



Release User Group Agenda

August 27th, 2019

10:00 a.m.–11:00 a.m. (Pacific Time)

| Web Conference Information | Conference Call Information |
|--|--|
| <p>Web Address: https://caiso.webex.com/meet/RUG Meeting Number: 960 941 245</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>Dial-in Number: 866-528-2256 International Dial-in: 216-706-7052 Access Code: 291 426 5</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> | |

Release User Group Agenda

August 27th, 2019

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 | Trang Deluca Cynthia Hinman Christopher McIntosh Jeremy Malekos Janet Morris |

The ISO offers innovative training programs

| Date | Training courses and workshops |
|--------------|--|
| August 26 | Pre-Market Sim Training – ESDER 3A (Webinar) |
| August 27 | Pre Market Sim Training – RT Market Neutrality (Webinar) |
| August 29 | Pre Market Sim Training – LMPME (Webinar) |
| September 26 | Welcome to the ISO (Webinar) |
| October 8 | Pre Market Sim Training - CCDEBE Phase 1 (Webinar) |



CustomerTraining@caiso.com

New Modules (recorded webinar and slides)

You can find new initiatives training courses on the learning center web page below. More resources will be added throughout 2019 in accordance with project schedules.

Computer Based Training

There are more than 20 computer based training modules on the ISO website covering:

- Markets and Operations
- Reference Materials
- Settlements and Metering
- Western Energy Imbalance Market

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>

Release Plan Summary: 2019

Fall 2019

- Commitment Costs and Default Energy Bid Enhancements Phase 1
- Energy Storage and Distributed Energy Resources Phase 3A
- RMR and CPM Enhancements
- Local Market Power Mitigation Enhancements
- EIM 2019 Enhancements
- FERC Order 841 – Energy Storage Resources
- Real-Time Market Neutrality Settlement

Spring 2020

- Energy Imbalance Market (EIM) - 2020 Salt River Project
- Energy Imbalance Market (EIM) - 2020 Seattle City Light

Independent 2020

- Automated Dispatch System (ADS) User Interface (UI) Replacement

Fall 2020

- Commitment Costs and Default Energy Bid Enhancements Phase 2
- Contingency Modeling Enhancements - Transmission
- Energy Storage and Distributed Energy Resources Phase 3B
- Dispatch Operating Target Tariff Clarifications
- Intertie Deviation Settlement
- Excess Behind the Meter Production
- Capacity Procurement Mechanism Soft Offer Cap (BOG Q1 2020)
- Import Bid Cost Verification (BOG June 2020)

Release Plan Summary: 2020 - 2022

Spring 2021

- Energy Imbalance Market (EIM) 2021 - Public Service Company of New Mexico
- Energy Imbalance Market (EIM) 2021 - North-Western Energy
- Energy Imbalance Market (EIM) 2021 - Los Angeles Dept. of Water and Power
- Energy Imbalance Market (EIM) 2021 - Turlock Irrigation District

Fall 2021 – tentative, subject to impact assessment

- Day Ahead Market Enhancements (BOG Q4 2020)
- RA Enhancements (BOG May/Jun 2020)
- Energy Storage and Distributed Energy Resources Phase 4 (BOG Q1 2020)
- Storage as a Transmission Facility (BOG TBD)
- TAC Structure Enhancements (BOG TBD)
- Market Settlement Timeline Transformation (BOG Nov 2019)

Spring 2022

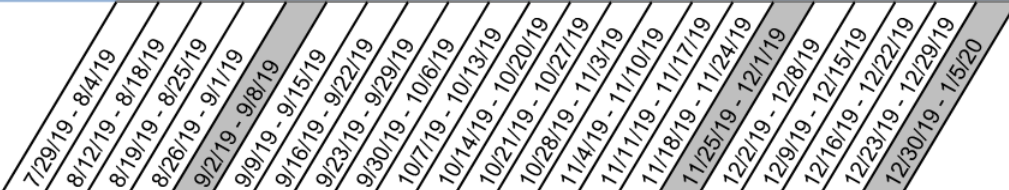
- Energy Imbalance Market (EIM) 2022 - Avista
- Energy Imbalance Market (EIM) 2022 - Tucson Electric Power

Release Schedule 2019

Date of Data Refresh: 8/9/2019



| Legend | |
|-------------------|-----------------|
| Market Simulation | CA ISO Holiday |
| External Testing | Deployment Week |



MAP Stage Environment Window

| | |
|--|--|
| Fall 2019 Release Maintenance | Fall 2019 Release Maintenance (08/19-09/03) |
| CCDEBE1 | CCDEBE1 (09/03-11/21) |
| CCDEBE1 - Market Sim | CCDEBE1 - Market Sim (09/03-11/21) |
| ESDER3A | ESDER3A (09/03-10/11) |
| ESDER3A - Market Sim | ESDER3A - Market Sim (09/03-10/11) |
| RMRC PME | RMRC PME (09/03-10/11) |
| RMRC PME - Market Sim | RMRC PME - Market Sim (09/03-10/11) |
| LMPME | LMPME (09/03-10/11) |
| LMPME - Market Sim | LMPME - Market Sim (09/03-10/11) |
| EIM2019 | EIM2019 (09/03-10/11) |
| EIM2019 - Market Sim | EIM2019 - Market Sim (09/03-10/11) |
| FERC841 | FERC841 (09/03-10/11) |
| FERC841 - Market Sim | FERC841 - Market Sim (09/03-10/11) |
| RTM Neutrality Settlement | RTM Neutrality Settlement (09/03-10/11) |
| RTM Neutrality Settlement - Market Sim | RTM Neutrality Settlement - Market Sim (09/03-10/11) |
| EIM 2020 SRP & SCL | EIM 2020 SRP & SCL (12/03-01/31) |
| EIM 2020 SRP & SCL - Market Sim | EIM 2020 SRP & SCL - Market Sim (12/03-01/31) |

Production Environment Window

| | |
|--|--|
| RTM Neutrality Settlement Effective Date | RTM Neutrality Settlement Effective Date (08/01) |
| FNM DB 2019Q3 | FNM DB 2019Q3 (09/17-09/19) |
| ESDER3A - DRRS | ESDER3A - DRRS (11/06-11/06) |
| ESDER3A | ESDER3A (11/13) |
| RMRC PME Implementation | RMRC PME Implementation (11/13) |
| LMPME | LMPME (11/13) |
| EIM2019 | EIM2019 (11/13) |
| FERC841 | FERC841 (11/13) |
| RTM Neutrality Settlement Implementation | RTM Neutrality Settlement Implementation (11/13) |
| FNM DB 2019M11 | FNM DB 2019M11 (11/19-11/21) |
| CCDEBE1 | CCDEBE1 (12/04) |
| RMRC PME Effective Date | RMRC PME Effective Date (01/01) |

<http://www.caiso.com/Documents/ReleaseSchedule.pdf>

2019 Fall Release

Fall 2019 Release – Overview

| | Board Approval | External BRS | Config. Guide | Technical Specifications | Mkt Sim Scenarios | Draft Tariff* | BPMs | External Training | Market Sim | Production Activation |
|-------------------------------------|----------------|----------------------|----------------------|--|-------------------|-----------------|--------------------|-------------------|----------------------------|--------------------------------|
| Fall 2019 Release - Overview | | 04/01/19 | 05/17/19 | 05/17/19 | 05/17/19 | 07/14/19 | 08/26/19 | 08/26/19 | 09/03/19 – 10/11/19 | 11/13/19 |
| CCDEBE1 | 03/22/18 | 07/19/19 09/03/19 | N/A | 05/17/19 CMRI 07/10/19 SIBR | N/A | 05/10/19 | 09/26/19 | 08/29/19 | 09/03/19 – 11/04/19 | 12/04/19 |
| ESDER3A | 09/05/18 | 07/18/19 | 05/17/19 07/08/19 | 05/16/19 MF, DRRS, MRI-S | 06/19/19 v1.1 | 05/28/19 | 07/30/19 | 08/26/19 | 09/03/19 – 10/11/19 | 11/06/19 - DRRS 11/13/19 |
| RMR-CPME | 03/28/19 | 07/25/19 | 06/03/19 07/08/19 | N/A | 06/27/19 v1.0 | 04/03/19 | 08/26/19 | 08/28/19 | 09/03/19 – 10/11/19 | 11/13/19 Effective 01/01/19 |
| LMPME | 03/28/19 | 04/01/19 | N/A | 05/16/19 CMRI 06/28/19 MF | 06/17/19 v1.1 | 04/16/19 | 09/05/19 | 08/29/19 | 09/03/19 – 10/11/19 | 11/13/19 |
| EIM2019 | N/A | 08/12/19 | 05/17/19 | 05/17/19 CMRI 07/03/19 BSAP 07/19/19 OASIS | N/A | N/A | 07/30/19 | 08/26/19 | 09/03/19 – 10/11/19 | 11/13/19 |
| FERC841 | N/A | 06/20/19 | 06/03/19 | N/A | N/A | N/A | 8/21/09 8/30/09 | N/A | 09/03/19 – 10/11/19 | 11/13/19 |
| RTM Neutrality Settlement | 07/25/19 | 08/07/19 | 07/31/19 | N/A | N/A | 07/30/19 | 08/26/19 | 08/27/19 | 09/03/19 – 10/11/19 | 11/13/19 Effective 08/01/19 |

Notes:

Items in **BLUE** are complete

Items in **PURPLE** indicate a new date.

Items in **RED** indicate a new date which is later than the target date listed on the overview line.

*Draft Tariff dates have been updated to show only the draft tariff posting. FERC Filing dates can be seen on individual project slides.

Fall 2019 Release – System Interface Changes

MF

| Project | Change Type | API Service Name & Major Version, Artifacts | Minor Version | RDT | MAP Stage | Production Activation | Technical Specifications |
|-----------------------------|-------------|--|---------------|----------------------------|-------------|-----------------------|--------------------------|
| ESDER3A LMPME CCDEBE1 | Modify | RetrieveGeneratorRDT_MFRDv4 RetrieveGeneratorRDT_MFRDv4_DocAttach | 20191001 | | Sep 3, 2019 | Nov 13, 2019 | 5.1 |
| ESDER3A LMPME | Modify | SubmitGeneratorRDT_MFRDv4 SubmitGeneratorRDT_MFRDv4_DocAttach | 20191001 | GRDT v13.0 | Sep 3, 2019 | Nov 13, 2019 | 5.1 |

SIBR/BSAP

| System | Project | Change Type | API Service Name & Major Version, Artifacts | MAP Stage | Production Activation | Technical Specifications |
|--------|----------|-------------|--|--------------|-----------------------|--------------------------|
| SIBR | CCDEBE1 | Modify | RetrieveCleanBidSet_SIBRv5 RetrieveCleanBidSet_SIBRv5_DocAttach | Oct 14, 2019 | Dec 4, 2019 | v13.1 |
| SIBR | CCDEBE1 | Modify | RetrieveCurrentBidResults_SIBRv5 RetrieveCurrentBidResults_SIBRv5_DocAttach | Oct 14, 2019 | Dec 4, 2019 | v13.1 |
| SIBR | CCDEBE1 | Modify | SubmitRawBidSet_SIBRv5 SubmitRawBidSet_SIBRv5_DocAttach | Oct 14, 2019 | Dec 4, 2019 | v13.1 |
| BSAP | EIM 2019 | Modify | RetrieveBalancingTestResults_BSAPv2 RetrieveBalancingTestResults_BSAPv2_DocAttach | Sep 3, 2019 | Nov 13, 2019 | 1.7 |

Fall 2019 Release – System Interface Changes

CMRI

| Project | Change Type | UI Change | API Service Name & Major Version, Artifacts | MAP Stage | Production Activation | Technical Specifications |
|------------------|-------------|---|--|-------------|-----------------------|--------------------------|
| LMPME CCDEBE1 | Modify | Tab: Default Bids Existing Report: Default Energy Bid Curves | RetrieveDefaultBidCurves_CMRIv2 RetrieveDefaultBidCurves_CMRIv2_DocAttach *8/12/19: Service wsdl files retrieveDefaultBidCurves_v2.wsdl and retrieveDefaultBidCurves_v2_DocAttach.wsdl are updated to refer the correct version of XSD files. *8/15/19: Note: This will include Publication timestamp in DefaultBidCurve_v2 | Sep 3, 2019 | Nov 13, 2019 | 3.9.1 |
| LMPME | Modify | Tab: Default Bids Existing Report: Default Commitment Costs | RetrieveExternalDefaultCommitmentCost_CMRIv1 RetrieveExternalDefaultCommitmentCost_CMRIv1_DocAttach | Sep 3, 2019 | Nov 13, 2019 | 3.9.1 |
| EIM 2019 | New | Tab: Energy Imbalance Market New Report: Resource Operating Limits | RetrieveEIMResourceOperatingLimit_CMRIv1 RetrieveEIMResourceOperatingLimit_CMRIv1_DocAttach | Sep 3, 2019 | Nov 13, 2019 | 3.9.1 |
| EIM 2019 | New | Tab: Real-Time New Report: Resource Operating Limits | RetrieveResourceOperatingLimit_CMRIv1 RetrieveResourceOperatingLimit_CMRIv1_DocAttach | Sep 3, 2019 | Nov 13, 2019 | 3.9.1 |

OASIS

| Project | Change Type | UI Change | API Service Name & Major Version, Artifacts | MAP Stage | Production Activation | Technical Specifications |
|----------|-------------|--|---|-------------|-----------------------|--------------------------|
| EIM 2019 | New | Tab: ENERGY New Report: Transmission Loss | ENE_TRANS_LOSS | Sep 3, 2019 | Nov 13, 2019 | 5.1.9 |

CMRI Improvements

| Project Info | Details/Date |
|---|--|
| <p>CMRI UI Upgrade & Performance Improvements</p> | <p>CAISO is planning CMRI UI Upgrade & Performance Improvements</p> <ul style="list-style-type: none"> • Performance Improvements <ul style="list-style-type: none"> • Technology/Infrastructure Upgrade • Data Model Normalization <ul style="list-style-type: none"> • Due to data model normalization there will be data migration effort from old model to new model. • Data migration process is being tested in Non-Production environment. Current Plan: <ul style="list-style-type: none"> • Complete the data migration and cut over to new UI and performance improvements. • After cutover, users will have access to all the data. • ISO will communicate CMRI performance improvements patch deployment time line. • Market Participant Testing prior to Production deployment. • NO API interface changes and NO functionality changes. • CAISO requests to use the latest supported version as mentioned in the Tech Specs for application programming interfaces (API) |

| Milestone Type | Milestone Name | Dates | Status |
|-----------------------|--|--------------|--------|
| Map Stage | CMRI Improvements available in MAP Stage | Jun 10, 2019 | ✓ |
| Production Activation | CMRI Performance Improvements | Sept 4, 2019 | |

Commitment Cost and Default Energy Bid Enhancements - Tariff filing approach (from draft tariff review on June 12 call)

Fall 2019 Implementation - CCDEBE Phase1 - will file with FERC by end of August 2019

- ✓ Commitment Cost Caps
- ✓ Reference Level Adjustments with changes adopted in LMPME
- ✓ Make Day Ahead Market process permanent
- ✓ Make D+2 Process permanent
- ✓ Use of indices clarification per LMPME
- ✓ Use of Monday Only in DAM and RTM per LMPME

Fall 2020 Implementation

- CCDEBE Phase 2 - tariff filing TBD
 - ✓ Increase commitment cost caps/decrease adder to commitment cost calculations
 - ✓ Adopt market power mitigation of commitment costs
- FERC Order No 831 - will file with FERC by end of August 2019
 - ✓ Increase of energy bid cap to \$2000/MWh
 - ✓ Cost verification of bids above \$1000/MWh (internal and resource specific system resources)
 - ✓ After the cost recovery
- Import Bid Cost Verification - tariff filing TBD
 - ✓ Delay stakeholder process to develop screens for import bids from non-resource specific system resources
 - ✓ Implement concurrent with Order No. 831 compliance
 - ✓ Consider changes to power balance constraint penalty prices and other scarcity prices due to increase in bid cap

Fall 2019 – Commitment Cost and Default Energy Bid Enhancements Ph1

| Project Info | Details/Date |
|------------------------------|---|
| Application Software Changes | <p><u>Scope:</u> Enhances the ability to submit market-based commitment cost bids in order to reflect unique costs and volatility:</p> <ul style="list-style-type: none"> • Ex-ante cost adjustment requests • Reference Level Adjustments to default commitment cost bids (start-up and minimum load costs) and default energy bids • Make Day Ahead Market process permanent • Make D+2 Process permanent • Use of indices clarification, and Monday Only in DAM and RTM, per LMPME • Conditionally Available Resources (CAR) <p><u>Impacted Systems:</u></p> <ul style="list-style-type: none"> • SIBR: Allow the submittal of Ex Ante cost adjustments. • CMRI: Provide additional source information for default bids. <p>Submit requests through CIDI for manual consultation and ex-post default bid adjustments.</p> |
| BPM Changes | <ul style="list-style-type: none"> • Market Instruments • Market Operations |
| Business Process Changes | <ul style="list-style-type: none"> • 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) |

Fall 2019 – Commitment Cost and Default Energy Bid Enhancements Ph1

| 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 v1.1 | Jan 22, 2019 | ✓ |
| | Publish External BRS v1.2: Phase 1/Phase 2, clarifications | Mar 29, 2019 | ✓ |
| | Publish External BRS v1.3: Reference Level Adjustments | Apr 05, 2019 | ✓ |
| | Publish External BRS v1.4 for CCDEBE tariff traceability | Jul 19, 2019 | ✓ |
| | Publish External BRS v1.5: implementation notes & clarifications (BRQ046, BRQ035/335), Generic Hub GPI update | Sep 3, 2019 | |
| Config Guides | Config Guide | N/A | |
| Tech Spec | Publish Technical Specifications | May 17, 2019 | ✓ |
| | Publish Technical Specification updates for CARs and Electric Pricing Hub weighting | Jun 28, 2019 | ✓ |
| Tariff | File Tariff - CCDEBE Phase 1 | Aug 30, 2019 | |
| | Draft Tariff published | May 13, 2019 | ✓ |
| | Tariff stakeholder walkthrough conference call | Jun 11, 2019 | ✓ |
| BPMs | Post Draft BPM changes | Sep 26, 2019 | |
| External Training | Deliver External Training | Oct 08, 2019 | |
| Market Sim | Unstructured Market Sim Window | Oct 21, 2019 - Nov 04, 2019 | |
| Production Activation | CCDEBE Phase 1 | Dec 04, 2019 | |

* Project schedule shows risk in meeting current targets. Project team attempting to mitigate risk. Tariff filing will request a “no-later-than” Dec 11 effective date.

Fall 2019 – ESDER Phase 3a – Bid Dispatchable Option

| Project Info | Details/Date |
|---|---|
| <p>Application Software Changes</p> | <p><u>Scope:</u> The ESDER 3a scope of the larger ESDER3 initiative will include two (2) demand response enhancements:</p> <ul style="list-style-type: none"> • New bid dispatchable options for demand response resources • Removal of single LSE requirement for PDR registrations & removal of default load adjustment (DLA) <p>Additionally, for ESDER2 Tariff Compliance, following is being implemented as part of this project</p> <ul style="list-style-type: none"> • Customer Load Baseline Submittal <p><u>Impacted Systems (Overview):</u></p> <p>Master File:</p> <ul style="list-style-type: none"> • RDTs for PDR registrations in MF will require selection of an effective Bid Dispatchable Option to be used for market optimization and dispatch <p>DRRS:</p> <ul style="list-style-type: none"> • PDR registrations will not require all service accounts to have the same LSE <p>SIBR:</p> <ul style="list-style-type: none"> • Will apply Net Benefit Test price criteria for PDR bids and reject those not meeting the applicable criteria • Will not allow Bid Dispatchable Options to be changed in SIBR <p>HASP/RTM:</p> <ul style="list-style-type: none"> • Will use effective Bid Dispatchable Option registered in MF (e.g., 5-min, 15-min or Hourly) for market optimization and dispatch instructions • Will broadcast new PDR energy schedules/awards and instructions to downstream applications <p>Settlements:</p> <ul style="list-style-type: none"> • Will remove the default load adjustment (DLA) application • Will provide Bid Cost Recovery for PDRs with 15-Minute Bids but not Hourly Bids <p>CMRI:</p> <ul style="list-style-type: none"> • Will include energy schedules and awards for PDRs with new Bid Dispatchable Options (Existing) <p>MRI-Settlements (ESDER2 Tariff Compliance):</p> <ul style="list-style-type: none"> • New BASE measurement type for monitoring calculated baseline data |

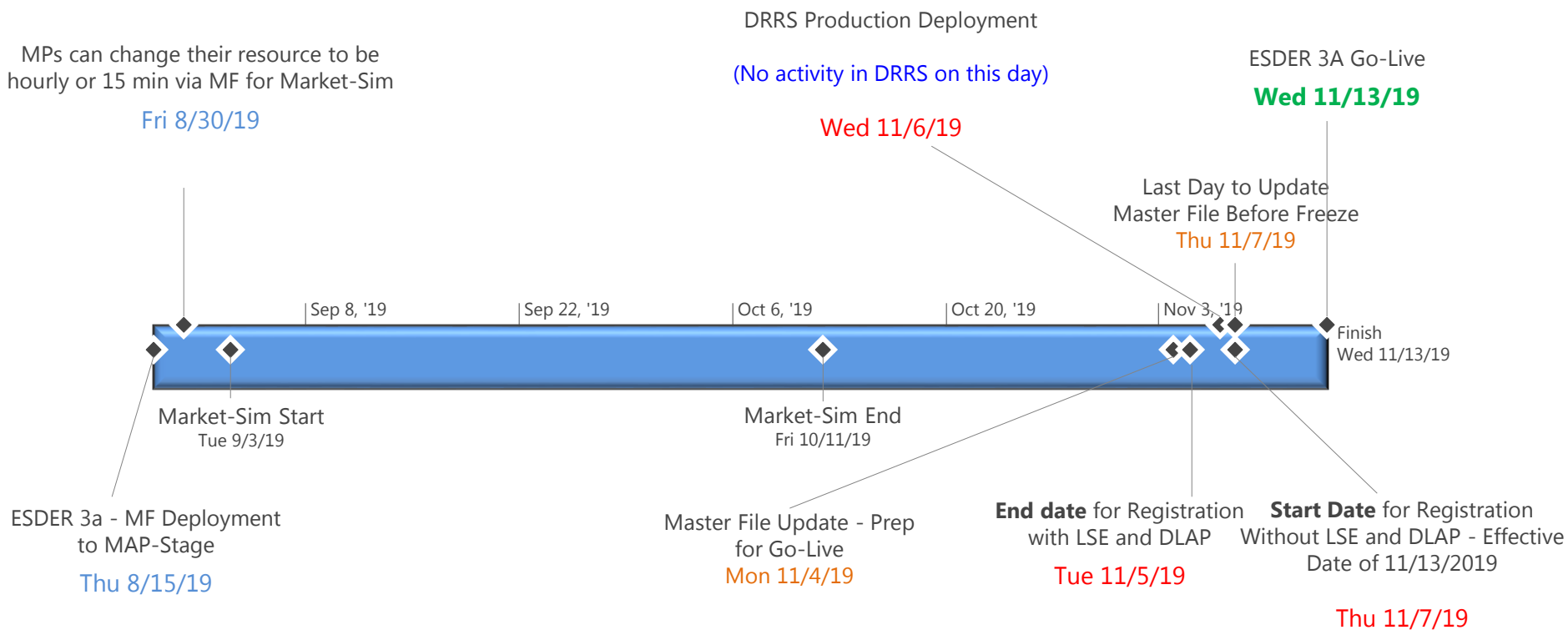
Fall 2019 – ESDER Phase 3a – Bid Dispatchable Option (cont.)

| Project Info | Details/Date |
|---------------|--|
| BPM Changes | <ul style="list-style-type: none"> Market Instruments, Metering, and Demand Response (new BPM) Market Operations |
| Tariff Change | 4.13 and 11.6 |

| Milestone Type | Milestone Name | Dates | Status |
|-----------------------|--|-----------------------------|--------|
| Board Approval | Obtain Board of Governors Approval | Sep 05, 2018 | ✓ |
| External BRS | Post External BRS v1.0 | Feb 11, 2019 | ✓ |
| | Post Revised External BRS v1.1 | Feb 25, 2019 | ✓ |
| | Post Revised External BRS v1.2 | Mar 20, 2019 | ✓ |
| | Post Revised External BRS v1.3 | Jun 20, 2019 | ✓ |
| | Post Revised External BRS v1.4 | Jul 18, 2019 | ✓ |
| Config Guides | Post Draft Config Guides | May 17, 2019 | ✓ |
| Tech Spec | Publish Technical Specifications | May 17, 2019 | ✓ |
| Tariff | Post Draft Tariff | May 28, 2019 | ✓ |
| | File Tariff | Aug 29, 2019 | |
| BPMs | Post Draft BPM (DR, MI & Metering) changes | Jul 30, 2019 | ✓ |
| | Post draft BPM changes - Market Operations | Aug 20, 2019 | ✓ |
| External Training | External training | Aug 26, 2019 | ✓ |
| Market Sim | ESDER 3a | Sep 03, 2019 - Oct 11, 2019 | |
| Production Activation | ESDER 3a - DRRS | Nov 06, 2019 | |
| | ESDER 3a - IFM/RTN, Settlements, SIBR | Nov 13, 2019 | |

Fall 2019 – ESDER Phase 3a – Bid Dispatchable Option (cont.)

Proposed DRRS & MF Transition Timeline



Fall 2019 – RMR and CPM Enhancements

| Project Info | Details/Date |
|------------------------------|--|
| Application Software Changes | <p><u>Scope:</u> RMR and CPM Enhancements will address the following policy and tariff amendment scope:</p> <ul style="list-style-type: none"> • Risk-of-Retirement tariff provisions will transition from CPM to RMR section • RMR units under the new tariff provisions shall: <ul style="list-style-type: none"> Have reliability capacity allocated by TAC Area (for PTOs, not LSEs), Flex RA credit shall be applied Receive Must-Offer Obligation (MOO) Subject to RAAIM Streamline RMR invoicing, settlement process through inclusion in ISO Settlement process <p><u>Impacted Systems (Overview):</u></p> <p>Master File:</p> <ul style="list-style-type: none"> • No impact. ISO will internally manage RMR resource status and vintage (e.g. RMR vs. RMRL). <p>CIRA:</p> <ul style="list-style-type: none"> • New features to both qualify (e.g. confirm EFC is defined) and allocate System/Local/Flex reliability capacity by TAC Area (for PTOs) for RMR units with new contract type: <ul style="list-style-type: none"> • Apply Flex RA credit by TAC Area (for PTOs) • Perform RMR Substitution • Support RMR Risk-of-Retirement • Like RA resources, RMR units under the new tariff will receive RAAIM status determination <p>SIBR</p> <ul style="list-style-type: none"> • Like RA resources, automatically generates cost-based energy bids for new contract type RMR units for un-submitted bid range below RMR contract capacity <ul style="list-style-type: none"> • Bids will reflect applicable GHG Compliance costs, SC charges, Major Maintenance Adder (MMA), and (if applicable) Opportunity Costs (OC); Note: MMA and OC are recovered through fixed cost payments (not market rents) and will be clawed-back during the ISO settlement process. • Removes self-schedule requirement for new contract type RMR units scheduled/dispatched in Day-Ahead Market <p>IFM/RTM:</p> <ul style="list-style-type: none"> • Unit Commitment, Economic Dispatch decisions will include applicable MMA and OC (no change from today) • Like RA resources, new contract type RMR units will have automatic RA Obligation (\$0/MWh bids in RUC) |

Fall 2019 – RMR and CPM Enhancements (cont.)

| Project Info | Details/Date |
|------------------------------|---|
| Application Software Changes | <p><u>Impacted Systems (Continued):</u></p> <p>IFM/RTM:</p> <ul style="list-style-type: none"> • Unit Commitment, Economic Dispatch decisions will include applicable MMA and OC (no change from today) • Like RA resources, new contract type RMR units will have automatic RA Obligation (\$0/MWh bids in RUC) <p>Settlements:</p> <ul style="list-style-type: none"> • RMR units under new contract type will receive: <ul style="list-style-type: none"> • RMR under new tariff provisions will settle through the ISO Settlements calendar; • Legacy RMR (RMRL) will continue to receive payment through the RMR invoicing process • Monthly RMR capacity payment (by resource) and cost allocation (by PTO) • RAAIM settlement/allocation • Bid Cost Recovery (does not include MMA or OC) • Clawback of fixed MMA and OC costs (if applicable) <p>CPM tariff revisions will be addressed during the CPM Soft Offer Cap policy initiative.</p> |
| BPM Changes | Reliability Requirements, Generator Management, Market Operations, Market Instruments, Settlements and Billing |
| Tariff Change | 11.13, 31.2.2, 34.1, 40.9, 41, 43, 43A, Appendix G |

Fall 2019 – RMR and CPM Enhancements (cont.)

| Milestone Type | Milestone Name | Dates | Status |
|-----------------------|---|-----------------------------|--------|
| Board Approval | Board of Governors Approval | Mar 28, 2019 | ✓ |
| External BRS | Post External BRS | Apr 01, 2019 | ✓ |
| | Post Updated External BRS v1.1 | Jul 26, 2019 | ✓ |
| Config Guides | Publish Config Guide | Jun 03, 2019 | ✓ |
| Tech Spec | Publish Technical Specifications | N/A | |
| Tariff | File Tariff w/ FERC | Apr 23, 2019 | ✓ |
| | Receive FERC order (Deficiency Letter) | Jul 19, 2019 | ✓ |
| | Refiled with FERC | Jul 26, 2019 | ✓ |
| BPMs | Post Draft BPM changes <ul style="list-style-type: none"> • Settlements and Billing – PRR1184 • Generator Management • Reliability Requirements • Market Instruments • Market Operations | Aug 30, 2019 target | |
| External Training | Deliver External Training | Aug 28, 2019 | |
| Market Sim | RMR/CPM | Sep 03, 2019 - Oct 11, 2019 | |
| Production Activation | RMR/CPM Deployment | Nov 13, 2019 | |
| | RMR and CPM Effective Date | Jan 01, 2020 | |

Fall 2019 – Local Market Power Mitigation Enhancements

| Project Info | Details/Date |
|------------------------------|---|
| Application Software Changes | <p>Scope: Prevent Flow reversal, Limits transfer, DEB for Hydro, Reference level adjustment process, Gas price Indices</p> <p>Impacted Systems:</p> <p>RTM: Prevent flow reversal Eliminate rule mitigate in FMM carry to RTD Eliminate rule mitigate for balance of hour for FMM, balance 15 minute for RTD Use current market competitive LMP for mitigation Add a nominal parameter to mitigated bids Mitigated bid = MAX (DEB, Competitive LMP + \$0.xx parameter)</p> <p>RTM: Limit transfers to limit Economic Displacement Optional rule for EIM BAA Limit transfers to the greater of exports in MPM and flexible ramping requirements Export Limit = MAX [ExportsBase, ExportsMPM, $\Sigma FRUMPMAward$] The exporting BAA will receive congestion rents created by this proposed rule</p> <p>OASIS: Publish EIM transfer limit</p> <p>CMRI: Display new Hydro DEB type</p> <p>Master File: Option to limit transfer per a defined rule Manage Hydro DEB eligibility at resource level New field to select and rank hydro DEB option Store resource's maximum storage horizon Identify default trading hubs for hydro resources, requests changes to additional hubs Ability to view parameters and ranking of approved hydro DEBs</p> |
| BPM Changes | Market Operations, Market Instruments |
| Tariff Change | Section 29.39, 31.2.1, 39.7 |

Fall 2019 – Local Market Power Mitigation Enhancements (cont.)

| Milestone Type | Milestone Name | Dates | Status |
|-----------------------|---|-----------------------------|--------|
| Board Approval | Board of Governors Approval | Mar 28, 2019 | ✓ |
| External BRS | Post External BRS | Apr 01, 2019 | ✓ |
| Config Guides | Post Draft Config Guides | N/A | |
| Tech Spec | Publish Technical Specifications – MF v5.0, CMRI v3.9.0 | May 17, 2019 | ✓ |
| | Publish Technical Specification updates for CARs and Electric Pricing Hub weighting – MF v5.1 | Jun 28, 2019 | ✓ |
| Tariff | File Tariff | Jul 02, 2019 | ✓ |
| BPMs | Post Draft BPM changes | Sep 05, 2019 | |
| External Training | Deliver External Training | Aug 29, 2019 | |
| Market Sim | Market Simulation Testing | Sep 03, 2019 - Oct 11, 2019 | |
| Production Activation | LMPM - Enhancements | Nov 13, 2019 | |

* Project schedule shows risk in meeting current targets. Tariff filing requested a “no-later-than” Dec 4 effective date.

Fall 2019 – Energy Imbalance Market Enhancements 2019

| Project Info | Details/Date |
|------------------------------|--|
| Application Software Changes | <p>Scope: Implement 21 EIM enhancements requested by EIM entities through CIDI System</p> <p>Impacted Systems: BAAOP: Add displays for BAA overview, Unit deviations, Load Bias, transfer limits, contingency flag, timestamps, and other identified items. Enhance sorting and layouts ability. Enhance alarm ability for market thresholds. BSAP: Enhance capability for Base schedule modification, Add aggregated BS deviation in API. OASIS or CMRI: Display ROC limits Display 5-min market transmission Loss RTM: prevent ETSR swing using explicit triggers. ADS: Publish current DOP in the MSG transition period. Settlement: Publish data for UFE shadow calculation; Settle EIM Resource Deviation within Regulation/ABC range as instructed regulation energy. CMRI: Publish resource limit values</p> |
| BPM Changes | Market Instruments, Energy Imbalance Market |

| Milestone Type | Milestone Name | Dates | Status |
|-----------------------|---|-----------------------------|--------|
| Board Approval | Obtain Board of Governors Approval | N/A | |
| External BRS | Milestone: Post External BRS | Feb 05, 2019 | ✓ |
| | Milestone: Post External BRS Revisions 1.4 | Aug 12, 2019 | ✓ |
| Config Guides | Publish Config Guides | May 17, 2019 | ✓ |
| Tech Spec | Create ISO Interface Spec (Tech spec) – OASIS v5.1.9 | Jul 19, 2019 | ✓ |
| | Revised ISO Interface Spec (Tech spec) – BSAP v1.7 | Jul 03, 2019 | ✓ |
| | ISO Interface Spec (Tech spec) – BSAP v1.6, CMRI v3.9.0 | May 17, 2019 | ✓ |
| Tariff | File Tariff | N/A | |
| BPMs | Post Draft BPM changes | Aug 30, 2019 | ✓ |
| External Training | External Training Webinar | Aug 26, 2019 | |
| Market Sim | Market Sim Window | Sep 03, 2019 - Oct 11, 2019 | |
| Production Activation | EIM Enhancements 2019 | Nov 13, 2019 | |

Fall 2019 – FERC 841 Energy Storage Resources

| Project Info | Details/Date |
|------------------------------|---|
| Application Software Changes | <p>Scope: FERC issued Order 841 to remove the barriers to the participation of electric storage resources in the capacity, energy and ancillary service markets operated by RTOs and ISOs.</p> <p>CAISO will achieve compliance with Order 841 through implementation of two (2) specific scope items:</p> <ul style="list-style-type: none"> • Reduce the minimum capacity for participating Generators to 100kW for storage resources • Remove Transmission Access Charge (TAC) for Pumped-Storage Hydro Units <p>Impacted Systems:</p> <p>RIMS: No changes to system. Registration process change to allow minimum rated capacity of 100kW for storage resources</p> <p>Settlements: Revision to charge codes to remove TAC for Pumped-Storage Hydro Units</p> |
| BPM Changes | Market Operations, Settlements and Billing |
| Tariff Change | <p>4.6.3.2 – Exemption for Generating Units of Less Than One (1) MW</p> <p>26.1 – Transmission Rates and Charges</p> <p>Appendix A – Definition Change for Participating Generator</p> |

| Milestone Type | Milestone Name | Dates | Status |
|-----------------------|---|------------------------------|--------|
| Board Approval | Obtain Board of Governors Approval | N/A | |
| External BRS | Milestone: Post External BRS | Jun 20, 2019 | ✓ |
| Config Guides | Milestone: Post Config Guide | Jun 03, 2019 | ✓ |
| Tech Spec | N/A: Publish Technical Specifications | Aug 13, 2019 | ✓ |
| Tariff | File Tariff | N/A | |
| BPMs | Draft BPM changes - Settlements - Market Operations and Gen Management | Aug 21, 2019 Aug 30, 2019 | ✓ |
| External Training | External training | N/A | |
| Market Sim | Market Sim Window | Sep 03, 2019 - Oct 11, 2019 | |
| Production Activation | FERC 841 - NGR Model | Nov 13, 2019 | |

Fall 2019 – Real-Time Market Neutrality Settlement

| Project Info | Details/Date |
|------------------------------|--|
| Application Software Changes | Settlement: modify CC6477, CC64770 <ul style="list-style-type: none"> Remove EIM transfer adjustment amount Credit the GHG cost for non-CA transfers in EIM transfer financial value calculation Use 5-minute ETSR After-The-Fact tags submitted by EIM BAA |
| BPM Changes | Settlements & Billing |
| Tariff Change | 11.5.4.1 Real Time Imbalance Energy Offset |

| Milestone Type | Milestone Name | Dates | Status |
|-----------------------|------------------------------------|-----------------------------|--------|
| Board Approval | Obtain Board of Governors Approval | Jul 25, 2019 | ✓ |
| External BRS | Post External BRS | Jul 08, 2019 | ✓ |
| | Post External BRS (Updated) | Aug 07, 2019 | ✓ |
| Config Guides | Publish Config Guide | Jul 31, 2019 | ✓ |
| Tech Spec | Publish Technical Specifications | N/A | |
| Tariff | File Tariff w/FERC | Jul 30, 2019 | ✓ |
| BPMs | Post Draft BPM changes | Aug 26, 2019 | ✓ |
| External Training | Deliver External Training | Aug 27, 2019 | |
| Market Sim | Market Sim Window | Sep 03, 2019 - Oct 11, 2019 | |
| Production Activation | RT Market Neutrality Settlement | Nov 13, 2019 | |

2020 Spring Release

Spring 2020 – EIM integrations for SCL and SRP

| Project Info | Details/Date |
|------------------------------|---|
| Application Software Changes | Implementation of SCL and SRP as EIM Entities |
| BPM Changes | EIM BPM will be updated if needed to reflect new modeling scenarios identified during implementation and feedback from SCL and SRP. |
| Market Simulation | December 2019 – January 2020 |
| Parallel Operations | February 2020 – March 2020 |

| Milestone Type | Milestone Name | Dates | Status |
|-----------------------|------------------------------|------------------------------|--------|
| Market Sim | Market Sim Window | December 2019 – January 2020 | |
| Parallel Operations | Parallel Operations | February 2020 – March 2020 | |
| Tariff | File Readiness Certification | March 2020 | |
| Production Activation | EIM – SCL and SRP | April 2020 | |

2020 Independent

2020 – ADS Replacement

| Project Info | Details/Date |
|------------------------------|---|
| Application Software Changes | <ul style="list-style-type: none"> • 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 • Various user interface enhancements adding content per Operation's request • ADS B2B services changes - TBD. |
| BPM Changes | <ul style="list-style-type: none"> • Market Instruments • Market Operations |

| 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 | TBD | |
| Tech Spec | Publish Technical Specifications | TBD | |
| Tariff | File Tariff | TBD | |
| BPMs | Post Draft BPM changes | TBD | |
| Market Sim | Market Sim Window | Q3 2020 | |
| Production Activation | ADS Replacement | Q3 2020 | |
| Production | ADS Parallel Operations | Q3 2020 | |
| Decommission | Old ADS Decommission | TBD | |

2020 Fall Release

Fall 2020 – Commitment Cost and Default Energy Bid Enhancements Ph2

| Project Info | Details/Date |
|------------------------------|---|
| Application Software Changes | <p>Scope: Enhances the ability to submit market-based commitment cost bids in order to reflect unique costs and volatility:</p> <ul style="list-style-type: none"> • Introduces market power mitigation (MPM) measures for commitment costs. • 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 <p>Impacted Systems:</p> <ul style="list-style-type: none"> • SIBR: Incorporate negotiated default commitment bids. Increase commitment cost caps. Allow for hourly submittal of minimum load bids into day-ahead market. Increase energy bid caps, incorporate soft energy bid cap. • 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. • 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 requests for manual consultation and ex-post default bid adjustments. |
| BPM Changes | <ul style="list-style-type: none"> • Market Instruments • Market Operations |
| Business Process Changes | <ul style="list-style-type: none"> • 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) |

Fall 2020 – Import Bid Cost Verification

| Project Info | Details/Date |
|-------------------------------|--|
| Market notice May 16, 2019 | <p>The objective of the Import Bid Cost Verification initiative is to ensure energy prices continue to reflect the marginal cost of supply when those prices exceed \$1,000/MWh, and to ensure intertie offer rules are consistent with ISO's internal bidding rules by developing reasonable cost-verification measures for intertie offers above \$1,000/MWh.</p> <p>In 2016, the Federal Energy Regulatory Commission (FERC) required Independent System Operators (ISO)/ Regional Transmission Organizations (RTOs) to raise energy bid-caps from \$1,000/MWh to \$2,000/MWh, and ensure internal supply offers above \$1,000/MWh are cost-justified. FERC did not require the same treatment for suppliers that submit intertie offers, but it was open to individual ISO/RTOs developing and justifying their own requirements for intertie offers above \$1,000/MWh. This initiative is therefore intended to develop reasonable cost-verification measures for intertie offers above \$1,000/MWh</p> |

Fall 2020 – ESDER Phase 3b – Load Shift Product

| Project Info | Details/Date |
|------------------------------|--|
| Application Software Changes | <p><u>Scope:</u></p> <p>The ESDER 3b initiative will include two (2) demand response enhancements:</p> <ul style="list-style-type: none">• Addition of a Load Shift Product wherein demand response resources with behind the meter (BTM) storage devices can participate in both load consumption and load curtailment.• Enable sub-metered electric vehicles supply equipment (EVSE) to participate in load curtailment <p><u>Impacted Systems (Overview):</u></p> <p>Master File:</p> <ul style="list-style-type: none">• Registration of new PDR Resource Types and business rules for PDRs with BTM storage devices and wanting to participate in both Load Curtailment and Consumption• Two (2) Resource IDs will be assigned to the same Resource to allow Consumption versus Curtailment participation (PDR-LSR) <p>DRRS:</p> <ul style="list-style-type: none">• Allow two resource IDs to be selected for registrations with LSR baseline methods• New baseline methods for PDR-LSRs and EVSEs• New attribute for locations to indicate BTM device <p>CIRA:</p> <ul style="list-style-type: none">• Will prevent the request of NQC for PDR-LSR Consumption resources |

Fall 2020 – Dispatch Operating Target Tariff Clarification

| Project Info | Details/Date |
|------------------------------|---|
| Application Software Changes | <p>Scope: Allow Energy Intermittent Resources (EIRs) to automate their response to operational instructions that require the resource not to exceed their `</p> <p>Impacted Systems: RTM: Operator can select EIR resources, system to send Operating instruction Flag to ADS ADS: Receive Operating instruction flag for EIRs. Broadcast message to EIRs operator.</p> |
| BPM Changes | Market Instruments Market Operations |
| Tariff Change | Changes tariff language from “Operating Order” to “Operating Instruction” in multiple sections. |

Fall 2020 – Intertie Deviation Settlement

| Project Info | Details/Date |
|------------------------------|---|
| Application Software Changes | <p>Scope: Implement a new Under/Over Delivery Charge for intertie deviations from Market Schedule and After-The-Fact (ATF) E-Tag, to replace Decline charge</p> <p>Impacted Systems: Settlements</p> <ul style="list-style-type: none"> • Calculate FMM binding intertie award, exclude Curtailment, calculate under/over delivery quantity as deviation of schedule and ATF E-Tag, Charge under/over delivery Charge at 50% of RTD LMP. • Remove the decline charge calculation and Decline Threshold • Allocate Over/Under delivery charge to measured demand |
| BPM Changes | Settlements and Billing |
| Tariff Change | Section 11.31 |

2021 Spring Release

Spring 2021 – EIM integrations for PNM, LADWP, TID and NWE

| Project Info | Details/Date |
|------------------------------|--|
| Application Software Changes | Implementation of PNM, LADWP, TID, and NWE as EIM Entities |
| BPM Changes | EIM BPM will be updated if needed to reflect new modeling scenarios identified during implementation and feedback from PNM, LADWP, TID, and NWE. |
| Market Simulation | December 2020 – January 2021 |
| Parallel Operations | February 2021 – March 2021 |

| Milestone Type | Milestone Name | Dates | Status |
|-----------------------|--------------------------------|------------------------------|--------|
| Market Sim | Market Sim Window | December 2020 – January 2021 | |
| Parallel Operations | Parallel Operations | February 2021 – March 2021 | |
| Tariff | File Readiness Certification | March 2021 | |
| Production Activation | EIM – PNM, LADWP, TID, and NWE | April 2021 | |

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

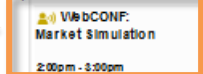
What to look for on the calendar...

Calendar of Meetings, Training and Events

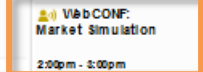
Month: February Year: 2018 Calendar View List View Print View

| 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) 3:30pm - 6:30pm 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) 3:15pm - 6:00pm 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)

