Market Performance and Planning Forum

October 23, 2019
Objective: Enable dialogue on implementation planning and market performance issues

• Review key market performance topics
• Share updates to 2019 release plans, resulting from stakeholders inputs
• Provide information on specific initiatives
  – to support Market Participants in budget and resource planning
• Focus on implementation planning; not on policy
• Clarify implementation timelines
• Discuss external impacts of implementation plans
• Launch joint implementation planning process
<table>
<thead>
<tr>
<th>Time:</th>
<th>Topic:</th>
<th>Presenter:</th>
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<tbody>
<tr>
<td>1:00 – 1:05</td>
<td>Introduction, Agenda</td>
<td>Kristina Osborne</td>
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<tr>
<td>1:05 - 2:50</td>
<td>Market Performance and Quality Update</td>
<td>Market Analysis and Forecasting</td>
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<tr>
<td>2:50 – 3:20</td>
<td>Policy Update</td>
<td>Brad Cooper, John Goodin</td>
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<tr>
<td>3:20 – 4:00</td>
<td>Release Update</td>
<td>Trang Deluca</td>
</tr>
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</table>
Market Update

Market Analysis and Forecasting Department
Maximum Gas Constraint enforced in SDGE area due to planned outage

• Planned SDG&E system-wide gas curtailment of CAISO Dispatchable Electric Generation was in effect starting on October 14, 2019, at 12:01 AM PCT.

• Maximum gas constraint nomogram was enforced in all the markets starting 10/14/2019 to 10/18/2019 (in DA) and 10/14/2019 to 10/17/2019 (in RT)

• Nomogram was not binding for any hours except for one hour on 10/18/2019 in DA market
Total CRR payment after pro-rata adjustments

August - Total Balancing Account (~7 million)

- Net Monthly Balancing Surplus: 33%
- Monthly Auction Revenue: 33%

September - Total Balancing Account (~10 million)

- Net Monthly Balancing Surplus: 58%
- Annual Auction Revenue: 23%
Total CRR surplus includes both auction revenues and balancing surpluses, and all of that is allocated to measured demand.
Steady surplus was observed in the last three months of 2019
Auction revenue shortfall after CRR1B Policy implementation is showing a reduction of shortfall in magnitude.
The ISO fixed an issue of the fifteen-minute market load forecast posted on OASIS

- The ISO posts the load forecasts used in the CAISO’s markets
- When a new load forecast came into the market prior to the publication of results, the new load forecast was posted on OASIS
- The load forecast of the buffer interval was taken for reference when posting the load forecast to OASIS
- These publication issues were fixed proactively since October 10, 2019
- The resulting load forecast differences in publication are small
RTD renewable (VERs) curtailment remained low since May
Hydro production higher than previous year in August and September
ISO total monthly VERS schedules and forecasts compared to actuals
Monthly wind (VERS) downward flexibility in FMM
Monthly solar (VERS) downward flexibility in FMM from 11 AM to 5 PM
Renewable (VERS) schedules including net virtual supply aligns with VER forecast in August and September

Hourly distribution of maximum RTD renewable (VERS) curtailment in September
Self scheduled interties in the real-time market stayed at high levels
Improved price convergence in August

Note: Metric Based on System Marginal Energy Component (SMEC)
RT prices higher than DA prices for both NP15 and SP15 in August and September
Insufficient upward ramping capacity in ISO real-time declined since June
Insufficient downward ramping capacity in real-time remained low
Exceptional dispatch volume in the ISO area slid in August and September
As summer conditions ended, Exceptional dispatches fell in September.
Bid cost recovery rose in August
Bid cost recovery (BCR) by Local Capacity Requirement area
ISO area RTCO and RTIEO increased in September

<table>
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<tr>
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<tr>
<td>RTIEO</td>
<td>$18,506,981</td>
<td>-$10,407,733</td>
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<tr>
<td>Total Offset</td>
<td>$135,229,751</td>
<td>$43,223,625</td>
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CAISO price correction events decreased in August and September
EIM-Related price correction events remain low in August and September
Flexible Ramp Up Sufficiency Test Results
Most BAAs Fail Flex Up Test less than 2% of intervals
Flexible Ramp Down Sufficiency Test Results

Most BAAs Fail Flex Down Test less than 2% of intervals
Average Flexible Ramp Product Cleared Awards for each area with EIM Area Requirement - June to July 2019
Average Flexible Ramp Down Price ($/MWh)
Uncertainty Up Settlement Amount

Flexible Ramp Product Uncertainty Up Amount

Flexible Ramp Constraint

Payments (Millions $)

FRC Payment  AZPS  CISO  NEVP  PACE  PACW  PSEI  PGE  BCHA  IPCO  BANCSMUD

California ISO
Day-ahead load forecast

**MAPE = abs(Forecast – Actual)/Actual**
Day-ahead peak to peak forecast accuracy

**MAPE = \frac{\text{abs}(\text{Forecast} - \text{Actual})}{\text{Actual}}**
Day-ahead wind forecast

**The 2017 generation data used for accuracy calculation contains the economically dispatched MW.**

**MAPE = \frac{\text{abs(Forecast} - \text{Actual})}{\text{Capacity}}**
**The 2017 generation data used for accuracy calculation contains the economically dispatched MW.**

**MAPE = abs(Forecast – Actual)/Capacity**
Real-time wind forecast

The 2017 generation data used for accuracy calculation contains the economically dispatched MW.

**This forecast accuracy is pulled directly from the CAISO Forecasting System.**

**MAPE = \frac{|\text{Forecast} - \text{Actual}|}{\text{Capacity}}**
2017 has been changed to track the RTD accuracy, i.e. the forecast made 7.5 minutes before the binding interval. The 2017 generation data used for accuracy calculation contains the economically dispatched MW.

**MAPE = abs(Forecast – Actual)/Capacity**
EIM T-60 Forecast

AZPS T-60 Forecast

IPCO T-60 Forecast

PGE T-60 Forecast

NVE T-60 Forecast

ISO PUBLIC
EIM T-60 Forecast

PACE T-60 Forecast

PACW T-60 Forecast

PSE T-60 Forecast

SMUD T-60 Forecast

California ISO
Policy Update

John Goodin
Senior Manager, Infrastructure & Regulatory Policy

Brad Cooper
Senior Manager, Market Design Policy
Energy Storage and Distributed Energy Resources – Phase 4

• Scope:
  – Enhancements to energy storage and distributed energy resource model and rules
• EIM Governing Body advisory role
• Status:
  – Revised Straw Proposal posted October 21
  – Stakeholder webinar on October 28; comments due November 11
  – ELCC DR study and further storage DEB development in upcoming straw proposals
  – Q3 2020 EIM Governing Body briefing and ISO Board decision
Hybrid Resources

- **Scope:** Explore how hybrid generation resources can be registered and configured to operate within the ISO market.
- **EIM Governing Body advisory role**
- **Status:**
  - Straw proposal published on September 30
  - Stakeholder meeting on straw proposal October 3
  - Comments due Oct 21
  - Revised straw proposal schedule for December 10
  - ISO Board decision Q2 2020
Capacity Procurement Mechanism - Soft Offer Cap

- **Scope:** updating the capacity procurement mechanism soft-offer cap, compensation for 12-month CPM designations, and bids above the soft offer cap.

- **No EIM Governing Body role**

- **Status:**
  - Assessing next steps based on RA direction and management input
Resource Adequacy Enhancements

• Scope: Considering reforms needed to the ISO’s resource adequacy rules, requirements, and processes to ensure the future reliability and operability of the grid.

• No EIM Governing Body role

• Status:
  – Stakeholder meeting held on Second RSP October 9; comments due 24
  – Third Revised Straw Proposal in December
  – ISO Board decision Q3/4 2020
Flexible Ramping Product Enhancements

• Scope:
  – Deliverability
  – Eligibility to provide
  – Ramp management between RTUC and RTD

• EIM Governing Body Role:
  • EIM Governing Body advisory role

• Status:
  – Straw proposal to be posted in November
  – March 2020 EIM Governing Body briefing and ISO Board decision
  – Implementation Fall 2020
Day-Ahead Market Enhancements

• Scope:
  – Day-ahead imbalance reserve product

• EIM Governing Body Role:
  – EIM Governing Body Charter specifies advisory role for components that change real-time market rules
  – However, Management believes it will be appropriate for the EIM Governing Body to have advisory role for entire initiative

• Status:
  – Revised straw proposal to be posted in January
  – 2021 EIM Governing Body briefing and ISO Board decision
Extended Day-Ahead Market

• Scope:
  – Extending day-ahead market to EIM entities

• EIM Governing Body Role:
  – EIM Governing Body Charter specifies role only for components that change real-time market rules
  – However, Management will request that the CAISO Board of Governors give the EIM Governing Body joint approval authority for entire initiative

• Status:
  – Stakeholder call on issue paper held October 17
  – Commence series of workshops early February 2020
  – 2021 EIM Governing Body briefing and ISO Board decision
FERC Order 831 – Import Bidding & Market Parameters

- **Scope:**
  - Cost verification for import bids above $1,000/MWh
  - ISO market constraint relaxation prices
- **EIM Governing Body advisory role**
- **Status:**
  - Revised straw proposal to be published late November
  - May 2020 EIM Governing Body briefing and ISO Board decision
System Market Power Mitigation

• Scope:
  – Review results of ISO’s analysis of ISO balancing authority area’s structural competitiveness
  – Determine if measures are appropriate to address system-level market power

• EIM Governing Body advisory role

• Status:
  – Discussed conceptual proposal at September 20 working group and October 11 MSC meeting
  – MSC opinion prior to November CAISO Board of Governors meeting
  – Recommendation as to whether to launch stakeholder initiative at November Board meeting
Market Settlement Timeline Transformation

• **Scope:**
  – Revise market settlement timelines to be more efficient and better accommodate business needs

• **EIM Governing Body advisory role**

• **Status:**
  – October EIM Governing Body briefing and November ISO Board decision
Release Plan Update

Trang Deluca
Sr. Project Manager
The ISO offers innovative training programs

<table>
<thead>
<tr>
<th>Date</th>
<th>Training courses and workshops</th>
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<tr>
<td>October 23</td>
<td>Market Transactions – Training Workshop (Folsom)</td>
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<td>October 24</td>
<td>ISO Settlements – Training Workshop (Folsom)</td>
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<td>Existing Day-ahead Market Training (associated with EDAM initiative) – FULL</td>
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<tr>
<td>November 12</td>
<td>Existing Day-Ahead Market Training (associated with EDAM initiative) (Folsom)</td>
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**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

**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 2019/2020 in accordance with project schedules.
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)
- Market Settlement Timeline Transformation (BOG Nov 2019)
- Import Bidding and Market Parameters, (A.K.A. Import Bid Cost Verification and FERC Order 831) – June 2020 BOG
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 (Q4 - BOG)

Spring 2022
- Energy Imbalance Market (EIM) 2022 - Avista
- Energy Imbalance Market (EIM) 2022 - Tucson Electric Power
## Release Schedule 2019

**Date of Data Refresh:** 10/4/2019

### MAP Stage Environment Window

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**Notes:**

- Please do not delete slide.

**Links:**


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**California ISO**

**ISO PUBLIC**

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2019 Fall Release
## Fall 2019 Release – Overview

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<th>Config. Guides</th>
<th>Technical Specifications</th>
<th>Mkt Sim Scenarios</th>
<th>Draft Tariff*</th>
<th>BPMs</th>
<th>External Training</th>
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**Notes:**
- Items in **BLUE** are complete
- Items in **RED** indicate a new date which is later than the target date listed on the overview line.
## Fall 2019 Release – System Interface Changes

### MF

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<th>Minor Version</th>
<th>RDT</th>
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### SIBR/BSAP

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| BSAP    | EIM 2019| Modify      | RetrieveBalancingTestResults_BSAPv2
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## CMRI

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## OASIS

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<th>Production Activation</th>
<th>Technical Specifications</th>
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</table>
**Application Software Changes**

**Scope:**
Enhances the ability to submit market-based commitment cost bids in order to reflect unique costs and volatility:
- 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)

**Impacted Systems:**
- SIBR: Allow the submittal of Ex Ante cost adjustments.
- CMRI: Provide additional source information for default bids.

Submit requests through CIDI for manual consultation and ex-post default bid adjustments.

**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)
## Fall 2019 – Commitment Cost and Default Energy Bid Enhancements Ph1

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<tr>
<td>Draft Policy</td>
<td>Publish Draft Business Rules externally</td>
<td>Jan 31, 2018</td>
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<tr>
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<td>Mar 22, 2018</td>
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<tr>
<td>External BRS</td>
<td>Publish revised external BRS v1.1</td>
<td>Jan 22, 2019</td>
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<tr>
<td></td>
<td>Publish External BRS v1.2: Phase 1/Phase 2, clarifications</td>
<td>Mar 29, 2019</td>
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<td></td>
<td>Publish External BRS v1.3: Reference Level Adjustments</td>
<td>Apr 05, 2019</td>
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<td>Publish External BRS v1.4 for CCDEBE tariff traceability</td>
<td>Jul 19, 2019</td>
<td>✔️</td>
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<tr>
<td></td>
<td>Publish External BRS v1.5: implementation notes &amp; clarifications (BRQ046, BRQ035/335), Generic Hub GPI update</td>
<td>Sep 04, 2019</td>
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<td>Config Guides</td>
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<td>Tech Spec</td>
<td>Publish Technical Specifications</td>
<td>May 17, 2019</td>
<td>✔️</td>
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<tr>
<td></td>
<td>Publish Technical Specification updates for CARs and Electric Pricing Hub weighting</td>
<td>Jun 28, 2019</td>
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<td>Publish updated CMRI Technical Specifications</td>
<td>Oct 24, 2019</td>
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<td>File Tariff - CCDEBE Phase 1</td>
<td>Aug 30, 2019</td>
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<td></td>
<td>Draft Tariff published</td>
<td>May 13, 2019</td>
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<td>Tariff stakeholder walkthrough conference call</td>
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<td>BPMs</td>
<td>Publish draft Market Instruments: Attachment O on CCDEBE Stakeholder Processes page</td>
<td>Oct 04, 2019</td>
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<td>Post Draft BPM changes via PRR</td>
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<td>External Training</td>
<td>Deliver External Training</td>
<td>Oct 08, 2019</td>
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<td>Finalize external training material</td>
<td>Oct 04, 2019</td>
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<td>Market Sim Window</td>
<td>Oct 14, 2019 - Nov 26, 2019</td>
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<td>Production Activation</td>
<td>CCDEBE Phase 1</td>
<td>Dec 04, 2019</td>
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</tbody>
</table>

* Project schedule shows risk in meeting current targets. Project team attempting to mitigate risk. Tariff filing requested a “no-later-than” Dec 11 effective date.
### Application Software Changes

<table>
<thead>
<tr>
<th>Project Info</th>
<th>Details/Date</th>
</tr>
</thead>
</table>
| **Scope:** | The ESDER 3a scope of the larger ESDER3 initiative will include two (2) demand response enhancements:  
  • New bid dispatchable options for demand response resources  
  • Removal of single LSE requirement for PDR registrations & removal of default load adjustment (DLA)  
  Additionally, for ESDER2 Tariff Compliance, following is being implemented as part of this project  
  • Customer Load Baseline Submittal  |
| **Impacted Systems (Overview):** | |
| **Master File:** | RDTs for PDR registrations in MF will require selection of an effective Bid Dispatchable Option to be used for market optimization and dispatch  |
| **DRRS:** | PDR registrations will not require all service accounts to have the same LSE  |
| **SIBR:** | 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  |
| **HASP/RTM:** | 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  |
| **Settlements:** | Will remove the default load adjustment (DLA) application  
  • Will provide Bid Cost Recovery for PDRs with 15-Minute Bids but not Hourly Bids  |
| **CMRI:** | Will include energy schedules and awards for PDRs with new Bid Dispatchable Options (Existing)  |
| **MRI-Settlements (ESDER2 Tariff Compliance):** | New BASE measurement type for monitoring calculated baseline data |
### Project Info Details/Date

| BPM Changes | • Market Instruments, Metering, and Demand Response (new BPM)  
• Market Operations |
| Tariff Change | 4.13 and 11.6 |

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<tr>
<th>Milestone Type</th>
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<th>Dates</th>
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<td>Sep 05, 2018</td>
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<td>Feb 25, 2019</td>
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<td>Feb 11, 2019</td>
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<td>Post Draft Config Guides</td>
<td>May 17, 2019</td>
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<td>Tech Spec</td>
<td>Publish Technical Specifications</td>
<td>May 17, 2019</td>
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<td>File Tariff</td>
<td>Sep 03, 2019</td>
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<td>ESDER 3a</td>
<td>Sep 03, 2019 - Oct 11, 2019</td>
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<td>Production Activation</td>
<td>ESDER 3a - DRRS</td>
<td>Nov 06, 2019</td>
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<td>ESDER 3a - IFM/RTN, Settlements, SIBR</td>
<td>Nov 13, 2019</td>
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</table>
Proposed DRRS & MF Transition Timeline

- **ESDER 3a - MF Deployment to MAP-Stage**: Thu 8/15/19
- **Market-Sim Start**: Tue 9/3/19
- **Market-Sim End**: Fri 10/11/19
- **Master File Update - Prep for Go-Live**: Tue 10/29/19
- **ESDER 3A Go-Live**: Wed 11/13/19
- **DRRS Production Deployment**: Wed 11/6/19
  - (No activity in DRRS on this day)
- **Last Day to Update Master File Before Freeze**: Wed 11/6/19
- **End Date for Registration with LSE and DLAP**: Tue 11/5/19
- **Start Date for Registration Without LSE and DLAP - Effective Date of 11/13/2019**: Thu 11/7/19

**Notes**:
- MPs can change their resource to be hourly or 15 min via MF for Market-Sim **Fri 8/30/19**
- **Finish**: Wed 11/13/19
- **Sep 8, '19**
- **Sep 22, '19**
- **Oct 6, '19**
- **Oct 20, '19**
- **Nov 3, '19**
## Fall 2019 – RMR and CPM Enhancements

<table>
<thead>
<tr>
<th>Application Software Changes</th>
<th>Details/Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scope:</strong> RMR and CPM Enhancements will address the following policy and tariff amendment scope:</td>
<td></td>
</tr>
<tr>
<td>• Risk-of-Retirement tariff provisions will transition from CPM to RMR section</td>
<td></td>
</tr>
<tr>
<td>• RMR units under the new tariff provisions shall:</td>
<td></td>
</tr>
<tr>
<td>- Have reliability capacity allocated by TAC Area (for PTOs, not LSEs), Flex RA credit shall be applied</td>
<td></td>
</tr>
<tr>
<td>- Receive Must-Offer Obligation (MOO)</td>
<td></td>
</tr>
<tr>
<td>- Subject to RAAIM</td>
<td></td>
</tr>
<tr>
<td>- Streamline RMR invoicing, settlement process through inclusion in ISO Settlement process</td>
<td></td>
</tr>
<tr>
<td><strong>Impacted Systems (Overview):</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Master File:</strong></td>
<td></td>
</tr>
<tr>
<td>• No impact. ISO will internally manage RMR resource status and vintage (e.g. RMR vs. RMRL).</td>
<td></td>
</tr>
<tr>
<td><strong>CIRA:</strong></td>
<td></td>
</tr>
<tr>
<td>• 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:</td>
<td></td>
</tr>
<tr>
<td>- Apply Flex RA credit by TAC Area (for PTOs)</td>
<td></td>
</tr>
<tr>
<td>- Perform RMR Substitution</td>
<td></td>
</tr>
<tr>
<td>- Support RMR Risk-of-Retirement</td>
<td></td>
</tr>
<tr>
<td>• Like RA resources, RMR units under the new tariff will receive RAAIM status determination</td>
<td></td>
</tr>
<tr>
<td><strong>SIBR</strong></td>
<td></td>
</tr>
<tr>
<td>• Like RA resources, automatically generates cost-based energy bids for new contract type RMR units for un-submitted bid range below RMR contract capacity</td>
<td></td>
</tr>
<tr>
<td>- 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.</td>
<td></td>
</tr>
<tr>
<td>• Removes self-schedule requirement for new contract type RMR units scheduled/dispatched in Day-Ahead Market</td>
<td></td>
</tr>
<tr>
<td><strong>IFM/RTM:</strong></td>
<td></td>
</tr>
<tr>
<td>• Unit Commitment, Economic Dispatch decisions will include applicable MMA and OC (no change from today)</td>
<td></td>
</tr>
<tr>
<td>• Like RA resources, new contract type RMR units will have automatic RA Obligation ($0/MWh bids in RUC)</td>
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## Project Info

<table>
<thead>
<tr>
<th>Application Software Changes</th>
<th>Details/Date</th>
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<tr>
<td>Impacted Systems (Continued):</td>
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<tr>
<td><strong>IFM/RTM:</strong></td>
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</tr>
<tr>
<td>• Unit Commitment, Economic Dispatch decisions will include applicable MMA and OC (no change from today)</td>
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<tr>
<td>• Like RA resources, new contract type RMR units will have automatic RA Obligation ($0/MWh bids in RUC)</td>
<td></td>
</tr>
<tr>
<td><strong>Settlements:</strong></td>
<td></td>
</tr>
<tr>
<td>• RMR units under new contract type will receive:</td>
<td></td>
</tr>
<tr>
<td>• RMR under new tariff provisions will settle through the ISO Settlements calendar;</td>
<td></td>
</tr>
<tr>
<td>• Legacy RMR (RMRL) will continue to receive payment through the RMR invoicing process</td>
<td></td>
</tr>
<tr>
<td>• Monthly RMR capacity payment (by resource) and cost allocation (by PTO)</td>
<td></td>
</tr>
<tr>
<td>• RAAIM settlement/allocation</td>
<td></td>
</tr>
<tr>
<td>• Bid Cost Recovery (does not include MMA or OC)</td>
<td></td>
</tr>
<tr>
<td>• Clawback of fixed MMA and OC costs (if applicable)</td>
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</table>

CPM tariff revisions will be addressed during the CPM Soft Offer Cap policy initiative.

<table>
<thead>
<tr>
<th>BPM Changes</th>
<th>Reliability Requirements, Generator Management, Market Operations, Market Instruments, Settlements and Billing</th>
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<tbody>
<tr>
<td>Tariff Change</td>
<td>11.13, 31.2.2, 34.1, 40.9, 41, 43, 43A, Appendix G</td>
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## Fall 2019 – RMR and CPM Enhancements (cont.)

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<td>Board Approval</td>
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<td>Mar 28, 2019</td>
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<td>Post External BRS</td>
<td>Apr 01, 2019</td>
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<td>Post Updated External BRS v1.1</td>
<td>Jul 26, 2019</td>
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<td>Config Guides</td>
<td>Publish Config Guide</td>
<td>Jun 03, 2019</td>
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<td>Tech Spec</td>
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<td>File Tariff w/ FERC</td>
<td>Apr 23, 2019</td>
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<td>Receive FERC order (Deficiency Letter)</td>
<td>Jul 19, 2019</td>
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<td>RMR/CPM</td>
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<td>Production Activation</td>
<td>RMR/CPM Deployment</td>
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<tr>
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<td>RMR/CPM Effective Date</td>
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</table>
### Application Software Changes

**Scope:** Prevent Flow reversal, **Limits transfer** for Hydro, Reference level adjustment process, Gas price Indices

**Impacted Systems:**

**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)

**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, ΣFRUMPMAward]
- The exporting BAA will receive congestion rents created by this proposed rule

**OASIS:** Publish EIM transfer limit

**CMRI:** Display new Hydro DEB type

**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

**BPM Changes**

**Market Operations, Market Instruments**

**Tariff Change**

Section 29.39, 31.2.1, 39.7
FERC tariff ruling received September 30th

Summary
LMPME tariff changes proposed to (1) eliminate balance of the hour mitigation, (2) allow an EIM entity to enforce a net export limit and (3) create a new hydro default energy bid. FERC accepted our proposal to eliminate balance of the hour mitigation and to create a new hydro default energy bid. FERC rejected our proposal to allow an EIM entity to enforce a net export limit.

Impact
- Net Export Limit functionality will not be included in the LMPME production go-live
- Structured Scenario 3 focused on this feature; this scenario is no longer valid and should not be considered within LMPME Market Simulation results

References
- View the full order here: https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20190930-3056
## Fall 2019 – Local Market Power Mitigation Enhancements (cont.)

<table>
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<tr>
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<td>Post Draft Config Guides</td>
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<td>Tech Spec</td>
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<td>Market Sim</td>
<td>Market Sim Window</td>
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<td>Production Activation</td>
<td>LMPM - Enhancements</td>
<td>Nov 13, 2019</td>
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**Application Software Changes**

**Scope:**
Implement 21 EIM enhancements requested by EIM entities through CIDI System

**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

**BPM Changes**

Market Instruments, Energy Imbalance Market

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<td>Nov 13, 2019</td>
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# Fall 2019 – Energy Imbalance Market Enhancements 2019

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<th>Area</th>
<th>Features/Scope</th>
<th>Timing Status</th>
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<tbody>
<tr>
<td>BAAOP</td>
<td>• Transformer Flow – In MAP Stage&lt;br&gt;• Resource Flex Ramping – In MAP Stage&lt;br&gt;• Flexible Ramping Sufficiency Results – In MAP Stage&lt;br&gt;• EIM Area Summary – In MAP Stage&lt;br&gt;• ETSR Detail – In MAP Stage&lt;br&gt;• EIM Threshold Display and Calculations – In MAP Stage&lt;br&gt;• RTD Dispatch Control – In MAP Stage&lt;br&gt;• RTPD Dispatch Control – In MAP Stage</td>
<td>Available</td>
</tr>
<tr>
<td>Reporting Features and BSAP Interface Changes</td>
<td>• Loss Transmission OASIS Report&lt;br&gt;• CMRI Resource Operating Limits Report&lt;br&gt;• CMRI EIM Operating Limits Report&lt;br&gt;• Copy and Modify Base schedule (BSAP) EIM19-BRQ1270&lt;br&gt;• Add retrieve aggregate service for BS Deviation (BSAP) EIM19-BRQ1560</td>
<td>Available</td>
</tr>
</tbody>
</table>
## Fall 2019 – FERC 841 Energy Storage Resources

### 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.

CAISO will achieve compliance with Order 841 through implementation of two (2) specific scope items:
- Reduce the minimum capacity for participating Generators to 100kW for storage resources
- Remove Transmission Access Charge (TAC) for Pumped-Storage Hydro Units

### BPM Changes
- Market Operations, Settlements and Billing

### Tariff Change
- 4.6.3.2 – Exemption for Generating Units of Less Than One (1) MW
- 26.1 – Transmission Rates and Charges
- Appendix A – Definition Change for Participating Generator

### Milestone Table

<table>
<thead>
<tr>
<th>Milestone Type</th>
<th>Milestone Name</th>
<th>Dates</th>
<th>Status</th>
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<td>Board Approval</td>
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<tr>
<td>External BRS</td>
<td>Milestone: Post External BRS</td>
<td>Jun 20, 2019</td>
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<tr>
<td>Config Guides</td>
<td>Milestone: Post Config Guide</td>
<td>Jun 03, 2019</td>
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<td>Tech Spec</td>
<td>N/A: Publish Technical Specifications</td>
<td>Aug 13, 2019</td>
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<td>Tariff</td>
<td>CAISO's Compliance Filing</td>
<td>Dec 8, 2018</td>
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<td>BPMs</td>
<td>Settlemetns &amp; Billing – PRR #1177 released</td>
<td>Aug 26, 2019</td>
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<td></td>
<td>Market Operations – PRR #1180 released</td>
<td>Aug 30, 2019</td>
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<td></td>
<td>Generator Management – PRR scheduled</td>
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<td>Market Simulation</td>
<td>Market Sim Environment Window - Phase 1</td>
<td>Sep 03, 2019 - Oct 11, 2019</td>
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<tr>
<td>Production Activation</td>
<td>FERC 841 - NGR Model</td>
<td>Nov 13, 2019</td>
<td></td>
</tr>
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</table>
### Fall 2019 – Real-Time Market Neutrality Settlement

#### Application Software Changes
- Settlement: modify CC6477, CC64770
  - 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

<table>
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<tr>
<th>Milestone Type</th>
<th>Milestone Name</th>
<th>Dates</th>
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<td>Jul 08, 2019</td>
<td>✔</td>
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<td>Post External BRS (Updated)</td>
<td>Aug 07, 2019</td>
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<td>File Tariff w/FERC</td>
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<td>Post Draft BPM changes</td>
<td>Aug 26, 2019</td>
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<tr>
<td>External Training</td>
<td>Deliver External Training</td>
<td>Aug 27, 2019</td>
<td>✔</td>
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<tr>
<td>Market Sim</td>
<td>Market Sim Window</td>
<td>Sep 03, 2019 - Oct 11, 2019</td>
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<td>Production Activation</td>
<td>RT Market Neutrality Settlement</td>
<td>Nov 13, 2019</td>
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2020 Spring Release
### Spring 2020 – EIM integrations for SCL and SRP

<table>
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<th>Project Info</th>
<th>Details/Date</th>
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<td>Application Software Changes</td>
<td>Implementation of SCL and SRP as EIM Entities</td>
</tr>
<tr>
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<td>EIM BPM will be updated if needed to reflect new modeling scenarios identified during implementation and feedback from SCL and SRP.</td>
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<td>Parallel Operations</td>
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<td>Market Sim</td>
<td>Market Sim Window</td>
<td>December 2019 – January 2020</td>
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<td>Parallel Operations</td>
<td>Parallel Operations</td>
<td>February 2020 – March 2020</td>
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<td>Tariff</td>
<td>File Readiness Certification</td>
<td>March 2020</td>
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<tr>
<td>Production Activation</td>
<td>EIM – SCL and SRP</td>
<td>April 2020</td>
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</table>
## 2020 – ADS Replacement

<table>
<thead>
<tr>
<th>Project Info</th>
<th>Details/Date</th>
</tr>
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</table>
| 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  
                                 • Various user interface enhancements adding content per Operation’s request  
                                 • ADS B2B services changes - TBD. |
| BPM Changes                | • Market Instruments  
                                 • Market Operations                                                                 |

<table>
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<tr>
<th>Milestone Type</th>
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<th>Dates</th>
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<td>ADS Update</td>
<td>ADS Update Meeting</td>
<td>Aug 15, 2018</td>
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<td>Config Guides</td>
<td>Design review - BPM and Tariff SMEs</td>
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<tr>
<td>Tech Spec</td>
<td>Publish Technical Specifications</td>
<td>N/A</td>
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<td>File Tariff</td>
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<tr>
<td>BPMs</td>
<td>Post Draft BPM changes</td>
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<td>Market Sim Window</td>
<td>Q4 2020</td>
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<td>ADS Replacement</td>
<td>Q4 2020</td>
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<td>ADS Parallel Operations</td>
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<td>Decommission</td>
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2020 Fall Release
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.

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.
## Project Info

<table>
<thead>
<tr>
<th>Details/Date</th>
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</table>

### Scope:

The ESDER 3b initiative will include two (2) demand response enhancements:
- 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.

### Impacted Systems (Overview):

#### Master File:
- 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)

#### DRRS:
- 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

#### CIRA:
- Will prevent the request of NQC for PDR-LSR Consumption resources
### Project Info

<table>
<thead>
<tr>
<th>Details/Date</th>
</tr>
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<tbody>
<tr>
<td>BPM Changes</td>
</tr>
<tr>
<td>• Market Instruments, Market Operations, Outage Management, Reliability Requirement and Metering</td>
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</table>

<table>
<thead>
<tr>
<th>Tariff Change</th>
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<tbody>
<tr>
<td>Sections 4.13, 6.4, 6.5, 11.6, 11.8, 31.3, 34.1, 34.4, 34.5, 30.7 and 34.8</td>
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### Milestone Type

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<td>Feb 25, 2020</td>
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<td>Mar 30, 2020</td>
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<td>File Tariff</td>
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<td>External training</td>
<td>Jun 22, 2020</td>
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<td>Market Sim Window</td>
<td>Jun 30, 2020 - Aug 14, 2020</td>
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<tr>
<td>Production Activation</td>
<td>ESDER Phase 3b - Load Shift Product</td>
<td>Oct 01, 2020</td>
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</table>
Fall 2020 – Dispatch Operating Target Tariff Clarification

**Project Info**

<table>
<thead>
<tr>
<th>Application Software Changes</th>
<th>Details/Date</th>
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<tbody>
<tr>
<td><strong>Scope:</strong> Allow Energy Intermittent Resources (EIRs) to automate their response to operational instructions that require the resource not to exceed their `</td>
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</tr>
<tr>
<td><strong>Impacted Systems:</strong></td>
<td></td>
</tr>
<tr>
<td>RTM: Operator can select EIR resources, system to send Operating instruction Flag to ADS</td>
<td></td>
</tr>
<tr>
<td>ADS: Receive Operating instruction flag for EIRs. Broadcast message to EIRs operator.</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>BPM Changes</th>
<th>Details/Date</th>
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<tbody>
<tr>
<td>Market Instruments</td>
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<td>Market Operations</td>
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<table>
<thead>
<tr>
<th>Tariff Change</th>
<th>Details/Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes tariff language from “Operating Order” to “Operating Instruction” in multiple sections.</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Milestone Type</th>
<th>Milestone Name</th>
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<td>Config Guides</td>
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<td>BPMs</td>
<td>Post Draft BPM changes</td>
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<td>External Training</td>
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<td>Market Sim Window</td>
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<tr>
<td>Production Activation</td>
<td>Dispatch Operating Target Tariff Clarification</td>
<td>Oct 01, 2020</td>
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## Fall 2020 – Intertie Deviation Settlement

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<td><strong>Application Software Changes</strong></td>
<td><strong>Scope:</strong> Implement a new Under/Over Delivery Charge for intertie deviations from Market Schedule and After-The-Fact (ATF) E-Tag, to replace Decline charge</td>
</tr>
<tr>
<td><strong>Impacted Systems:</strong></td>
<td><strong>Settlements</strong></td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td>• Remove the decline charge calculation and Decline Threshold</td>
</tr>
<tr>
<td></td>
<td>• Allocate Over/Under delivery charge to measured demand</td>
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<tr>
<td><strong>BPM Changes</strong></td>
<td>Settlements and Billing</td>
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<tr>
<td><strong>Tariff Change</strong></td>
<td>Section 11.31</td>
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2021 Spring Release
## Project Info

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<td>Implementation of PNM, LADWP, TID, and NWE as EIM Entities</td>
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<tr>
<td>BPM Changes</td>
<td>EIM BPM will be updated if needed to reflect new modeling scenarios identified during implementation and feedback from PNM, LADWP, TID, and NWE.</td>
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<tr>
<td>Market Simulation</td>
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## Milestone Type

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<td>Parallel Operations</td>
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<tr>
<td>Tariff</td>
<td>File Readiness Certification</td>
<td>March 2021</td>
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</tr>
<tr>
<td>Production Activation</td>
<td>EIM – PNM, LADWP, TID, and NWE</td>
<td>April 2021</td>
<td></td>
</tr>
</tbody>
</table>
Stay Informed
Ways to participate in releases

• Visit the Release Planning page

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

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>Feb 6</td>
<td>Training: Get to know the ISO - Day 1</td>
</tr>
<tr>
<td>Feb 6</td>
<td>WebCONF: Market Simulation</td>
</tr>
<tr>
<td>Feb 7</td>
<td>Market Settlement User Group</td>
</tr>
<tr>
<td>Feb 7</td>
<td>WebCONF: Market Simulation</td>
</tr>
<tr>
<td>Feb 10</td>
<td>Meeting: Audit Committee</td>
</tr>
<tr>
<td>Feb 10</td>
<td>WebCONF: Market Simulation</td>
</tr>
<tr>
<td>Feb 13</td>
<td>WebCONF: Participating Transmission Owner UnitCost GUIDES</td>
</tr>
<tr>
<td>Feb 13</td>
<td>WebCONF: Market Simulation</td>
</tr>
<tr>
<td>Feb 16</td>
<td>Meeting: Consume Revenue Rights</td>
</tr>
<tr>
<td>Feb 16</td>
<td>WebCONF: Market Simulation</td>
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<tr>
<td>Feb 19</td>
<td>Call: Regards to the Governor</td>
</tr>
<tr>
<td>Feb 20</td>
<td>Call: Regards to the Governor</td>
</tr>
<tr>
<td>Feb 22</td>
<td>Call: Regards to the Governor</td>
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<td>Feb 22</td>
<td>WebCONF: Market Simulation</td>
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<td>Feb 26</td>
<td>Call: Regards to the Governor</td>
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<tr>
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<td>WebCONF: Market Simulation</td>
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Release Users Group (RUG)
Remaining 2019 MPPF Schedule

• December 11

Reference ISO public calendar for participation details.

Agenda topic suggestions:
• Submit through CIDI
  • Select the Market Performance and Planning Forum category
• Send email to isostakeholderaffairs@caiso.com.