

Release User Group Agenda

November 20th, 2018

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.	Dial-in Number: 866-528-2256 International Dial-in: 216-706-7052 Access Code: 291 426 5

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 20th, 2018

10:00 a.m. – 11:00 a.m. (Pacific Time)

Time	Topic	Facilitator
10:00 – 10:05	Agenda & ISO Roll call	Adrian Chiosea
10:05 – 10:45	Release Plan	Joanne Alai Heidi Carder Eureka Cullado Marcelo Da Costa Trang Deluca Ayman Fattah Jami Herguth Cynthia Hinman Mohan Koya Deann MacDougall Christopher McIntosh LeAnne McLaughlin Janet Morris Indu Nambiar Prince Phillip Raeann Quadro Raymond Riley LuAnn Rivera Craig Williams John Williams Justin Wong



The ISO offers innovative training programs

Date	Training	
	No courses scheduled at this time	



New Modules (recorded webinar and slides)	

Generator Contingency and Remedial Action Scheme Modeling (GCARM)

Congestion Revenue Rights (CRR) Auction Efficiency – Track 1A and Track 1B

Commitment Cost Enhancements Phase 3 (CCE3)

EIM Enhancements 2018

Energy Storage / Distributed Energy Resources Phase 2

Eligible Intermittent Resource Dispatch Operating Target (EIR DOT)

Greenhouse Gas (GHG) Enhancements for EIM

Welcome to the ISO (find under Markets and Operations learning track)

New computer-based training (CBT) courses		
ISO Orientation	Master File Process	Metering Overview
Day-Ahead Overview	Emergency Response & Abnormal Operations	Mara to compli
Real-Time Overview	Outages Overview	More to come!!

Visit our **Learning Center** web page to access our training calendar, register for courses and find other useful resources, including computer based training courses, recorded webinars and new release training materials at:

http://www.caiso.com/participate/Pages/LearningCenter/default.aspx



ISO PUBLIC

Release Plan Summary: 2018 – Independent 2019

Independent 2018

- Imbalance Conformance Enhancements (ICE)
- Congestion Revenue Right Auction Efficiency 1B

Spring 2019

- Commitment Cost Enhancement (CCE) Phase 3
- Energy Imbalance Market (EIM) 2019 Balancing Authority of Northern California (BANC) / Sacramento Municipal Utility District (SMUD)

Independent 2019

- Generator Contingency and Remedial Action Scheme (RAS) Modeling
- Automated Dispatch System (ADS) User Interface (UI) Replacement
- FERC Order 844 Uplift Cost Allocation & Transparency
- Interconnection Process Enhancements (Nov 2018 BOG)

Fall 2019 – tentative, subject to impact assessment

- Commitment Costs and Default Energy Bid Enhancements
- Dispatch Operating Target Tariff Clarifications
- Energy Storage and Distributed Energy Resources Phase 3
- RMR and CPM Enhancements (March 2019 BOG)
- Intertie Deviation Settlement (March 2019 BOG)
- Local Power Mitigation Enhancements (Q1 2019 BOG)



Release Plan Summary: Fall 2019 - Spring 2020

Spring 2020

- Energy Imbalance Market (EIM) 2020 Salt River Project
- Energy Imbalance Market (EIM) 2020 Seattle City Light
- Energy Imbalance Market (EIM) 2020 Los Angeles Dept. of Water and Power

Fall 2020

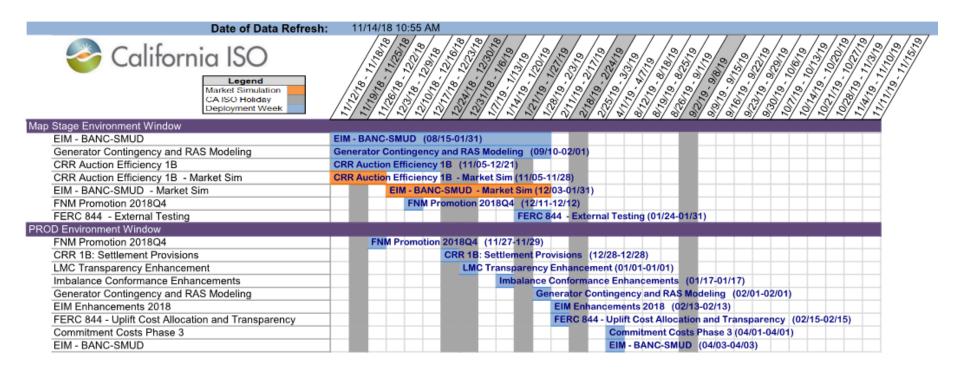
- Contingency Modeling Enhancements Transmissions
- DAME 15 Minute Granularity Phase 1 (Q1, 2019 BOG)
- Storage as a Transmission Facility (Feb 2019 BOG)
- RA Enhancements Track 2 (Mar 2019 BOG)
- Excess Behind the Meter Production (Q2, 2019 BOG)

TBD – tentative, subject to impact assessment

DAME - Flexible Ramping Product (Q2, 2019 BOG)



Release Schedule 2018 – Spring 2019





2018 Independent Projects



2018 – Imbalance Conformance Enhancements

Project Info	Details/Date
Application Software Changes	Improve RTPD, RTD limiter algorithm to better adjust for factors before and after conformance (Inc. VER deviations; other patterns observed from conformance studies; and after conformance value entered - ramping across multiple intervals rather than today's one interval). In scope for delivery in early 2019.
BPM Changes	Definitions & Acronyms BPM. The ISO is replacing the term 'load biasing' with 'imbalance conformance'

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	May 16, 2018	✓
External BRS	Post External BRS	Jul 10, 2018	✓
Config Guides	Post Config Guides	N/A	
Tech Spec	Publish Technical Specifications	N/A	
Tariff	File Tariff	Nov 27, 2018	
BPMs	Post Draft BPM changes	Nov 27, 2018	
	Publish Final Business Practice Manuals	Jan 25, 2019	
External Training	External Training Complete	N/A	
Market Simulation	Market Sim Window	N/A	
Production Activation	Imbalance Conformance Enhancements	Jan 28, 2019	



2018 – LMC Transparency Enhancement

Project Info	Details/Date
Application Software Changes	Logical Meter Calculation (LMC) enhancements will provide additional transparency for ISO market participant dynamic system resources (non ISO-polled) by providing LMC Allocation Factors used to determine the 5-minute settlement interval meter value as a bill determinant. Allocation Factor bill determinants become available for settlement dates on or after April 1, 2019.

Milestone Type	Milestone Name	Dates	Status
External BRS	Post External BRS	Nov 19, 2018	✓
Config Guides	Post Config Guides	Oct 19, 2018	✓
BPMs	Post Draft BPM changes – PRR 1102	Oct 19, 2018	✓
Market Simulation	Market Sim Window	N/A	
Production Activation	LMC Transparency Enhancements	January 1, 2019	



2018 - CRR Auction Efficiency - 1B

Project Info	Details/Date
	Targeted reduction of congestion revenue rights payouts on a constraint by constraint basis
	 CRRS: Calculate offset MW for netted CRRs per portfolio per constraint/contingency case per hour: Calculate netted CRR portfolio proportion of netted flow on constraint (alpha) Calculate IFM constraint flow difference (CFD) Calculate netted CRR portfolio Offset MW = alpha x CFD Calculate netted CRR portfolio Notional, Offset, Clawback and Circular Scheduling Revenue values
	Settlement:
Application Software Changes	 Daily Settlement: Daily CRR Settlement value based on results of constraint-based calculations Daily CRR Surplus Distribution Payment from available constraint-specific funds (In CC6700) Daily surplus and deficits per constraint managed during the month Monthly Settlement - at end of each month Monthly CRR Surplus Distribution Payment from available constraint-specific funds (New CC6701)
	Residual funds allocated to Balancing Account and measured demand. (New CC6706)
	CMRI: Report individual CRR's Notional, Offset, Clawback and Circular Scheduling Revenue values
	OASIS: Report constraint-based data affecting CRR settlements
	Market Clearing/Credit Tracking: Process new charge codes



2018 - CRR Auction Efficiency – 1B

Project Info	Details/Date
BPM Changes	 Congestion Revenue Rights Definitions & Acronyms Market Instruments Market Operations Settlements & Billing
Business Process Changes	Manage Operations Support & Settlements (MOS) / Manage Market Billing & Settlements

Milestone Type	Milestone Name	Dates	Status
Board Approval	BOG Presentation and Approval - Track 1B	Jun 21, 2018	✓
External BRS	Post External Draft BRS	Aug 06, 2018	✓
Config Guides	Post Draft Configuration Guides	Sep 10, 2018	✓
Tech Spec	Create ISO Interface Spec (Tech spec)	Sep 10, 2018	✓
Tariff	File Tariff	Jul 17, 2018	✓
	Update Tariff and Refile with FERC	Oct 01, 2018	✓
BPMs	Post BPM (Draft)	Nov 05, 2018	✓
External Training	Deliver external training	Oct 31, 2018	✓
Market Sim	CRR Auction Efficiency 1B	Nov 05, 2018 - Nov 28, 2018	
Production Activation	CRR Auction Efficiency 1B	Dec 28, 2018	
	65% Transmission Capacity for CRR Allocation & Auction	Sep 24, 2018	✓
	Settlement Provisions	Dec 28, 2018	



ISO PUBLIC Page 12

2019 Spring Release



Spring 2019 - Commitment Cost Enhancements Phase 3

Project Info	Details/Date
Application Software Changes	Scope: 1. Clarify use-limited registration process and documentation to determine opportunity costs 2. Determine if the ISO can calculate opportunity costs • ISO calculated; Modeled limitation Start/run hour/energy output • Market Participant calculated; Negotiated limitation 3. Clarify definition of "use-limited"; add MSG Configuration ID to ULPDT 4. Change Nature of Work attributes (Outage cards) • Modify use-limited reached for RAAIM Treatment • Allow PDR to submit use-limit outage card for fatigue break. 5. Market Characteristics (added to GRDT in Spring 2018) shall be Read-Only and set to Null • Maximum Daily Starts • Maximum MSG transitions • Ramp rates Impacted Systems: 1. Master File: Set use-limited resource types and limits 2. ECIC: Process use limited resource input values for and Receive opportunity cost adders from opportunity cost tool 3. CIRA: RAAIM exempt rule for "use-limited reached" 4. CMRI: Publish opportunity cost adders on bid caps 6. OMS: "Use-Limited Reached" nature of work attribute for Generation Outage Card 7. Settlements: Publish the actual start up, run hour and energy output for the use-limited resources 8. Opportunity cost calculator (OCC): Calculate and publish opportunity costs for start-up, MLC and DEB
BPM Changes	Market Instruments, Outage Management, Reliability Requirement, Market Operations
Business Process Changes	 Manage Market & Reliability Data & Modeling Manage Markets & Grid



Spring 2019 - Commitment Cost Enhancements Phase 3 (cont.)

Project Info	Details/Date
FERC ruling: CCE3 changes	 Updates: As a result of FERC's ruling against CAISO's proposal to allow scheduling coordinators to register market values for resource characteristics in the Master File, changes have been made to prevent the collection of this data. This resulted in Technical Specification, RDT, and validation rule changes, which have been posted to the CAISO website.

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board of Governors (BOG) Approval	Mar 25, 2016	✓
External BRS	Post Updated External BRS	Aug 21, 2017	✓
Config Guides	Config Guide	May 17, 2018	✓
Tech Spec	Publish Updated Master File Technical Specification, GRDT/IRDT Definitions	Jul 13, 2018	✓
	Publish updated CMRI Tech Spec, updated API for Use Limit Type Enumeration update	Aug 02, 2018	✓
Tariff	Draft Tariff	Jul 31, 2017	✓
	File Tariff	Mar 23, 2018	✓
BPMs	Publish Draft BPM: Outage Management	Nov 30, 2018	
	Publish Draft BPM: Reliability Requirements	Nov 30, 2018	
	Publish Draft BPM: Market Instruments	Oct 19, 2018	✓
	Publish Draft BPM: Market Operations	Oct 19, 2018	✓
External Training	Deliver external training	Sep 10, 2018	✓
Market Simulation	Full Market Simulation Testing	Sep 05, 2018 - Oct 12, 2018	✓
Production Activation	Commitment Costs Phase 3	Apr 01, 2019	
	CCE3 Deployment to Production: Master File	May 16, 2018	✓
	CCE3 Deployment in Production: Full Scope	Nov 01, 2018	✓



Spring 2019 – EIM BANC/SMUD

Project Info	Details/Date
Application Software Changes	Implementation of SMUD as an EIM Entity
BPM Changes	EIM BPM will be updated if needed to reflect new modeling scenarios identified during implementation and feedback from SMUD.
Market Simulation	December 3, 2018 – January 31, 2019
Parallel Operations	February 1, 2019 – March 30, 2019

Milestone Type	Milestone Name	Dates	Status
Tariff	File Readiness Certification	Mar 01, 2019	
Market Sim	Market Sim Window	Dec 03, 2018 - Jan 31, 2019	
Parallel Operations	Parallel Operations	Feb 1, 2018 - Mar 30, 2019	
Production Activation	EIM - BANC-SMUD	Apr 03, 2019	



2019 Independent



2019 - Generator Contingency and Remedial Action Scheme Modeling

Project Info	Details/Date
Application Software Changes	 Enhance the Security Constrained Economic Dispatch Model generation/load loss in the dispatch Model transmission loss along and generation/load loss due to RAS operation dispatch Model transmission reconfiguration due to RAS operation in the dispatch Update the congestion component of LMP so that it considers the cost of positioning the system to account for generator contingencies and RAS operations Enhance DAM, RTM and EIM to support generator contingencies Impacted systems: CRR, EDR, EMMS, IFM/RTM, Integration, MF.
BPM Changes	Managing Full Network Model CRR Market Operations EIM
Business Process Changes	 Manage Congestion Revenue Rights (MMR LII) Manage Operations Planning Manage Real Time Operations - Transmission & Electric System (MMG LII)

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Sep 19, 2017	✓
External BRS	Complete and Post External BRS	Mar 16, 2018	✓
Config Guides	Post Draft Config Guides	N/A	
Tech Spec	Create ISO Interface Spec (Tech spec)	N/A	
Tariff	File Tariff	Nov 28, 2018	
BPMs	Post Draft BPM changes	Dec 05, 2018	
External Training	Deliver external training	Sep 12, 2018	✓
Market Sim	Market Sim Window	Sep 17, 2018 - Oct 12, 2018	✓
Production Activation	Generator Contingency and RAS Modeling	Feb 01, 2019	



2019 – ADS Replacement

Project Info	Details/Date
Application Software Changes	 Transition to web-based user interface to eliminate the need to install thick client Transition ADS provisioning to the Access and Identity Management (AIM) application including Resource Level Access Controls (RACL) access The query tool will provide 30 days of historical data Move near-term transactions for FERC-764 15-minute awards to ADS; This will include user interface; historical transactions will stay in CMRI. Various user interface enhancements adding content per Operation's request ADS B2B services will not otherwise change.
BPM Changes	Market InstrumentsMarket Operations
Business Process Changes	To Be Determined

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	N/A	
External BRS	Post External BRS	Aug 06, 2018	✓
ADS Update	ADS Update Meeting	Aug 15, 2018	✓
Config Guides	Design Review - BPM and Tariff SMEs	N/A	
Tech Spec	Publish Technical Specifications	TBD	
Tariff	File Tariff	N/A	
BPMs	Post Draft BPM changes	TBD	
	Publish Final Business Practice Manuals	TBD	
External Training	Conduct External Training	TBD	
Market Sim	Market Sim Window	TBD	
Production Activation	ADS Replacement	TBD	



2019 - FERC 844 Uplift Cost Allocation & Transparency

Project Info	Details/Date
Application Software Changes	 Order No. 844 directs CAISO to post three monthly reports: A zonal uplift report of all uplift payments categorized by transmission zone, day, and uplift category that must be posted within 20 calendar days of the end of each month; A resource-specific report of the total amount of uplift paid to each resource, aggregated across the month, that must be posted within 90 calendar days of the end of each month; and An operator-initiated commitment report listing the commitment size, transmission zone, commitment reason, and commitment start time of each operator-initiated commitment that must be posted within 30 calendar days of the end of each month. CAISO must include in its tariff the transmission constraint penalty factors used in its market software, as well as any circumstances under which those penalty factors can set locational marginal prices, and any process by which CAISO can temporarily change the penalty factors.
BPM Changes	Market Instruments
Business Process Changes	Manage Operations Support & Settlements (MOS)

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Nov 14, 2018	✓
External BRS	External Business Requirements	Nov 26, 2018	
Config Guides	Post Configuration Guide Updates	N/A	
Tech Spec	Create ISO Interface Spec (Tech spec)	Dec 05, 2018	
Tariff	File Tariff	Nov 28, 2018	
BPMs	Post Draft BPM changes for Market Instruments	Jan 04, 2019	
External Training	Deliver external training	Jan 21, 2019	
External Testing	External Testing Window	Jan 24, 2019 – Jan 31, 2019	
Production Activation	FERC 844 - Uplift Cost Allocation and Transparency	Feb 15, 2019	



ISO PUBLIC Page 20

2019 Fall Release



Fall 2019 - Commitment Cost and Default Energy Bid Enhancements

Project Info	Details/Date
	Scope:
	Enhances the ability to submit market-based commitment cost bids in order to reflect unique costs and volatility:
	 Support integration of renewable resources through incentivizing flexible resources participation during tight fuel supply
	 Account for costs of flexible resources (gas and non-gas) to reduce risk of insufficient cost recovery
	Encourage participation of non-RA and voluntary EIM resources; compliance with FERC Order 831
	Raises energy bid cap from \$1,000/MWh to \$2,000/MWh:
	Requires supporting verified costs of energy bids above \$1,000/MWh
	Introduces market power mitigation (MPM) measures for commitment costs.
	Impacted Systems:
Application Software Changes	 SIBR: Incorporate negotiated default commitment bids, allow the submittal of Ex Ante cost adjustments. Increase commitment cost caps, increase energy bid caps, incorporate soft energy bid cap. Allow for hourly submittal of minimum load bids into day-ahead market.
	• IFM/RTM: Add MPM tests for commitment costs. Mitigate commitment costs where tests indicate market power. Incorporate MPM (both energy and commitment) in short term unit commitment process. Recalibrate the penalty price parameters in response to raising energy bid cap to \$2,000/MWh.
	 CMRI: Provide resource-specific reporting on mitigation results for commitment costs. Provide additional source information for default bids.
	 MQS/PCA: Incorporate mitigation of commitment costs for specific exceptional dispatch (ED) types. Incorporate bid locking of commitment costs for ED instructions and for certain cases where resources are uneconomic to operating.
	 Master File: Allow submittal of resource-specific minimum load costs for costs that are independent of the Pmin level. Add the ability to indicate preference for new negotiated cost basis type. Provide a view of resource-specific scalars used for validating Ex-Ante cost adjustments.
	CIDI: Incorporate templates for submitting request for manual consultation and ex-post default bid adjustments.



ISO PUBLIC Page 22

Fall 2019 - Commitment Cost and Default Energy Bid Enhancements

Project Info	Details/Date
BPM Changes	 Market Instruments Market Operations
Business Process Changes	 Maintain Major Maintenance Adders (MMG LIII) Maintain Negotiated Default Energy Bids (MMG LIII) Maintain Negotiated O_Ms (MMG LIII) Manage Day Ahead Market (MMG LII) Manage Market Billing Settlements (MOS LII) Manage Real Time Hourly Market (RTPD) (MMG LII) Manage Real Time Operations – Maintain Balance Area (MMG LII)

Milestone Type	Milestone Name	Dates	Status
Draft Policy	Publish Draft Business Rules externally	Jan 31, 2018	✓
Board Approval	Obtain Board of Governors Approval	Mar 22, 2018	✓
External BRS	Publish revised external BRS	Apr 01, 2019	
Config Guides	Config Guide	May 17, 2019	
Tech Spec	Publish Technical Specifications	May 17, 2019	
Tariff	File Tariff	Jun 14, 2019	
BPMs	Post Draft BPM changes	Jul 12, 2019	
External Training	Deliver external training	Jul 12, 2019	
Market Sim	Market Sim Window	Jul 15, 2019 - Aug 30, 2019	
Production Activation	CCDEBE	Oct 01, 2019	



ISO PUBLIC Page 23

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 <u>www.caiso.com</u> for meeting dates and times and add events to your calendar
 - Typically held on Mondays and Thursdays
 - Market sim calls for major releases will be market noticed
 - 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 February 2018 4 🕨 day today Mon Sun Wed Thu Fri Sat **Market Sim** ≜₀ WebCONF: O Deadline: Training: 🙎 Meeting: Training: Market Simulation Get to Know the ISO - Day 1 Comments -Audit Com mittee Settlements 201 Interconnection Process Teleconference (Executive) 2:00pm - 3:00pm 9:00am - 4:00pm En han cem ents 2018 - Is sue 9:00am - 4:00pm Paper and Meeting 8:30am - 9:30am Dis cus sion im balance Conformance Training: Settlements 101 Enhance ments Training: Get to Know the ISO - Day 2 10:00am - 12:00pm 9:00am - 4:00pm Neb CONF: Meeting: Meeting: 2017-2018 Transmission Te chnical User Group Planning Process Flexible Resource Adequacy Criteria Must Offer Obligation Phase 2 -10:00am - 4:00pm Revised Draft Flexible Market Sim Nabconf: Capacity Framework Market Simulation 10:00am - 4:00pm 2:00pm - 3:00pm ≜₀ V\b b CONF: Market Settlement User Group 10:00am - 11:00am NVebCONF: Deadline: Deadline: Meeting: Participating Transmission Congestion Revenue Rights Submissions - April 2018 Comments - Review Owner Per Unit Cost Auction Efficiency Monthly Resource Transmission Access Release Users Group Guides Adequacy and Supply Plans Charge Structure Straw 10:00am - 4:00pm Proposal and Meeting 10:00am - 12:00pm Dis cus sion (RUG) MODEONE: Congestion Revenue Rights 20 VVebCONF: Release User Group Market Simulation Board of Governors 11:00am - 11:20am 10:00am - 11:00am Teleconference (General) Nabconf: 2:00pm - 3:00pm Outage Management 8:16am - 9:00am Energy imbalance Market System Customer Governing Body Partnership Group Teleconference (Executive) Board of Governors 2:00pm - 3:00pm Teleconference (Executive) 11:30am - 12:20pm 9:00am - 10:00am Call: Market Update 10:16am - 11:00am Mabconf:



ISO PUBLIC

Market Simulation