DCF 07/26/23</li> <li>2nd DCF 9/6/23</li> <li>Pre-prod DCF 10/18</li> <li>Prod deploy &amp; Final Config Output file 10/25</li> </ul>	1 <sup>st</sup> of the month; new CCs	<ul style="list-style-type: none"> <li>CMRI 6.4.0 7/17/23</li> <li>OASIS 7.4.0 7/17/23</li> <li>SIBR 17 8/14/23</li> </ul>	9/18/23 – 10/13/23	11/1/23
Energy Storage Enhancements – SOC	Approved 12/14/22	<ul style="list-style-type: none"> <li>Draft 02/10/23</li> <li>Revised DTL 03/15/23</li> <li>Filed 03/31/23</li> <li>Accepted 06/01/23</li> </ul>	1.4	NA	NA	NA	10/3/23 – 10/13/23	Fall 2023 Release
Hybrid Resources 2C – Metered Quantities	NA	NA	08/17/23	NA	NA	NA	9/7/23 – 10/13/23	11/1/23

# Fall 2023 Release Overview – System Impacts

Project	ADS	CIRA	CMRI	ITS	Master File	MF RDT	OASIS	OMS	RIMS	MRI-S Metering	Settlements	Market	SIBR
MIC Enhancements		X					X*						
WA WEIM GHG Enhancements			X		X	X*	X*				X	X	X
WEIM Resource Sufficiency Evaluation Enhancements Phase 2 Track 2	X		X*	X	X	X*						X	
Energy Storage Enhancements Track 2			X*		X		X*		X		X	X	X*
Energy Storage Enhancements – SOC												X	
Hybrid Resources 2C – Metered Quantities										X			

**X\* = Technical Specifications**

# Fall 2023 Release Overview – System Interface Changes

System	Project	UI	API	Data/Comments	Tech Specs
ADS	RSEE2T2	<p>Existing – bottom right grid for Instructions</p> <p>ADS will start showing under ‘Instruction Type’ column, values that include “EN”, “DAPT”, and “DALPT”, with corresponding value in the ‘Cleared MW’ column. For multiple priority types, there will be multiple rows with the different Instruction Type/Priority and associated Cleared MW value.</p>	<p>Changes to getDispatchBatch v8 API to populate EN instructions and Breakdown of Cleared MW by priority types for Batch Type 5.</p>	<p>Currently, ADS only processes advisory, and with this RSEE2T2 change, it will start processing energy and showing Priority Type and Cleared MW.</p> <p>Will display all Resource-specific market priority types and their associated MW data for export resources, including but not limited to:</p> <ul style="list-style-type: none"> <li>• ETC (including CRN ID and Type)</li> <li>• TOR (including CRN ID and Type)</li> <li>• DAPT</li> <li>• DALPT (this includes rolled-over DAECON)</li> <li>• RTPT</li> <li>• RTLPT</li> <li>• RTECON (RT economic exports that clear HASP)</li> </ul>	<p><a href="#">8/10/2023</a></p>
CIRA	MIC Enhancements	<p>New: Plans &gt; Manage Import Allocation &gt; SC Request Unassigned Import Capability Reserved Import Capability Contact Information</p> <p>New: Reports &gt; Import Capability RA Report</p>	NA		NA



# Fall 2023 Release Overview – System Interface Changes

System	Project	UI	API	Data/Comments	Tech Specs
CMRI	ESE2	New report to display Exceptional Dispatch Hold State of Charge  New: Post-Market > Exceptional Dispatch Hold State of Charge	New: RetrieveStorageUpliftData_CMRIv1 RetrieveStorageUpliftData_CMRIv1_DocAttach		<a href="#">7/17/2023</a>
CMRI	RSEE2T2	New report for resource-specific market priority types and associated MW schedules breakdown for export resources  New: Day-Ahead > RUC Import Export Schedules by Market Priority Types	New: RetrieveMarketPriorityType_CMRIv1 New: RetrieveMarketPriorityType_CMRIv1_DocAttach	Similar to the Existing Day-Ahead > DA Import-Export Schedules report, but the Schedule Type column shall be replaced with “Market Priority Type” and its data enumeration shall be: <ul style="list-style-type: none"> <li>• ETC (including CRN ID and Type)</li> <li>• TOR (including CRN ID and Type)</li> <li>• DAPT</li> <li>• DALPT (this includes rolled-over DAECON)</li> </ul>	<a href="#">8/10/2023</a>
CMRI	RSEE2T2	New report for resource-specific market priority types and associated MW schedules breakdown for export resources  New: Real-Time > Real-Time Export Schedules by Market Priority Types	New: RetrieveMarketPriorityType_CMRIv1 New: RetrieveMarketPriorityType_CMRIv1_DocAttach	Similar to Existing Real-Time -> Real-Time Unit Commitment (RTUC) Advisory Schedules report, but only report binding intervals for export resources and the Schedule Type column shall be replaced with “Market Priority Type” and its data enumeration shall be: <ul style="list-style-type: none"> <li>• ETC (including CRN ID and Type)</li> <li>• TOR (including CRN ID and Type)</li> <li>• DAPT</li> <li>• DALPT (this includes rolled-over DAECON)</li> <li>• RTPT</li> <li>• RTLPT</li> <li>• RTECON (RT economic exports that clear HASP)</li> </ul>	<a href="#">8/10/2023</a>
CMRI	WA WEIM GHGE	NA	NA	New Attributes/Records to indicate state/include GHG index price for each state	NA

# Fall 2023 Release Overview – System Interface Changes

System	Project	UI	API	Data/Comments	Tech Specs
ITS	RSEE2T2	Existing	NA	<p>Exports e-Tagging Submission Requirement</p> <p>&gt; SCs shall be required to e-tag the following as “Firm Provisional Energy (G-FP)”, via utilizing Misc. field:</p> <ul style="list-style-type: none"> <li>o RT economic (RTECON) exports that clear HASP</li> <li>o DA economic (DAECON) exports that clear both RUC and HASP</li> <li>o RTLPT exports that clear HASP</li> <li>o DALPT exports that clear both RUC and HASP</li> </ul> <p>&gt; SCs shall be required to e-tag the following as “Firm Energy (G-F)”:</p> <ul style="list-style-type: none"> <li>o RTPT exports that clear HASP</li> <li>o DAPT exports that clear both RUC and HASP</li> </ul>	NA
MF RDT	RSEE2T2	Add a new Resource-Specific Capacity Test Failed-to-Start Rule Exemption flag	Add a new Resource-Specific Capacity Test Failed-to-Start Rule Exemption flag: capacityTestFTSExemptFlag under Resource Attributes		<p>- Tech Spec 8/10/2023</p> <p>- GRDT 8/22/2023</p> <p>- RDT Definitions 8/29/23</p>
MF RDT	WA WEIM GHGE	Add a new BAA level attribute to identify BAAs associated with Washington State	<p>SubmitGeneratorRDT_MFRDv5</p> <p>SubmitGeneratorRDT_MFRDv5_DocAttach</p> <p>RetrieveGeneratorRDT_MFRDv5</p> <p>RetrieveGeneratorRDT_MFRDv5_DocAttach</p> <p>Minor Version 20231001</p> <p>Added GHG section in the Elements Table</p> <ul style="list-style-type: none"> <li>- GHGComplianceObligFlag</li> <li>- GHGEmissionFactor</li> <li>- State</li> </ul>	<p>1. Convert the GHG details in 0..N nested element to record GHG details for each State applicable to the Generator.</p> <p>2. Add an additional element “State” to indicate CA, WA etc.</p>	<p>- Tech Spec 8/10/2023</p> <p>- GRDT 8/22/2023</p> <p>- RDT Definitions 8/29/23</p>

# Fall 2023 Release Overview – System Interface Changes

System	Project	UI	API	Data/Comments	Tech Specs
OASIS	ESE2	Existing: Energy > System > Operator-Initiated Commitment report	Existing: System > Operator-Initiated Commitment report	New ED type Reason Code: "SOC Hold" and "SOC Charge"	<a href="#">7/17/2023</a>
OASIS	MIC Enhancements	New: Available Import Capability Data New: Import Capability used in RA Plan Data	New: AVAIL_IMP_CAP_GRP New: ANNUAL_IMP_CAP_USED_RA_PLAN_GRP MONTHLY_IMP_CAP_USED_RA_PLAN_GRP		<a href="#">7/17/2023</a>
OASIS	WA WEIM GHGE	Existing: Prices > Index Prices > Greenhouse Gas Allowance Index Prices	Existing – Prices > Index Prices > Greenhouse Gas Allowance Index Prices	Add WA GHG index prices, display average of daily WA GHG price indices	<a href="#">7/17/2023</a>
RIMS	ESE2	Existing: Existing > App & Study > Equipment Configuration tab > Generation as Modeled and Implemented grid	NA	> Pull storage resource MWh from MF > Add new field for calculated MWh > Add new field for storage resource duration in hours	NA
SIBR	ESE2	New Hourly feature on Hourly tab to elect Y/N for Off Grid Charge.	New optional element in xsd for 'offGridCharge' used by designated resource to manage Sub/Stand Alone ACC. RawBidSet, BidResults, CleanBidSet v5 xsd. Version 20231101.	New HourlyParameter for offGridCharge this is a Yes/No type that is optional.	<a href="#">8/10/2023</a>
SIBR	WA WEIM GHGE	Existing	Existing	Consume WA GHG adders	NA

# Fall 2023 – MIC Enhancements

Project Information	Details
<b>High Level Project Scope</b>	<p>The purpose of this initiative is to address potential improvements to either the calculation of Maximum Import Capability or the process used to allocate and track it during Resource Adequacy validation process. This initiative will focus on the following scope items:</p> <ol style="list-style-type: none"><li>1. Additional transparency with making data publicly available</li><li>2. Inclusion of contractual data from non-CPUC jurisdictional LSEs into the main portfolio</li><li>3. Request for MIC expansion</li><li>4. Give “same day priority” to the step 13 unallocated Remaining Import Capability for LSEs with existing RA Contracts</li><li>5. Update Tariff and BPM language to be consistent with current approved practice</li></ol>
<b>BPM Changes</b>	Reliability Requirements, Transmission Planning Process, Market Instruments
<b>Tariff Changes</b>	Yes
<b>Impacted Systems</b>	CIRA, OASIS

# Fall 2023 – MIC Enhancements

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board Approval	Nov 03, 2021	✓
External BRS	Post External BRS	Apr 11, 2022	✓
	BRS 1.1	Aug 21, 2023	✓
	BRS 1.2 - Removed "On Demand" from BRQ005	Sep 06, 2023	✓
Tariff	ER21-1469 Accepted	May 28, 2021	✓
	ER22-844 Accepted	Mar 18, 2021	✓
BPMs	Draft BPM changes – Reliability Requirements 1523	Jul 27, 2023	✓
	Draft BPM changes – Market Instruments 1524	Jul 28, 2023	✓
	BPM changes approved – Transmission Planning Process	May 18, 2022	✓
Tech Spec	CIRA	NA	✓
	OASIS	Jul 17, 2023	✓
Training	Training	Aug 7, 2023	✓
Market Sim Scenarios	Market Sim Scenarios	Jul 28, 2023	✓
		Aug 09, 2023	✓
Market Sim	Market Sim Window	Aug 14, 2023 – Oct 13, 2023	✓
Production Activation	Maximum Import Capability (MIC) Enhancements	Nov 1, 2023	

# Fall 2023 – WA WEIM GHG Enhancements - Overview

Project Information	Details/Date
<b>High Level Business Problem or Need</b>	<p>Pursuant to State of Washington’s recently revised Clean Air Act and beginning in 2023, Washington (WA) will require reporting of emissions associated with Western Energy Imbalance Market (WEIM) transactions. Emissions reporting is a key element of Washington’s new cap-and-invest program that sets a limit on overall carbon emissions in Washington and requires emitters to obtain allowances equal to their covered GHG emissions.</p> <p>This initiative comprises the first phase of enhancements to support reporting WEIM transactions for emissions year 2022. As reporting rules continue to develop, additional enhancements outside of the scope of this initiative will likely be necessary.</p>
<b>High Level Project Scope</b>	<ul style="list-style-type: none"> <li>• Identify resources within WA State boundary</li> <li>• Update WA State associated resources’ greenhouse gas (GHG) reference levels with dynamic pricing using vendor-provided indices               <ul style="list-style-type: none"> <li>• Note: while Tariff stipulates use of static pricing as an interim measure prior to the first Washington allowance auction, due to implementation timing, this is not anticipated to be necessary. This first auction is scheduled for February 28, 2023.</li> </ul> </li> <li>• Calculate and publish monthly projected GHG prices for Washington State</li> <li>• Develop reports to support WEIM Entity annual reporting to Washington State</li> </ul>
<b>BPM Changes</b>	Energy Imbalance Market (EIM), Market Instruments
<b>Tariff Changes</b>	Sections 30.4.4.5, 30.4.5.2, 39.6.1.6.2, 39.7.1.1.1.1, 39.7.1.1.1.2, 39.7.1.1.1.4
<b>Impacted Systems</b>	MF, Internal System, SIBR, OASIS

# Fall 2023 – WA WEIM GHG Enhancements - Overview

System	High Level Changes
<b>MF</b>	<ul style="list-style-type: none"><li>• New rule to verify that relevant resources within WA State must provide resource specified GHG emission rate</li><li>• New attribute at the BAA level to identify BAAs associated with Washington State</li><li>• New attribute to associate resources within WA State with the State of WA to identify resources with GHG obligation<ul style="list-style-type: none"><li>• Exception: BPA—not subject to WA reporting rule</li></ul></li></ul>
<b>Internal System</b>	<ul style="list-style-type: none"><li>• Reference level (commitment costs/DEBs) changes to reflect GHG costs<ul style="list-style-type: none"><li>• DEBs to include GHG components for generators inside WA State</li><li>• Update GHG startup cost curve for resources inside WA State</li><li>• Update Greenhouse Gas Minimum Load Cost Allowance</li></ul></li><li>• Differentiate between CA and WA resources</li><li>• Capture WA GHG price in the resource-specific minimum load and startup GHG adders for the purposes of commitment cost calculations</li></ul>
<b>SIBR</b>	<ul style="list-style-type: none"><li>• Receive startup GHG adders for the purposes of commitment cost calculations for WA State resources</li><li>• Confirm GHG curves generated for WEIM resources within WA State are successfully received and processed</li></ul>
<b>OASIS</b>	<ul style="list-style-type: none"><li>• Add WA GHG index prices to existing GHG Index Price OASIS report<ul style="list-style-type: none"><li>• Only applicable for dynamic GHG pricing</li></ul></li></ul>

# Fall 2023 – WA WEIM GHG Enhancements

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Oct 26, 2022	✓
	WEIM Governing Board Approval	Oct 26, 2022	✓
External BRS	Publish External BRS	Feb 06, 2023	✓
Settlements Config Guides	Settlements Config Guides	NA	
Tech Spec	MFRDT Tech Spec	Aug 10, 2023	✓
	MF RDT File Draft	Aug 16, 2023	✓
	RDT Definitions Draft	Aug 18, 2023	✓
	OASIS	Jul 17, 2023	✓
Tariff	File Tariff ER23-474	Nov 21, 2022	✓
	Tariff Accepted	Feb 10, 2023	✓
	Filed Amendment	Mar 13, 2023	✓
	Amendment Accepted	Apr 20, 2023	✓
	Waiver Accepted	Aug 24, 2023	✓
BPMs	Publish Draft BPM for Interim Solution – WEIM PRR 1506	Apr 26, 2023	✓
	Publish Draft BPM for Interim Solution – Market Instruments PRR 1507	Apr 26, 2023	✓
	Publish Draft BPM for full functionality – Market Instruments PRR 1534	Aug 24, 2023	✓
	Publish Draft BPM for full functionality – WEIM PRR 1535	Aug 24, 2023	✓
Training	Training	Aug 28, 2023	✓
Market Sim	Unstructured Testing	Sep 7, 2023 – Sep 29, 2023	✓
Production Activation	Interim Solution	May 01, 2023	✓
	WA WEIM GHG Enhancements	Nov 01, 2023	



## 2023 – WA WEIM GHG Enhancements – Interim Solution

- ✓ **Effective May 1, 2023**, the CAISO has implemented an alternative interim solution to activate functionality in the Washington WEIM GHG Enhancements initiative.
- The alternative interim solution would allow SCs for resources in Washington to reflect their GHG costs in the default energy bids and commitment costs.
- This effectively activates the tariff language for this initiative and the alternative interim solution will remain in effect until it is replaced with the full initiative implementation later this year. We don't expect the interim solution to delay the implementation of the full functionality.

# Fall 2023 – WEIM Resource Sufficiency Evaluation Enhancements Phase 2

## Track 2

Project Information	Details
<b>High Level Project Scope</b>	<ul style="list-style-type: none"> <li>• <b>Track-2</b> <ul style="list-style-type: none"> <li>• Item2A – Clarification of Post-HASP Block Hour Low-Priority Export                             <ul style="list-style-type: none"> <li>• Operator-Driven Low-Priority Export Curtailment                                     <ul style="list-style-type: none"> <li>• CAISO operator’s ability to initiate pro-rata curtailment based on identified MW, given the following priority order:   <ul style="list-style-type: none"> <li>• RTECON (RT economic hourly block export schedules that clear HASP).</li> <li>• RTLPT (RT Self-Schedule hourly block export schedules not backed by Generation from non-RA Capacity and cleared HASP).</li> <li>• Non-high-priority DA export [i.e. DAECON (DA economic hourly block export schedules that clear both RUC and HASP), or DALPT (DA hourly block export schedules not backed by Generation from non-RA Capacity that also cleared both RUC and HASP and are protected Self-Schedules)]</li> </ul> </li> <li>• CAISO operator’s ability to identify/filter exports by market priority types as well as “Firm Provisional Energy (G-FP)” eTag identifier.</li> <li>• Publish resource-specific market priority types and their associated MW data to ADS.</li> </ul> </li> </ul> </li> <li>• Item2B – Develop MF resource identification Capacity Test Failed-to-Start Rule Exemption flag to allow SCs of WEIM and CISO short start units that start with non-positive telemetry to identify specific resources that will be exempted from this functionality in RSE Capacity test. (Implemented in Phase 1 – enhancements needed)</li> </ul> </li> </ul>
<b>BPM Changes</b>	WEIM, Market Instruments, Market Operations
<b>Tariff Changes</b>	Yes
<b>Impacted Systems</b>	MF, Market, ITS, ADS

# Fall 2023 – WEIM Resource Sufficiency Evaluation Enhancements Phase 2 Track 2

System	High Level Changes
<b>MF</b>	<ul style="list-style-type: none"> <li>• Definition and Submission of Resource-Specific Capacity Test Failed-to-Start Rule Exemption Flag via GRDT</li> <li>• Make Resource-Specific Capacity Test Failed-to-Start Rule Exemption flag accessible to downstream systems.</li> </ul>
<b>ITS</b>	<ul style="list-style-type: none"> <li>• Clarification of Post-HASP Block Hour Low-Priority Export</li> <li>• Consume DAM Resource-Specific Market Priority Types and Resource-specific RUC Energy Awards from RUC.</li> <li>• Consume All Resource-Specific Market Priority Types from RTM.</li> <li>• SCs shall be required to submit Misc Info field Prior Type attribute for “Firm Provisional Energy (G-FP)” e-tags to identify RTECON, DAECON, RTLPT, DALPT.</li> <li>• SCs shall be required to submit Misc Info field Prior Type attribute for “Firm Energy (G-F)” e-tags to identify RTPT, DAPT.</li> <li>• Validate submitted export e-Tags against data received from RUC and RTM to approve/deny and adjust (if warranted) the submitted e-Tags.</li> </ul>
<b>Market</b>	<ul style="list-style-type: none"> <li>• Access Resource-Specific Capacity Test Failed-to-Start Rule Exemption flag from MF.</li> <li>• Exempt Specific Resources from Capacity Test Failed-to-Start Rule/Functionality.</li> <li>• Clarification of Post-HASP Block Hour Low-Priority Export</li> <li>• Broadcast All Resource-specific market priority types to ITS (from RTM).</li> </ul>
<b>ADS</b>	<ul style="list-style-type: none"> <li>• Clarification of Post-HASP Block Hour Low-Priority Export               <ul style="list-style-type: none"> <li>• Consume Resource-Specific Market Priority Types and their Associated MW Data from RTM.</li> <li>• Publish Resource-Specific Market Priority Types and their Associated MW Data.</li> <li>• Include Resource-Specific Market Priority Types in ADS Query Functionality.</li> </ul> </li> </ul>

# Fall 2023 – WEIM Resource Sufficiency Evaluation Enhancements Phase 2 Track 2

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval WEIM Governing Board Approval	Dec 14, 2022	✓
External BRS	Post External BRS	Mar 10, 2023	✓
	Post External BRS v1.1	Mar 31, 2023	✓
	Post External BRS v1.2	Jun 27, 2023	✓
	Post External BRS v1.3	Sep 05, 2023	✓
	Post External BRS v1.4	Sep 20, 2023	✓
	Post External BRS v1.41	Sep 21, 2023	✓
Settlements Config Guides	NA	NA	
Tech Spec	ADS	Aug 10, 2023	✓
	CMRI	Aug 10, 2023	✓
	MFRDT Tech Spec	Aug 10, 2023	✓
	MFRDT File Draft	Aug 22, 2023	✓
	RDT Definitions Draft	Aug 29, 2023	✓
Tariff	Tariff (NA, and NA for activation change from Fall 2023 Release to Feb 2023)	NA	
BPMs	Draft BPM changes – Market Instruments PRR 1531	Aug 23, 2023	✓
	Draft BPM changes – WEIM PRR 1532	Aug 24, 2023	✓
	Draft BPM changes – Market Operations PRR 1533	Aug 24, 2023	✓
	Draft BPM changes – Market Instruments PRR 1537	Aug 25, 2023	✓
	Draft BPM changes – Market Operations PRR 1536	Aug 24, 2023	✓
Training	Training	Sep 13, 2023	✓
Market Sim Scenarios	Market Sim Scenarios	Jul 28, 2023	✓
		Aug 23, 2023	✓
		Sep 08, 2023	✓
Market Sim	Market Sim Window	Sep 25, 2023 – Oct 13, 2023	✓
	Market Sim – Pro Rata Curtailment	Nov – Dec 2023	
Production Activation	Resource Sufficiency Evaluation Enhancements Phase 2 Track 2	Feb 2023	

# Fall 2023 – WEIM Resource Sufficiency Evaluation Enhancements Phase 2 Track 2 BRS 1.3 – 9/6/23

Updated for the following:

## Track 2

- Section 1.3 (Scope), Section 4 (Details of Business Need/Problem), RSEE2-BRQ-03060 (Track-2) – Item2A
  - Updated to remove DAECON enumeration and clarify that DAECON is rolled over to DALPT.
- RSEE2-BRQ-03060 (Track-2) – Item2A
  - Updated to clarify use of CAISO Priority Type Misc field.
  - Updated ETC/TOR market priority types tags to enter CRN in CAISO Contract field.
  - Updated to revise CRN market priority type to ETC/TOR.
- RSEE2-BRQ-03080 (Track-2) – Item2A
  - Updated to remove DAECON enumeration and clarify that DAECON is rolled over to DALPT.
  - Updated to revise validation rules regarding CRN.
  - Updated to revise CRN market priority type to ETC/TOR.
  - Updated to add clarification bullet that validations will apply to newly created eTags as well as modifications to existing eTags.
- RSEE2-BRQ-03160
  - Updated to remove DAECON enumeration.
- RSEE2-BRQ-04010, RSEE2-BRQ-05480 (Track-2) – item2A
  - Added to roll over DAECON to DALPT.
- RSEE2-BRQ-08040 (Track-2) – item2A
  - Updated to remove DAECON enumeration and clarify that DAECON is rolled over to DALPT.
  - Updated to clarify inclusion of CRN ID and Type
- RSEE2-BRQ-08560, RSEE2-BRQ-08580 (Track-2) – item2A
  - Updated to remove DAECON enumeration and clarify that DAECON is rolled over to DALPT.
  - Updated to clarify inclusion of CRN ID and Type
  - Add a note to publish CRN and CRN Type for CMRI reports.
- RSEE2-MSIM-10060, RSEE2-MSIM-10080 (Track-2) – item2A
  - Updated to remove DAECON enumeration and clarify that DAECON is rolled over to DALPT.
- RSEE2-MSIM-10100 (Track-2) – item2A
  - Updated to remove DAECON enumeration.
- Appendix-D: Reports
  - Added for new CMRI report data samples for the two CMRI reports.

## Track 3

- RSEE2-BRQ-02160 (Track-3) – item3A
  - Revised the DR Performance Adjustment process.
- RSEE2-BRQ-02170 (Track-3) – Item3A
  - Updated calculation to show application of DR Performance Adjustment percentage of 75%

# Fall 2023 – WEIM Resource Sufficiency Evaluation Enhancements Phase 2 Track 2 BRS 1.4 & 1.41 – 9/20/23 & 9/22/23

Updated for the following:

## Track 2

- RSEE2-BRQ-03060, RSEE2-BRQ-03080 (Track-2) – Item2A
  - Updated to expand ETC/TOR market priority type to separate ETC, TOR.
- RSEE2-BRQ-04010, RSEE2-BRQ-05480 (Track-2) – Item2A
  - Updated to limit DAECON roll over into DALPT to export resources only.
- RSEE2-BRQ-08040 (Track-2) – Item2A
  - Updated to make it applicable to export resources only.
  - Updated to expand ETC/TOR market priority type to separate ETC, TOR.
- RSEE2-BRQ-08560, RSEE2-BRQ-08580 (Track-2) – Item2A
  - Updated to expand ETC/TOR market priority type to separate ETC, TOR.
- Appendix-D: Reports (Track-2) – Item2A
  - RUC Export Schedules by Market Priority Types
    - Updated CMRI report name
    - Updated to expand ETC/TOR market priority type to separate ETC, TOR.
  - Real-Time Export Schedules by Market Priority Types
    - Updated to expand ETC/TOR market priority type to separate ETC, TOR.

Updated for the following:

- Appendix-D: Reports (Track-2) – Item2A
  - RUC Export Schedules by Market Priority Types
    - Updated to delete Effective Interties column.

# Fall 2023 – Energy Storage Enhancements Track 2

Project Information	Details
<b>High Level Business Problem or Need</b>	<p>This initiative evolves processes and systems to help storage resource scheduling coordinators better manage resource state of charge and continue to ensure efficient market outcomes. The purpose of this initiative is to enhance reliability tools and the co-located model with regards to storage resources. The reliability enhancements include updates to bidding rules, exceptional dispatch of storage resources, storage resource opportunity costs, and local area minimum online constraints. The co-located model enhancements include preventing co-located resources from charging when beyond generation levels for on-site resources and allowing pseudo-tied resources to use the co-located model. The scope of Track 1 covered the enhancements for Summer 2023 Release. The remaining scope in the Energy Storage Enhancements Policy is covered in Track 2 for Fall 2023 Release.</p>
<b>High Level Project Scope</b>	<p><b>Reliability Enhancements</b></p> <ul style="list-style-type: none"> <li>• Include lost opportunity from not generating in storage compensation due to hold Exceptional Dispatch (ED) to hold SOC (i.e. 0 MW ED)             <ul style="list-style-type: none"> <li>• Calculate counterfactual energy revenues with and without the SOC hold ED</li> <li>• If prices are below bids counterfactuals will not include discharges</li> <li>• Use actual LMPs (the ISO will not generate counterfactual LMPs)</li> <li>• Include SOC hold ED period through the end of the day in time horizon</li> </ul> </li> <li>• Allow for Exceptional Dispatches (EDs) to be issued for storage resources to hold SOC             <ul style="list-style-type: none"> <li>• Develop functionality within ED User Interface; automate existing excel tool functionality</li> <li>• Storage may receive a traditional ED or an SOC ED, but not both</li> </ul> </li> </ul> <p><b>Co-Located Model Enhancements</b></p> <ul style="list-style-type: none"> <li>• Develop an electable co-located model available to all storage resources             <ul style="list-style-type: none"> <li>• Storage schedules to never exceed renewable schedules (i.e. no grid charging)</li> <li>• Storage may deviate down to match solar, when solar is producing less than schedules in real-time</li> <li>• Deviations to be subject to imbalance energy charges</li> <li>• Require storage resources to submit outages when depleted and unable to charge</li> <li>• Require all resources to respond to operator and ED instructions within physical bounds of operation</li> </ul> </li> <li>• Allow for co-located pseudo-tie resources to apply Aggregate Capability Constraint (ACC)             <ul style="list-style-type: none"> <li>• Resources under an ACC must be pseudo-tied from the same BAA</li> </ul> </li> </ul>
<b>BPM Changes</b>	Market Operations, Settlements & Billing
<b>Impacted Systems</b>	Settlements, Market, CMRI, RIMS, MF, OASIS, ADS, OMS, ITS

# Fall 2023 – Energy Storage Enhancements Track 2

System	High Level Changes
<b>Market</b>	<ul style="list-style-type: none"> <li>Allow operator to enter exceptional dispatch (ED) in the market to allow for EDs of storage resources by SOC in addition to capacity</li> <li>Update the definition of EDs to allow the operator to enter EDs for storage resources identified with two new Reason Codes under Instruction Type: System Emergency (“SYSEMR”)</li> </ul>
<b>ADS</b>	ADS consumes new ED Reason Codes (“SOC Hold” and “SOC Charge”) applicable to storage resources
<b>Settlements</b>	<ul style="list-style-type: none"> <li>New rules to align with Tariff settlement language for SOC formula</li> <li>New inputs for the storage resource ED opportunity cost values</li> <li>Design and configure new charge code for the allocation of ED SOC uplift</li> <li>Modify real-time bid cost recovery (BCR) charge code to account for revenue from storage resources ED SOC uplift</li> <li>Configure No Pay rules and assessment for ED SOC</li> </ul>
<b>CMRI</b>	Receive and shall publish the ED SOC information using new UI and API on a new report entitled “Exceptional Dispatch Hold State of Charge”
<b>OASIS</b>	Receive and publish new ED reason Codes (“SOC Hold” and “SOC Charge”) under System Emergency Instruction Type as “Reason” on the Operator Initiated Commitment OASIS Report
<b>RIMS</b>	<ul style="list-style-type: none"> <li>Add field for storage resource duration (hours)</li> <li>Add field for calculated MWh</li> <li>Calculate energy (MWh) using duration*MW</li> <li>Allow pseudo tied resources to be modeled as co-located</li> </ul>
<b>MF</b>	<ul style="list-style-type: none"> <li>Apply co-located flag to pseudo tied resources</li> <li>Set minimum ACC constraint to zero for co-located resources that cannot or choose not to not grid charge</li> <li>New MF attribute to denote resources that select to not grid charge</li> </ul>
<b>OMS</b>	Storage resources must submit outage cards if: <ul style="list-style-type: none"> <li>The co-located VER cannot provide the charging energy as forecasted per Tariff requirements</li> <li>System shall require storage resources to submit outage cards if the resource has depleted its SOC and there is no ability to charge the resource per Tariff requirements</li> </ul>
<b>ITS</b>	System shall model pseudo-tied and dynamic co-located storage resources following the standard NRI pseudo-tie and dynamic rules and practices Note: pseudo-tied and dynamic storage resources must be registered as TNGR resources



# Fall 2023 – Energy Storage Enhancements Track 2

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval WEIM Governing Board Approval	Dec 14, 2022	✓
External BRS	Post External BRS	May 26, 2023	✓
	V1.1	Jun 29, 2023	✓
	V1.2	Aug 08, 2023	✓
	V1.3	Aug 18, 2023	✓
	V1.4 Remove BRQ094	Sep 12, 2023	✓
	<b>V1.5 Updated BRQ093, BRQ077, BRQ078.</b>	<b>Oct 13, 2023</b>	✓
Settlements Config Guides	First Draft Technical Documents	Feb 17, 2023	✓
	1 <sup>st</sup> Draft Config Output File	Jul 26, 2023	✓
	2 <sup>nd</sup> Draft Config Output File	Sep 06, 2023	✓
	Pre-production Draft Config Output File	Oct 18, 2023	
	Production deploy & Final Config Output File	Oct 25, 2023	
Tech Spec	Publish Interface Specification – CMRI	Jul 17, 2023	✓
	Publish Interface Specification – OASIS	Jul 17, 2023	✓
Tariff	File Tariff	Mar 31, 2023	✓
	FERC Acceptance	Jun 01, 2023	✓
	File Extension of MSOC	Mar 28, 2023	✓
	FERC Approval of Extension of MSOC	May, 25, 2023	✓
	File Tariff Track 2	Aug 01, 2023	✓
	FERC Acceptance	Sep 29, 2023	✓
BPMs	Draft BPM changes – Market Operations 1526	Aug 18, 2023	✓
	Draft BPM changes – Market Settlements & Billing 1528	Aug 21, 2023	✓
	Draft BPM changes – Market Instruments 1537	Aug 25, 2023	✓
	Draft BPM changes – Market Operations 1536	Aug 24, 2023	✓
Training	Training	Sep 13, 2023	✓
Market Sim Scenarios	Market Sim Scenarios	Aug 03, 2023	✓
	1.1	Aug 22, 2023	✓
Market Sim	Market Sim Window	Sep 18, 2023 – Oct 13, 2023	✓
Production Activation	Energy Storage Enhancements Track 2	Nov 01, 2023	

# Fall 2023 – Energy Storage Enhancements Track 2 BRS 1.5

Updates in red: Updated BRQ093, BRQ077, BRQ078.

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted	Comments
ESE2-BRQ093	System shall broadcast the following information to downstream systems: <ul style="list-style-type: none"> <li>• ED start time</li> <li>• ED end time</li> <li>• Resource ID</li> <li>• SOC Hold <del>instruction</del> Reason Code</li> <li>• <b>Instruction Type of the first SOC Hold ED of the day, listed for all intervals of the evaluation period.</b></li> <li>• Counterfactual dispatch MW with hold</li> <li>• Counterfactual dispatch MW without hold</li> </ul>	Core  <i>Compliance: N/A</i>  <i>BPM: N/A</i>	Internal System (CMRI)	
ESE2-BRQ077	... Theoretical dispatch MW shall be based on any EDs (other than SOC Hold EDs) and the RTL/UED value. These values are limited above by: (SOC - Min SOC) * 12), And limited below by: (Max SOC-SOC) * -12)/ <b>RTE</b> ...	Core  <i>Compliance: § 11.5.6.1.2</i>  <i>BPM: Market Operations</i>	Internal System	These updates were made to reflect the fix for the issue reported in market simulation:  Issue addressed: When the calculated SOC approaches the maximum limit, the dispatches for the resource to charge approach zero but not as quickly as they should. The total MWs dispatched is the same, but the timing is off, which can impact the revenue amount, depending on the RT prices.
ESE2-BRQ078	... Theoretical dispatch MW shall be based on any EDs (other than SOC Hold EDs) and the RTL/UED value. These values are limited above by: (SOC - Min SOC) * 12), And limited below by: (MAX SOC –SOC) *-12)/ <b>RTE</b> ...	Core  <i>Compliance: § 11.5.6.1.2</i>  <i>BPM: Market Operations</i>	Internal System	

# Energy Storage Enhancements – SOC Impacts from Regulation

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval WEIM Governing Board Approval	Dec 14, 2022	✓
External BRS	V1.4 V1.5 – Revision to reflect two-constraint implementation	Mar 29, 2023 Oct 2023	✓
Settlements Config Guides	NA	NA	NA
Tech Spec	NA	NA	NA
Tariff	File Tariff 1533 FERC Acceptance	Mar 31, 2023 Jun 01, 2023	✓ ✓
BPMs	BPM changes – Market Operations 1530 BPM changes – two-constraint formula BPM changes – Attenuation factors	Aug 21, 2023 Oct 2023 Oct 2023	✓
Training	Training	May 02, 2023 June 22, 2023	✓ ✓
Market Sim Scenarios	NA	NA	NA
Stakeholder Workshop	<a href="#">ESE Workshop Paper</a>	Jul 31, 2023	✓
	<a href="#">Presentation - ESE SOC</a>	Aug 02, 2023	✓
	<a href="#">PG&amp;E Presentation - ESE SOC</a>	Aug 03, 2023	✓
	<a href="#">Video - ESE Workshop</a>	Aug 03, 2023	✓
	<a href="#">Workshop Paper ESE SOC Implementation Update</a>	Oct 02, 2023	✓
	<a href="#">Notice: ESE SOC: Workshop paper addendum posted for revised implementation of ESE SOC constraint</a>	Oct 02, 2023	✓
	<a href="#">Presentation: ESE SOC Implementation Update</a>	Oct 09, 2023	✓
	<a href="#">Video - ESE SOC Implementation Update</a>	Oct 09, 2023	✓
Market Sim Production Activation	Market Sim Window  Energy Storage Enhancements – SOC Impacts from Regulation	Oct 03, 2023 – Oct 13, 2023  Fall 2023 Release	✓

# Energy Storage Enhancements – SOC Impacts from Regulation

## **Notice 10/2/23: Energy Storage Enhancements State of Charge: Workshop paper addendum posted for revised implementation of ESE SOC constraint**

The Energy Storage Enhancements (ESE) initiative approved by FERC on June 1, 2023 contained a revision to the day-ahead market state-of-charge (SOC) constraint. The approved policy allowed the market to optimally schedule both energy and regulation by considering their impacts on the SOC.

During the market simulation and prior to the implementation of this revised constraint, stakeholders observed that the inclusion of regulation in the SOC formulation resulted in the market procuring additional regulation down awards at negative marginal prices. This negative pricing result was the SOC in the day-ahead market temporally linking MWh of “energy” charging resulting from a regulation down award with the potential and future discharge of those same MWh’s; functionally the market determined it was efficient to pay for regulation down awards that could be discharged later in the day at a profit.

The ISO delayed implementation of this feature, published a [workshop paper](#), and held a stakeholder meeting to discuss this result with market participants while collectively workshopping next steps. During that workshop Pacific Gas and Electric (PG&E) presented on a proposed modification to the implementation of the SOC constraint that included also retaining the existing SOC constraint that considers energy awards only. When implemented concurrently in the market the two constraints decouple the dispatch of energy and regulation awards. While the SOC constraint that considers regulation awards will continue to ensure that regulation awards are supported in conjunction with energy awards through the day-ahead market optimization, the need to also satisfy the SOC constraint that only considers energy awards will ensure that energy discharge awards are supported absent the potential energy created by regulation. This revision removes the direct pricing linkage between regulation and energy, and the potential for negative priced regulation down awards due to modeling all commodities within a single constraint.

In response to stakeholder comments supporting the exploration of the solution put forward by PG&E, the ISO developed code to test the revised implementation. Testing indicated the revised formulation eliminated regulation awards clearing at negative prices. The ISO plans to expand the testing of this constraint with stakeholders through market simulation starting Oct. 3, 2023, through October 13. Pending successful market simulation, the ISO plans to implement the ESE SOC constraint consistent with existing regulatory timelines. The ISO would like to thank stakeholders, specifically PG&E, for working towards a successful implementation of this element of the ESE initiative. Additional information, including results of ISO analysis to date, is available on the Energy Storage Enhancements initiative webpage.

## Energy Storage Enhancements SOC Constraint Results

The ISO has tested the proposed ESE SOC implementation within its non-Production market environment. As expected the proposed implementation of the SOC constraint resulted in a reduction to the quantity of regulation down procured and the elimination of negative marginal prices for regulation down awards. The results show changes for the awards of energy, regulation up and regulation down as well as the prices for these commodities. These results are expected as the consideration of regulation awards within the SOC constraint naturally will result in a different market solution.

To review the data, please see the [updated workshop paper addendum](#).

# Energy Storage Enhancements – SOC Impacts from Regulation

New approach for the ESE DA/RTM market SOC Constraint implementation:

- No changes to the formula from the ESE final proposal (10/27/22) and tariff filing (3/31/23)
- Instead of replacing the current Production SOC formula with the updated formula from the final proposal, a new formula will be added so both formulas will be active
- There are modifications to differentiate these two different SOC terms concurrently active in the market
- Notice published 10/2/23
- Additional information and results were also published 10/2/23 as an addendum to the workshop paper published 7/31/23

Next steps:

- MAPSTAGE: Formulas & Attenuation Factors will active for TD 9/30 onwards (See next slides for formulas & initial AS multipliers)
- Market Simulation TDs 10/3 – 10/13
- Production Attenuation Factors to be announced by mid-October
- Q4 attenuation factors applied to MAPSTAGE 10/12

## Energy Storage Enhancements SOC Constraint - Formulas

Both formulas will be concurrently active:

$$- SOC_{i,t}^{AT} = SOC_{i,t-1}^{AT} - (EN_{i,t}^{(+)} + \eta_i EN_{i,t}^{(-)} + ATRU_t RU_{i,t} - ATRD_t \eta_i RD_{i,t}) \frac{\Delta T}{T_{60}}$$

$$- SOC_{i,t}^{EN} = SOC_{i,t-1}^{EN} - (EN_{i,t}^{(+)} + \eta_i EN_{i,t}^{(-)}) \frac{\Delta T}{T_{60}}$$

# Energy Storage Enhancements SOC Constraint – Initial Attenuation Factors for MAPSTAGE Market Simulation – Updated 10/12

Trade Hour	Reg Up	Reg Dn
1	0.155532108	0.217641845
2	0.060427028	0.273907168
3	0.053872425	0.264006907
4	0.03963295	0.254700294
5	0.060780211	0.219224923
6	0.094415395	0.276941693
7	0.102756687	0.199380602
8	0.083975162	0.333574134
9	0.067642372	0.31896198
10	0.048508887	0.356633015
11	0.039057639	0.35758482
12	0.059619434	0.343296571
13	0.081502319	0.343546036
14	0.101151252	0.331278604
15	0.084154413	0.371070826
16	0.12697805	0.336602079
17	0.087839604	0.347630967
18	0.059837124	0.489439386
19	0.040848644	0.277452546
20	0.065436552	0.224654738
21	0.084623454	0.25311912
22	0.068115324	0.303061703
23	0.088715871	0.231437642
24	0.0726193	0.235240777



# Energy Storage Enhancements

Release	Track (& BRS)	Implementation	Systems	Scope	Tariff	BPM
Summer 2023	1	July 1, 2023	SIBR IFM/RTM	Require storage to bid energy in the opposite direction of AS awards	Accepted 6/1/23 "require energy storage resources to submit RT energy bids to cover DA AS awards"	MO 1530
Summer 2023	1	July 1, 2023	IFM	Update DA storage resource DEB to include storage specific opportunity cost	Accepted 6/1/23 "enhance energy storage resources' DA DEB to include opportunity costs"	MI 1516
Fall 2023	2 (moved from 1)	November 1, 2023	Settlements RTM CMRI	Include lost opportunity cost from not generating in storage resource compensation due to ED to hold SOC (0 MW ED)	Accepted 6/1/23 "provide energy storage resources with opportunity costs when they receive an ED to hold a SOC"	S&B 1528 MO 1536 MI 1537
Fall 2023	2	November 1, 2023	RTM	Allow for EDs to be issued for storage resources to hold SOC		MO 1536
Fall 2023	2	November 1, 2023	MF SIBR IFM/RTM RIMS	Develop an electable co-located model available to all storage resources: storage schedules to never exceed renewable schedules (no grid charging)	Accepted 9/29/23 "provide biddable parameters that allow storage resources to avoid charging schedules that would exceed the energy output of co-located renewable resources"	MO 1526
Fall 2023	2	November 1, 2023	MF	Allow for co-located pseudo-tie resources to apply Aggregate Capability Constraint (ACC)	Accepted 9/29/23 "extend use of the ACC to pseudo-tied resources"	MO 1526
Fall 2023	NA (was 1)	Fall 2023 Release	IFM/RTM	Include expected impacts from regulation in SOC	Accepted 6/1/23 "clarify that CAISO will consider the impact regulation awards have on energy storage resources' SOC"	MO 1530

# Fall 2023 – Hybrid Resources 2C Metered Quantities for Hybrids

Project Information	Details/Date
<b>High Level Project Scope</b>	<p>System (MRI-S) shall allow the SC of a Hybrid resource the ability to submit Metered Quantities on a component ID only, which would override the current Metered Quantities. This ability shall be made available regardless if the resource is ISO Polled or SCME.</p> <p>Implementation note: ISO Polled or SCME based on the MasterFile flag.</p> <p>New data type: ISOME</p>
<b>Impacted Systems</b>	MRI-S

# Fall 2023 – Hybrid Resources 2C – Metered Quantities for Hybrids

Milestone Type	Milestone Name	Dates	Status
BRS	BRS	Aug 17, 2023	✓
Tech Spec	Create and Publish ISO Interface Spec (Tech Specs)	NA	
Market Sim	Market Sim Window	Sep 09 2023 – Oct 13, 2023	✓
Production Activation	Hybrid Resources 2C – Metered Quantities for Hybrids	Nov 01, 2023	

# Independent 2023 Releases

# 2023 - Variable Operations and Maintenance Cost Review

Project Information	Details/Date
<b>High Level Project Scope</b>	<p>Through this triennially recurring stakeholder process, the ISO will review the default variable operations and maintenance (VOM) adders and, if necessary, update these default values.</p> <p>After reviewing the currently effective default VOM adders, the ISO is proposing to update the default values by applying a 18.73% inflation increase. For any resources currently using default values, the ISO will automatically update their VOM adder values in Master File. Any negotiated VOM adder values will not be affected by this initiative.</p>
<b>BPM Changes</b>	Market Instruments
<b>Tariff Changes</b>	Section 30.4.5.4
<b>Impacted Systems</b>	NA (Master File data update only)

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board briefing/approval	Sep 20, 2023	✓
Tariff	Draft Tariff Language	Aug 23, 2023	✓
	<b>FERC Filing 2956</b>	<b>Sep 28, 2023</b>	✓
	FERC Response Requested by	Nov 28, 2023	
<b>BPMs</b>	<b>Post Draft BPM changes – Market Instruments PRR 1539</b>	<b>Sep 22, 2023</b>	✓
Market Sim	Market Sim Window	NA	
Production Effective Date	Effective Date	Dec 1, 2023 (expected)	

# UI & API URL & IP Changes (Application Delivery Resiliency)

- Areas
  - Access Policy Manager - Application Authentication
  - Local Traffic Manager - Load Balancing
  - Application Security Manager - Web Application Firewall
- User Impacts & Actions
  - New IP ranges requiring firewall changes
    - Please open the entire 45.42.16.0/21 network on ports 80 & 443 for our new IP space
  - New URLs for UIs and APIs requiring cutover
  - No application functionality changes expected
  - No provisioning changes expected

# UI & API URL & IP Changes (Application Delivery Resiliency)

## Plan

- MAP-Stage new API URLs **available as of May 18, 2023** to transition
- MAP-Stage old API URLs **no longer available as of Sep 01, 2023**
- Please open the entire 45.42.16.0/21 network on ports 80 & 443 for our new IP space to access new API URLs

API	Existing MAPSTAGE	New MAPSTAGE
BAAOP	<a href="https://wsmap.caiso.com/sst/baaop">https://wsmap.caiso.com/sst/baaop</a>	<a href="https://mapstage-ws.caiso.com/sst/baaop">https://mapstage-ws.caiso.com/sst/baaop</a>
BSAP	<a href="https://wsmap.caiso.com/sst/bsap">https://wsmap.caiso.com/sst/bsap</a>	<a href="https://mapstage-ws.caiso.com/sst/bsap">https://mapstage-ws.caiso.com/sst/bsap</a>
CIRA	<a href="https://wsmap.caiso.com/sst/cira">https://wsmap.caiso.com/sst/cira</a>	<a href="https://mapstage-ws.caiso.com/sst/cira">https://mapstage-ws.caiso.com/sst/cira</a>
CMRI	<a href="https://wsmap.caiso.com/sst/cmri">https://wsmap.caiso.com/sst/cmri</a>	<a href="https://mapstage-ws.caiso.com/sst/cmri">https://mapstage-ws.caiso.com/sst/cmri</a>
DRRS	<a href="https://wsmap.caiso.com/sst/drrs">https://wsmap.caiso.com/sst/drrs</a>	<a href="https://mapstage-ws.caiso.com/sst/drrs">https://mapstage-ws.caiso.com/sst/drrs</a>
EIDE	<a href="https://wsmap.caiso.com/sst/eide">https://wsmap.caiso.com/sst/eide</a>	<a href="https://mapstage-ws.caiso.com/sst/eide">https://mapstage-ws.caiso.com/sst/eide</a>
ALFS (& FDR)	<a href="https://wsmap.caiso.com/sst/runtime.asvc">https://wsmap.caiso.com/sst/runtime.asvc</a>	<a href="https://mapstage-ws.caiso.com/sst/runtime.asvc">https://mapstage-ws.caiso.com/sst/runtime.asvc</a>
MF	<a href="https://wsmap.caiso.com/sst/runtime.asvc">https://wsmap.caiso.com/sst/runtime.asvc</a>	<a href="https://mapstage-ws.caiso.com/sst/runtime.asvc">https://mapstage-ws.caiso.com/sst/runtime.asvc</a>
PISOA	<a href="https://wsmap.caiso.com/sst/runtime.asvc">https://wsmap.caiso.com/sst/runtime.asvc</a>	<a href="https://mapstage-ws.caiso.com/sst/runtime.asvc">https://mapstage-ws.caiso.com/sst/runtime.asvc</a>
RCBSAP	<a href="https://wsmap.caiso.com/sst/rcbsap">https://wsmap.caiso.com/sst/rcbsap</a>	<a href="https://mapstage-ws.caiso.com/sst/rcbsap">https://mapstage-ws.caiso.com/sst/rcbsap</a>
RCSERVICES (RCEIDE)	<a href="https://wsmap.caiso.com/sst/rcservices">https://wsmap.caiso.com/sst/rcservices</a>	<a href="https://mapstage-ws.caiso.com/sst/rcservices">https://mapstage-ws.caiso.com/sst/rcservices</a>
SIBR	<a href="https://wsmap.caiso.com/sst/sibr">https://wsmap.caiso.com/sst/sibr</a>	<a href="https://mapstage-ws.caiso.com/sst/sibr">https://mapstage-ws.caiso.com/sst/sibr</a>
STLMT	<a href="https://wsmap.caiso.com/sst/stlmt">https://wsmap.caiso.com/sst/stlmt</a>	<a href="https://mapstage-ws.caiso.com/sst/stlmt">https://mapstage-ws.caiso.com/sst/stlmt</a>
OMS	<a href="https://wsmap.caiso.com/sst/weboms">https://wsmap.caiso.com/sst/weboms</a>	<a href="https://mapstage-ws.caiso.com/sst/weboms">https://mapstage-ws.caiso.com/sst/weboms</a>
ECIC	<a href="https://wsmap.caiso.com/sst/ecic">https://wsmap.caiso.com/sst/ecic</a>	<a href="https://mapstage-ws.caiso.com/sst/ecic">https://mapstage-ws.caiso.com/sst/ecic</a>

# UI & API URL & IP Changes

## Phase 1: Deployment for new API URLs

- CAISO previously sent communications on the soft cutover for the new API URLs in the MAP Stage environment. Market Participants are required to validate access and transition to the new API URLs before August 15, 2023. **The old API URLs in MAP Stage are no longer available as of September 1, 2023.** For Production, there are no changes to the API URLs; however, the IP addresses will be changed. Please stay tuned for more information.

## Phase 2: Deployment for new UI URLs

- Starting on July 27, 2023, some of the ISO applications will be available for testing starting in the MAP Stage environment and then Production. Application access is based on the user's provisioning. No application down time is expected. We will send additional communication for the remaining UI URLs once they are ready for validation.

## Action requested:

- Market Participants can begin accessing the new UI URLs in parallel with the current UI URLs for a window of time.
- The timeline to validate access and transition to the new UI URLs for each environment is shorter than the API timeline; therefore, action is needed sooner.
- Once the new UI URLs are deployed into Production, Market Participants have 30 business days to validate and transition to the new UI URLs.

Applications & Environments	Deployment Start Dates	New User Interface (UI) URLs
<b>Balancing Area Authority Operations Portal (BAAOP)</b>		
MAP Stage	Fri 7/28/23	<a href="https://mapstage-baaop.caiso.com">https://mapstage-baaop.caiso.com</a>
Production	Wed 9/20/23	<a href="https://baaop.caiso.com">https://baaop.caiso.com</a>
<b>Base Schedule Aggregation Portal (BSAP)</b>		
MAP Stage	Fri 7/28/23	<a href="https://mapstage-bsap.caiso.com">https://mapstage-bsap.caiso.com</a>
Production	TBD	<a href="https://bsap.caiso.com">https://bsap.caiso.com</a>
<b>Reliability Coordinator Base Schedule Aggregation Portal (RCBSAP)</b>		
MAP Stage	Fri 7/28/23	<a href="https://mapstage-rcbsap.caiso.com">https://mapstage-rcbsap.caiso.com</a>
Production	TBD	<a href="https://rcbsap.caiso.com">https://rcbsap.caiso.com</a>
<b>Schedule Infrastructure &amp; Business Rules (SIBR)</b>		
MAP Stage	Fri 7/28/23	<a href="https://mapstage-sibr.caiso.com">https://mapstage-sibr.caiso.com</a>
Production	TBD	<a href="https://sibr.caiso.com">https://sibr.caiso.com</a>
<b>Reporting (Includes SIBR Reports, Transmission Registry, RIMS, Master File, and FSP folder)</b>		
MAP Stage	Mon 7/31/23	<a href="https://mapstage-reporting.caiso.com">https://mapstage-reporting.caiso.com</a>
Production	TBD	<a href="https://reporting.caiso.com">https://reporting.caiso.com</a>
<b>Market Participant Portal (MPP)</b>		
MAP Stage	TBD	<a href="https://mapstage-mpp.caiso.com">https://mapstage-mpp.caiso.com</a>
Production	TBD	<a href="https://mpp.caiso.com">https://mpp.caiso.com</a>
<b>Customer Market Results Interface (CMRI)</b>		
MAP Stage	Thu 8/3/23	<a href="https://mapstage-cmri.caiso.com">https://mapstage-cmri.caiso.com</a>
Production	TBD	<a href="https://cmri.caiso.com">https://cmri.caiso.com</a>
<b>Congestion Revenue Rights (CRR)</b>		
MAP Stage	Mon 8/7/23	<a href="https://mapstage-crr.caiso.com">https://mapstage-crr.caiso.com</a>
Production	TBD	<a href="https://crr.caiso.com">https://crr.caiso.com</a>
<b>WEIM Portal</b>		
MAP Stage	Done	<a href="https://mapstage-weim.caiso.com">https://mapstage-weim.caiso.com</a>
Production	Done	<a href="https://weim.caiso.com">https://weim.caiso.com</a>
<b>Master File (MF)</b>		
MAP Stage	Wed 8/9/23	<a href="https://mapstage-mf.caiso.com">https://mapstage-mf.caiso.com</a>
Production	TBD	<a href="https://mf.caiso.com">https://mf.caiso.com</a>
<b>Transmission Registry (TR)</b>		
MAP Stage	Tue 9/5/23	<a href="https://mapstage-tr.caiso.com/">https://mapstage-tr.caiso.com/</a>
Production	TBD	<a href="https://tr.caiso.com">https://tr.caiso.com</a>



# Future Releases

# Future Releases Overview

Project	BOG	Tariff	Production Activation
Transmission Service & Market Scheduling Priorities Phase 2	Feb 2023 – Approved	<ul style="list-style-type: none"> <li>03/27/23: Draft Tariff Language</li> <li>06/14/23: Revised DTL</li> <li>07/14/23: Track 2 DTL</li> <li>File Track 1 July 28, 2023</li> <li>File Track 2 Jan 2024</li> </ul>	Summer 2024
Transmission Exchange Agreement	NA		Summer 2024
WEIM Resource Sufficiency Evaluation Enhancements Phase 2 Track 3	Dec 14, 2022 – Approved	NA	Summer 2024
Hybrid Resources 2C - RIMS	NA	NA	2024
Day-Ahead Market Enhancements	Feb 2023 – Briefing May 17, 2023 – Approved	<ul style="list-style-type: none"> <li>06/02/23: Draft Tariff Language, Draft Tariff Matrix</li> <li>06/16/23: Comments due on DTL</li> <li>06/23/23: Meeting</li> <li>07/11/23: Revised DTL</li> <li>File 08/22/23</li> <li>FERC Response requested by 12/21/23</li> </ul>	Deploy Fall 2025 Activate Spring 2026
Extended Day-Ahead Market On-Boarding	Feb 2023 – Approved	<ul style="list-style-type: none"> <li>03/30/23: Draft Tariff Language</li> <li>05/24/23: Working DTL</li> <li>06/08/23: Revised DTL</li> <li>07/06/23: Comments due on DTL</li> <li>07/25/23: Revised DTL</li> <li>07/26/23: Meeting</li> <li>File 08/22/23</li> <li>FERC Response requested by 12/21/23</li> </ul>	Deploy Fall 2025 Activate Spring 2026

# 2024 – Transmission Service & Market Scheduling Priorities Phase 2

Project Information	Details
<b>High Level Business Need</b>	Presents a long-term, durable framework to establish wheeling through scheduling priorities in the ISO markets that can further evolve with operational experience. It does not focus on, nor does it change, the processes for wheeling out or exporting from the ISO BAA.
<b>High Level Project Scope</b>	<p>The following are the key design elements of the proposed framework for establishing wheeling through scheduling priority across the ISO system:</p> <ul style="list-style-type: none"> <li>• Calculating Available Transfer Capability (ATC) in Monthly &amp; Daily Increments</li> <li>• Accessing and Reserving ATC</li> <li>• Transmission study and expansion process</li> <li>• Application of priorities in post-HASP process</li> <li>• Compensation framework for wheeling through scheduling priority</li> </ul>
<b>BPM Changes</b>	<ul style="list-style-type: none"> <li>• Market Instruments</li> <li>• Market Operations</li> <li>• Reliability Requirements</li> <li>• Settlements and Billing</li> <li>• Transmission Planning Process</li> <li>• Generator Interconnection and Deliverability Allocation Procedures</li> </ul>
<b>Tariff Changes</b>	<p>Sections:</p> <ul style="list-style-type: none"> <li>• §23.1, §23.2, §23.3, §23.4, §23.5, §23.6, §23.7</li> <li>• §26.1.4.5</li> <li>• §30.5.1</li> <li>• §34.12.3</li> <li>• §Appendix A</li> <li>• §Appendix L</li> </ul>
<b>Impacted Systems</b>	<ul style="list-style-type: none"> <li>• AIM</li> <li>• System for ATC calculation, access, and reservation</li> <li>• SIBR</li> <li>• RTM</li> <li>• Settlements</li> <li>• OASIS</li> <li>• ITS</li> </ul>

# 2024 – Transmission Service & Market Scheduling Priorities Phase 2

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Feb 01, 2023	✓
External BRS	Post External BRS	Q4 2023	
Settlements Config Guides	Post Draft Config Guides	Yes	
Tech Spec	Create ISO Interface Specifications	Yes	
Tariff	Filed ER23-2510 for Wheeling Through File Track 2	Jul 28, 2023 Jan 2024	✓
BPMs	Draft BPM changes – Market Instruments Draft BPM changes – Market Operations Draft BPM changes – Reliability Requirements Draft BPM changes – Settlements and Billing Draft BPM changes – Transmission Planning Process Draft BPM changes – Generator Interconnection and Deliverability Allocation Procedures	Yes	
Production Activation	Transmission Service & Market Scheduling Priorities Phase 2 – Activate daily and long-term increment calculations	Summer 2024	

# 2024 – Transmission Exchange Agreement

Project Information	Details/Date
<b>High Level Business Problem or Need</b>	<p>The TEA is expiring in 2024 and absent WAPA’s ability to resell their capacity on the Pacific AC Intertie (“PACI”) #1 line which is owned and operated by WAPA-SNR and within the CAISO BAA they will move the line to the BANC BAA and the ISO will lose 1200 MW transfer capability at Malin.</p>
<b>High Level Project Scope</b>	<ul style="list-style-type: none"> <li>• WAPA needs functionality to sell their TOR (using ETC/TOR terminology instead of CRN) to other parties on their OASIS.</li> <li>• If the TOR rights are sold then WAPA will notify the CAISO to provide the purchaser the hedging and scheduling priority opportunity provided all ETCs/TORs.</li> <li>• The market and settlement systems need to be able to “move” the CRN from the WAPA CRN to the purchaser SCIDs so that the settlement to the purchaser SCID reverse the costs of transmission access charge and congestion (aka the perfect hedge) and the IFM and RTM provide a high scheduling priority.</li> <li>• WAPA will not take on the obligation to settle with their purchaser.</li> <li>• WAPA can sell any increments of MWs up to their 400 MW ownership rights. Therefore, the solution needs to be flexible enough to allow the “existing” TORs to vary the MWs capabilities. [Note: We can require restrictions, if required – e.g. no less than 5 MW increments]</li> <li>• WAPA’s functionality allows them to schedule between Malin and Round Mountain, and Malin and Tracy. This would be the source and sink that that functionality needs to provide.</li> <li>• If there are outages on the line, the curtailment should be consistent with current practice.</li> </ul>
<b>BPM Changes</b>	<p>Settlements Configuration Guides</p>
<b>Tariff Changes</b>	<p>N/A</p>
<b>Impacted Systems</b>	<p>SIBR, DAM/RTM, Settlements, ITS, MF</p>

# 2024 – Transmission Exchange Agreement

Milestone Type	Milestone Name	Dates	Status
External BRS	Post External BRS	Q4 2023	
Settlements Config Guides	Post Draft Config Guides	Yes	
Tech Spec	Create ISO Interface Specifications	Yes	
Tariff	NA	NA	
BPMs	Draft BPM changes – Settlements & Billing	Yes	
Production Activation	Transmission Exchange Agreement Renegotiation	Summer 2024	

# 2024 – WEIM Resource Sufficiency Evaluation Enhancements Phase 2

## Track 3

Project Information	Details
<b>High Level Project Scope</b>	<b>Track-3</b> <ul style="list-style-type: none"><li>Item3A – DR Inclusion with RSE via ALFS (RSEE-1060) (Implemented in Phase 1 – enhancements needed)<ul style="list-style-type: none"><li>Furnish ALFS-SOA API integration to DR SCs to automatically submit their DR LF Adjustment (that reflect Non-Participating DR Schedules) to account for DRs that are not explicitly modeled in real-time markets.</li></ul></li></ul>
<b>BPM Changes</b>	Demand Response, WEIM
<b>Tariff Changes</b>	NA
<b>Impacted Systems</b>	MF, ALFS, Market, BAAOP

# 2024 – WEIM Resource Sufficiency Evaluation Enhancements

## Phase 2 Track 3

System	High Level Changes
<b>MF</b>	<ul style="list-style-type: none"> <li>• RSEE-1060 – Business Process: Ensure DR Inclusion Flag Submission by WEIM Entity Only via CIDI.</li> <li>• RSEE-1060 – Business Process: STF Notification of Changes to DR Inclusion Flag on WEIM Entity / WEIM Sub-Entity Level.</li> </ul>
<b>ALFS</b>	<ul style="list-style-type: none"> <li>• Access DR Inclusion Flag on WEIM Entity/Sub-Entity Levels from MF.</li> <li>• Translate the WEIM Entity/Sub-Entity DR Inclusion Flag to their associated LF zones (During MF transfer, the sub-area LF zone will adopt the WEIM Entity attestation flag).</li> <li>• Receive Non-Participating DR Schedules from WEIM Entity or WEIM Sub-Entity</li> <li>• Broadcast Non-Participating DR Schedules for WEIM Entity BAA or WEIM Sub-Entity.</li> <li>• Broadcast DR LF Adjustment Data (that have been adjusted in ALFS) to downstream systems.</li> </ul>
<b>Market</b>	<ul style="list-style-type: none"> <li>• Consume the following from ALFS:               <ul style="list-style-type: none"> <li>• ALFS-DF-Submitted DR LF Adjustment (hourly aggregate)</li> <li>• STF-DF-Excluded DR LF Adjustment (hourly aggregate)</li> </ul> </li> <li>• Accounting for DR LF Adjustments in RSE.</li> </ul>
<b>BAAOP</b>	<p>Display DR LF Adjustments received from ALFS in BAAOP.</p> <p>Disable manual entry via BAAOP UI on a sunset date, after all participants transition to ALFS API submission.</p>



# 2024 – WEIM Resource Sufficiency Evaluation Enhancements

## Phase 2 Track 3

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval WEIM Governing Board Approval	Dec 14, 2022	✓
External BRS	Post External BRS	Mar 10, 2023	✓
	Post External BRS v1.1	Mar 31, 2023	✓
	Post External BRS v1.2	Jun 27, 2023	✓
	Post External BRS v1.3	Sep 05, 2023	✓
	Post External BRS v1.4 (No changes to Track 3)	Sep 12, 2023	✓
Settlements Config Guides	NA	NA	
Tech Spec	Create ISO Interface Spec (Tech spec) – ALFS	Yes	
Tariff	Tariff	NA	
BPMs	Draft BPM changes – Demand Response Draft BPM changes – WEIM	Yes	
Market Sim Scenarios	Market Sim Scenarios	Yes	
Market Sim	Market Sim Window	Yes	
Production Activation	Resource Sufficiency Evaluation Enhancements Phase 2 Track 3	Summer 2024	

# 2024 – Hybrid Resources 2C RIMS

Project Information	Details/Date
<p><b>High Level Business Problem or Need</b></p>	<p>The ISO launched this stakeholder initiative to identify new or enhanced market rules and business processes needed to accommodate hybrid resources, resources that consist of two sets of market rule changes that will facilitate mixed-fuel type (hybrid and co-located resources) project participation in the ISO markets.</p> <p>Prior to this initiative, Phase 1 identified a first set of modifications generally concerned with setting up and operating co-located resources.</p> <p>Building on phase 1, Phase 2 focuses on modifications that will explore how hybrid generation resources can be registered and configured to operate within the ISO market. The initiative will further develop solutions allowing developers to maximize the benefits of their resource’s configuration. Additionally, hybrid resource configurations also raise new operational and forecasting challenges that the ISO plans to address during this initiative.</p>
<p><b>High Level Project Scope</b></p>	<p>With this initiative, there’s an opportunity to increase storage and the number of hybrid resources that can connect to the ISO grid. Currently the interconnection queue includes more than 24,000 MW of mixed fuel projects and nearly 20,000 MW of storage which represents roughly half of all generation in the current interconnection queue.</p>
<p><b>BPM Changes</b></p>	<p>Settlements &amp; Billing</p>
<p><b>Impacted Systems</b></p>	<p>Summer 2023: Settlements            Fall 2023: Metered Quantities for Hybrids  <b>Independent 2024: RIMS</b>            Completed: Today’s Outlook, ISO Today Mobile Application, Reports</p>
<p><b>Requirements</b></p>	<p><a href="http://www.caiso.com/Documents/BusinessRequirementsSpecifications-HybridResourcesPhase2.pdf">http://www.caiso.com/Documents/BusinessRequirementsSpecifications-HybridResourcesPhase2.pdf</a></p>

# 2024 – Hybrid Resources 2C RIMS

Milestone Type	Milestone Name	Dates	Status
External BRS	Publish External BRS	Jan 31, 2023	✓
Settlements Config Guides	NA for RIMS	NA	
Tech Spec	Create and Publish ISO Interface Spec (Tech Specs)	NA	
Market Sim	Market Sim Window – RIMS	NA	
Production Activation	Hybrid Resources 2C – RIMS	2024	

# 2024 - Congestion Revenue Rights (CRR) Upgrade

Project Information	Details/Date
<b>High Level Project Scope</b>	<p>The Congestion Revenue Rights (CRR) system was implemented by CAISO in 2008 as part of the Market Redesign and Technology Upgrade (MRTU) implementation. The current CRR system is at its end of life, does not have the flexibility to accommodate future policy changes and requires the ISO to calculate data and run processes manually outside the current system to produce a successful CRR Auction.</p> <p>The CAISO has decided on a significant upgrade of the existing CRR system and adopt the latest technology stack aligned with CAISO's technology standards, consolidate all CRR related functions, minimize human errors, reduce processing time, eliminate manual workarounds, and positions the system to accommodate policy changes down the road.</p> <p><b>Congestion Revenue Rights (CRR) system replacement project scope is the roll-out of a:</b></p> <ul style="list-style-type: none"> <li>• Brand new user-interface (UI) system with an updated new look-and-feel, to replace the existing legacy system implemented during the MRTU 2008 go-live and brought up to current ISO technology standards</li> <li>• Set of application-programming interfaces (APIs) to enable integration between ISO and market participant systems</li> </ul> <p><b>Overall, to support the following in one consolidated CRR external-facing system:</b></p> <ul style="list-style-type: none"> <li>• Annual/Monthly Auction and Allocation market participant bid submission and results retrieval</li> <li>• Load data submission by CRR LSEs, CEC</li> <li>• Load migration data submission by CRR UDCs</li> <li>• Secured "Congestion Revenue Rights Full Network Model" information access</li> <li>• Private and public access of CRR market input and output information</li> </ul>
<b>BPM Changes</b>	<p>Congestion Revenue Rights</p> <ul style="list-style-type: none"> <li>• Enhancements made to the new CRR product.</li> <li>• Automatic publishing of CRR market results.</li> <li>• Automatic CRR notification.</li> <li>• New CRR schedule calendar.</li> <li>• New CRR FNM access.</li> <li>• New CRR data submission and download interface UI/API.</li> <li>• New CRR market results interface.</li> <li>• Load Migration</li> </ul>
<b>Tariff Change</b>	<p>No</p>
<b>Impacted Systems</b>	<p>CRR, AIM, CMRI, OASIS, CTS, Market Clearing, EMMS, IFM/RTN, MQS, Master File, MPP, Settlements, WebOMS, ETCC.</p>

# 2024 - Congestion Revenue Rights (CRR) Upgrade

System	High Level Changes
<b>CRR</b>	<p>Significant system upgrade including:</p> <ul style="list-style-type: none"> <li>• Enhancements made to the new CRR application.</li> <li>• Automatic publishing of CRR market results.</li> <li>• Automatic CRR notification.</li> <li>• New CRR schedule calendar.</li> <li>• New CRR FNM access.</li> <li>• New CRR data submission and download interface UI/API.</li> <li>• Other TBDs identified through BRS development.</li> </ul>
<b>AIM</b>	<ul style="list-style-type: none"> <li>• New users and roles to support new CRR functionality</li> </ul>
<b>CMRI</b>	<ul style="list-style-type: none"> <li>• Full and incremental Payload publishing</li> <li>• Publish CRR Awards payload on event-driven, ad-hoc or scheduled basis</li> <li>• Publish CRR Awards payload on event-driven, ad-hoc or scheduled basis</li> </ul>
<b>OASIS</b>	<ul style="list-style-type: none"> <li>• Publish CRR Calendar, and all available CRR market names, and credit margin information, 3 year historical expected value..</li> <li>• Allow authorized users to publish CRR inventory payloads</li> <li>• Broadcast the following: set aside values, the results of all CRR markets, retired pnode/anode mapping, binding constraints, initial and updated CRR source and sink list for each CRR market,</li> </ul>
<b>CTS</b>	<ul style="list-style-type: none"> <li>• Broadcast</li> </ul>
<b>EMMS</b>	<ul style="list-style-type: none"> <li>• CRR will consume data from EMMS</li> </ul>
<b>IFM/RTN</b>	<ul style="list-style-type: none"> <li>• CRR will consume data from IFM/RTN</li> </ul>
<b>MQS</b>	<ul style="list-style-type: none"> <li>• MQS will consume and process SCID in a new format</li> <li>• MQS will consume ownership payload in bulk</li> </ul>
<b>Master File</b>	<ul style="list-style-type: none"> <li>• Master File will be modified as needed to support the new CRR functionality</li> </ul>
<b>MPP</b>	<ul style="list-style-type: none"> <li>• CRR will provide pre-configured external reports</li> </ul>
<b>Settlement</b>	<ul style="list-style-type: none"> <li>• Settlements will be modified as needed to support the new CRR functionality</li> </ul>
<b>WebOMS</b>	<ul style="list-style-type: none"> <li>• CRR will consume data from WebOMS</li> </ul>
<b>ETCC</b>	<ul style="list-style-type: none"> <li>• CRR will consume data from ETCC</li> </ul>

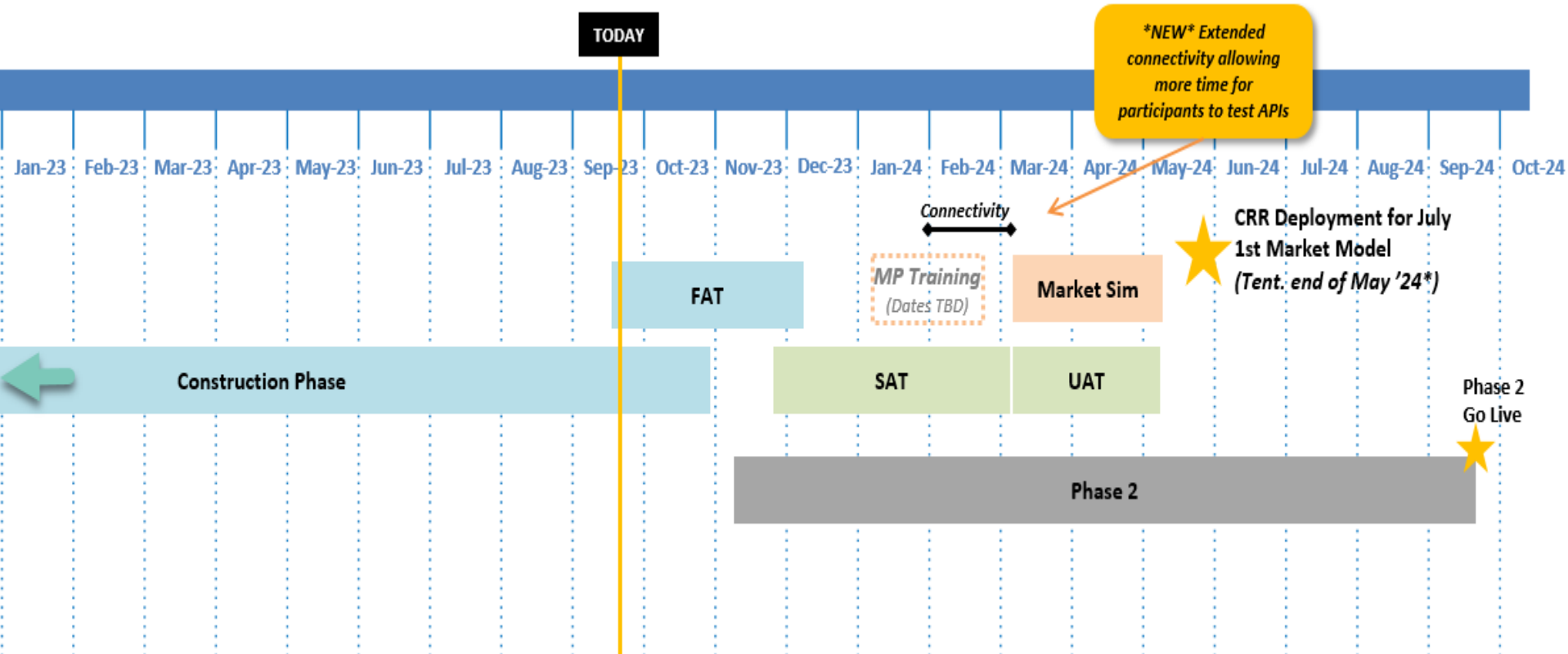
# 2024 - Congestion Revenue Rights (CRR) Upgrade

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	NA	
External BRS	Publish External BRS BRS Revision v1.3	Nov 16, 2022 Mar 29, 2023	✓ ✓
Config Guides	Post Draft Config Guides	Yes	
Tech Spec	Publish Technical Specification	Feb 24, 2023	✓
Deployment Plan	Draft Deployment Plan	Yes	
Training	Training	Yes	
Market Sim	Market Sim	Mar 18, 2024 – May 03, 2024	
<b>Customer Partnership Group</b>	<b>Next CPG</b>	<b>Nov 15, 2023 (Tentative)</b>	

# 2024 - Congestion Revenue Rights (CRR) Upgrade

Updated September 2023

- Construction nearing end, but will continue through Factory Acceptance Testing (FAT)
- **Big Milestone!** Factory Acceptance Testing started week of 9/18, but delayed from target date
- Opportunities identified to compress functional testing timelines (SAT), so time savings anticipated
- **Impact on Go Live Date still TBD** – will know more as FAT progresses
- Connectivity – 3 weeks extend connectivity plus standard one week connectivity.



# 2024 - CRR System Upgrade – Get Connected

- CRR meetings:
  - **Bi-weekly Technical User Group (TUG)** Tue 10 AM, alternates with RUG.
    - Meetings available on the CAISO calendar on [www.caiso.com](http://www.caiso.com)
    - Meeting details and presentation materials are available on the CAISO Developer site at [www.developer.caiso.com](http://www.developer.caiso.com) , which requires an account to be setup for access
  - **CRR Customer Partnership Group**
    - **Next CPG meeting is Wed, 11/15 @ 10 AM**
    - Monthly
    - Meetings available on the CAISO calendar on [www.caiso.com](http://www.caiso.com)
    - Meeting details and presentation materials are available on [www.caiso.com](http://www.caiso.com) > Stay Informed > Meetings & Events > Customer Partnership Groups



# Day Ahead Market Enhancements

Project Information	Details/Date
<p><b>High Level Business Problem or Need</b></p>	<p>In recent years, Variable Energy Resource (VER) have gained significant traction in the energy grid, playing a crucial role in achieving renewable energy targets and reducing greenhouse gas emissions. However, their increasing presence has introduced a new challenge energy imbalances between the Day Ahead and Real Time markets.</p> <p>Another reason for the energy imbalance is the day-ahead market operates on hourly time increments, whereas real-time market schedules energy in 15 and 5-minute intervals. This discrepancy in granularity results imbalances since the rea-l-time market schedules fluctuate within the hour while day-ahead market schedules remain fixed for the entire hour.</p> <p>These imbalances necessitates out-of-market interventions by operators, such as forecast biasing and dispatches, to uphold grid reliability. However, this situation presents an opportunity to improve our market software, enabling us to achieve a more efficient and economical solution while addressing the variability and reliability concerns within the market.</p>
<p><b>High Level Project Scope</b></p>	<p>Enhance the California ISO's (CAISO's) day-ahead market by:</p> <ul style="list-style-type: none"> <li>• Introducing an imbalance reserve (IRU/IRD) product to provide flexible capacity to account for real-time ramping needs</li> <li>• Enhancing the residual unit commitment process to also ensure there is sufficient downward dispatch capability (RCU/RCD)</li> <li>• Enhancing the day-ahead market to maximize benefits of greater West-wide diversity in the day-ahead optimization for Western Energy Imbalance Market participants</li> </ul>
<p><b>BPM Changes</b></p>	<p>Settlements and Billing, Market Instruments &amp; Market Operations</p>
<p><b>Tariff Changes</b></p>	<p>Sections 27, 31, 34, 39</p>
<p><b>Impacted Systems</b></p>	<p>MF, SIBR, DAM, OASIS, CMRI, Settlements &amp; Internal Systems</p>

# Day Ahead Market Enhancements

System	High Level Changes
<b>MF</b>	<ul style="list-style-type: none"> <li>Define IRU, IRD, RCU, RCD eligibility for the resource ID in MF.</li> </ul>
<b>SIBR</b>	<ul style="list-style-type: none"> <li>IRU,IRD,RCU,RCD bid rules</li> </ul>
<b>DAM</b>	<ul style="list-style-type: none"> <li>Calculate IRU/IRD requirements</li> <li>MPM: Market Power Mitigation for IRU/IRD</li> <li>IFM: procure IRU/IRD</li> <li>IRU/IRD deployment scenarios</li> <li>IRU/IRD requirement distribution</li> <li>IRU/IRD in NA-AC power flow</li> <li>Include IRU/IRD in constraints</li> <li>RCU/RCD procurement</li> <li>RUC-MPM pass</li> <li>Impact on RUC performance with additional MPM pass</li> <li>LMP for EN, IRU/IRD, RCU/RCD</li> </ul>
<b>OASIS</b>	<ul style="list-style-type: none"> <li>IRU, IRC, RCU,RCD related public reports</li> </ul>
<b>CMRI</b>	<ul style="list-style-type: none"> <li>IRU, IRC, RCU,RCD related private reports</li> </ul>
<b>Settlements</b>	<ul style="list-style-type: none"> <li>IRU, IRC, RCU,RCD Settlements</li> </ul>

# Day Ahead Market Enhancements

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board briefing/approval	May 17, 2023	✓
External BRS	DAME External BRS Published	Jul 25, 2023	✓
Tariff	First Draft Tariff Posting	Jun 02, 2023	✓
	Second Draft Tariff Posting	Jul 11, 2023	✓
	FERC Filing	Aug 22, 2023	✓
Config Guides	FERC Response Requested by	Dec 21, 2023	
	Post Draft Config Guides - First set of charge codes	Jan 16, 2024	
	Post Draft Config Guides - Second set of charge codes	Feb 26, 2024	
Tech Spec	Post Draft Config Guides - Third set of charge codes	Apr 08, 2024	
	Publish Technical Specifications	Nov 28, 2023	
BPMs	Post Draft BPM changes	Apr 21, 2025	
External Training	External User Training	May 08, 2025	
Market Sim	Market Sim Scenarios	Aug 04, 2023	✓
	Market Sim Window	Jun 02, 2025 - Aug 22, 2025	
Implementation - Inactive	Day Ahead Market Enhancements Implementation Activities	Fall 2025	
Activation	DAME Activation (Financially Binding)	Spring 2026	

# Extended Day Ahead Market (EDAM) Implementation

Project Information	Details/Date
<b>High Level Business Problem or Need</b>	<p>The purpose of this initiative is to create a comprehensive extended day-ahead market that extends over multiple balancing authority areas (BAAs) participating in the WEIM. EDAM is a voluntary day-ahead electricity market with the potential to deliver significant economic, environmental, and reliability benefits for participants across the West. EDAM will more efficiently and effectively integrate renewable resources and address the significant operational challenges presented by a rapidly changing resource mix, emerging technologies, and the impacts of climate change. EDAM will enable procurement of robust supply and flexible capacity that will position EDAM participants to effectively address changes in conditions from day-ahead to real-time, improving their response to potential reliability challenges. EDAM builds upon the proven ability of the Western Energy Imbalance Market (WEIM) to increase regional coordination, support state policy goals, and cost effectively meet demand..</p>
<b>High Level Project Scope</b>	<p>The EDAM design leverages existing features of the ISO day-ahead market that are common in other day-ahead markets across the country. The design also considers enhancements proposed in contemporaneous stakeholder initiatives, that will harness flexibility across the larger footprint by incorporating an imbalance reserve product, and that will enhance price formation. EDAM introduce new products, imbalance reserve and reliability capacity, as well as new penalties, RSE surcharge.</p>
<b>BPM Changes</b>	<ul style="list-style-type: none"> <li>Definitions and Acronyms</li> <li>Energy Imbalance Market (EIM)</li> <li>Market Instruments</li> <li>Market Operations</li> <li>Settlements and Billing</li> <li>EDAM</li> </ul>
<b>Impacted Systems</b>	<p>MF, ALFS, ALFS-SOA, SIBR, RTSI, RTBS, BSAP, DAM (IFM and RUC), DA-RSE (new), RTM (RTPD and RTD), STUC, MPM, SMDM, ITS, BARC, GHG Pass (new), Settlements, CMRI, OASIS, ADS, WebOMS</p>
<b>Requirements</b>	<p>Published Aug 02, 2023</p>

# Extended Day Ahead Market (EDAM) Implementation

Milestone Type	Milestone Name	Dates	Status
External BRS	Publish External BRS	Aug 02, 2023	✓
Tariff	Draft Tariff Language	Mar 30, 2023	✓
	Revised Draft Tariff Language	Jun 8, 2023	✓
Tariff	Updated Revised Draft Tariff Language	Jul 25, 2023	✓
	FERC Filing	Aug 22, 2023	✓
	FERC Response requested by	Dec 21, 2023	✓
	Requested effective date for tariff changes for EDAM agreements and onboarding provisions	Dec 21, 2023	
Settlements Config Guides	Draft Technical Documents – Tier 1	Jan 16, 2024	
	Draft Technical Documents – Tier 2	Feb 26, 2024	
	Draft Technical Documents – Tier 3	Apr 08, 2024	
Tech Spec	Create and Publish ISO Interface Spec (Tech Specs)	Nov 2023	
BPMs	Definitions and Acronyms Energy Imbalance Market (EIM) Market Instruments Market Operations Settlements and Billing EDAM	TBD	
Training	Training	TBD	
Production	EDAM Implementation Activities	Fall 2025	
	EDAM Onboarding (Financially Binding)	Spring 2026	

# Stay Informed

# Ways to participate in releases

- Visit the Release Planning page
  - <http://www.caiso.com/informed/Pages/ReleasePlanning/Default.aspx>
- Attend meetings
  - Release Users Group (RUG) bi-weekly meetings
    - Initiative status updates
    - System change updates on independent releases
  - Market Simulation calls
    - Visit the ISO calendar at [www.caiso.com](http://www.caiso.com) for meeting dates and times and add events to your calendar
    - Typically held on Mondays and Thursdays
  - Market Performance and Planning Forum
    - Bi-monthly review of market performance issues
    - High level discussion of release planning, implementation and new market enhancements

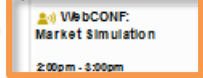
# What to look for on the calendar...

## Calendar of Meetings, Training and Events

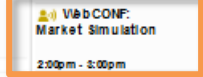
Month: February Year: 2018 Calendar View List View Print View

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	5 WebbCONF: Market Simulation 2:00pm - 3:00pm	6 Training: Get to Know the ISO - Day 1 9:00am - 4:00pm WebbCONF: Imbalance Conformance Enhancements 10:00am - 12:00pm WebbCONF: Technical User Group 10:00am - 11:00am	7 Deadline: Comments - Interconnection Process Enhancements 2018 - Issue Paper and Meeting Discussion Training: Get to Know the ISO - Day 2 9:00am - 4:00pm Meeting: Flexible Resource Adequacy Criteria Must Offer Obligation Phase 2 - Revised Draft Flexible Capacity Framework 10:00am - 4:00pm WebbCONF: Market Settlement User Group 10:00am - 11:00am	8 Meeting: Audit Committee Teleconference (Executive) 8:30am - 9:30am Training: Settlements 101 9:00am - 4:00pm Meeting: 2017-2018 Transmission Planning Process 10:00am - 4:00pm WebbCONF: Market Simulation 2:00pm - 3:00pm	9 Training: Settlements 201 9:00am - 4:00pm	10
11 WebbCONF: Participating Transmission Owner Per Unit Cost Guides 10:30am - 12:00pm WebbCONF: Market Simulation 2:00pm - 3:00pm	12 Meeting: Congestion Revenue Rights Auction Efficiency 10:00am - 4:00pm WebbCONF: Release User Group 10:00am - 11:00am Call: Energy Imbalance Market Governing Body Teleconference (Executive) 11:30am - 12:30pm	13 Deadline: Submissions - April 2018 Monthly Resource Adequacy and Supply Plans Call: Congestion Revenue Rights 11:00am - 11:30am WebbCONF: Outage Management System Customer Partnership Group 2:00pm - 3:00pm	14 Deadline: Comments - Review Transmission Access Charge Structure Straw Proposal and Meeting Discussion Call: Board of Governors Teleconference (General) 8:15am - 9:00am Call: Board of Governors Teleconference (Executive) 9:00am - 10:00am Call: Market Update 10:15am - 11:00am WebbCONF: Market Simulation	15	16	17

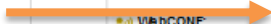
Market Sim



Market Sim



Release Users Group (RUG)





# RUG Calendar 2023



2023

Release User Group Meetings

Note: dates subject to change; for the latest information please visit the Calendar on [www.caiso.com](http://www.caiso.com)

January						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
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February						
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31						



Meeting



Holiday



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# RUG Calendar 2024

January						
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August						
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September						
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 CAISO Holiday

 RUG Forum