Release User Group Agenda

November 2, 2021 *10:00 a.m.–11:00 a.m.* *(Pacific Time)*

Web Conference Information	Conference Call Information
Web Address: https://caiso.webex.com/meet/RUG Meeting Number: 960 941 245 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.	*1-844-517-1271 US Toll Free* *+1-682-268-6591 US Toll* *Access code: 960 941 245*
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.	

Release User Group Agenda

November 2, 2021 *10:00 a.m. – 11:00 a.m. (Pacific Time)*

Time	Topic	Facilitator
10:00 – 10:05	Agenda & ISO Roll call	Trang Vo
10:05 – 10:45	Release Plan	Adrian Chiosea Jami Herguth Janet Morris Bill Bonnell

Upcoming ISO virtual training programs

Training Courses and workshops	Date and time
Welcome to the ISO	November 17, 2021 (9am – 11am)
The 2022 training schedule will be published in the Learning Center soon. Stay tuned!	
Email us at CustomerReadiness@caiso.com for any training or readiness related questions	

CustomerReadiness@caiso.com

Learning Center

Visit our **Learning Center** web page to access our training calendar, register for courses and find other informational resources: http://www.caiso.com/participate/Pages/LearningCenter/default.aspx

ISO computer based training is always available

New Modules
Integration of Renewables Watch Data in Today's Outlook
OASIS Enhancements – Phase 1
Variable Operations and Maintenance Costs Review
Outage Modifications in OMS
RIMS WebSDK Upgrade
OSI Enhancements 2021: MRI-S Monitoring Data
Real-Time Settlements Review Phase 2
Hybrid Resources Phase 2a
ESDER Phase 4
Today's Outlook: RA Capacity Trends
CIDI Enhancements
Outage Management System (webOMS) Enhancements
Process for Submitting Ongoing Obligations in CIDI
FERC Order 831 Market Simulation Scenarios
FERC Order 831 Import Bidding and Market Parameters
Resource Adequacy Enhancements Phase 1
Summer 2021 Readiness – Parts 1, 2 and 3
Resource Adequacy Enhancements Phase 1

CustomerReadiness@caiso.com

SC Training Topics
Day-Ahead Overview
Real-Time Overview
Master File Process
Market Pricing
Bids and Self-Schedules
Full Network Model
Settlements Process
Day-Ahead Settlements
Real-Time Settlements
Post-Market Settlements
Convergence Bidding Settlements
Metering Overview
And many more….

Release Plan Summary: 2021

Independent 2021

- EIM Enhancements 2021 Phase 2
- Variable Operations and Maintenance Cost Review
- Operations Systems Improvements 2021 Enhancements

Fall 2021

- ✓ Energy Storage and Distributed Energy Resources Phase 4
- Hybrid Resources Phase 2-A
- ✓ EIM Base Schedule Submission Deadline Phase 1
- ✓ Real-Time Settlement Review Phase 2
- ✓ Intertie Shadow Pricing Resolution

Release Plan Summary: 2022

EIM Spring 2022 - March, April

- Energy Imbalance Market (EIM) 2022 - Avista
- Energy Imbalance Market (EIM) 2022 – Bonneville Power Administration
- Energy Imbalance Market (EIM) 2022 – Tacoma Power
- Energy Imbalance Market (EIM) 2022 - Tucson Electric Power

Spring 2022 - May 1

- Hybrid Resources Phase 2-B
- Short-Long Start Definitions

2022 (tentative – subject to change pending Policy and planning activities)

- Resource Sufficiency Evaluation Phase 1
- External Load Forward Scheduling Rights Process Phase 1
- IPE Phase 1
- RDRR Bidding Enhancements

Fall 2022 (tentative – subject to change pending Policy and planning activities)

- FRP Improvements
- Resource Adequacy Enhancements Phase 2
- FERC 2222 Implementation
- FERC NOPR - Managing Transmission Line Ratings
- EIM Sub-Entity Scheduling Coordinator
- EIM Base Schedule Submission Deadline Phase 2

2023

- Congestion Revenue Rights (CRR) Upgrade

2021 Independent

2021 – EIM Enhancements 2021 Phase 2

Project Information	Details/Date
High Level Business Problem or Need	To collectively address important issues identified by EIM market participants through Customer Inquiry, Dispute and Information system (CIDI) requests to improve the visibility, functions and features in Energy Imbalance Market (EIM).
High Level Project Scope	• BAAOP: Specify parameters for Shared ramping capability constraint. • BAAOP: Separate ETSR Base from ETSR detail display
BPM Changes	EIM, Market Instruments
Tariff Change	Section 29.4
Impacted Systems	RTM/BAAOP, RTM/Integration, CMRI, RTM/BAAOP

2021 – EIM Enhancements 2021 Phase 2 (cont'd)

System	High Level Changes
Real-Time Market (RTM) /Real-Time Base Schedule (RTBS)	• Offline units with Base schedule • centralized activation/de-activation means of this functionality • System shall consider offline resources that are cycling as available for the balancing, bid range capacity, and flexible ramp sufficiency tests if capable for startup within the next hour. Same for shutdown
Real-Time Market (RTM)	• Shared ramping capability constraint • UI for EIM entity input parameters for ramp sharing • Use in the optimization for each resource based on BAA ramp share parameters

Real-Time Market (RTM)/Real-Time Unit Commitment (RTUC) [(HASP, STUC, FMM)]	• Cycling resource with base schedule in Market
	• centralized activation/de-activation means of this functionality
	  ○ Real-Time Markets shall have the capability to automatically start-up an offline resource that is cycling if it is economic to run.
	  ○ Similarly, Real-Time Markets shall have the capability to automatically shut down an online resource that is cycling if is not economic to run.
	  ○ Consider EIM resources with positive base schedules above minimum load and with three-part bids as cycling during the relevant trade hour (i.e. optimize its unit commitment on the basis of its bids), with the following exceptions:
	  ○ Self-schedule exists
	  ○ Ancillary service base schedule exists (except when non-spin for an offline resource capable of startup within 10-minutes)
	  ○ Flexible ramp award exists (except when flex ramp up award for an offline resource capable of startup within 5-minutes)
	  ○ Inter-temporal constraint (startup time, minimum up time, minimum down time, maximum daily starts) prevents cycling
	• Real-time market horizon has limitation, where resource startup time plus minimum up time exceeds 240 minutes
	• Cycling shall include both startup and shutdown unit commitment decisions on basis of three-part bids (economic energy bid, startup, minimum load) and applicable temporal constraints.
	• A positive base schedule from a resource without an energy bid shall still be treated as a self-schedule.

2021 – EIM Enhancements 2021 Phase 2 (cont'd)

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	N/A	
External BRS	Milestone: Post External BRS	April 6, 2021	✓
Configuration Guides	Post Draft Configuration Guides	N/A	
Tech Spec	Create ISO Interface Spec (Tech spec)	N/A	
Tariff	File Tariff	N/A	
Production Activation	EIM Enhancements 2021 Phase 2 ETSR UI Shared Ramping Constraint	 TBD April 1, 2022	

2021 – Variable Operations & Maintenance Cost Review

Project Information	Details/Date
High Level Business Problem or Need	This project proposes to change the structure of how operations and maintenance (O&M) costs are estimated for use in the CAISO markets.
High Level Project Scope	**Scope 1:** Clarifying the categorization principles for variable operations and variable maintenance costs **Scope 2:** Changing the default O&M adder values that can be used in lieu of negotiated values **Scope 3:** Allow market participants to reflect their variable O&M costs in start-up costs, minimum load costs, and/or default energy bids, thus replacing the current cost framework consisting of major maintenance adders and variable O&M adders.
BPM Changes	Market Instruments
Tariff Change	30.4.5, 39.7.1.1.2
Impacted Systems	SIBR, Master File, IFM/RTM, Settlements
Suggested actions:	FERC has approved the proposed tariff revisions filed on 3/3/2021, thus the new default O&M adder values will go into effect on 1/1/2022. From 5/17/21 to 6/18/21 market participants were given an opportunity to negotiate new O&M adders and/or renegotiate legacy MMAs and variable O&M adders to be consistent with the new O&M adder framework. Applications not submitted during this spring timeframe are not guaranteed to be completed prior to 1/1/2022. Any existing negotiated variable O&M adder and major maintenance adders existing on 1/1/2022 will be “grandfathered” in under the new cost framework. The CAISO has released further instructions via the draft BPM in May 2021, see http://www.caiso.com/Documents/BPMforMarketInstruments-AttachmentL-DRAFT.pdf .

2021 – Variable Operations & Maintenance Cost Review (cont'd)

System	High Level Changes
Scheduling Infrastructure Business Rules (SIBR)	Scope 3: SIBR will receive the variable minimum load O&M adder and variable start-up O&M adder from Master File. For default variable minimum load O&M adder and default variable start-up O&M adders, system must be enhanced to perform an automated calculation (*Min load O&M Adder = Default Min load O&M Adder * Resource's PMAX or Start up O&M Adder = Default start up O&M Adder * Resource's PMAX*). If the resource has elected for a negotiated variable minimum load O&M adder or negotiated variable start-up O&M adder, the value can be used directly without the need to multiply with the Pmax. SIBR rules will need to be updated to reflect the latest terminology: Major Maintenance Adder to new terms "Variable Start-up O&M adder" and "Variable Minimum Load O&M adder".
Master File	Scope 2: Default variable energy O&M adder, default variable minimum load O&M adder and default variable start-up O&M adders will be stored on a resource- and configuration-specific level. Two new flags will need to be added at the resource/configuration level: ○ Default or Negotiated Variable Energy O&M Adder (naming change: Variable Energy O&M Adder replaces the Variable O&M Adder) ○ Default/Negotiated Variable Minimum Load O&M Adder and Default/Negotiated Variable Start-up O&M Adder (both new) The one new flag and the two new adder values must be visible within the Resource Data Template (RDT).

2021 – Variable Operations & Maintenance Cost Review (cont'd)

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Nov 18, 2020	✓
Tariff	File Tariff	March 3, 2021	✓
External BRS	Milestone: Post External BRS	Mar 25, 2021	✓
BPMs	Post Draft BPM Changes	May 7, 2021	✓
Negotiations	Phase 1 Negotiations Begin	May 17, 2021	✓
Config Guides	Post Draft Config Guides	N/A	N/A
Tech Spec	Create ISO Interface Spec (Tech spec)	May 28, 2021	✓
Negotiations	Phase 1 Negotiations Deadline	June 18, 2021	✓
External Training	Deliver External Training	Oct 14, 2021	✓
Production	Effective Date	Jan 1, 2022	

2021 - Operations Systems Improvements 2021 Enhancements

Project Information	Description
High Level Business Problem or Need	• The goal of this project is to deliver timely systems improvements that support efficient day-to-day work and operations. The project aims to improve market robustness, performance, and the technology foundation for system grid reliability by updating functionality and interfaces to reduce workarounds, automating manual processes and addressing functionality enhancements. A list of specific high priority improvements will be the scope for the project. A number of these improvements may have an impact on the way in which customers interact with CAISO systems.
Affected Systems	• A preliminary list of enhancements is included on the next slide. PLEASE NOTE: This list may change as the project progresses and priority are factored. The goal is to provide advanced notification of changes whenever possible
Schedule	• External BRS v1.1 now available on CAISO.com • MAP Stage Availability TBD* • Customer Training TBD* • PROD TBD* * The plans for testing and deployment will vary between improvement items as these may be released individually or in groups. More information on specific improvements will be made available as planning and schedules are solidified.

2021 - Operations Systems Improvements 2021 Enhancements

List of Proposed Improvements*

***PLEASE NOTE: This list may change as the project progresses and priorities are factored. The goal is to provide advanced notification of changes whenever possible**

System	Summary Description	Next Step
Market	Ability to block/unblock ETSRs for a specified Time interval	PROD – Nov 19
MRI -Settlements	Automate PTO submission of TAC Rates	2022
ADS	Add advance filter, additional color scheme, change grid color	PROD - Dec
Market	Modify Unit Details UI currently in Coming Soon	PROD - Nov
CIRA	Publish bilateral trades from CIRA to OASIS	2022
CIRA	EFC data to OASIS Phase 3	2022
Market	✓ ED Records Shall be Identified as Current or Non-Current within RTM	Complete
MRI -Settlements	✓ Request for all monitoring data to be viewable in MRI-S	Complete
OMS	✓ Ignore redundant curtailment points in API requests for aggregate children	Complete
OMS	✓ FNM - Changes to Switch Display View	
DRRS	✓ Creating an automated notification for Registration IDs with an End Date less than x business days	Complete
OMS	✓ Differentiate the SC & ACL for EIM external BA from CAISO BA	Complete
OMS	✓ Outage Report Changes to the 'Curtailed and Non-Operational Generation' report (with Summer 2021)	Complete
OMS	✓ NGR Outage process efficiency. (with Summer 2021)	Complete
OMS	✓ Further define when a COMMUNICATION or RELAY WORK outage does or does not impact a RAS	Complete
OMS	✓ FNM - Equipment Name should not be blank in the Outage Summary	Complete
Market	✓ Have resource "SOC_YN" flag to in the UI	Complete

2021 Fall Release

Fall 2021 Release - Overview

	BRS	Config Guide	Tech Spec	Mkt Sim Scenarios	Tariff	Training	Market Sim	Production Activation
Fall 2021 Release	**04/01/21**	**05/28/21**	**05/28/21**	**July 2021**	**07/23/21**	**09/10/21**	**Aug 30 - Oct 15, 2021**	**11/01/21**
ESDER Phase 4 BOG 9/30/20	02/03/21 08/05/21 10/11/21	05/27/21	05/28 MF 06/04 CMRI, OASIS 07/30 SIBR	06/30 08/05	Filed 3/19/21 (Amend) Filed 8/27/21 (Amend)	08/31/21	08/30/21 – 10/22/21	11/01/21
Hybrid Resources Phase 2-A BOG 11/18/20	03/26/21 08/04/21	N/A	05/27 MF	N/A	Filed 9/8/21	08/30/21	08/30/21 – 10/15/21	11/30/21
EIM Base Schedule Submission Deadline - Phase 1 BOG 12/17/20	01/15/21	N/A	N/A	03/05	Refiled 8/3/21	03/04/21	Apr 15 – Apr 23, 2021	11/01/21
Real-Time Settlement Review Phase 2 BOG 12/17/20	01/21/21	05/27/21	N/A	07/13	Filed, approved 4/30/21	08/25/21	08/30/21 – 10/15/21	11/01/21
Intertie Shadow Pricing Resolution	01/25/21	05/27/21	06/04 OASIS	N/A	N/A	N/A	08/30/21 – 10/15/21	11/01/21

Fall 2021 – Hybrid Resources Phases 2-A and 2-B - Overview

Project Information	Details/Date
High Level Business Problem or Need	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 project participation (hybrid and co-located resources) in the ISO markets.
High Level Project Scope	**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. The Phase 2 project has been split into two separate implementations, phases 2-A and 2-B, to support strategic delivery timing. Phase 2-B information is available under the Spring 2022 release section. **Phase 2-A** is scheduled to implement Fall 2021. This phase focuses on implementing Ancillary Services (AS) and High Sustainable Limit (HSL) functionality with a focus on the EMS, IFM/RTM, ALFS, Settlements, and CMRI systems. **Phase 2-B** is scheduled to implement Spring 2022. This project phase focuses on implementing the Hybrid Dynamic Limit functionality along with all remaining project scope to include changes to systems RIMS, Master File, EMS, SIBR, IFM/RTM, OASIS, ALFS, Settlements, MRI-S Metering, CMRI, Today's Outlook, ISO Today Mobile Application, Monthly Renewables Performance Report, Wind and Solar Real-Time Dispatch Curtailment Report', and the Over Supply Page. **External BRS Posting:** An updated External BRS v1.1 has been posted.
BPM Changes	Direct Telemetry, Market Instruments, Market Operations, Metering, Settlements and Billing
Tariff Changes	Proposed sections 4.18, 34.1.6.3, 30.5.6.1 Sections 27.13, 8.4.1.1(g), 8.4.3, Appendix K, Parts A, B and C, 8.2.3, 8.4.5, 34.7, 11.6.6, 4.8.2, 40.9.2 (b) (D)
Impacted Systems	ALFS, CMRI, Reporting, IFM/RTM, Master File, OASIS, RIMS, Settlements, MRI-S Metering, SIBR, Today's Outlook, ISO Today Mobile Application, Monthly Renewables Performance Report, Wind and Solar Real-Time Dispatch Curtailment Report, Over Supply Page.

Fall 2021 – Hybrid Resources Phase 2-A

System	High Level Changes
Automated Load Forecast System (ALFS)	• Identification of variable energy resources (VER) • New forecast type for hybrid resources • Forecast for hybrid resources that elect for ISO forecast
CAISO Market Results Interface (CMRI)	• Updates to include resource specific forecast data for hybrid resources (VER components).
Reporting	• Potential: Update report(s) for resource tagging changes: Solar Total tag, Wind Total Tag, Battery Total Tag (Renewable watch, Curtailment Report, ISO Today), and new Hybrid Total Tag
Integrated Forward Market (IFM)/Real-Time Market (RTM)	• When any resource behind an ACC constraint has an AS award, all resources behind that ACC constraint must follow their DOT and receive the must follow flag • Create a new user interface to display the hybrid summary • Include dispatchable generation calculation in RTD and RTPD for co-located resources • Modify 'Must Follow DOT' flag for AS cleared or AS dispatched award ○ Must Follow DOT Flag must turn to 'Y' for Ancillary Service Cleared by resource ID • HSL needs to be integrated with the persistent methodology for co-located resources: Validation rules must be developed for the HSL • Validate the dynamic operating limits • Software that takes the submitted limit and haircuts the energy bid used in each interval of the market time horizon • Limit the economic dispatch of a hybrid resource in the real-time market based on data submitted to SIBR • For co-located resources and hybrids, add new user interfaces • Dynamic Limit functionality: • Display a hybrid resources upper limit and lower limit • Display VER availability • Display ambient derates • Provide the capability to submit energy-not-available thru the functionality
Settlements	• Consume new VER Component ID for forecasting fee • Updates to forecast fee calculation based on meter data submitted for the VER components that elect ISO forecast

Fall 2021 – Hybrid Resources Phase 2-A (cont'd)

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Nov 18, 2020	✓
External BRS	Milestone: Post External BRS Revised BRS to specify scope for Phase 2-A (Fall 2021) and Phase 2-B (Spring 2022)	Mar 24, 2021 Aug 03, 2021	✓ ✓
Config Guides	Post Draft Configuration Guides	N/A	
Tech Spec	Create ISO Interface Spec (Tech spec)	May 28, 2021	✓
Structured Scenarios	Post proposed scenarios	N/A	
Tariff	File Tariff	Sep 8, 2021	✓
External Training	Deliver External Training	August 30, 2021	✓
Market Sim	Market Sim Window	Aug 30, 2021 - Oct 15, 2021	✓
Production Activation	Hybrid Resources Phase 2-A	Nov 30, 2021	

2022 Spring Release

Spring 2022 – EIM integrations for Avista, BPA, Tacoma Power, Tucson Electric Power

Project Info	Details/Date
Application Software Changes	System modifications as needed to accommodate any unique Avista, BPA, Tacoma Power, and Tucson Electric Power needs to support their EIM onboarding.
BPM Changes	EIM BPM will be updated if needed to reflect changes identified during the onboarding and as required to reflect the unique processes of Avista, BPA, Tacoma Power, and Tucson Electric Power.
Market Simulation	October 2021 thru January 2022
Parallel Operations	December 2021 thru March 2022

Milestone Type	Milestone Name	Dates			
		Avista	BPA	Tacoma Power	Tucson Electric Power
Market Sim	Market Sim Window	Oct 2021 thru Nov 2021			Dec 2021 thru Jan 2022
Parallel Operations	Parallel Operations	Dec 2021 thru Feb 2022			Feb 2022 thru Mar 2022
Tariff	File Readiness Certification	2/1/2022			3/1/2022
Production	Activation	3/2/22			4/1/22

Spring 2022 – Hybrid Resources Phases 2-B - Overview

Project Information	Details/Date
High Level Business Problem or Need	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 project participation (hybrid and co-located resources) in the ISO markets.
High Level Project Scope	**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. The Phase 2 project has been split into two separate implementations, phases 2-A and 2-B, to support strategic delivery timing. Phase 2-B information is available under the Spring 2022 release section. **Phase 2-A** is scheduled to implement Fall 2021. This phase focuses on implementing Ancillary Services (AS) and High Sustainable Limit (HSL) functionality with a focus on the EMS, IFM/RTM, ALFS, Settlements, and CMRI systems. **Phase 2-B** is scheduled to implement Spring 2022. This project phase focuses on implementing the Hybrid Dynamic Limit functionality along with all remaining project scope to include changes to systems RIMS, Master File, EMS, SIBR, IFM/RTM, OASIS, ALFS, Settlements, MRI-S Metering, CMRI, Today's Outlook, ISO Today Mobile Application, Monthly Renewables Performance Report, Wind and Solar Real-Time Dispatch Curtailment Report', and the Over Supply Page. **External BRS Posting:** An updated External BRS v1.1 has been posted.
BPM Changes	Direct Telemetry, Market Instruments, Market Operations, Metering, Settlements and Billing
Tariff Changes	Proposed sections 4.18, 34.1.6.3, 30.5.6.1 Sections 27.13, 8.4.1.1(g), 8.4.3, Appendix K, Parts A, B and C, 8.2.3, 8.4.5, 34.7, 11.6.6, 4.8.2, 40.9.2 (b) (D)
Impacted Systems	ALFS, CMRI, Reporting, IFM/RTM, Master File, OASIS, RIMS, Settlements, MRI-S Metering, SIBR, Today's Outlook, ISO Today Mobile Application, Monthly Renewables Performance Report, Wind and Solar Real-Time Dispatch Curtailment Report, Over Supply Page.

Spring 2022 – Hybrid Resources Phase 2-B (Cont'd)

System	High Level Changes
Automated Load Forecast System (ALFS)	• Identification of variable energy resources (VER) • New forecast type for hybrid resources • Forecast for hybrid resources that elect for ISO forecast
CAISO Market Results Interface (CMRI)	• Updates to include resource specific forecast data for hybrid resources (VER components).
Reporting	• Potential: Update report(s) for resource tagging changes: Solar Total tag, Wind Total Tag, Battery Total Tag (Renewable watch, Curtailment Report, ISO Today), and new Hybrid Total Tag
Integrated Forward Market (IFM)/Real-Time Market (RTM)	• When any resource behind an ACC constraint has an AS award, all resources behind that ACC constraint must follow their DOT and receive the must follow flag • Create a new user interface to display the hybrid summary • Include dispatchable generation calculation in RTD and RTPD for co-located resources • Modify 'Must Follow DOT' flag for AS cleared or AS dispatched award ○ Must Follow DOT Flag must turn to 'Y' for Ancillary Service Cleared by resource ID • HSL needs to be integrated with the persistent methodology for co-located resources: Validation rules must be developed for the HSL • Validate the dynamic operating limits • Software that takes the submitted limit and haircuts the energy bid used in each interval of the market time horizon • Limit the economic dispatch of a hybrid resource in the real-time market based on data submitted to SIBR • For co-located resources and hybrids, add new user interfaces • Dynamic Limit functionality: • Display a hybrid resources upper limit and lower limit • Display VER availability • Display ambient derates • Provide the capability to submit energy-not-available thru the functionality

Spring 2022 – Hybrid Resources Phase 2-B (Cont'd)

System	High Level Changes
Master File (MF)	• Enhance MF to identify Hybrid resources • Create a new categorization in MF to identify hybrid resources to handle dynamic limits • Add the ability to store the state-or-charge minimum and maximum limit • Identification of variable energy resources (VER) • Enhance MF to map hybrid resource to individual VER component(s) • **Note:** Renewable registration for VER components is currently mapped to Resource ID; will need further automation to map to individual VER component • New unit type to identify a hybrid resource under the existing NGR model • New identification of individual renewable components that make up a hybrid resource • Ability to elect for ISO forecast or SC submitted forecast to be at the renewable component level • Make the new categorization of hybrid resources along with associated attributes available for downstream applications • Add a MF rule to make sure the 'MOO Qualified Flag' is set to "N" for hybrid resources • Modifications to support the need for a few MF resource attributes (for example, fuel type, technology type, QF Flag, VER NGR flag, etc.) that need to be associated to the VER components that make up the hybrid resources • Map PI Tags (VER actual and meteorological tags) to each Resource ID or VER component. **Note:** System to be determined per Architecture Definition
Open Access Same Time Information (OASIS)	• Updates to create a new category for hybrid resources to be included in the forecast data reports.
Settlements	• Consume new VER Component ID for forecasting fee • Updates to forecast fee calculation based on meter data submitted for the VER components that elect ISO forecast
Metering (MRI-S)	• Ability to receive meter data at the VER Component ID level for hybrid resources • Updates for Western Renewable Energy Generation Information System (WREGIS) reporting of meter data on the Hybrid components
Scheduling Infrastructure and Business Rules (SIBR)	• Treat all hybrid resources as non REM NGRs • Flagging must be configured to ensure bid insertion does not occur • SIBR rules and new rule flow needs to be created to receive and validate the dynamic operating limits • Software that allows market participant to submit their dynamic limit • Allow submission of upper and lower economic limits for each 5-minute interval in a three hour window for hybrid resources • Validation of upper and lower economic limits • Validate the dynamic operating limits

Spring 2022 – Hybrid Resources Phase 2-B (Cont'd)

System	High Level Changes
Resource Interconnection Management System (RIMS)	• Enhance to identify Hybrid resources • RIMS will need to add a new Milestone type under App & Study > Project Summary > Status Report and Milestones: add Milestone Type "Co-located / Hybrid" • Under MPAI > General Info, below the drop box for additional fuel type, add "Co-located/Hybrid:" and add a drop down box with three choices – blank, "Co-located" and "Hybrid." App & Study will provide this information to MPAI when the project is pulled from App & Study. • Collect topographical map and Site Information for hybrid resources • Reference Tariff Appendix Q: Automation of existing manual processes for all renewable resources (resources ID or VER component) - Site Sheets and Topo Maps Impacts and Design Suggestions: o Automate the **Site Sheets** to automatically validate and review for accuracy by creating validation checks for the submitter. ➢ Allow the submitter to enter all of their information in a web form (one form for solar resources and one for wind resources). ➢ Incorporate validation check on information submitted to ensure all fields are entered correctly and match Appendix Q formatting (e.g., WGS84 coordinates, resource type filled out, address provided is a legitimate address). ➢ Add a web form check option to determine if primary met station equipment is LiDAR or not. ➢ Information entered into the system can be compiled into a site sheet (XLSX or PDF format), but the information can also be stored in a database for retrieval and query. o Automate **Topo Maps** validation checks. ➢ Require submitter to enter a list of coordinates for necessary elements on the topo map (project corners, met station location, and/or turbine locations) via a web form. The web form could then cross reference coordinates with the site sheet to confirm all information has been entered accurately and correctly. ➢ Require submitter to upload a digital copy (PDF) of their topo map. ➢ Require submitter to upload a picture of the physical site.

Spring 2022 – Short-Long Start Definitions

Project Information	Details
High Level Business Problem or Need	- To align market applications and business processes with revised ISO Tariff definitions of Short and Long Start resources. - To simplify and streamline CAISO definitions regarding startup classifications. - To clarify operational and settlement communication and outcomes for EIM and ISO market participants.
High Level Project Scope	- Update current ISO Tariff definitions and business practice manuals. - The Medium Start definition will be removed and rolled into the Short Start definition. - Clarify operational and settlement communication and outcomes for EIM and ISO market participants.
BPM Changes	- Definitions & Acronyms - Market Instruments - Market Operations - Reliability Requirements - Settlements & Billing
Tariff Change	The tariff is being changed to 1) align the market and settlement systems, and 2) align to the existing real-time optimization horizon. Sections: 34.3.1, 34.3.2, 34.6 40.6.2

Impacted systems	Details
Market Quality System (MQS)	Auxiliary Processes (Startup, Minimum Load, and Transition Cost BCR pre-qualification) shall consider a resource to be eligible for real-time commitment if the sum of startup time and minimum up time is 240 minutes or less (was previously startup time 270 minutes or less.)
SIBR	Update bid insertion rules to account for changes to Short Start and Long Start definitions under tariff revisions; account for the DA/RT unit commitment 240 minute cycle time for Short Start units (was previously 270 minutes). As previously implemented, Long Start units will not have bid-insertion performed in real-time markets if not committed in the Day-Ahead Market.
Integrated Forward Market, Real Time Market (IFM, RTM)	• Update IFM and RTM market systems to have the DA binding commitment cycle time (startup time + minimum up time) changed from 270 to 240 minutes. • No software impacts to Operator Displays.
Settlements	Settlement systems shall account for new tariff startup definitions when applying DA/RT Bid Cost Recovery, AS Non-Spin/Spin No Pay, and RAAIM Pre-Calc calculations.

Spring 2022 – Short-Long Start Definitions

Milestone Type	Milestone Name	Dates	Status
Board Approval	Inform Board of Governors	2022	
External BRS	Post External BRS	Jun 21, 2021	✓
Config Guides	Post Draft Config Guides	May 27, 2021	✓
Tech Spec	Create ISO Interface Spec (Tech spec)	N/A	
Tariff	File Tariff	TBD	
BPMs	Post Draft BPM changes	TBD	
External Training	Deliver External Training	TBD	
Market Sim	Market Sim Window	TBD	
Production Activation	Short-Long Start Definitions	May 1, 2022	

2022 Fall Release

Fall 2022 – Flexible Ramping Product Improvements Deliverability

Project Information	Details/Date
High Level Project Scope	The scope of the project FRP Deliverability is: 1. Procurement of FRP for BAA's that fails the flex test is separate for each BAA. 2. Procurement of FRP for BAA's that pass the flex test for the entire group of BAA. 3. Transmission constraints and transfer limits are enforced in FRP deployment scenarios 4. Distributing the uncertainty requirement in each BAA load and VER locations versus just load 5. Distributing the demand curve surplus variable as a decision variable at load aggregation points (LAP) versus Balancing Authority Areas (BAA) 6. To establish the Locational Marginal Capacity Prices (LMCP) for FRP
BPM Changes	Market Instruments, Market Operations
Tariff Change	Yes
Impacted Systems	RTM, Settlements, CMRI/OASIS

System	High Level Changes
Real Time Markets (RTM)	• RTM to be impacted based on the change in the FRP procurement systems. • Input data needed for forecasted advisory in the binding interval for RTPD for approx. 40 work days or weekends. • New demand curve calculation is needed.
Settlements	• Prices are nodal therefore mechanics for cost allocation pricing to be changed • Nodal FRP prices
CAISO Market Results Interface (CMRI)/ Open Access Same time Information (OASIS)	• Publish Resource Nodal prices for the FRP awards (CMRI) • Publish requirements for FRP per BAA and BAA group (OASIS) • Publish surplus by LAP (OASIS) • Publish the nodal FRP prices (OASIS)

Fall 2022 – Flexible Ramping Product Improvements Deliverability

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Sept 30, 2020	✓
External BRS	Publish External BRS	Jan 28, 2021	✓
Config Guides	Post Draft Config Guides	TBD	
Tech Spec	Publish Technical Specification	N/A	
Tariff	File Tariff	TBD	
BPMs	Publish Draft BPM updates	TBD	
External Training	Deliver External Training	TBD	
Market Sim	Market Sim Window	Start Jul, 2022	
Production Activation	FRP Deliverability	Oct 01, 2022	

Fall 2022 – EIM Base Schedule Submission Deadline Phase 2

Project Information	Details/Date
High Level Business Problem or Need	Provide EIM Scheduling Coordinators with additional flexibility to submit more accurate base schedules closer to the operating hour. Allow CAISO and EIM Entities to more accurately capture the startup energy of large conventional resources within their Resource Sufficiency Evaluations (RSE), thus increasing their ability to pass the RSE while lowering their exposure to uninstructed imbalance energy settlement.
High Level Project Scope	Updates to the base schedule submission timeline • Move market closing for the final binding EIM base schedule submissions from T-40 to T-30, and add additional RSE at T-40 • Note: Base Schedule Validation outlined in the Policy paper will be covered in existing Market Validation processes so no additional manual or automated business process requirements are needed for Tariff compliance.
BPM Changes	EIM, MI, MO, Settlements
Tariff Change	No
Impacted Systems	RTM, Settlements, BSAP, RCBSAP, ITS, ADS, CMRI/OASIS

Fall 2022 – EIM Base Schedule Submission Deadline Phase 2 (cont'd)

System	High Level Changes
Real-Time Market (RTM)	**Phase 2:** • Shorten the run time of the current T-37.5 RTPD interval • Move start time to after T-30 • Result publication remains at T-22.5 • Final RSE will begin following T-30 deadline • Add additional RSE test
Base Schedule Aggregation Portal (BSAP)	**Phase 2:** • Send base schedule to market at T-30
Interchange Transaction Scheduler (ITS)	**Phase 2:** • ITS will need to adjust the timing of RTPD publication checks and adjustments to account for the RTPD change from T-37.5 RTPD to T-30 • RTPD 5 run will be decreased to around five and a half minutes • RTPD 5 run will be considered late at T-22.5 • RTPD 4 should start at T-21.5 • Payload times need to be adjusted
CAISO Market Results Interface (CMRI)	**Phase 2:** • Additional payload consumed at T-30 for test results • Receive results from RTPD 5 run by T-22.5

Fall 2022 – EIM Base Schedule Submission Deadline Phase 2 (cont'd)

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Dec 17, 2020	✓
External BRS	Milestone: Post External BRS	Jan 15, 2021	✓
Production Activation	EIM Base Schedule Submission Deadline Phase 2	Oct 01, 2022	

2023 CRR Upgrade Project

2023 CRR System Upgrade - Overview

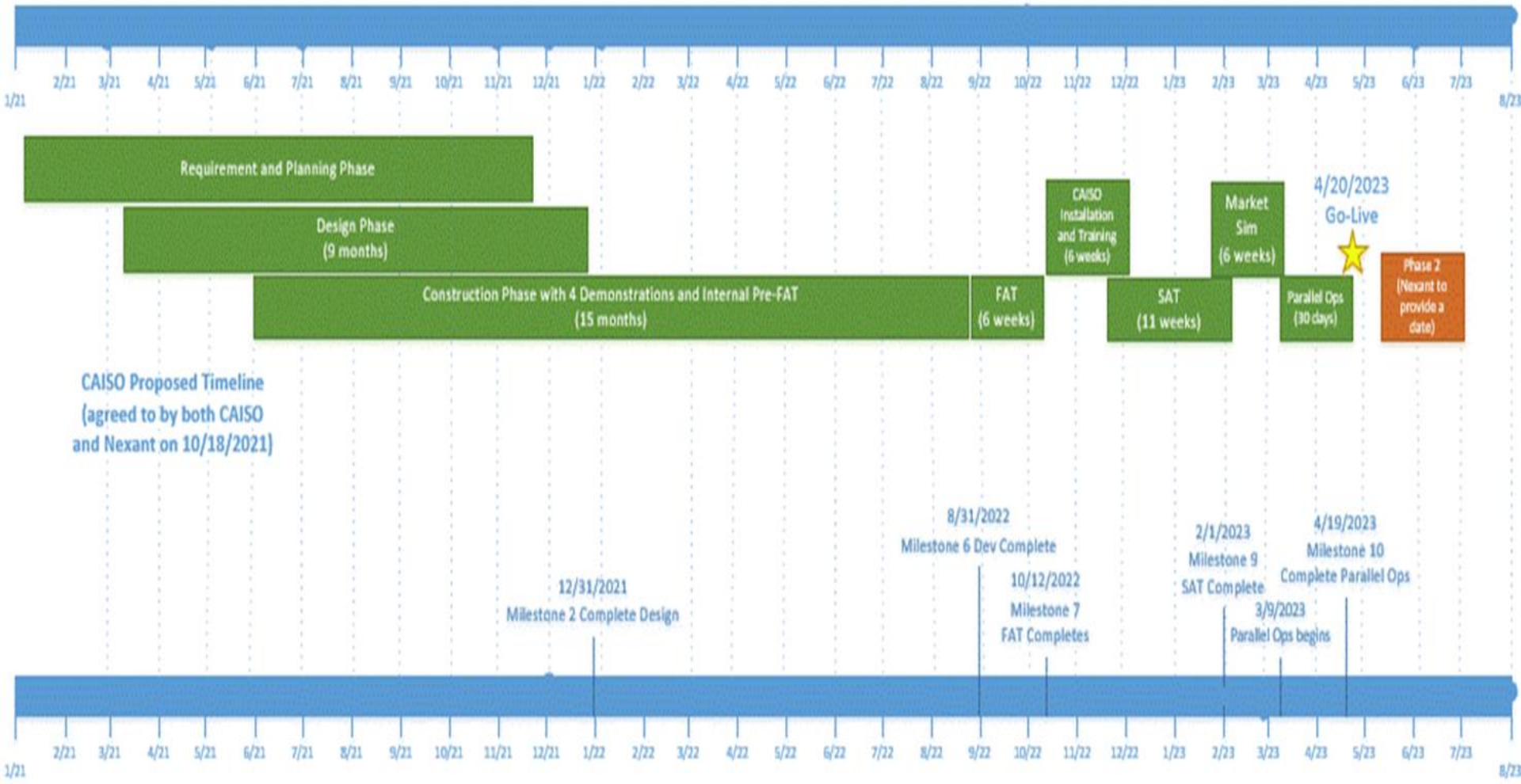
The Congestion Revenue Rights (CRR) system was implemented by CAISO in 2008 as part of the Market Redesign and Technology Upgrade (MRTU) implementation. The current CRR system is at its end of life, does not have the flexibility to accommodate future policy changes and requires the ISO to calculate data and run processes manually outside the current system to produce a successful CRR Auction.

The CAISO has decided to upgrade the existing CRR system to 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 position the system to accommodate policy changes down the road.

2023 CRR System Upgrade – Get Connected

- The two technical meetings we would like CRR technical users to attend are:
  - **Bi-weekly Technical User Group (TUG)** meetings at 10 AM on Tuesdays, alternating with RUG.
    - Meetings are available on the CAISO calendar on www.caiso.com
    - Meeting details and presentation materials are available on the CAISO Developer site at www.developer.caiso.com , which requires an account to be setup for access
  - **B2B Improvements – Webinar Series**
    - This meeting is by invitation only
    - Technical representations only as the meeting covers technical details with respect to the new integration pattern
    - Next meeting is on 11/3/2021
    - Interested folks should send email to inambiar@caiso.com
    - All CRR new API specifications will be presented and discussed in this meeting

2023 CRR System Upgrade – Milestone Schedule



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 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…

Market Sim

Release Users Group (RUG)

Market Sim

Calendar of Meetings, Training and Events

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

today **February 2018** month | day

Sun	Mon	Tue	Wed	Thu	Fri	Sat
4	5 WebCONF: Market Simulation 2:00pm - 3:00pm	6 Training: Get to Know the ISO - Day 1 9:00am - 4:00pm WebCONF: Imbalance Conformance Enhancements 10:00am - 12:00pm WebCONF: 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 WebCONF: 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 WebCONF: Market Simulation 2:00pm - 3:00pm	9 Training: Settlements 201 9:00am - 4:00pm	10
11	12 WebCONF: Participating Transmission Owner Per Unit Cost Guides 10:00am - 12:00pm WebCONF: Market Simulation 2:00pm - 3:00pm	13 Meeting: Congestion Revenue Rights Auction Efficiency 10:00am - 4:00pm WebCONF: Release User Group 10:00am - 11:00am Call: Energy Imbalance Market Governing Body Teleconference (Executive) 11:30am - 12:30pm	14 Deadline: Submissions - April 2018 Monthly Resource Adequacy and Supply Plans Call: Congestion Revenue Rights 11:00am - 11:30am WebCONF: Outage Management System Customer Partnership Group 2:00pm - 3:00pm	15 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 WebCONF: Market Simulation	16	17