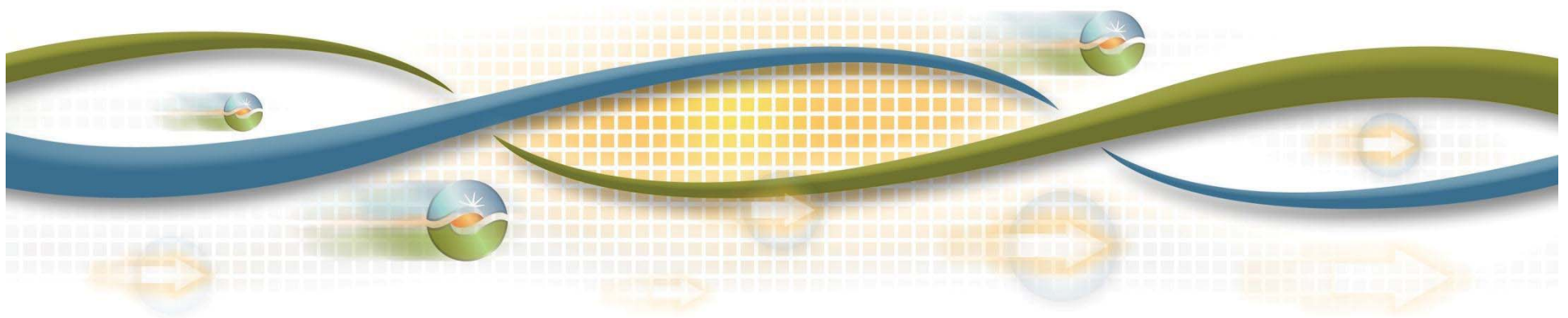




Market Performance and Planning Forum

May 17, 2016



Market Performance and Planning Forum Agenda – May 17, 2016

10:00- 10:05	Introduction, Agenda	Kristina Osborne
10:05 – 11:30	Market Performance and Quality Update	Amber Motley Nan Liu
11:30 – 12:00	Policy Update	Brad Cooper
12:00 – 1:00	Lunch	
1:00 – 2:00	Release Update	Janet Morris



Market Performance and Quality Update

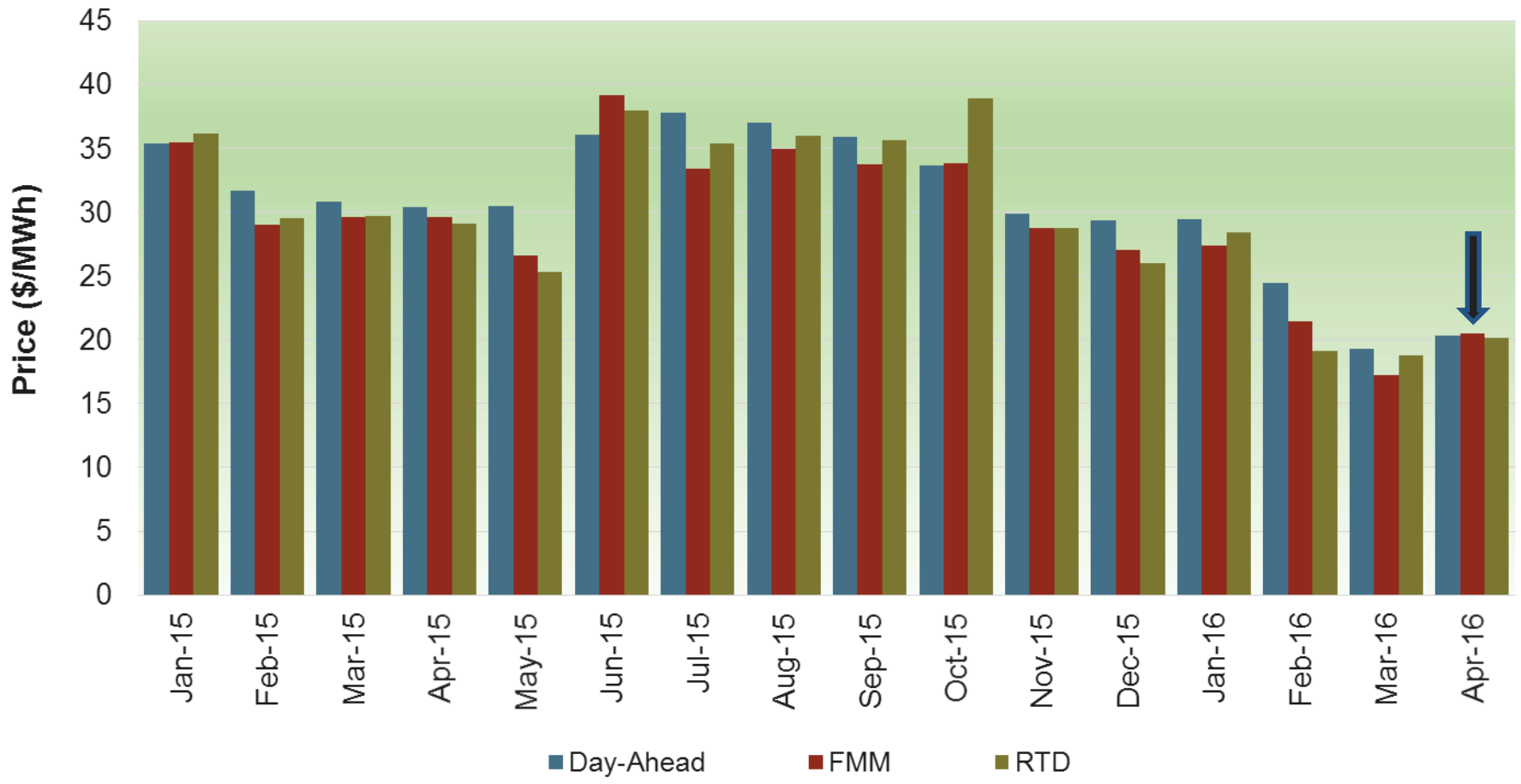
Amber Motley

Manager, Short Term Forecasting

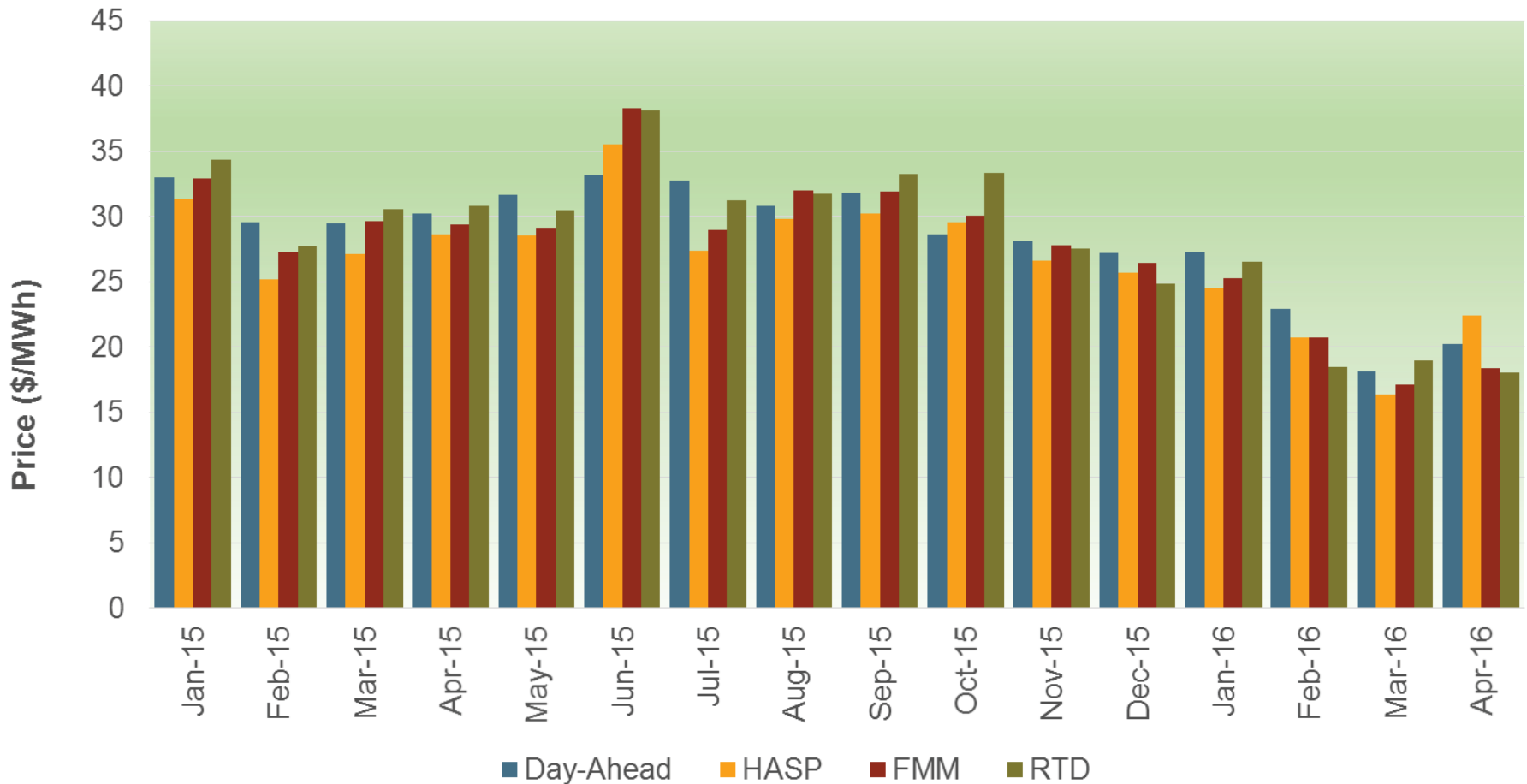
Nan Liu

Manager, Market Development and Analysis

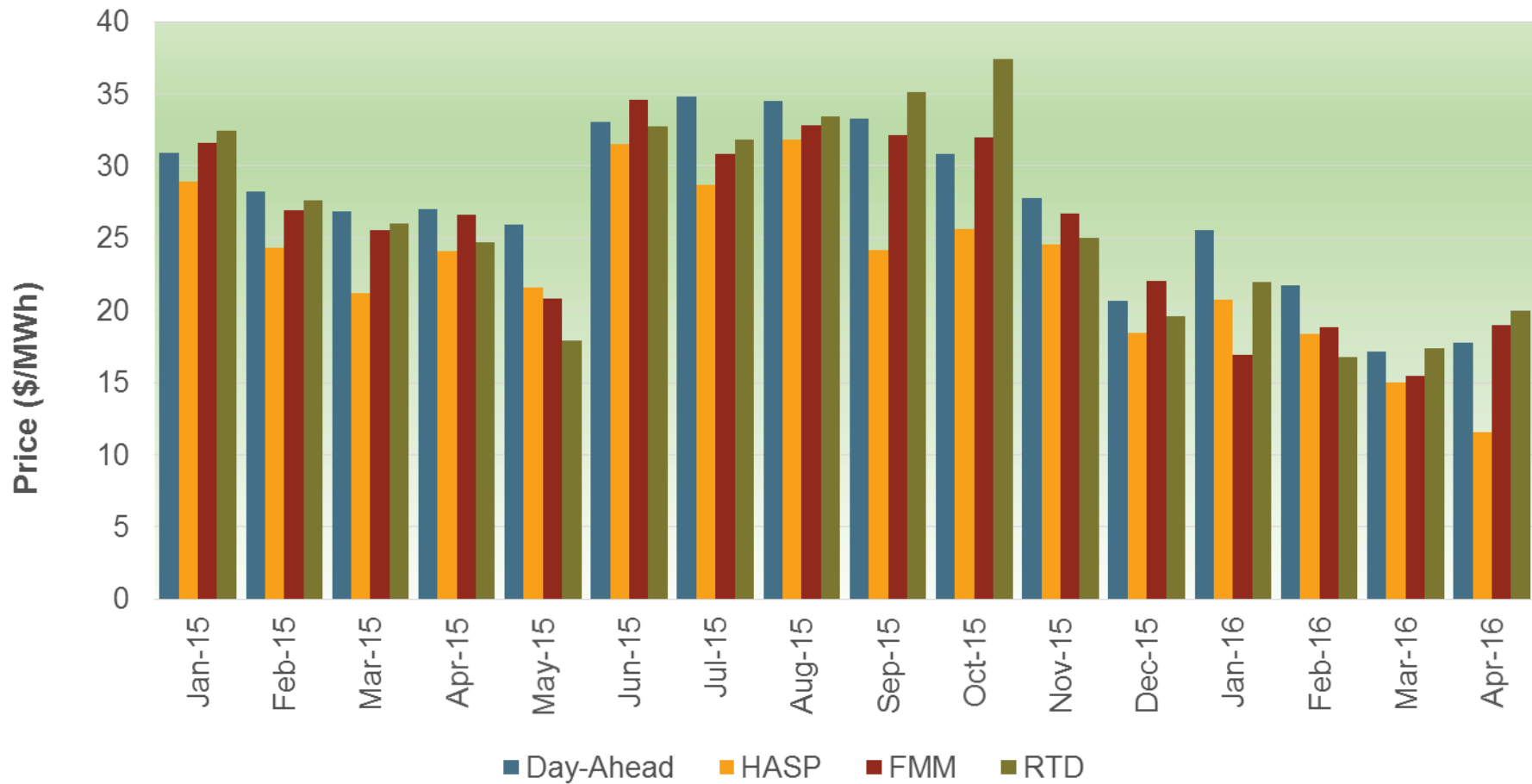
Good price convergence in April.



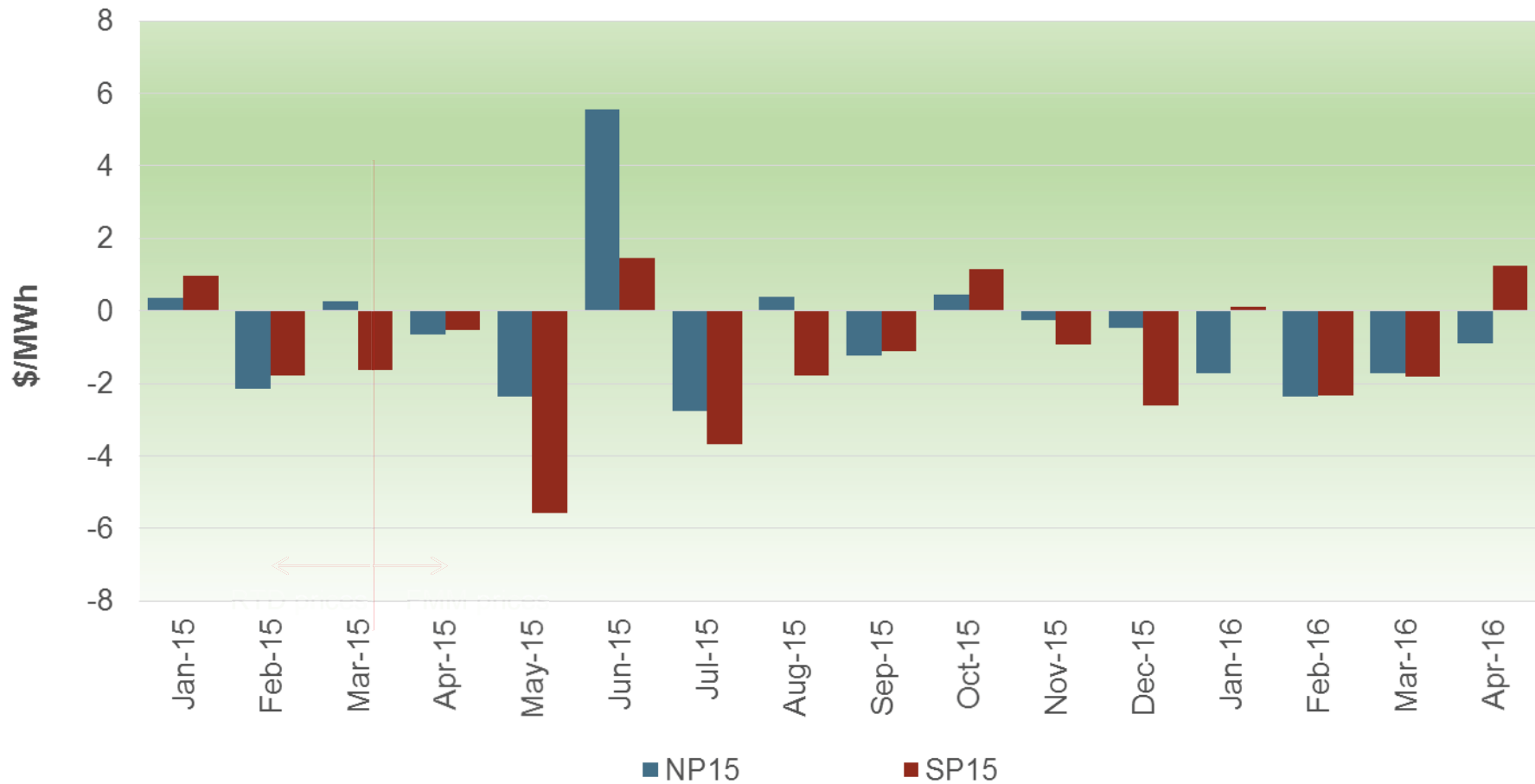
Good price convergence at Malin across day ahead and real-time markets in March.



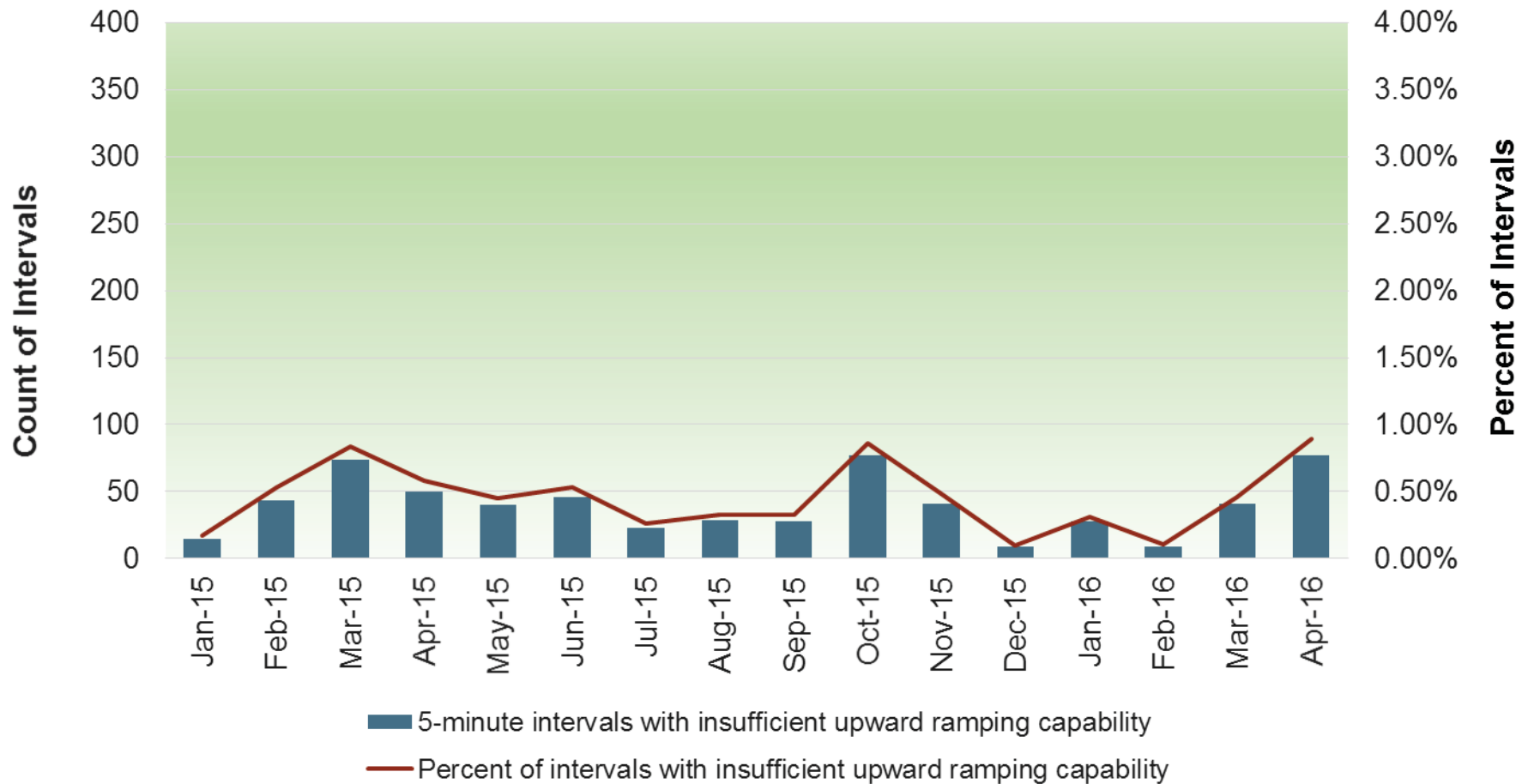
Good price convergence at Palo Verde across day ahead and real-time markets in March.



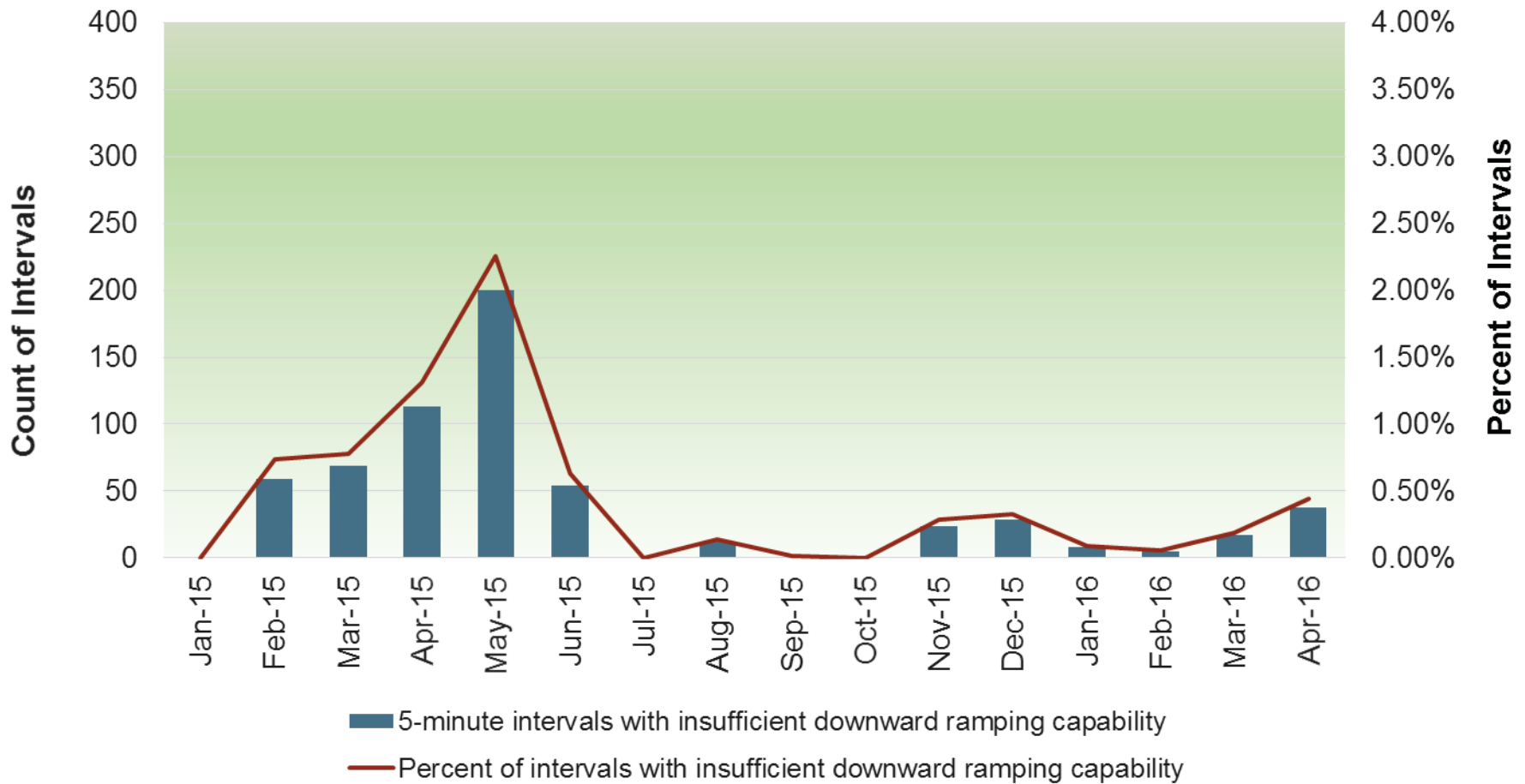
RT prices lower than DA prices in March for both NP 15 and SP 15.



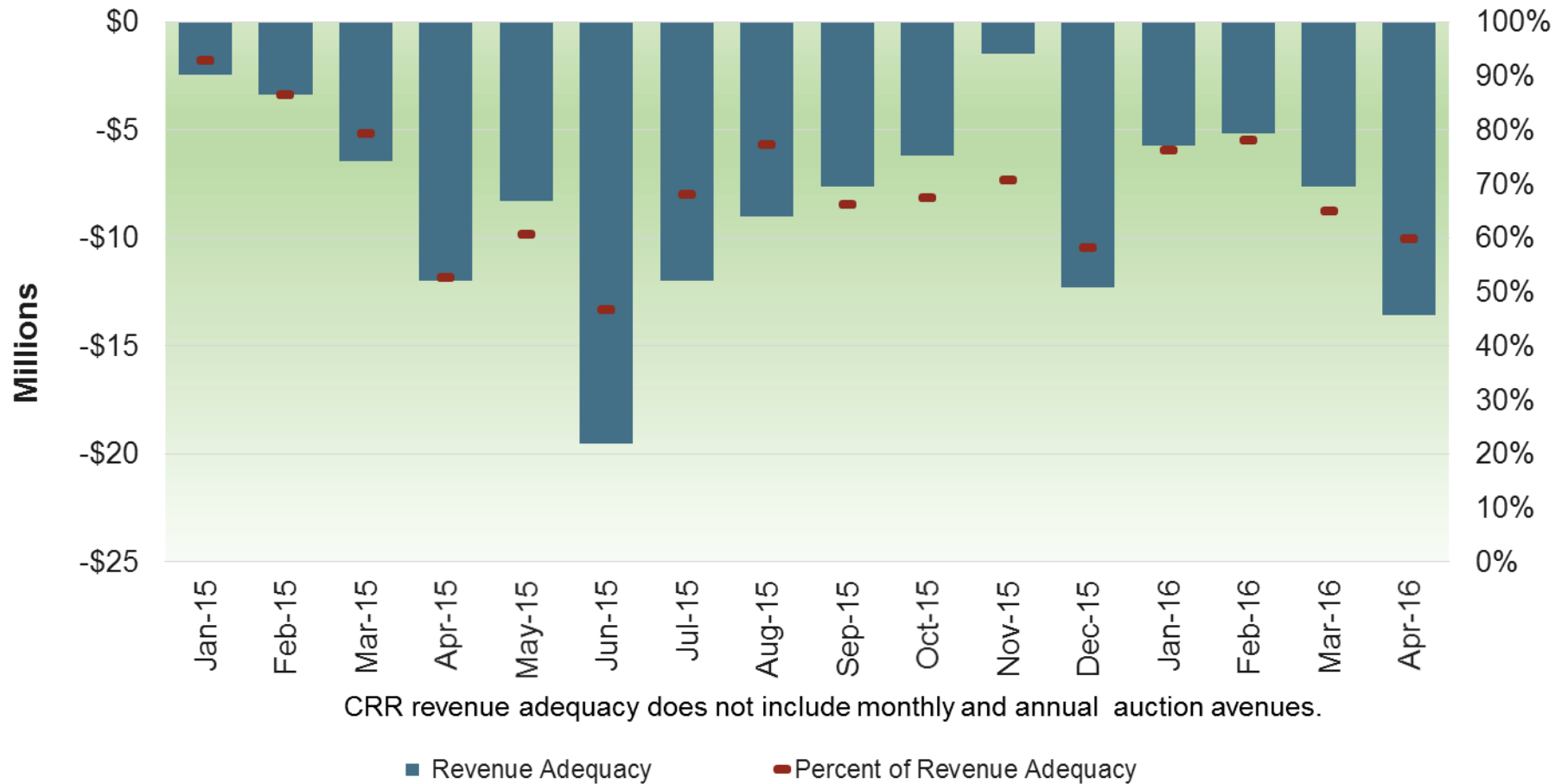
Insufficient upward ramping capacity in ISO increased since February, but still remained low.



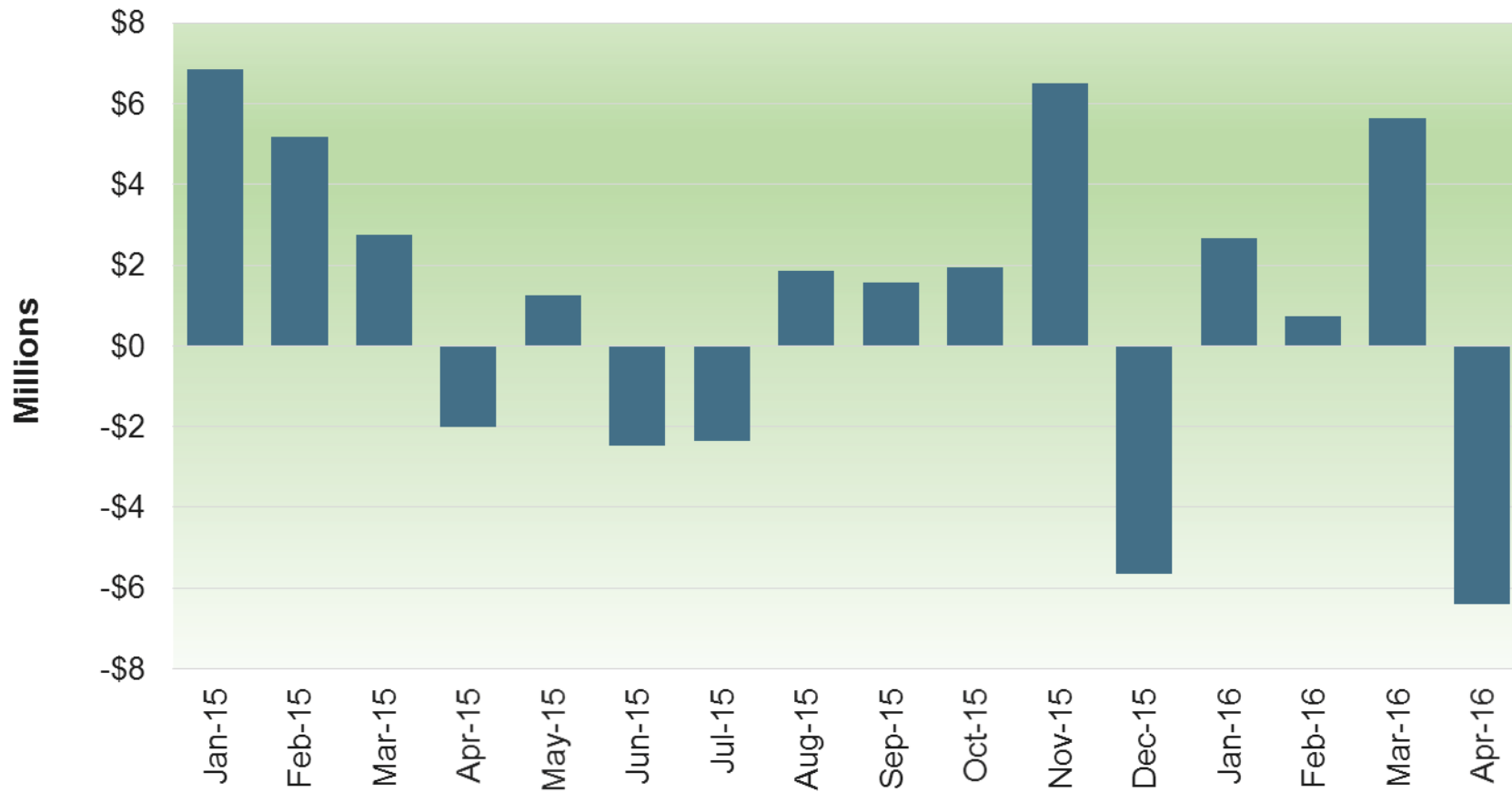
Insufficient downward ramping capacity stayed low in 2016.



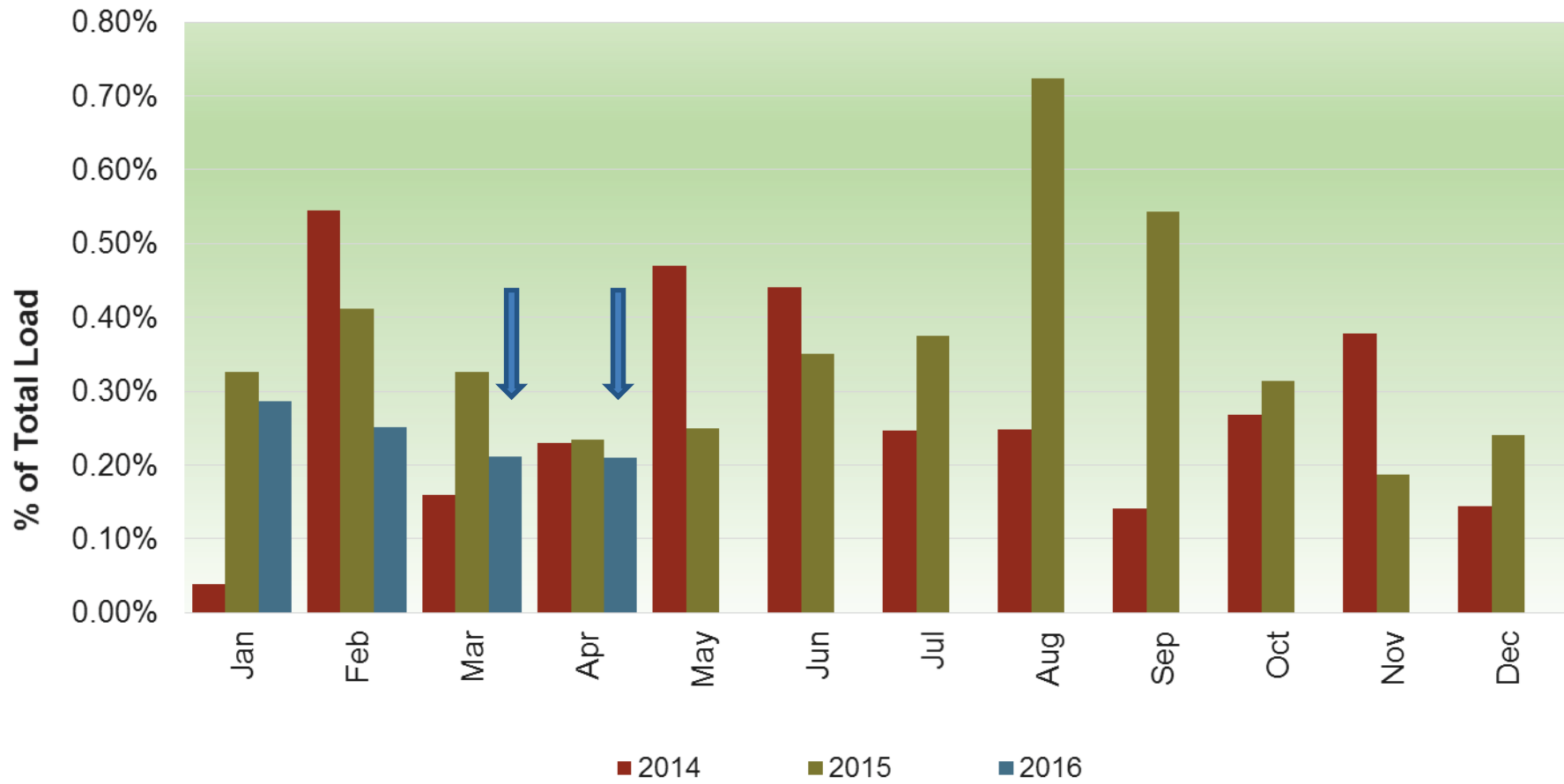
Congestion revenue rights market revenue inadequacy without including auction revenues



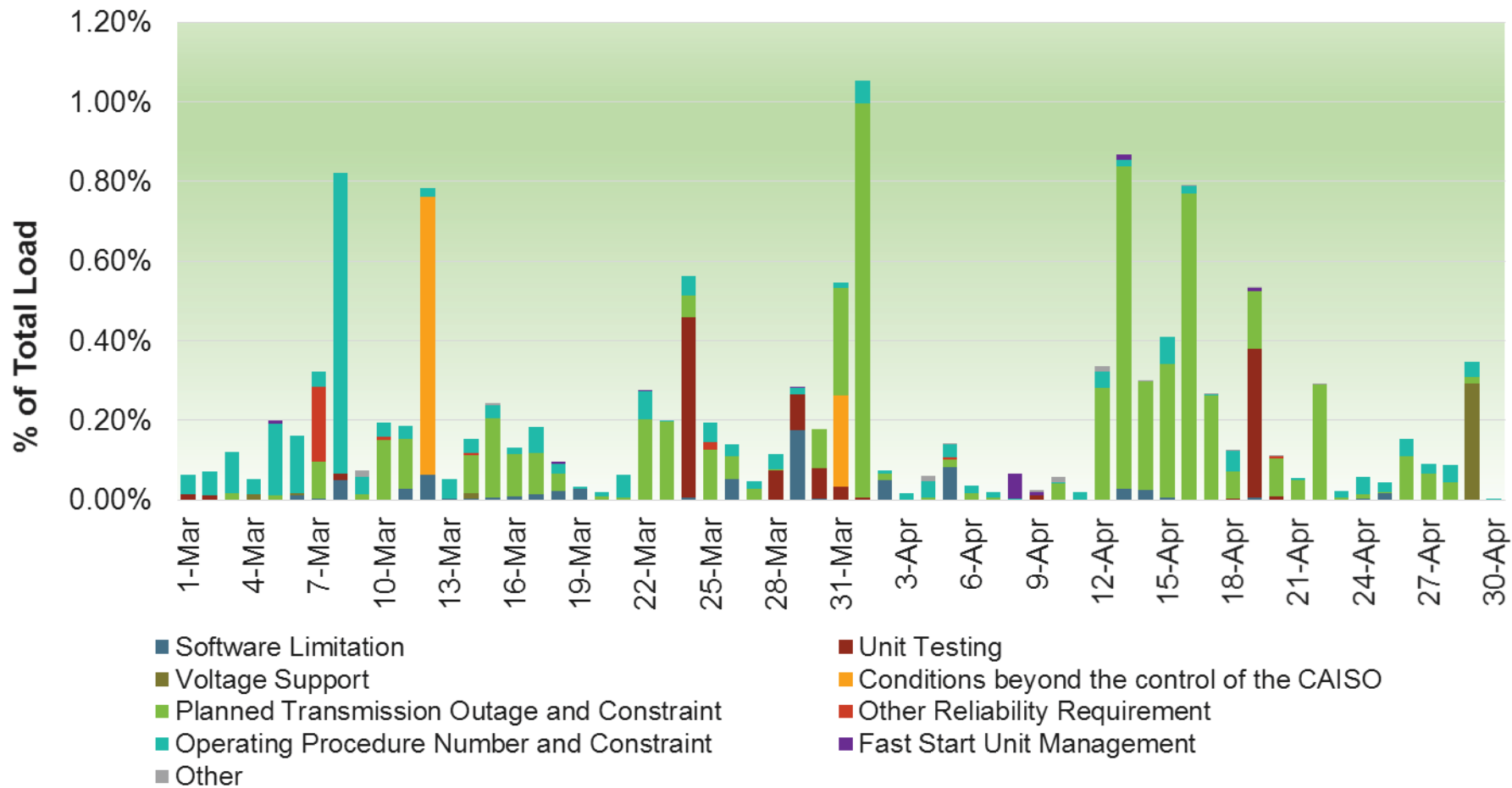
Congestion revenue rights market revenue inadequacy including auction revenues



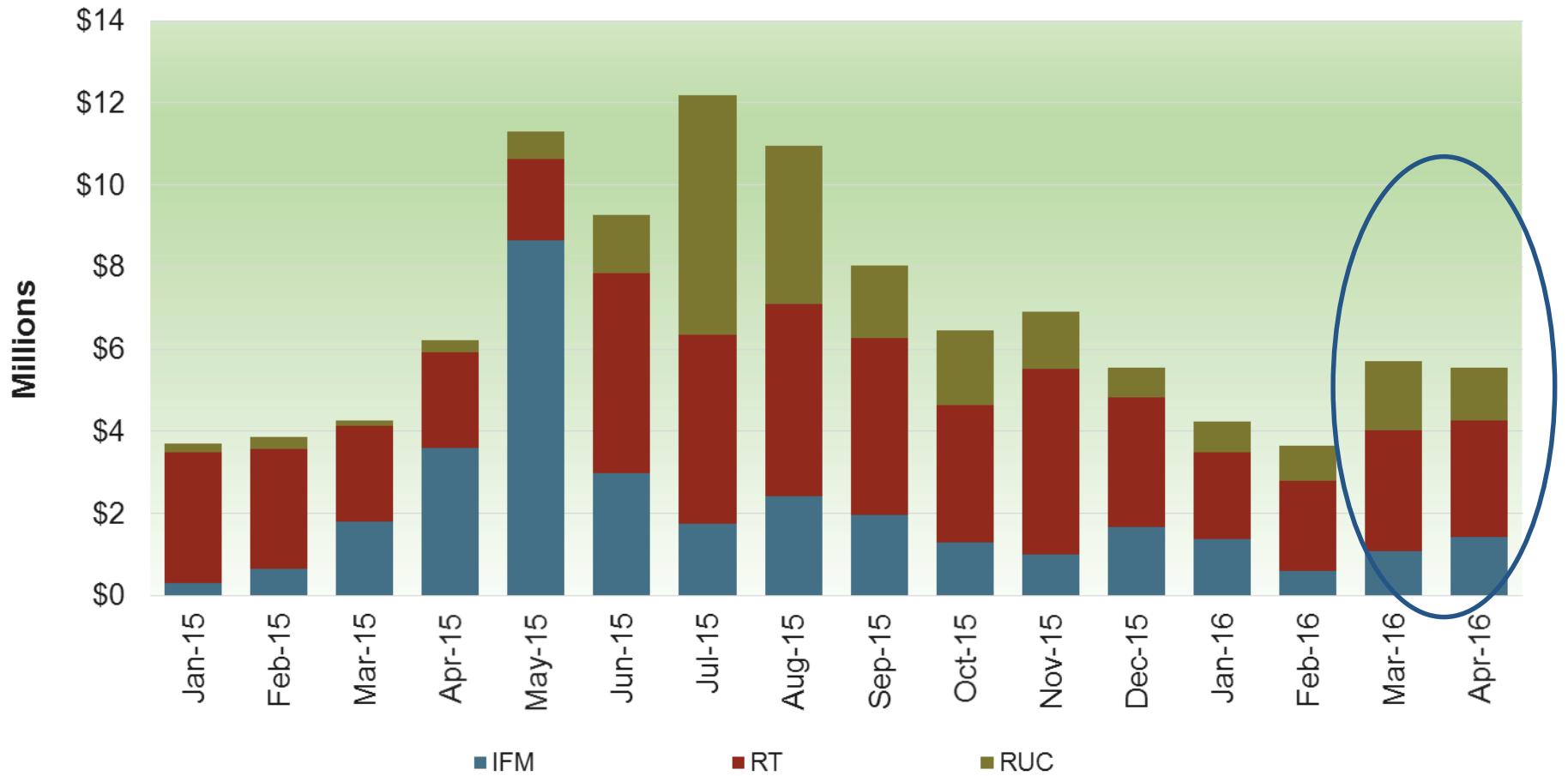
Exceptional dispatch volume in the ISO area decreased in March and April.



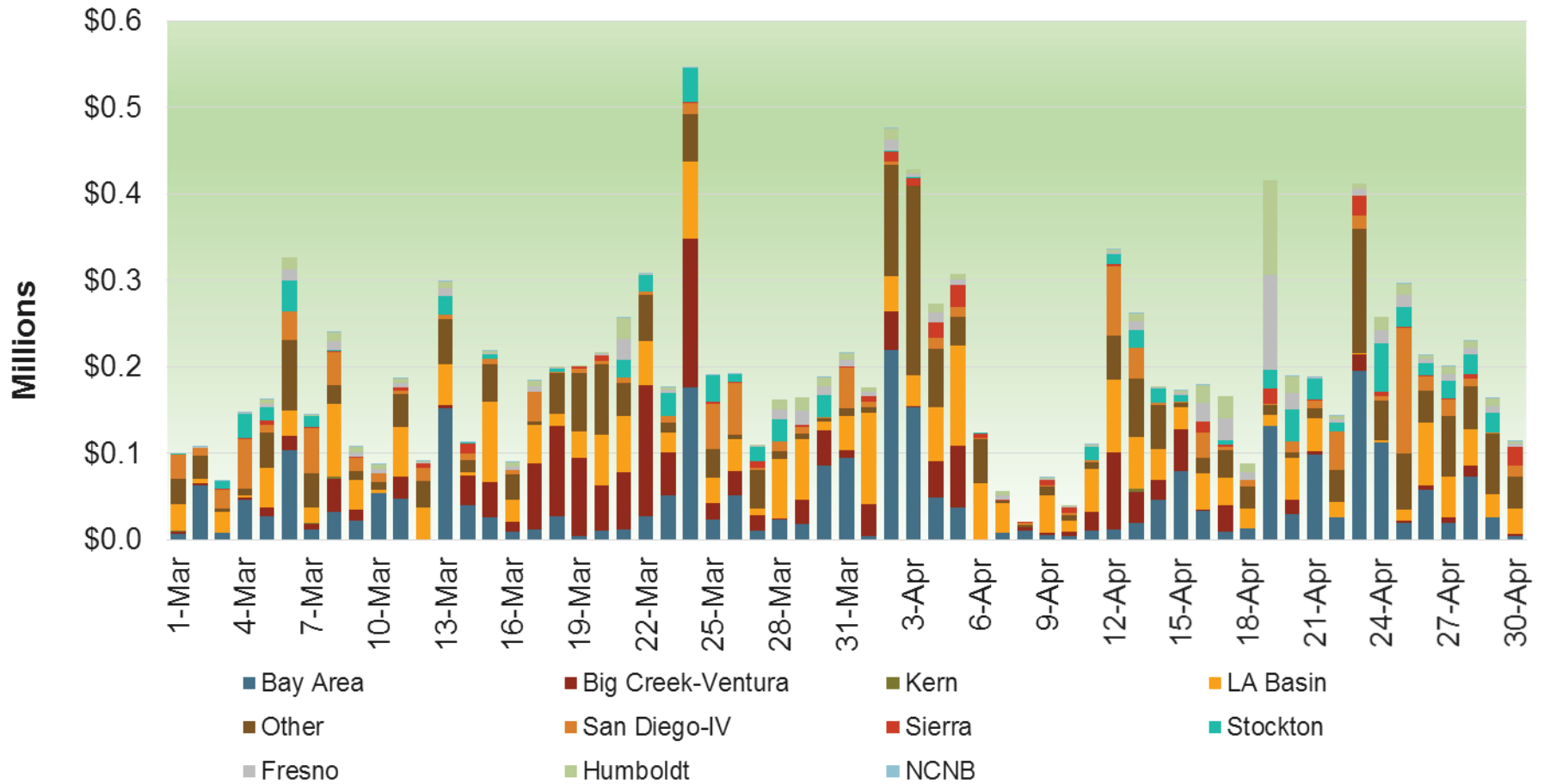
Daily exceptional dispatches by reason



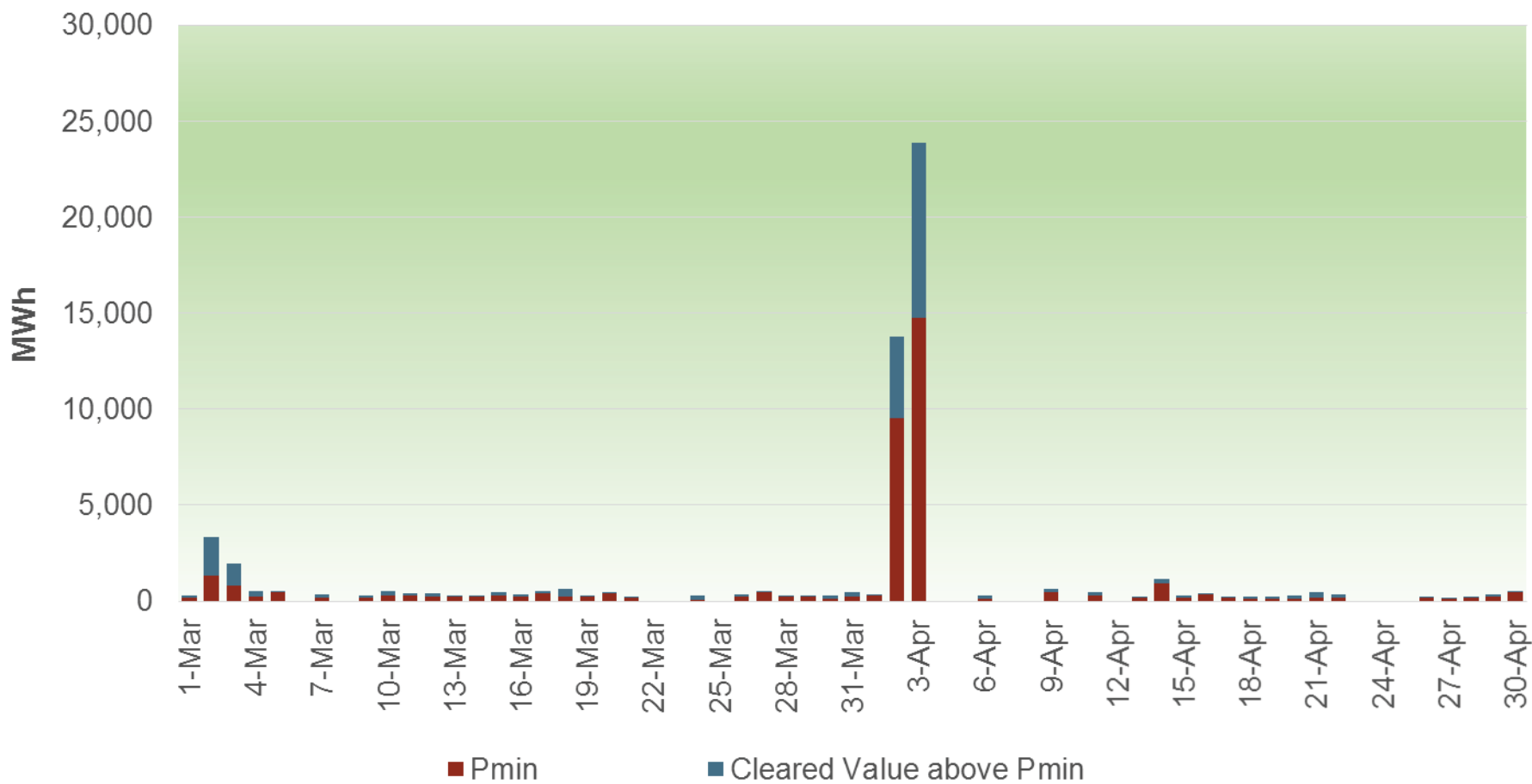
Bid cost recovery rose in March and April.



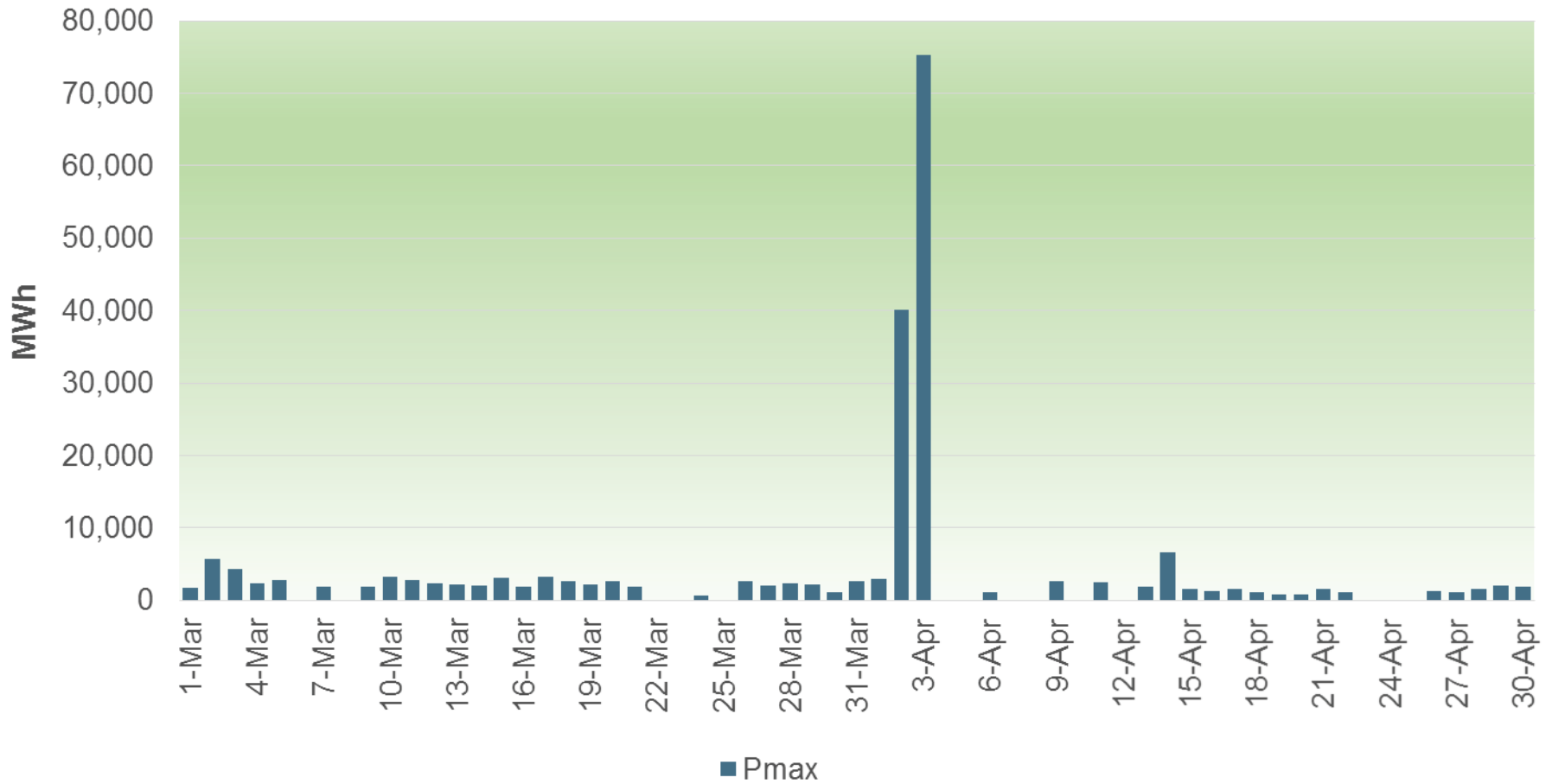
Bid cost recovery (BCR) by Local Capacity Requirement area



Minimum online commitment (MOC)



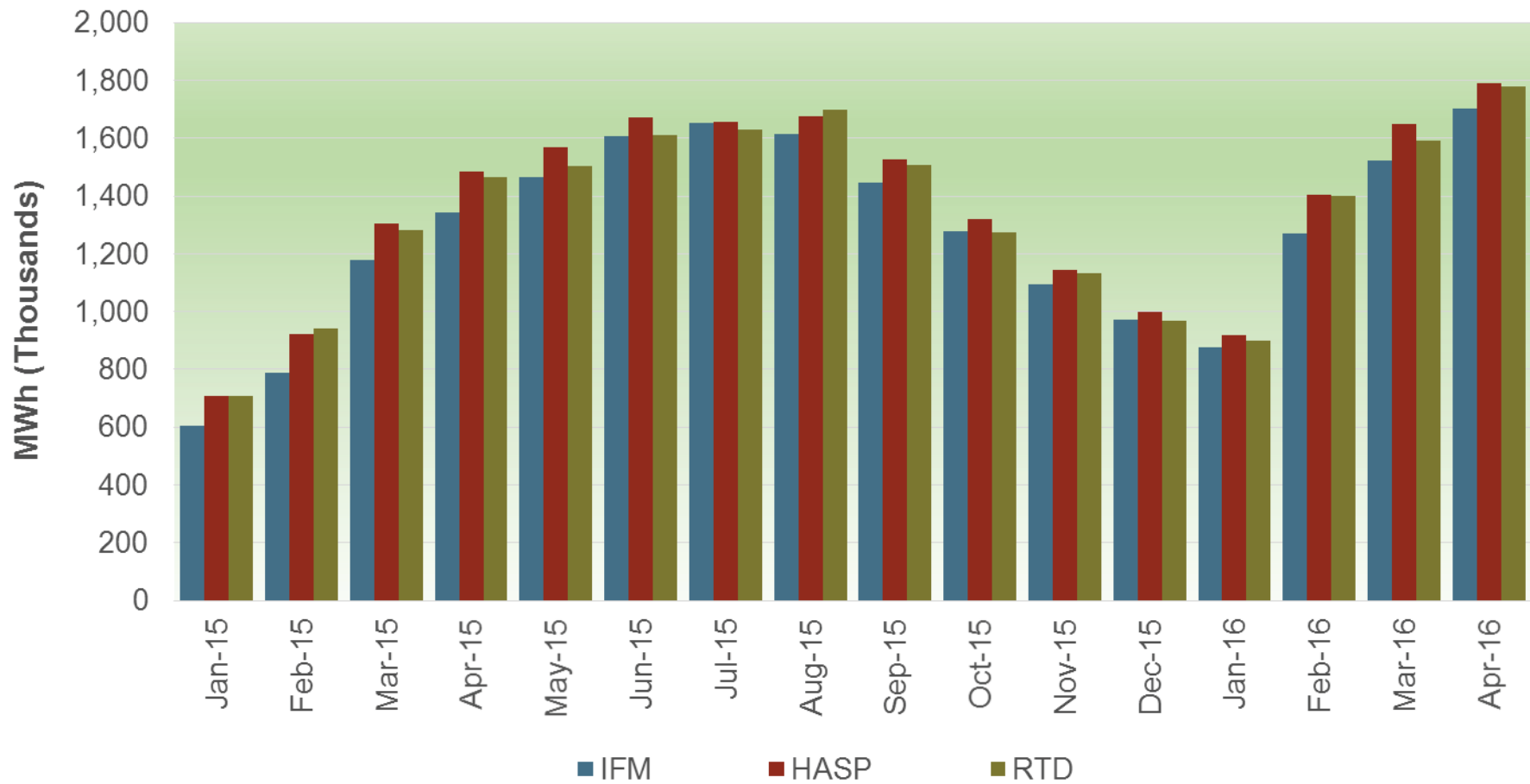
Pmax of MOC Cleared Units



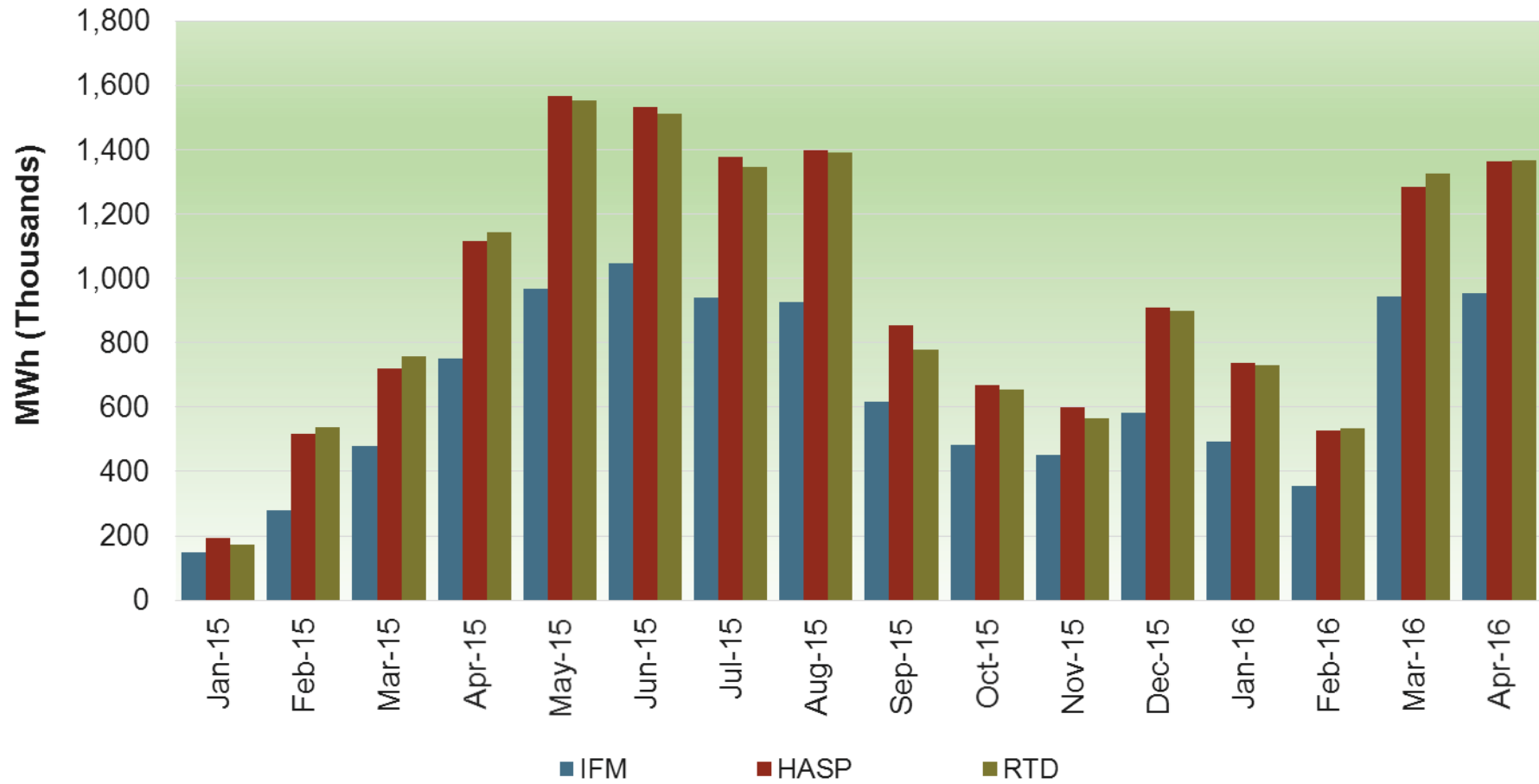
Binding minimum online commitments in March and April

MOC Name	Number (frequency) of binding hours in March and April
Humboldt 7110	947
MOC PEASE	479
MOC NP15	35
Orange County 7630	28
SCIT MOC	18
MOC Narrows 388679	9

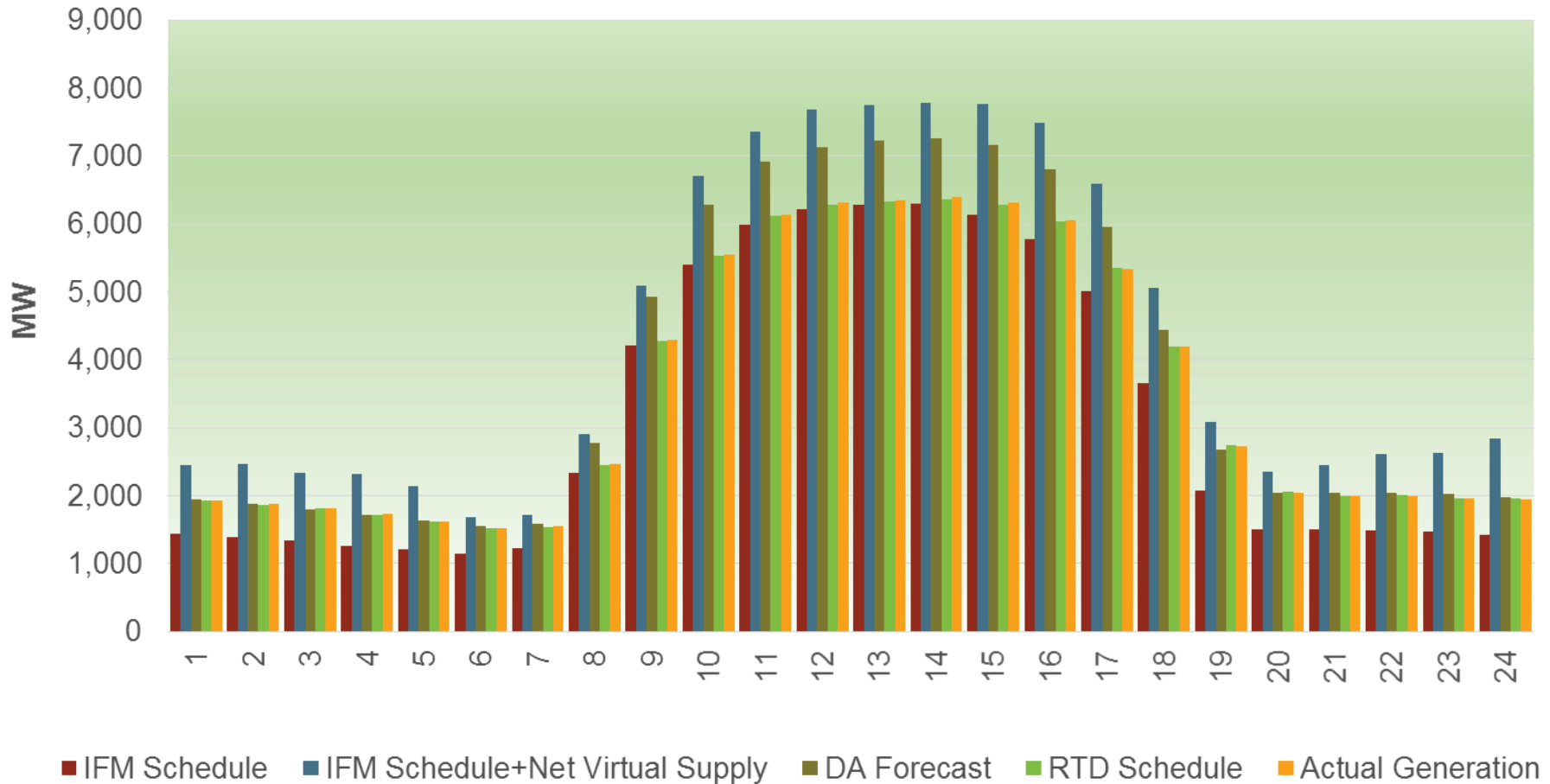
IFM under-scheduling of solar generation in March and April



IFM under-scheduling of wind generation in March and April

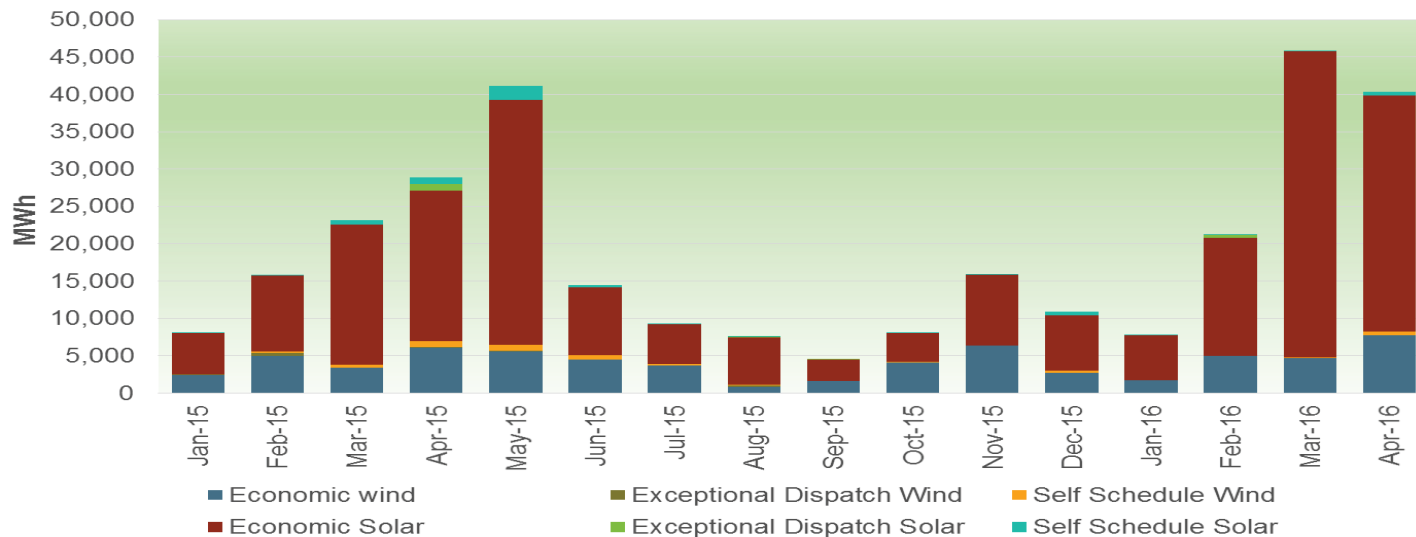
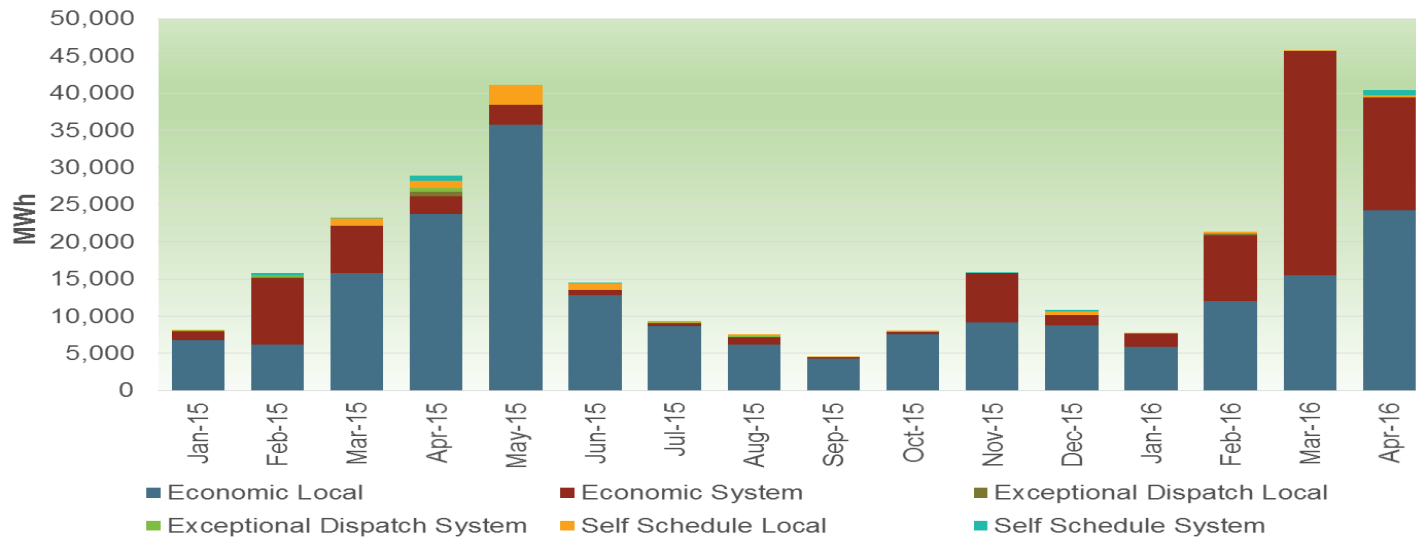


Renewable (VERS) schedules and forecast in March and April

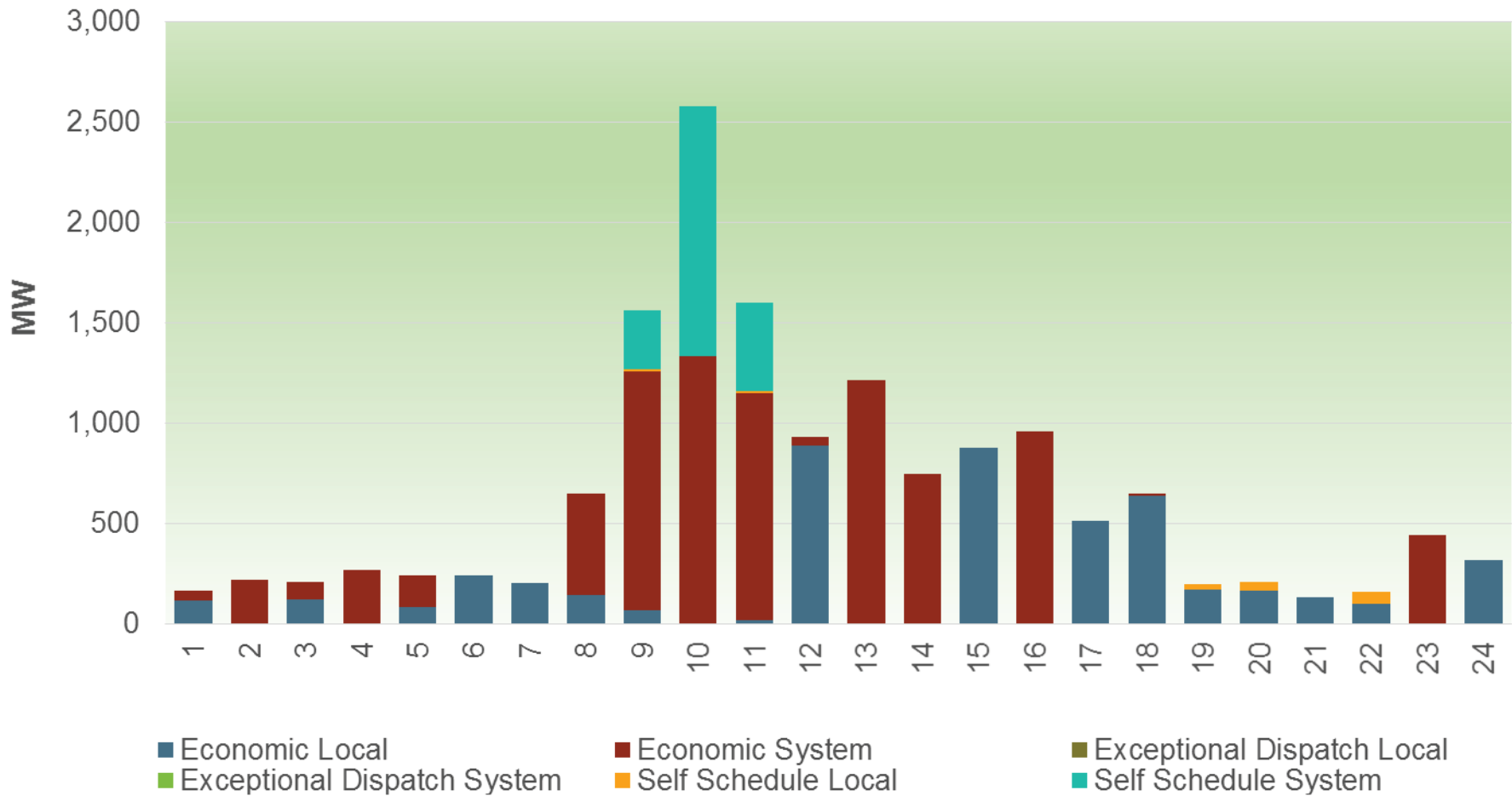


<http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=EFF75C2E-F28E-4087-B88B-8DFFAED828F8>

RTD renewable (VERs) curtailment rose in March and April



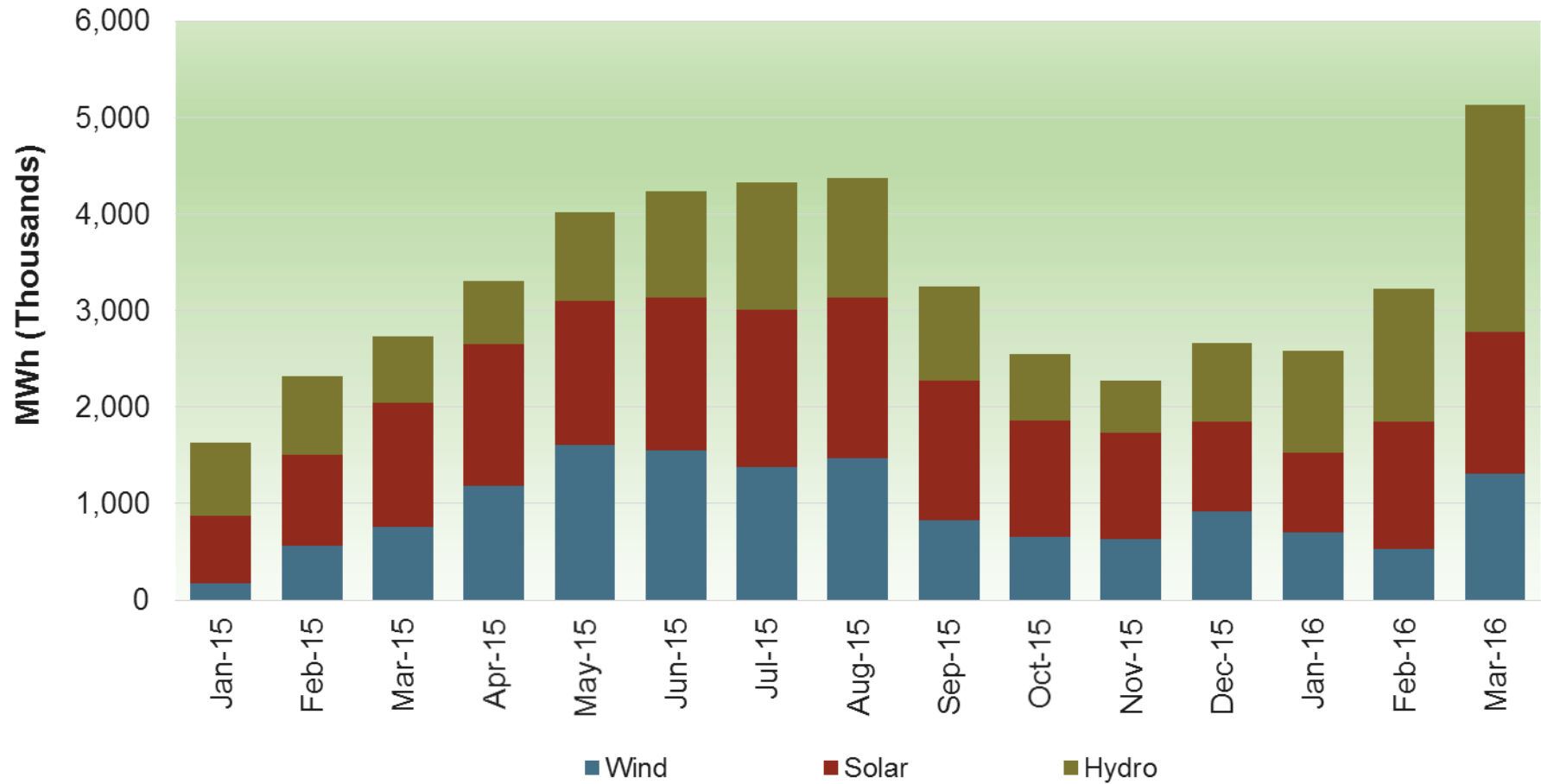
Hourly distribution of maximum RTD renewable (VERS) curtailment in April



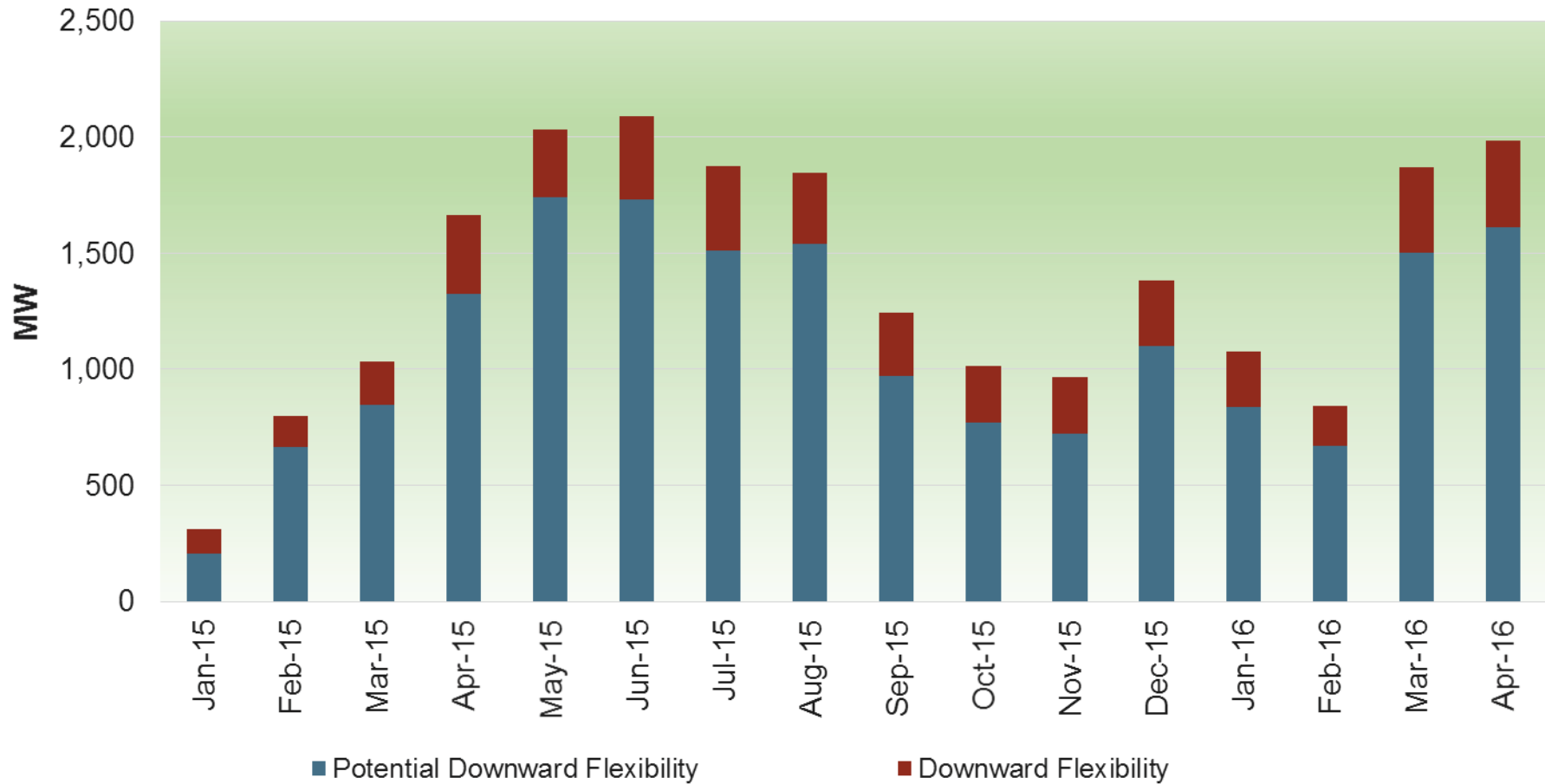
RTD renewable (VERs) curtailment and avoided curtailment



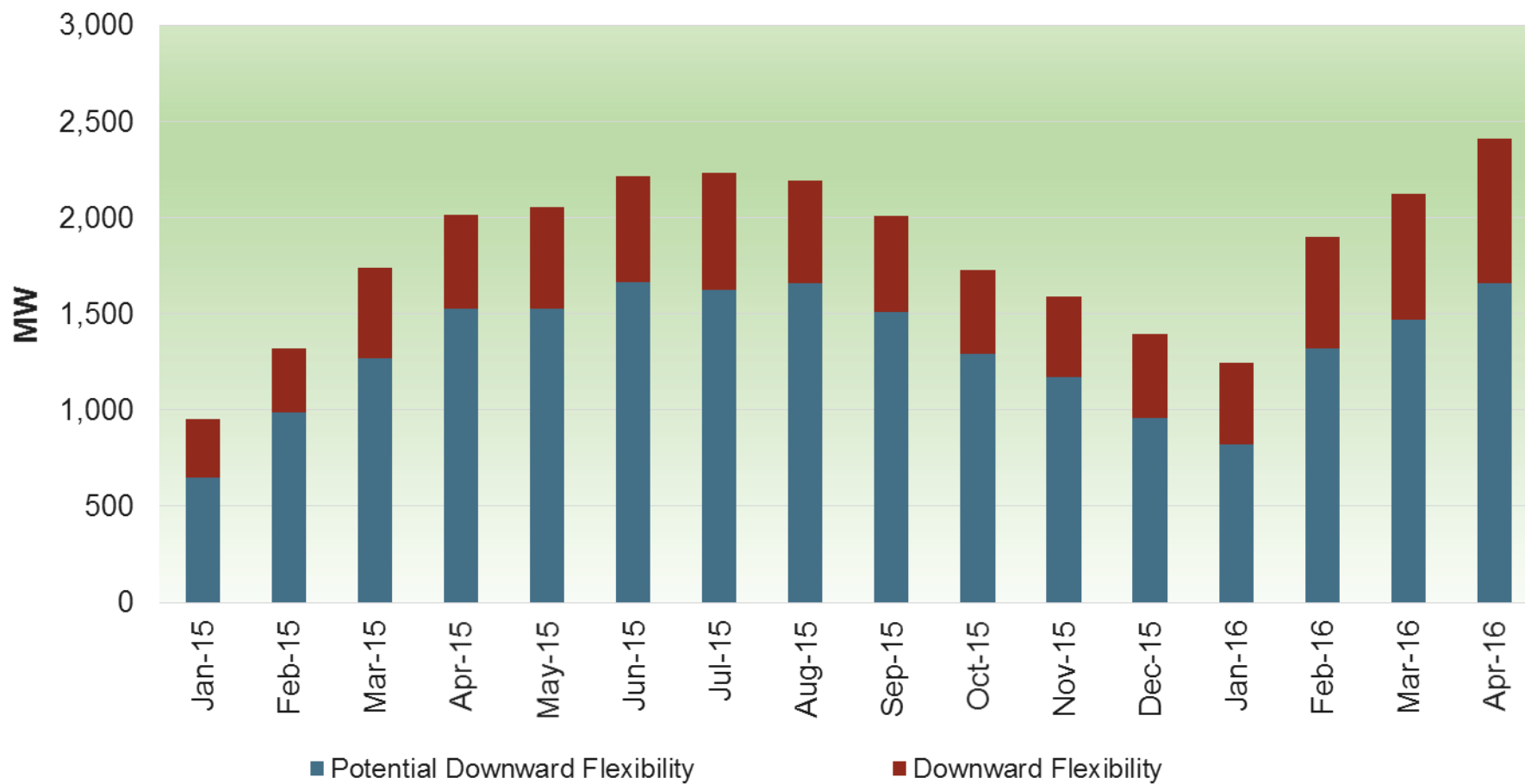
Wind, solar and hydro production



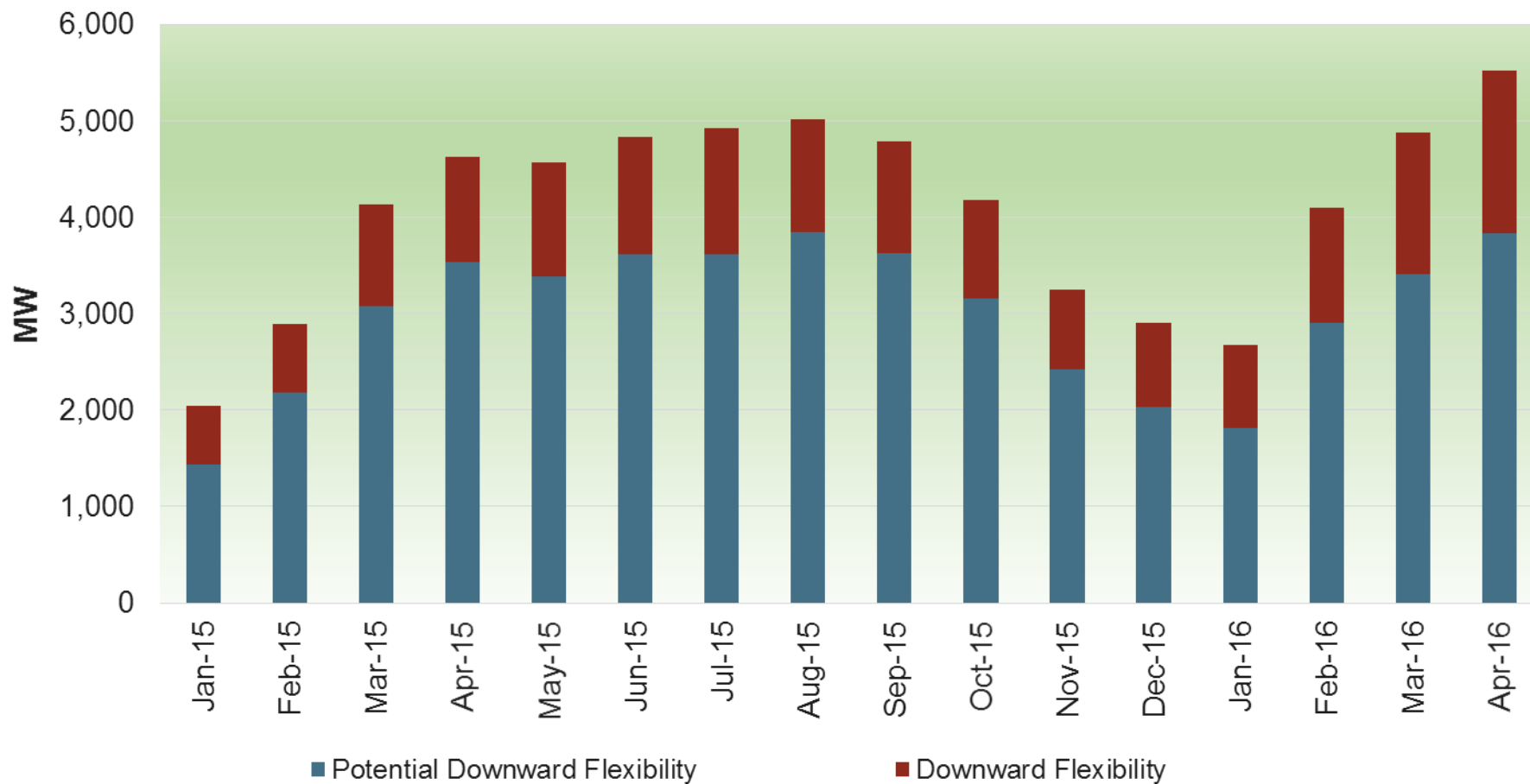
Monthly wind (VERs) downward flexibility in FMM



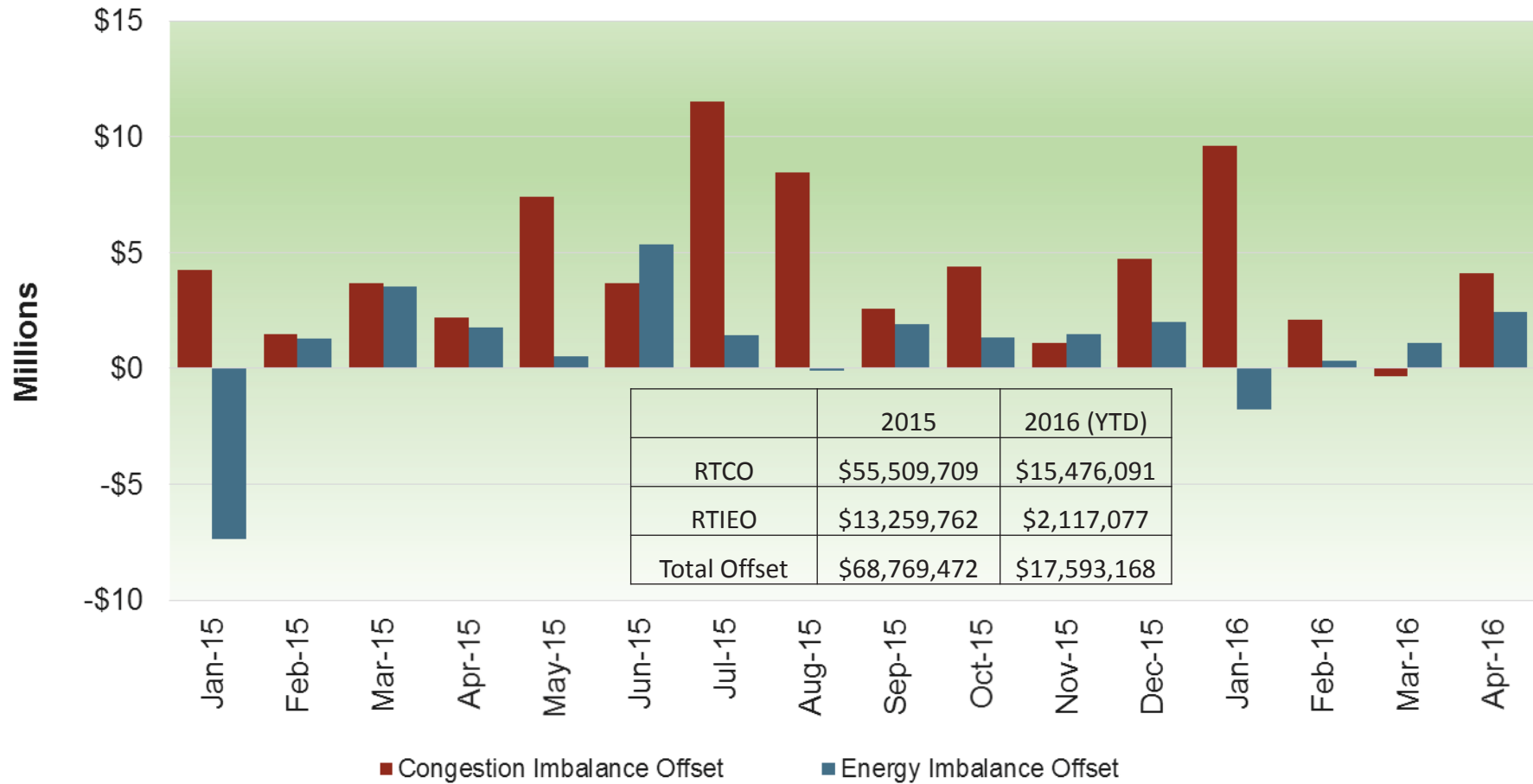
Monthly solar (VERS) downward flexibility in FMM



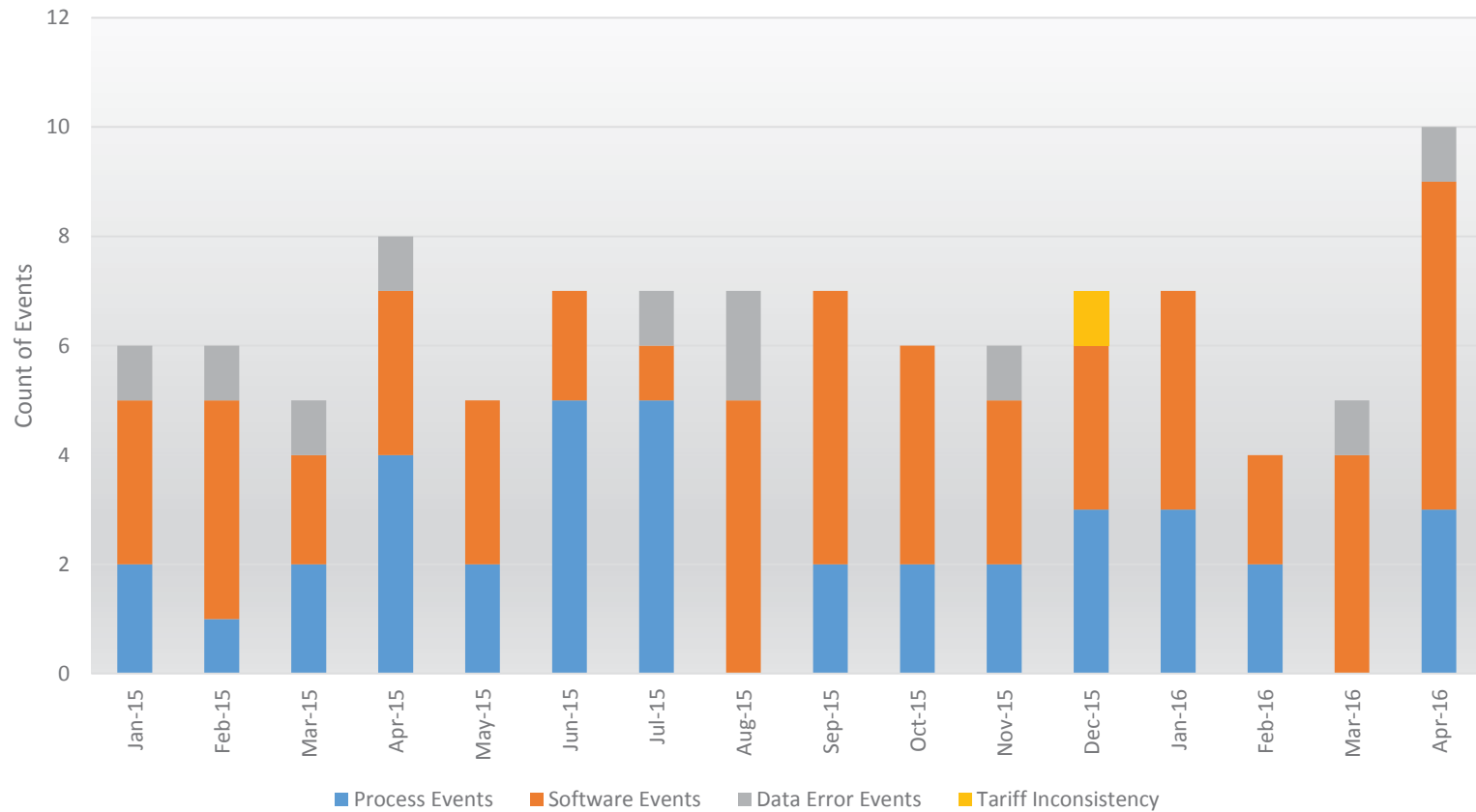
Monthly solar (VERs) downward flexibility in FMM from 11 AM to 5 PM



ISO area RTCO and RTIEO stayed low in March and April



Price correction events increased in April.



EIM Price trends

5-minute PACW Aggregate Price



5-minute PACE Aggregate Price



15-minute PACW Aggregate Price

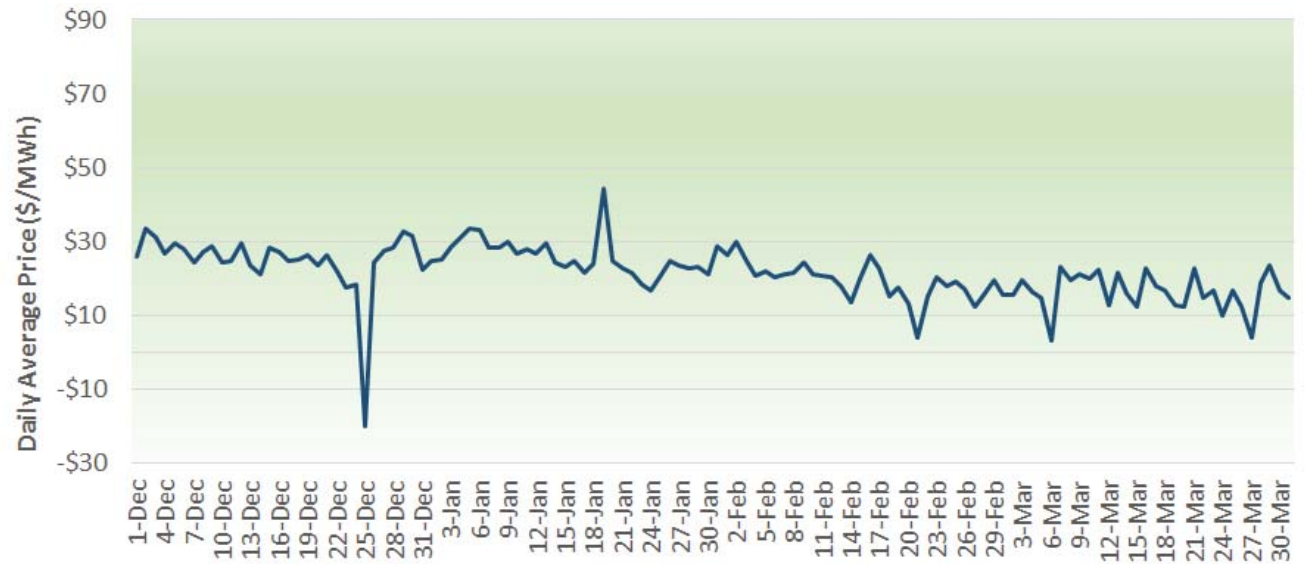


15-minute PACE Aggregate Price

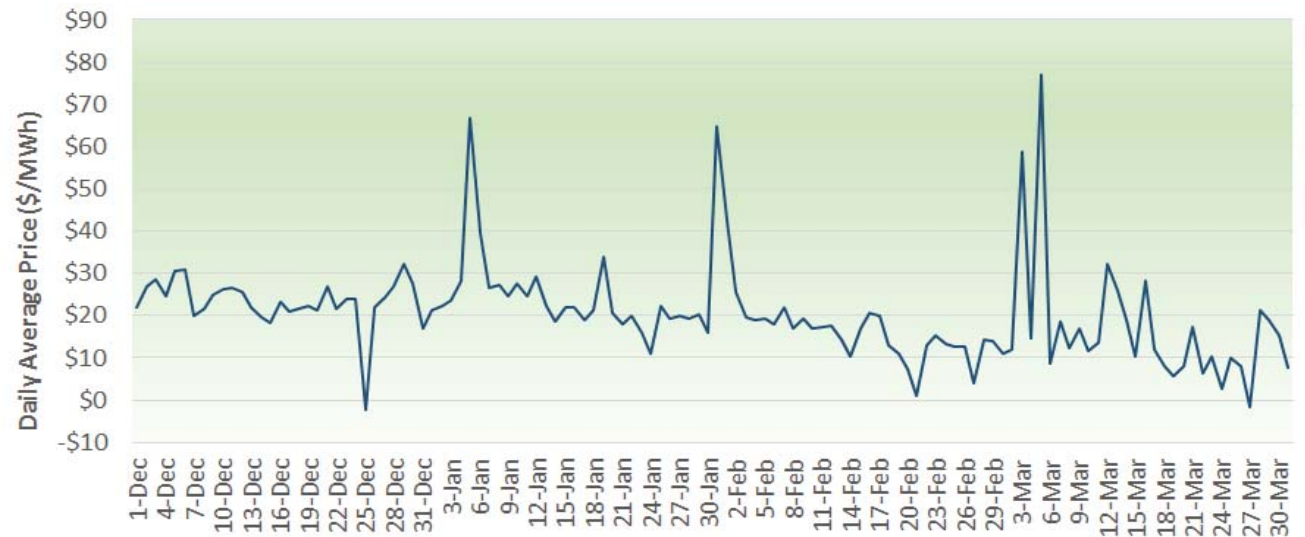


Nevada prices since December

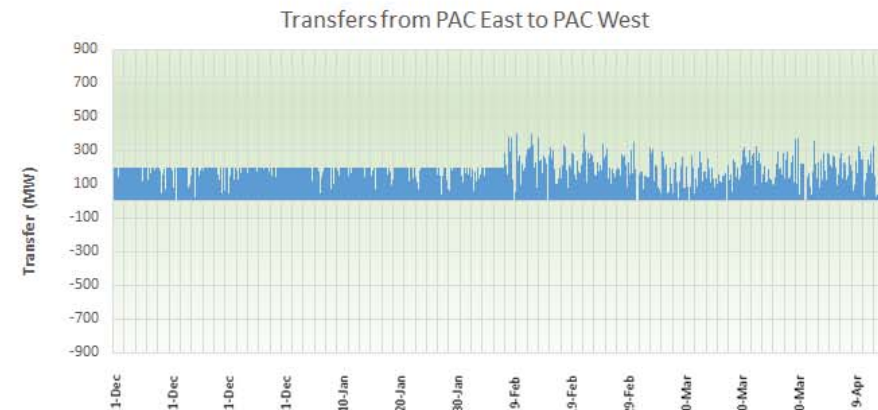
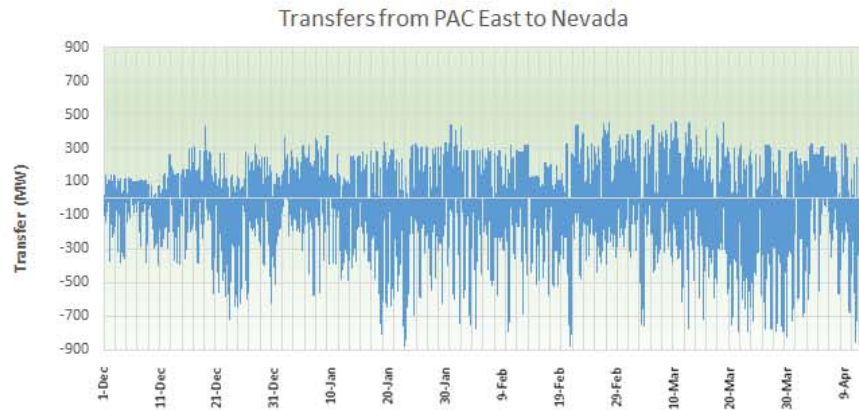
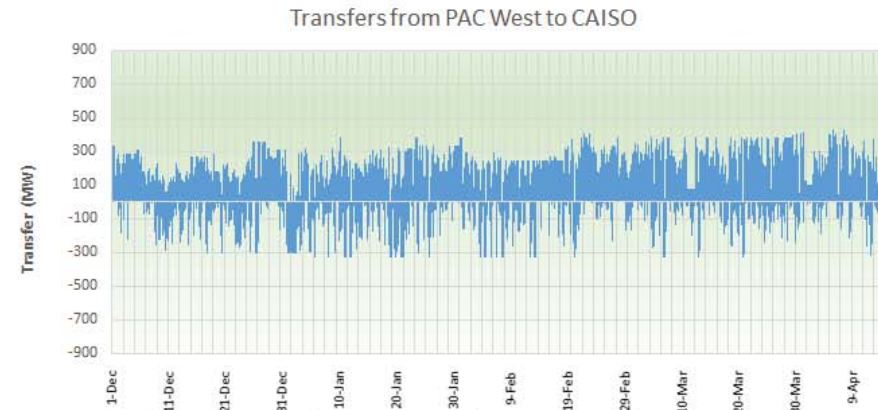
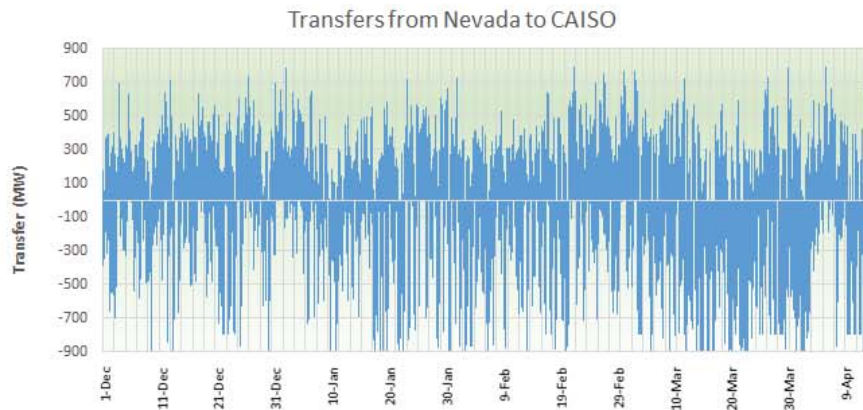
FMM Average Prices



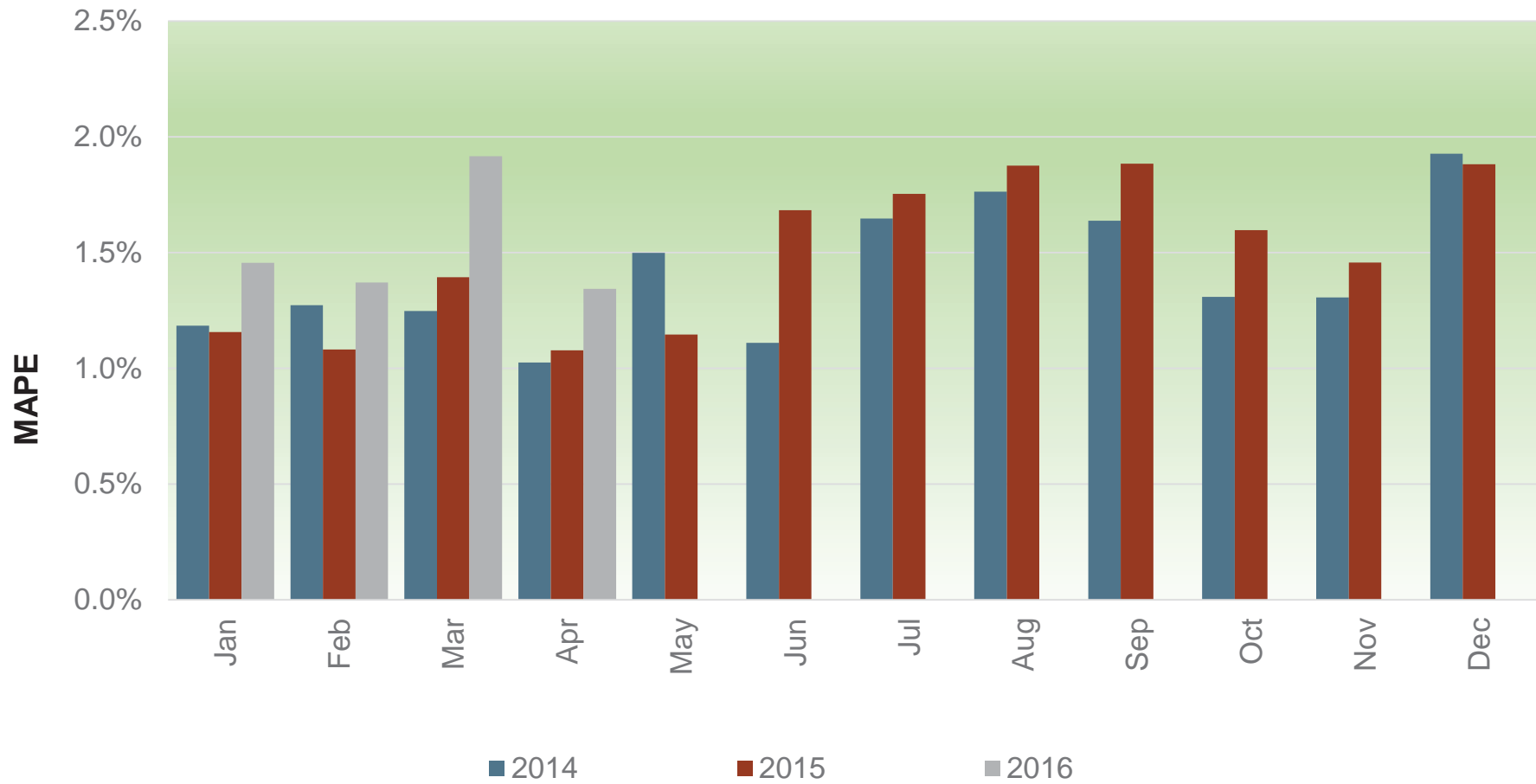
RTD Average Prices



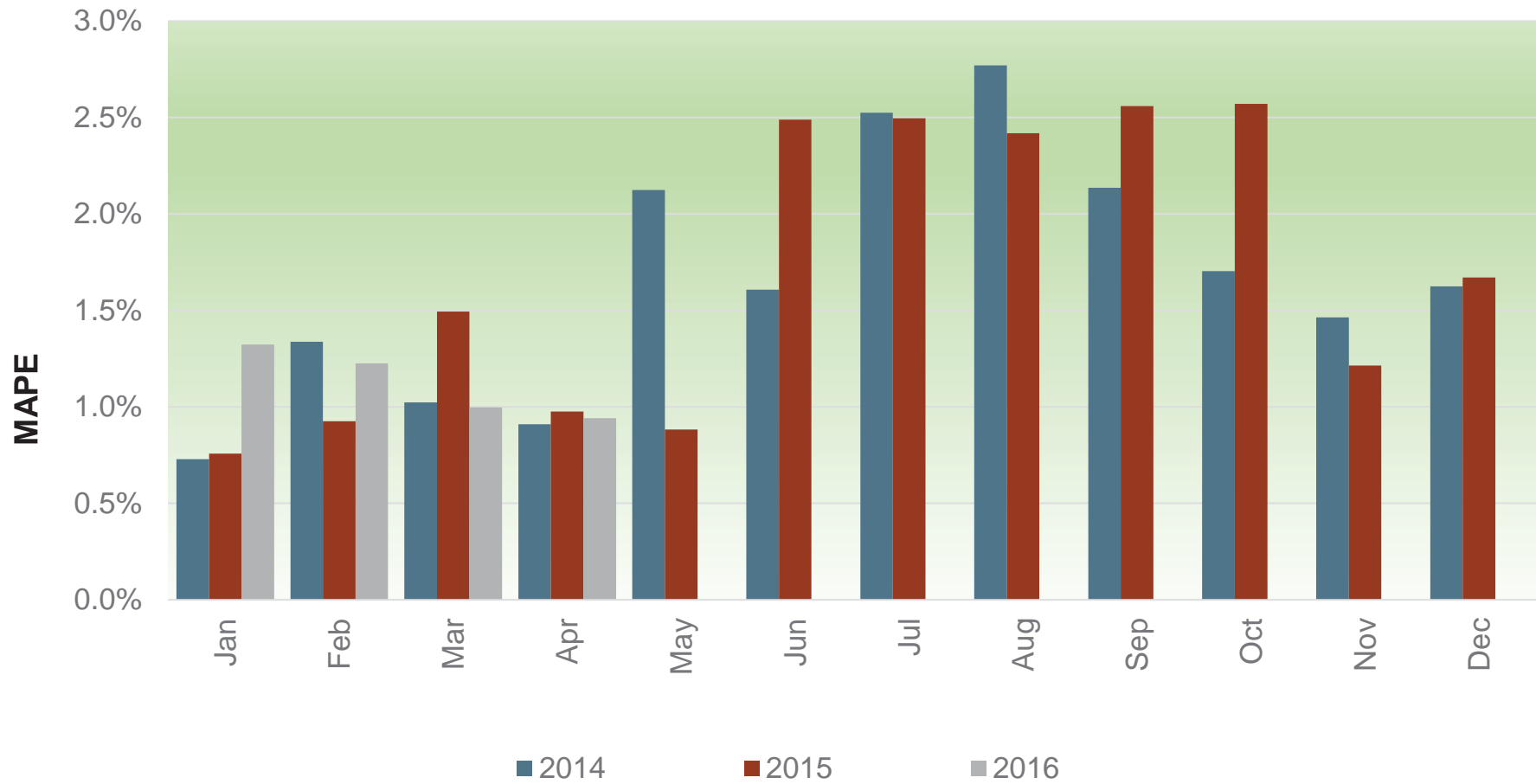
Transfers among balancing authority areas



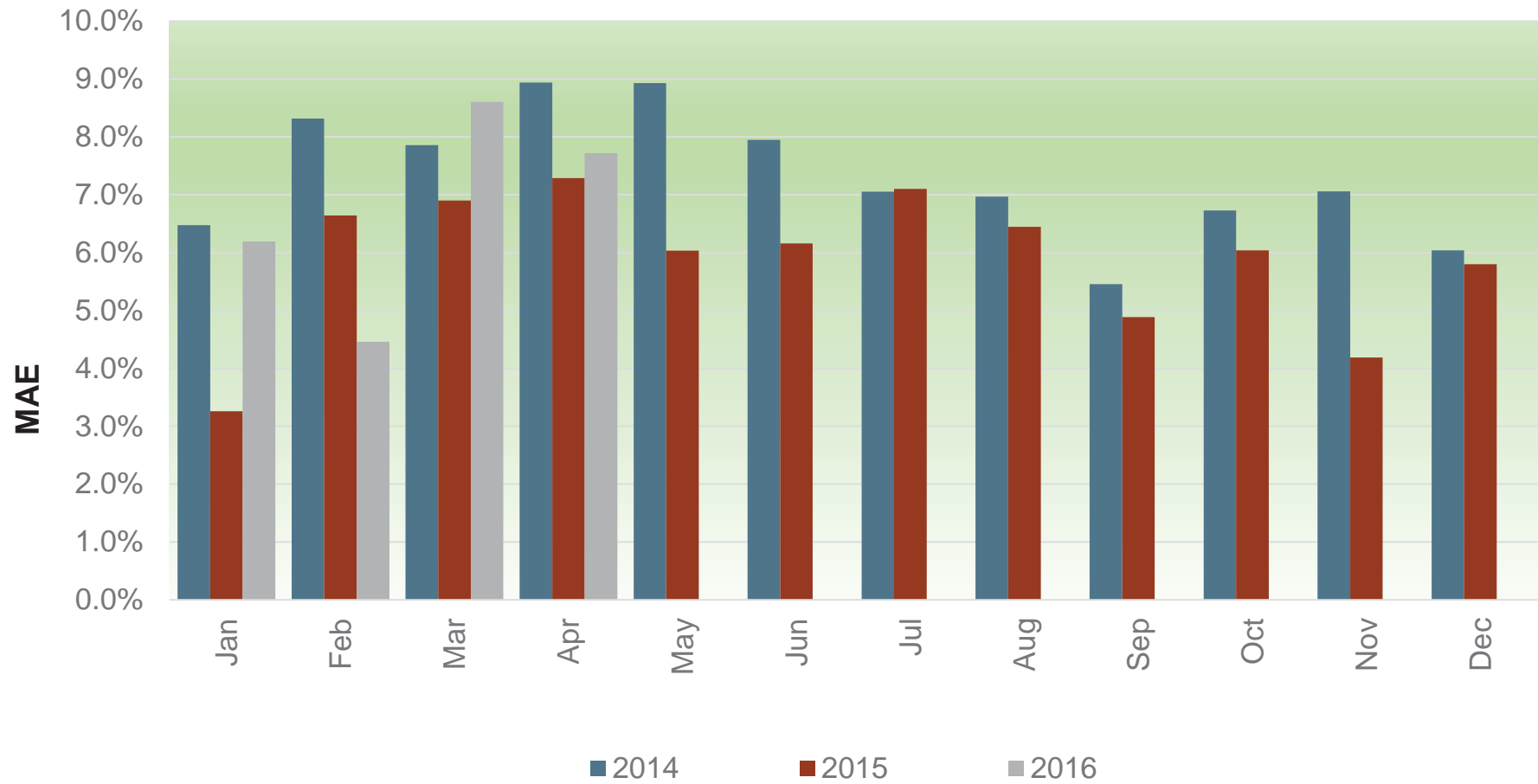
Day-ahead load forecast



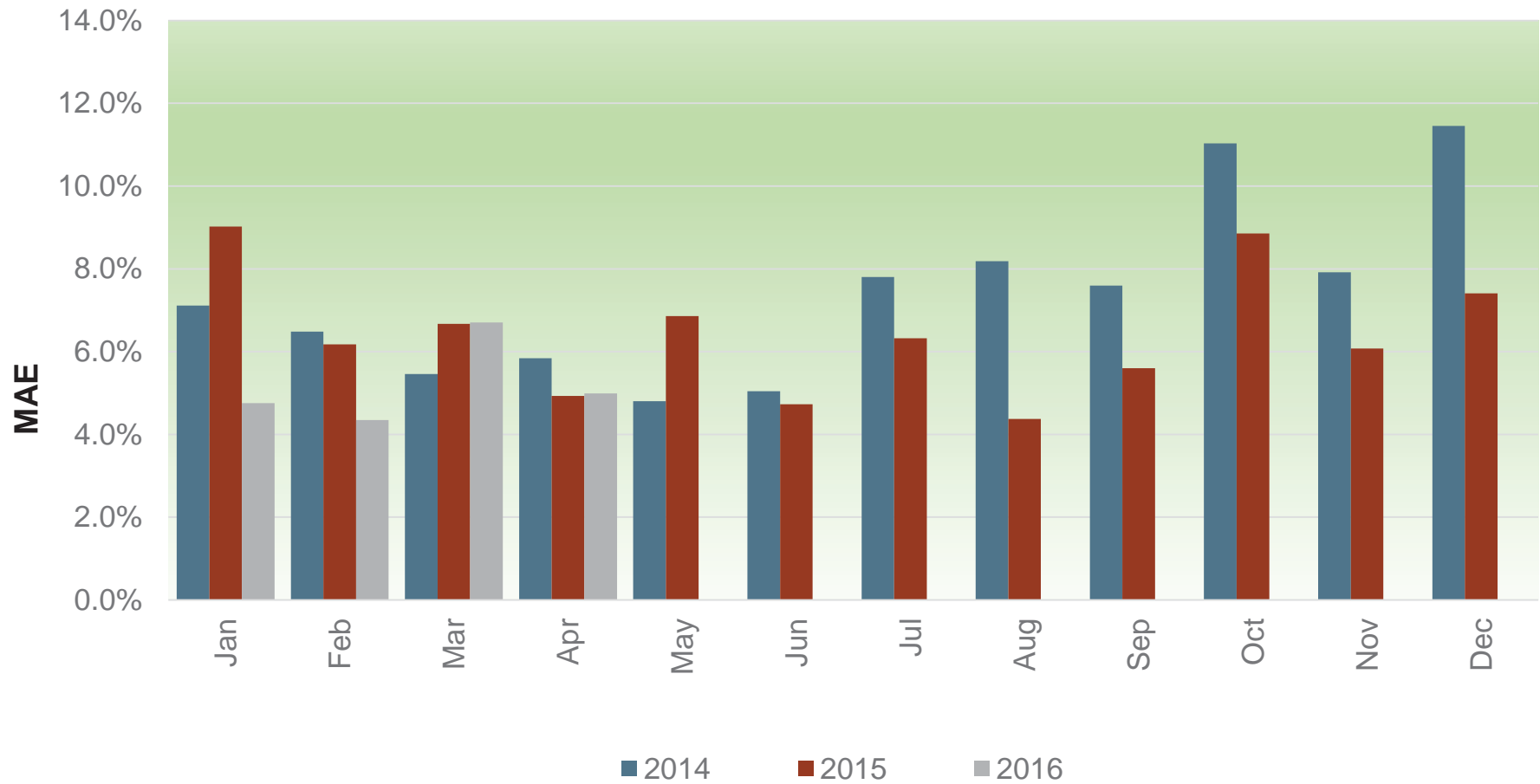
Day-ahead peak to peak forecast accuracy



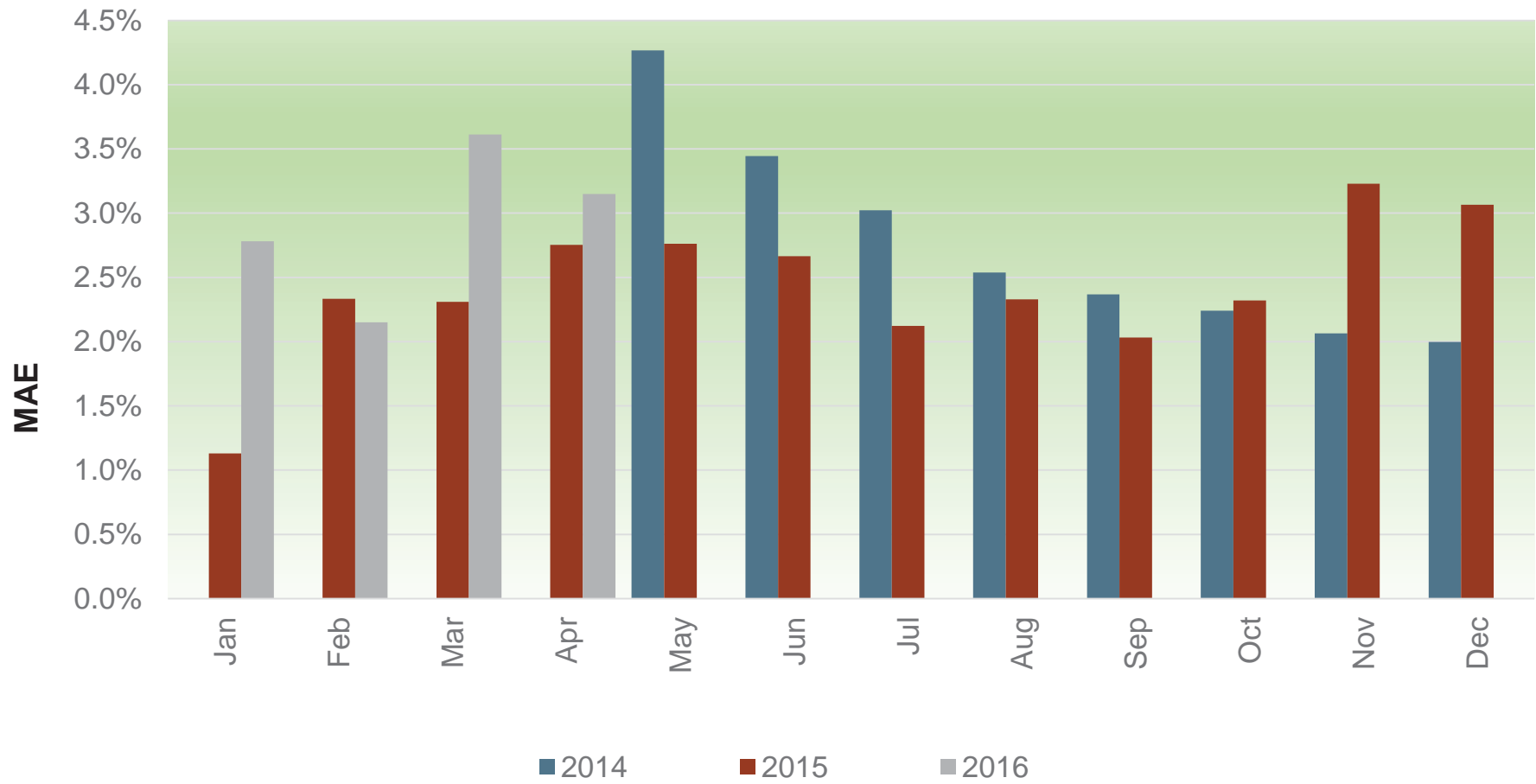
Day-ahead wind forecast



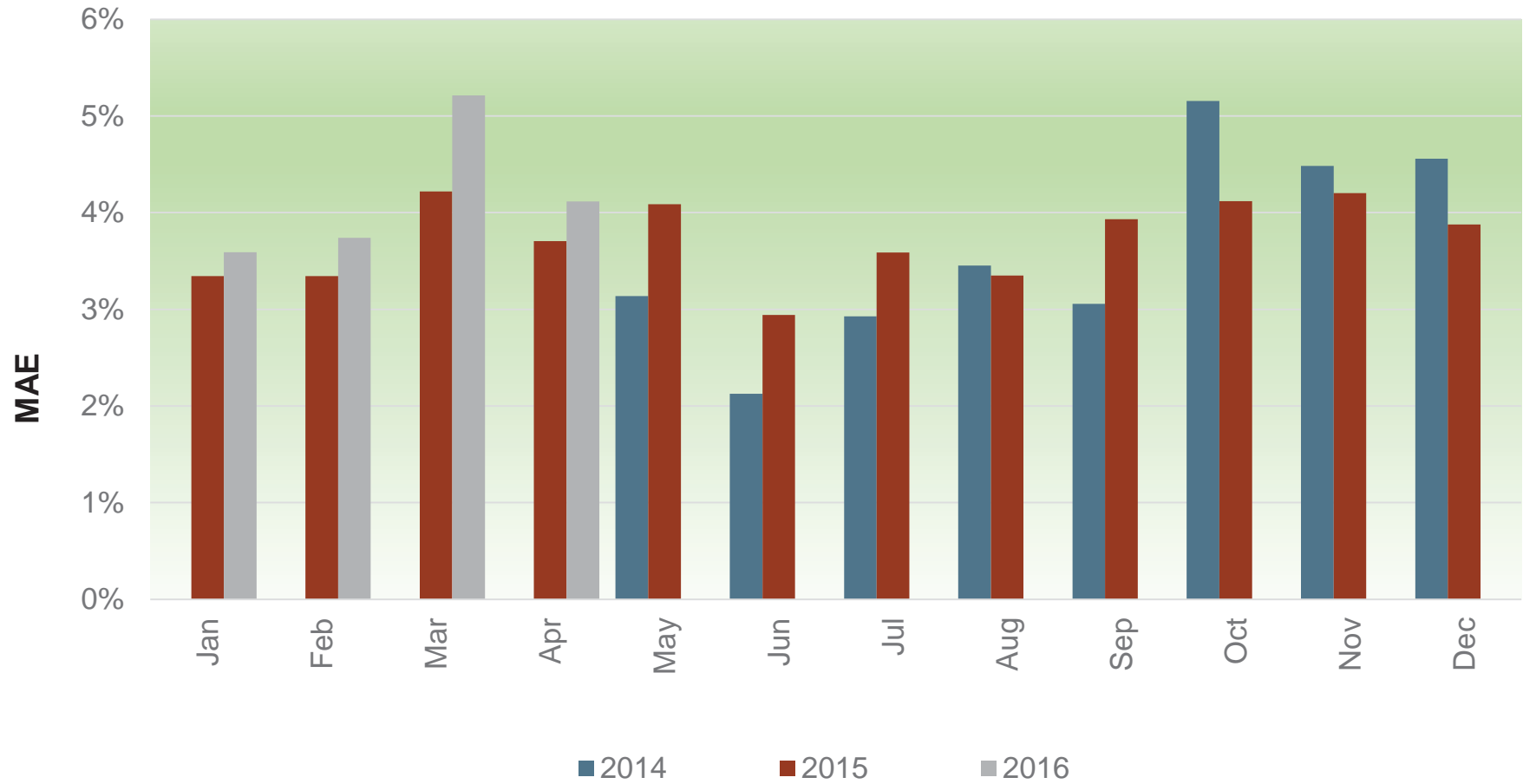
Day-ahead solar forecast



Real-time wind forecast



Real-time solar forecast





Policy Update

Brad Cooper

Manager, Market Design and Regulatory Policy

Ongoing policy stakeholder initiatives

- Contingency modeling enhancements
 - Fourth revised straw proposal and technical analysis posted in late May – early June
 - Aug 2016 Board, projected Fall 2017 implementation
- Generator contingency and remedial action scheme modeling
 - Straw proposal to be posted on May 19
 - October 2016 Board meeting, projected Fall 2017 implementation
- Bid Cost Recovery Enhancements
 - Straw Proposal to be posted in late May
 - August 2016 Board meeting
 - Projected Fall 2017 implementation

Ongoing policy stakeholder initiatives (continued)

- Stepped transmission constraints
 - Stakeholder call on issue paper on May 12
 - Straw proposal to be posted on June 14
 - October 2016 Board meeting, projected Fall 2017 implementation
- CRR clawback rule modifications
 - Draft final proposal posted on May 16
 - Stakeholder call on draft final proposal on May 23
 - June 2016 Board meeting, projected Fall 2017 implementation

Ongoing policy stakeholder initiatives (continued)

- Reliability services – phase 2
 - Currently developing revised schedule
 - June 2016 Board
 - Aug 2016 Board, projected Fall 2017 implementation
- Flexible resource adequacy criteria and must-offer obligation – phase 2
 - Currently developing revised schedule
 - Aug 2016 Board, projected Fall 2017 implementation
- Reactive power and financial compensation
 - Suspended until FERC NOPR concludes

Ongoing policy stakeholder initiatives (continued)

- Metering rules enhancements
 - Draft final proposal to be posted on June 7
 - Stakeholder call on draft final proposal on June 14
 - August 2016 Board meeting
 - Projected Fall 2018 implementation
- Energy storage and distributed energy resources (ESDER) Phase 2
 - Straw Proposal to be posted on May 24
 - Stakeholder call on straw proposal on May 31
 - October 2016 Board meeting

Ongoing policy stakeholder initiatives (continued)

- Transmission access charge options
 - Revised straw proposal to be posted on May 20
 - Stakeholder meeting in Portland on June 1
 - August 2016 Board meeting, projected Fall 2018 implementation
- Regional resource adequacy
 - Revised straw proposal to be posted on May 26
 - Aug 2016 Board meeting, projected Fall 2018 implementation

Policy stakeholder initiatives coming soon

- Planned to start next month
 - Regional integration CA greenhouse gas compliance
 - Bidding rules
- Planned to start 2016 Q3
 - Frequency response – phase 2



Market Performance and Planning Forum

May 17, 2016

We are currently at lunch, returning at ___ p.m.

If you have questions, please contact Kristina Osborne at kosborne@caiso.com or via cell at 916-802-7631.



Release Plan Update

Janet Morris
Director, Program Office

Release Plan 2016

Independent 2016

- Capacity Procurement Mechanism Replacement
- Reliability Services Initiative
- Commitment Cost Enhancements Phase 2 (remainder)
- Post Implementation OMS Enhancements
- Expanding Metering and Telemetry Options Phase 2
- Demand Response Registration Enhancements
- RIMS Functional Enhancements
- Bidding Rules Enhancements – Part A
- Aliso Canyon Initiative

Fall 2016

- BAL-003 Compliance
- Flexible Ramping Product
- BCR modifications and VER settlement
- Acceptable Use Policy - CMRI
- OMAR Replacement
- PIRP System Decommissioning and Data Transparency
- Energy Imbalance Market (EIM) Year 1 Enhancements Phase 2
- Energy Imbalance Market (EIM) 2016 Arizona Public Service (APS)
- Energy Imbalance Market (EIM) 2016 Puget Sound Energy (PSE)
- Energy Storage and Distributed Energy Resources (ESDER)

Release Plan 2017

Subject to further release planning:

- ADS User Interface Replacement
- Additional Data Transparency Enhancements (OASIS API changes)
- Additional OMS Enhancements

Independent 2017

- RTD Local Market Power Mitigation (LMPPM) Enhancements

Fall 2017 (tentative, to be confirmed)

- Reliability Services Initiative Phase 1B and Phase 2
- Bidding Rules Enhancements – Part B
- Stepped Constraints
- Commitment Cost Enhancement Phase 3
- Reactive Power Requirements and Financial Compensation
- Flexible Resource Adequacy Criteria and Must-offer Obligation Phase 2
- Bid Cost Recovery Enhancements
- Contingency Modeling Enhancements
- Energy Imbalance Market (EIM) Year 2 Enhancements
- EIM 2017 Portland General Electric (PGE)

Spring 2018

- EIM 2018 Idaho Power Company

Fall 2018 (tentative, to be confirmed)

- Metering Rules Enhancements
- Regional Resource Adequacy
- Transmission Access Charge Options

Independent 2016 Market Simulation

Market Simulation Dates – RSI, CPM, Commitment Costs Phase 2, and OMS Enhancements

3/15 - 5/27: Session 2 (Unstructured and Structured E2E)

2/16 - 6/15: OMS Enhancements (Unstructured)

Link to Early 2016 Release Market Simulation Plan -

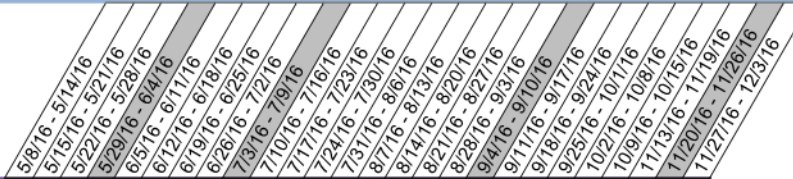
<http://www.caiso.com/Documents/MarketSimulationPlanEarly2016Release.pdf>

Release Schedule 2016

Date of Data Refresh: 5/9/16 1:38 PM



Legend	
Market Simulation	
CA ISO Holiday	
Deployment Week	



Map Stage Environment Window

Post Implementation OMS Enhancements	Post Implementation OMS Enhancements (02/08-06/15)
Bidding Rules Part A	Bidding Rules Part A (04/21-05/11)
Post Implementation OMS Enhancements - Market Sim	Post Implementation OMS Enhancements - Market Sim (02/16-05/24)
EIM - Puget Sound Energy	EIM - Puget Sound Energy (01/12-07/29)
EIM - Arizona Public Service	EIM - Arizona Public Service (01/12-07/29)
FNM Promotion 2016Q2 (DB78)	FNM Promotion 2016Q2 (DB78) (05/31-06/02)
Post-Mrkt Consol - DRRS Phase 2 - Reg	Post-Mrkt Consol - DRRS Phase 2 - Reg (06/06-06/17)
Post-Mrkt Consol - DRRS Phase 2 - Reg - Market Sim	Post-Mrkt Consol - DRRS Phase 2 - Reg - Market Sim (06/06-06/17)
FNM Promotion 2016Q3	FNM Promotion 2016Q3 (06/10-06/10)
Acceptable Use Policy - CMRI	Acceptable Use Policy - CMRI (07/05-08/30)
Acceptable Use Policy - CMRI - Market Sim	Acceptable Use Policy - CMRI - Market Sim (07/05-07/29)
BCR Modification and VER Settlement	BCR Modification and VER Settlement (07/05-07/29)
BCR Modification and VER Settlement - Market Sim	BCR Modification and VER Settlement - Market Sim (07/05-07/29)
EIM Year 1 - Phase 2	EIM Year 1 - Phase 2 (07/05-07/29)
EIM Year 1 - Phase 2 - Market Sim	EIM Year 1 - Phase 2 - Market Sim (07/05-07/29)
EIM - Puget Sound Energy - Market Sim	EIM - Puget Sound Energy - Market Sim (07/05-07/29)
EIM - Arizona Public Service - Market Sim	EIM - Arizona Public Service - Market Sim (07/05-07/29)
Flexible Ramping Product	Flexible Ramping Product (07/05-07/29)
Flexible Ramping Product - Market Sim	Flexible Ramping Product - Market Sim (07/05-07/28)
PIRP Decom, CMRI Reports, Data Transparency Imprv	PIRP Decom, CMRI Reports, Data Transparency Imprv (07/05-07/29)
PIRP Decom, CMRI Reports, Data Transparency Imprv - Market Sim	PIRP Decom, CMRI Reports, Data Transparency Imprv - Market Sim (07/05-07/29)
Post-Mrkt Consol - OMAR Replacement	Post-Mrkt Consol - OMAR Replacement (07/05-07/29)
Post-Mrkt Consol - OMAR Replacement - Market Sim	Post-Mrkt Consol - OMAR Replacement - Market Sim (07/05-07/29)
RIMS 5 Generation, Transmission and Queue Management - Testing	RIMS 5 Generation, Transmission and Queue Management - Testing (09/09-09/14)
FNM Promotion 2016Q4 (DB 80)	FNM Promotion 2016Q4 (DB 80) (11/23-11/29)

PROD Environment Window

Post Implementation OMS Enhancements	Post Implementation OMS Enhancements (03/29-05/26)
FNM Promotion 2016Q2 (DB78)	FNM Promotion 2016Q2 (DB78) (05/17-05/19)
Bidding Rules Part A	Bidding Rules Part A (05/23-05/23)
CPM	CPM (06/01-06/01)
RSI Phase 1a PROD- Session 2	RSI Phase 1a PROD- Session 2 (06/01-06/01)
Aliso Canyon Prod Activation 1	Aliso Canyon Prod Activation 1 (06/02-06/02)
Post-Mrkt Consol - DRRS Phase 2 - Reg	Post-Mrkt Consol - DRRS Phase 2 - Reg (06/20-06/20)
Aliso Canyon Prod Activation 2	Aliso Canyon Prod Activation 2 (07/06-07/06)
FNM Promotion 2016Q3	FNM Promotion 2016Q3 (08/16-08/18)
EIM - Puget Sound Energy	EIM - Puget Sound Energy (09/30-09/30)
EIM - Arizona Public Service	EIM - Arizona Public Service (09/30-09/30)
Acceptable Use Policy - CMRI	Acceptable Use Policy - CMRI (10/01-10/01)
BCR Modification and VER Settlement	BCR Modification and VER Settlement (10/01-10/01)
EIM Year 1 - Phase 2	EIM Year 1 - Phase 2 (10/01-10/01)
BAL- 003 Frequency Response	BAL- 003 Frequency Response (10/01-10/01)
PIRP Decom, CMRI Reports, Data Transparency Imprv	PIRP Decom, CMRI Reports, Data Transparency Imprv (10/01-10/01)
Post-Mrkt Consol - OMAR Replacement	Post-Mrkt Consol - OMAR Replacement (10/01-10/01)
Storage and Aggregated DER	Storage and Aggregated DER (10/01-10/01)
Flexible Ramping Product	Flexible Ramping Product (10/01-10/01)
RIMS5 Queue Management, Transmission and Generation	RIMS5 Queue Management, Transmission and Generation (10/11-10/11)
FNM Promotion 2016Q4 (DB 80)	FNM Promotion 2016Q4 (DB 80) (11/15-11/17)

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

June 2016 Settlements Release

ISSUE SUMMARY	BPM IMPACTED
<p>Update BPM Configuration guide for Real Time Energy to calculate the Balancing Authority Area EIM Transfer-In Quantity and EIM Transfer-Out Quantity as the directional net difference between RTD Energy Transfer System Resource quantity and the Energy Transfer System Resource Base Schedule.</p>	<p>PRR 896: CG PC Real Time Energy</p>
<p>Update the configuration to resolve Statement Hierarchy duplication issue for Scheduling Coordinators who participate in the Energy Imbalance Market and manage resources in two or more Balancing Authority Areas. No BPM Configuration guide updates required.</p>	<p>No PRR: (CC 491, CC 64600, CC64700, CC 64740, CC 64750, CC 66200, CC 64780, CC 67740, CC 69850, and CC 64770)</p>

June 2016 Settlements Release

Milestone	Date	Status
Configuration Guides Posted	December 8, 2015	✓
FIRST DRAFT Configuration Output File Posted	December 14, 2015	✓
MAP Stage Deployment	January 13, 2016	✓
SECOND DRAFT Configuration Output File Posted	January 14, 2016	✓
Market Simulation: Trade Dates to be Posted Calendar dates of Posting	March 8 – April 29, 2016 March 14 – May 06, 2016	
Pre-Production Configuration Output File Posted	May 12, 2016	
Production Deployment	May 23, 2016	
FINAL Configuration Output File Posted	May 23, 2016	

2016 – Capacity Procurement Mechanism Replacement (CPM)

Project Info	Details/Date
Application Software Changes	<p><u>Competitive Solicitation Process (CSP):</u> CSP replaces the existing administrative price process for annual, monthly and intra-monthly CPM events for flexible and generic RA capacity. CSP will cover all events that allow the ISO to procure additional capacity.</p> <p><u>CIRA:</u></p> <ul style="list-style-type: none"> - Bid Submittal system for SCs to submit capacity bids (not an existing bid type) - Capacity bids to implement new validation rules (not an existing bid type) - Capacity Bid submittal to be on a yearly, monthly, and intra-monthly level - LSE/LRA deficiency calculation to be performed for CSP for Generic and Flexible RA data - Existing CPM calculation to be deprecated for trade dates after the effective date of implementation. - Manage import allocation and bilateral trades of import allocation <p><u>Settlements:</u> Settlements will need new CPM formulas that will result in charge code impacts.</p> <p><u>Reporting:</u> If an annual or monthly CPM occurs greater than two times (over a rolling 24 month period) or more than 50% of the LSE's RA requirement is CPMed, a report must be given to Market Participants.</p> <p><u>OASIS:</u></p> <ul style="list-style-type: none"> - Publish all finalized offers into the competitive solicitation process on a rolling five-quarter delay. (Deferred)
Business Process Changes	<ul style="list-style-type: none"> - Solicitation for soft offer cap. Timeline for submittal needs to be defined. - Submittal process for annual/monthly CPM bid submittal - New business process for amount of capacity being relied on (non-RA from partial RA) - New process for Competitive Solicitation Process (annual/month/intra-monthly)

2016 – Capacity Procurement Mechanism Replacement (cont.)

Milestone	Details/Date	Status
BPM Changes	Reliability Requirements – PRR issued 11/4/15	✓
	Market Instruments – issue PRR 1/8/16	-
	Billing & Settlements – PRR issued 1/11/16	✓
Business Process Changes	<ul style="list-style-type: none"> - Solicitation for soft offer cap. Timeline for submittal needs to be defined. - Submittal process for annual/monthly CPM bid submittal - New business process for amount of capacity being relied on (non-RA from partial RA) - New process for Competitive Solicitation Process (annual/month/intra-monthly) 	
Board Approval	February 5, 2015	✓
External BRS	March 31, 2015	✓
Tariff	Filed: May 26, 2015 FERC Approved: October 1, 2015	✓
Technical Specifications	CIRA Session 1 → Fall 2016, MPs will use UIs OASIS Session 2 → Fall 2016	✓
Draft Configuration Guides	November 23, 2015 Session 2	✓
External Training	October 21, 2015: Session 1 – Onsite w/Webinar, Full Day (combined w/ CPG Call) <ul style="list-style-type: none"> • Training Materials – posted SP & RP page on 10/19 	✓ ✓
	January 6, 2016: Session 2 - Onsite w/ Webinar option, Full Day <ul style="list-style-type: none"> • Training Materials – post 1/5 	✓ ✓

2016 – Capacity Procurement Mechanism Replacement (cont.)

Milestone	Details/Date	Status
Market Simulation	April 11– May 6, 2016: Session 2 <ul style="list-style-type: none"> • 4/11-4/15: Unstructured • 4/18-4/22: Structured Week 1 & 2 • 4/25-4/29: Structured Week 3 - On-Site 4/26-4/29 • 5/2-5/13: Unstructured (New) • TBD: Re-run Structured Week 3 (New) • Post Structured Scenarios • SIBR Rules, Release Notes, Specs posted – 12/11 • CIRA User Guide – 1/18 	✓ ✓ ✓ ✓ ✓ ✓
Production Activation	11/1/2016: Session 2 Effective Date - Pending FERC Approval (New)	

2016 – Reliability Services Initiative (RSI) – 1A

Project Info	Details/Date
Application Software Changes	<p><u>CIRA:</u></p> <ul style="list-style-type: none"> - Manage new NQC/EFC process request for resource types. This will impact both internal users and Market Participants - Manage Import Allocation (CPM Replacement initiative is covering this scope but is needed for this initiative) - Manage RA obligation (taking into consideration substitution capacity and replacement capacity as RA capacity) will impact RA, Settlements, market, and outage. The output of CSP will be needed - Publish RA Obligations externally - Display Comparative snapshot of DA/RT obligation (outages, energy bids, RA obligation). Display input of RAAIM calculations - Display SCP and CPM availability calculation output for historic trade dates - Creation of substitution rules for flexible resource adequacy resources - Modify existing DA/RT generic substitution rules - DA substitution timeframe shall change from 6 AM to 8 AM - Enable the release of substitute capacity for generic and flexible resources - Allow imports to substitute for other imports and CAISO system resources. The RA obligation will be at a daily level - Use result of Pre-qualification analysis (the pre-qualification analysis is a manual process) for real time substitution validation - API for substitution and release functionality - Enable Generic CPM substitutions - Enable Flexible CPM substitutions - Build Submit & Retrieve APIs to support Substitutions (4 types) and release of sub capacity - Substitution will now be in CIRA - Addition of RAAIM exempt and planned outage exemption flag - Allow the outage correction process to exempt outage from RAAIM calculations up to 5 business days <p><u>OMS:</u></p> <ul style="list-style-type: none"> - Add 5 nature of work attributes and various validations - Remove SCP Exempt flag from display

2016 – Reliability Services Initiative (cont.) -1A

Project Info	Details/Date	Status
Application Software Changes	<p><u>MasterFile:</u></p> <ul style="list-style-type: none"> - Will store Use Limit Plan. There will be a new template (ULPDT – Use Limit Plan Data Template) <p><u>RAAM:</u></p> <ul style="list-style-type: none"> - Decommission RAAM <p><u>Settlements:</u></p> <ul style="list-style-type: none"> - RAAIM (RA Availability Incentive Mechanism) NEW – replaces SCP for backstop. Current SCP will retire with implementation of RAAIM. Will assess whether generic and flexible RA resources comply with MOO and better captures use limited resource availability. - New charge code changes are needed for implementation of the RA <p><u>Reporting:</u></p> <ul style="list-style-type: none"> - Report on the effectiveness of the RAAIM results (1 year after implementation) (Deferred) <p><u>Other:</u></p> <ul style="list-style-type: none"> - Modification of Use Plan with new validation rules - LSE cost allocation methodology needs to be automated. - Publish list of all available prequalification combinations 	

2016 – Reliability Services Initiative (cont.) – 1A

Milestone	Details/Date	Status
BPM Changes	Reliability Requirements - issued PRR #888 on 1/12/16	✓
	Outage Management - issued PRR #889 on 1/12/16	✓
	Billing & Settlements - issued PRR on 1/11/16	✓
Business Process Changes	<ul style="list-style-type: none"> - Process to assign NQC values to NGR/PDR/DG resources - Process for PDR/NGR/DG testing - Process for RA Availability Incentive Mechanism (RAAIM). Must retire SCP business process flows. - Modify DA/Real Time Substitution Process - Process for allocating year end unallocated RA Availability Incentive Mechanism (RAAIM) funds 	
Board Approval	March 26, 2015	✓
External BRS	March 31, 2015	✓
Tariff	Filed: May 28, 2015 FERC Approved: October 1, 2015	✓
Technical Specifications	CIRA Session 2 → Fall 2016, MPs will use UIs	
	MasterFile Session 2 <ul style="list-style-type: none"> • posted tech spec 9/24 on Release Planning Page • posted ULDT 9/11 to RP page • posted ULR documentation/ sample templates to RP page on 12/4 	✓ ✓ ✓
	OMS Session 2 <ul style="list-style-type: none"> • posted tech spec 12/2 	✓
Draft Configuration Guides	November 23, 2015 Session 2	✓

2016 – Reliability Services Initiative (cont.) – 1A

Milestone	Details/Date	Status
External Training	January 6, 2016: Session 2 – Onsite w/ optional Webinar, Full Day <ul style="list-style-type: none"> • Training Materials – post 1/5 	 
Market Simulation	April 11– May 6, 2016: Session 2 <ul style="list-style-type: none"> • 4/11-4/15: Unstructured • 4/18-4/22: Structured Week 1& 2 • 4/25-4/29: Structured Week 3 - On-Site 4/26-4/29 • 5/2-5/13: Unstructured (New) • TBD: Re-run Structured Week 3 (New) • Post Structured Scenarios • SIBR Rules, Release Notes, Specs posted – 12/11 • CIRA User Guide – 1/18 • MF UI User Guide – 1/6 • OMS User Guide – embedded in application • CIRA User Guide – 1/18 	       
Production Activation	11/1/2016: Session 2 Effective Date - Pending FERC Approval (New)	

2016 – Commitment Costs Phase 2

Project Info	Details/Date
Application Software Changes	<p>For the Early Jan 2016 release, the project will</p> <ul style="list-style-type: none"> Clarify definition, qualifications, and requirements for use-limited resources <ul style="list-style-type: none"> Implementation of the use limited definition (No longer applicable) Implement revised must-offer rules Impacted Systems: <ul style="list-style-type: none"> MF SIBR <p>CCE2 Early 2016 release implementation will be coordinated as part of the Reliability Services Initiative (RSI) project</p>

Milestone Type	Milestone Name	Status
Board Approval	Yes. March 26-27, 2015	✓
Tariff	Filed: May 28, 2015 Approved in Part: September 9, 2015 (FERC rejected the proposed revisions to the definition of “use limited resources”, but approved all other tariff revisions.)	✓
BPM Changes	Market Operations (Use Plan) – issued PRR #887 on 1/11/16	✓
Business Process Changes	No	✓
External Business Requirements	November 24, 2015	✓
Technical Specifications	No	✓
External Training	January 6, 2016: Session 2 – Onsite w/ optional Webinar, Full Day <ul style="list-style-type: none"> Training Materials – post 1/5 	✓ ✓
Draft Configuration Guides	No	✓
Market Simulation	February 8 th , 2016 – May 27 th , 2016 (Unstructured)	
Production Activation	11/1/2016: Session 2 Effective Date - Pending FERC Approval (New)	

2016 – Post Implementation OMS Enhancements

Project Info	Details/Date
Application Software Changes	<p>OMS Enhancements project will implement the following functionalities:</p> <ul style="list-style-type: none"> • Transmission Outage Report Enhancements • Manage Broadcast Status Update (deferred until Fall 2016) • Manage RetrieveResourceOutage API - add Invalid and Inconsistent flags <ul style="list-style-type: none"> • The API will be backwards compatible. OMS will support both V1 and V2 of B2B submit and retrieve outage API. The same applies to the transmission outage API as well. • System change to validate the "ChangeThreshold" only at time of submission of a change request, and allow change request to be accepted or rejected at any time. <p>The project is also addressing the backlog of known issues.</p> <p>Other roadmap items (Substitutions, Additional Natures of Work, and Removal of SCP exempt flag/Inclusion of RAIM exempt flag) will be part of the Reliability Services Initiative (RSI) project.</p> <p>The implementation will impact the following systems:</p> <ul style="list-style-type: none"> • Outage Management System (OMS) • Market Systems (IFM/RTN) • EMS • CIRA • Settlements
External Training	TBD

2016 – OMS Enhancements (Continued)

OMS Enhancements	Market Sim Target Date	Production Target Date
Broadcast Status Updates	Deferred scope	Deferred scope
Transmission Outage Report	N/A	May 25, 2016
Transmission Outage API Updates (New Natures of Work - RIMS_OUTAGE, RIMS_TESTING, New PSR Type – SYNCHRONOUS_MACHINE and multiple instances of Adjusted Operational Limit per equipment) Note: V1 and V2 will be supported	May 11, 2016	June 15, 2016
Ability to open “Notes” boxes to full size window	N/A	May 25, 2016
Rules engine updates to allow for auto-approval of certain types of outages	N/A	June 8, 2016
Market Impact Updates	Deferred scope	Deferred scope
Maximum Curtailment Generation Report	N/A	May 25, 2016

2016 – OMS Enhancements (Continued)

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval	N/A	
BPMs	Business Practice Manuals	N/A	
External BRS	External Business Requirements	Jun 12, 2015	✓
Tariff	Tariff	N/A	
Config Guides	Config Guide	N/A	
Tech Spec	Technical Specification Document	N/A	
Market Sim	Market Sim Window	Feb 16, 2016 – May 24, 2016	
Production Activation	Post Implementation OMS Enhancements	May 25, 2016	

2016 – Expanding Metering and Telemetry Options Phase 2

Project Info	Details/Date	Status
Application Software Changes	Distributed Energy Resource Provider (DERP) Agreement: <ol style="list-style-type: none"> 1. General functions of the DERP, <ul style="list-style-type: none"> • Offer Energy and AS: aggregated resources in Sub-Lap • Provide ISO with accurate Information • Responsible for operating and maintain DER 2. Specify data concentrator functionality for real time monitoring, control and after the fact metering data <ul style="list-style-type: none"> • disaggregate ISO signals to sub-resources; obtain a resource response • aggregate sub-resource operational and settlement meter data within a sub-Lap 3. Define the provision of technical and operational information to the ISO, <ul style="list-style-type: none"> • metering and communications requirements, • submission of economic bids and self-schedules and • provision of ancillary services 4. Identify responsibility for fulfilling the terms of the agreement <ul style="list-style-type: none"> • penalties and sanctions, cost responsibility, dispute resolution, representations and warranties, liability, uncontrollable forces and other miscellaneous terms 	
BPM Changes	Metering, Direct Telemetry	
Draft final proposal	June 10, 2015	✓

Milestone Type	Milestone Name /Date	Status
Board Approval	July 16, 2015	✓
External Business Requirements	N/A	
Updated BPMs	February 25, 2016, submitted PRR 892	✓
Technical Specifications	N/A	
Draft Configuration Guides	N/A	
Tariff implementation date	June 3, 2016	

2016 – Demand Response Registration Enhancements

Project Info	Details/Date
Application Software Changes	Enhance Demand Response Registration functionality and processes Develop new registration user interface for DRRS Develop new APIs for support of enhanced registration processes • CPG meeting (tech spec update & UI presentation) on May 26, 2016
BPM Changes	Metering
Business Process Changes	Automation of internal registration-related processes
User Training	Thursday, June 2, 2016

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board of Governors Approval	N/A	
BPMs	Publish Final Business Practice Manuals (Metering)	Jun 08, 2016	
	Post Draft BPM changes (Metering)	Jun 01, 2016	
External BRS	External BRS - Enabling Demand Response Phase 2 - Registration	Jun 04, 2015	✓
Tariff	Tariff Impacts	N/A	
Config Guides	Configuration Guide	N/A	
Tech Spec	Tech Specs - DRRS Phase 2 - Registration	Sep 17, 2015	✓
Market Sim	Market Sim Window	May 31, 2016 - Jun 17, 2016	
Production Activation	Post-Mrkt Consol - DRRS Phase 2 - Reg	Jun 22, 2016	

2016 – RIMS Functional Enhancements

Project Info	Details/Date	Status
Application Software Changes	Functional enhancements resulting from the Customer Partnership Group CPG. More details to be provided in the future.	
BPM Changes	Generator Interconnection and Deliverability Allocation Procedures Generator Interconnection Procedures Managing Full Network Model Metering Generator Management Transmission Planning Process	
Customer Partnership Group	10/16/15	✓
Application and Study Webinar	3/31/16	✓

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board approval not required	N/A	
BPMs	Generator Interconnection and Delivery Allocation	Apr 29, 2016	✓
External BRS	External BRS not Required	N/A	
Tariff	No Tariff Required	N/A	
Config Guides	Configuration Guides not required	N/A	
Tech Spec	No Tech Specifications Required	N/A	
Production Activation	RIMS5 App & Study	Mar 21, 2016	✓
	RIMS5 Queue Management, Transmission and Generation	Oct 31, 2016	

2016 – Bidding Rules Enhancements (Pmin Rerate) Part A

Project Info	Details/Date
Application Software Changes	<p>Bidding Rules Enhancement Part A will correct a structural inefficiency by combining consideration of energy and commitment cost bidding rules to refine and improve alignment between rules. Market Participants will receive the following enhancements to the existing Minimum Load Cost (MLC) bid process:</p> <ul style="list-style-type: none"> • Improve cost bidding flexibility to consider resource operating costs and characteristics • All the market participants to reflect actual costs through increased bid flexibility • Reduce inefficient market outcomes due to inappropriate changed bid prices • Resolve market inefficiency caused by rerating the MLC where the ISO is committing less economic resources <p>DAM/RTM: Updated Minimum Load Cost (MLC) calculations will include:</p> <ul style="list-style-type: none"> • Calculate the actual MLC based on the heat rate of the resource using a DEB integration method • Incremental DEB costs are added to the master file minimum load costs at the re-rated Pmin level • Support hourly MLC in optimization engine • Support rules for handling multiple Pmin rerates within the same hour <ul style="list-style-type: none"> • Also applies to MSG resources per configuration
BPM Changes	Market Operations

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board of Governors (BOG) approval	Feb 04, 2016	✓
BPMs	Post Draft BPM changes	May 13, 2016 (Emergency PRR)	
External BRS	Post External BRS	Feb 23, 2016	✓
Tariff	File Tariff	Mar 23, 2016	✓
Tech Spec	Create Tech Spec	N/A	
Market Sim	Market Sim Window	N/A	
Production Activation	Bidding Rules Part A	May 23, 2016	

2016 – Aliso Canyon

Project Info	Details/Date
Application Software Changes	<p>Purpose: explore market mechanisms or other tools to mitigate the risks to gas and electric markets to avoid electric service interruptions to the extent possible.</p> <p>SIBR:</p> <ul style="list-style-type: none"> • Allow MP to rebid commitment costs for hours without a day-ahead schedule or for RTM commitment periods until the minimum run time expires. SIBR rule change needed. Until implementable, tariff rule was included and monitoring will be needed. • No longer generate RT bids for non-resource adequacy resources or RA resources without a MOO. STUC bidding rule change. Bid Replication (stop creating bids that do not have a MOO for STUC). Current rule: create STUC bids if DAM clean bid exists for resource. New rule: create STUC bids if 1) DA schedule or RUC schedule exists; or 2) Resource is MOO. <p>Settlements:</p> <ul style="list-style-type: none"> • Leverage existing Good Faith Negotiation (GFN) to recover additional fuel costs • Create and configure a Pass Through Billing (PTB) to accommodate FERC awarded amount due to “After the Fact Cost Recovery Process” (No system Changes) <p>CMRI:</p> <ul style="list-style-type: none"> • New report to show the D+2 RUC Schedule. Will use standard CMRI report and IFM web services to do as part of Peak RC requirements, but will monitor as part of Aliso Canyon due to dependency. <p>Integration:</p> <ul style="list-style-type: none"> • Integration between ECIC, ICE, and market system will be needed depending on payload impacts <p>Nomogram:</p> <ul style="list-style-type: none"> • Expand number of variables from 25 to 150. This will help apply the constraint to all resources impacted by Aliso Canyon restriction. There are 6 zones and one for all zones. • Potential performance issue with simultaneous constraints • Non-Competitive Overwrite (UI change)
BPM Changes	Market Instruments, Market Operations, Settlements & Billing

2016 – Aliso Canyon

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board of Governors Approval	May 04, 2016	✓
BPMs	Post Draft BPM changes	TBD	
External BRS	External Business Requirements	May 16, 2016	
Tariff	File Tariff	May 06, 2016	✓
	Receive FERC order	Jun 02, 2016	
Config Guides	Post Draft Configuration Guides	N/A	
Tech Spec	Create ISO Interface Spec (Tech spec)	N/A	
Market Sim	Market Sim Window	N/A	
Production Activation	Aliso Canyon	Jun 02, 2016	
Production Activation	Aliso Canyon	Jul 06, 2016	

Note: SIBR Rules posted 5/12/16

2016 – Aliso Canyon

No	Feature	Section Numbers	Effective Date
1	Introduce a constraint as needed into the CAISO's market processes to limit the affected gas area burn to a maximum or minimum	27.11	June 2, 2016
2	Reserve internal transfer capability to respond to real-time load fluctuations or provide contingency reserve in southern California	27.5.6	June 2, 2016
3	Special tariff to deem selected constraints uncompetitive	39.7.2.2	June 2, 2016
4	Clarification that it has authority to suspect virtual bidding in the event that the CAISO identified market inefficiencies	7.9.2 (d)	June 2, 2016
5	Make two-day ahead advisory schedules available with the clarification that they are not financially binding or operationally binding	6.5.2.2.3	June 2, 2016
6	Adjust the gas price indexes used to calculation commitment and default energy bids for affected resources on the SoCalGas/SDG&E system	39.7.1.1.1.3 (d)	July 6, 2016
7	Use current gas price information to increase efficiency of economic dispatch	6.5.2.3.4 30.4.1.2 31.6.1 39.1.1.1.1.3 (a)(b)(c) and deleting old (b)	July 6, 2016
8	Permit market participants to rebid commitment costs in the real-time market	30.5.1(b)	June 2, 2016
9	Permit participants to file with FERC to recover fuel costs	30.11 39.7.1.1.3 40.6.8.1.7	June 2, 2016
10	Adjust monthly CRR FNM	36.4	June 2, 2016
11	Modifications to STUC so that STUC does not use Day-Ahead bids of resources not scheduled in day-ahead	34.6 40.6.3	June 2, 2016

2016 – Aliso Canyon

Two Day-Ahead Residual Unit Commitment (RUC) Advisory Schedules									
Trade Date	SC ID	Resource	Configuration	Resource Type	Product	HE01 [MW]	HE02 [MW]	...	HE25 [MW]
05/12/2016	SC01	ResourceA		Generator	RUC Award	99.99	99.99		99.99
05/12/2016	SC01	ResourceA		Generator	RUC Capacity	99.99	99.99		99.99
05/12/2016	SC01	ResourceA		Generator	RUC Schedule	99.99	99.99		99.99
05/12/2016	SC01	ResourceB		Generator	RUC Award	99.99	99.99		99.99
05/12/2016	SC01	ResourceB		Generator	RUC Capacity	99.99	99.99		99.99
05/12/2016	SC01	ResourceB		Generator	RUC Schedule	99.99	99.99		99.99
05/12/2016	SC01	ResourceC	Config_1x1	Generator	RUC Award	99.99	99.99		99.99
05/12/2016	SC01	ResourceC	Config_1x1	Generator	RUC Capacity	99.99	99.99		99.99
05/12/2016	SC01	ResourceC	Config_1x1	Generator	RUC Schedule	99.99	99.99		99.99
05/12/2016	SC01	ImportXYZ		Import Intertie	RUC Award	99.99	99.99		99.99
05/12/2016	SC01	ImportXYZ		Import Intertie	RUC Capacity	99.99	99.99		99.99
05/12/2016	SC01	ImportXYZ		Import Intertie	RUC Schedule	99.99	99.99		99.99

Report Generated: 05/13/2016 13:42:06

This report is based on the Two Day-Ahead process run. For the second trading day, the RUC Capacity is the positive difference between the RUC Schedule and the Minimum Load level of the resource. Please refer to the Market Instruments BPM regarding RUC reporting in CMRI. RUC data presented in this report is for informational purposes only.

Fall 2016 GRDT Changes

The following changes will be made to the Master File Generator RDT:

Resource Worksheet

- Remove Green House Gas Cost (EIMY1P2)
- Add O&M Adder **Type** (**non**-modifiable; ECIC)
- Remove MOO Flag (RSI)
- Remove Stranded Load (not applicable to Gens/TGs)

Configuration Worksheet

- Startup Heat Input

Transition Worksheet

- Remove Max Transition Cost
- Remove Transition Fuel
- Remove Transition Energy
- Add Transition Midpoint MW (modifiable; new for EIMY1P2)
- Add Transition Midpoint Time (modifiable; new for EIMY1P2)



Fall 2016 CMRI/OASIS/ADS High-Level Summary API changes

Project	CMRI	OASIS	ADS
RTD LMPM	<i>Update (add RTD results):</i> MPMResults v3	<i>Update (add RTD results)-</i> - PRC_MPM_RTM_LMP - PRC_MPM_RTM_NOMOGRAM - PRC_MPM_RTM_NOMOGRAM_CMP - PRC_MPM_RTM_FLOWGATE - PRC_MPM_CNSTR_CMP - PRC_MPM_RTM_REF_BUS -ENE_MPM	N/A
BCR/VER	<i>Update (add FCU Forecast marketServiceType):</i> ExpectedEnergyAllocationDetails v3 <i>Decom:</i> ExpectedEnergyAllocationDetails v1	N/A	N/A
Forecasting (PIRP Decom) and Data Transparency	<i>New:</i> EIRForecast v1 (PIRP Decom)	N/A	N/A
	<i>New:</i> ElectricityPriceIndex v1 (Data Transparency)	N/A	N/A

Fall 2016 CMRI/OASIS/ADS High-Level Summary API changes (cont'd)

Project	CMRI	OASIS	ADS
EIM Year 1 Phase 2	<p><i>New:</i></p> <ul style="list-style-type: none"> - GreenHouseGasCapData v1 - EIMInterchangeScheduleData v1 	<p><i>New:</i></p> <ul style="list-style-type: none"> -PRC_RTM_SCH_CNSTR (Scheduling Constraint Shadow Prices) -ENE_HRLY_BASE_NSI (EIM BAA Hourly Base NSI) <p><i>Update</i></p> <p>Add Energy, Loss, GHG components:</p> <ul style="list-style-type: none"> - PRC_SPTIE_LMP - PRC_CD_SPTIE_LMP - DAM_SPTIE_LMP_GRP - RTPD_SPTIE_LMP_GRP - RTD_SPTIE_LMP_GRP <p>Add 'GHG' product:</p> <ul style="list-style-type: none"> - PUB_BID 	N/A
Flex Ramp	<p><i>New:</i></p> <ul style="list-style-type: none"> - ResourceMovementPoint v1 - ResourceLevelMovement v1 <p><i>Update:</i></p> <ul style="list-style-type: none"> - MarketAwards v4 - SchedulePrices v4 <p><i>Decom:</i></p> <ul style="list-style-type: none"> - MarketAwards v2 - SchedulePrices v2 	<p><i>New:</i></p> <ul style="list-style-type: none"> - SLD_ADV_FCST (Advisory CAISO Demand Forecast) - ENE_UNCERTAINTY_MV (Uncertainty Movement by Category) - ENE_FLEX_RAMP_REQT (Flexible Ramp Requirements) - ENE_AGGR_FLEX_RAMP (Flex Ramp Aggr Awards) - ENE_FLEX_RAMP_DC (Flex Ramp Surplus Demand Curves) 	<p><i>Update:</i></p> <p>APIWebService/v8</p> <p><i>Decom:</i></p> <p>APIWebService/v6</p>

Fall 2016 Release Market Simulation

Market Simulation Dates

Initiative	Fall Release Market Sim Phase
EIM - APS/PSE	7/5/16 - 7/22/16
Fall 2016 Web Services	
OMAR Replacement	
BCR/VER	
Forecasting and Data Transparency	
EIM Year 1 Phase 2 Functionality	
BAL-003	8/2/16 - 8/19/16
CMRI AUP	
ESDER	
FRP Functionality	
Pricing Enhancements	

Link to Fall 2016 Release Market Simulation Plan -

http://www.caiso.com/Documents/MarketSimulationPlan_Fall2016Release.pdf

Fall 2016 – BAL-003 Compliance

Project Info	Details/Date
Application Software Changes	<ul style="list-style-type: none"> • To procure transferred frequency response from external BAs through a competitive solicitation process • <i>Allocate the cost of TFR to metered demand: new charge code</i> • Require generators to manage their plants consistent with NERC published reliability guidelines for primary frequency control • Require generators to provide governor control and plant level control system data to the ISO, including Droop Setting, Deadband, frequency responsive maximum output level, Plant-level distributed control systems(DCS) with frequency bias term (Y/N), level temperature loop controls(@what output and/or temperature; Y/N) • Increase market transparency of the ISO's frequency response performance through its Monthly Market Performances Reports • Clarify the authority of ISO to designate any reserve as contingency only reserve regardless of resource's election

Milestone Type	Milestone Name	Dates	Status
Board Approval	BOG Approval	Mar 25, 2016	✓
BPMs	Publish Final Business Practice Manuals	N/A	
External BRS	Post External BRS	May 03, 2016	✓
Tariff	File Tariff	Apr 21, 2016	✓
	Receive FERC order	N/A	
Config Guides	Draft Configuration Guides	Jun 20, 2016	
Tech Spec	Create ISO Interface Spec (Tech spec)	N/A	
Market Sim	Market Sim Window	8/2/16 - 8/19/16	
Production Activation	BAL- 003 Frequency Response	Oct 01, 2016	

Fall 2016 – Flexible Ramping Product

System	Description
<p>Real-Time Market</p>	<ul style="list-style-type: none"> • FMM and RTD markets (no DA) will procure two new market products (each with award and price), Flex Ramp Up (FRU) and Flex Ramp Down (FRD), based on upper and lower uncertainty histogram FRP requirements and the Flex Ramping Capacity surplus demand curves. • FRP award-eligible resources are 5-minute dispatchable <u>and</u> have economic energy bids in RTM. • Forecasted Movement shall apply to all resources that have movement from binding to the first advisory interval of a given RTPD or RTD market run. • Uncertainty Movement for resources classified under the Supply Category shall only apply to VER resources with DOT Instructions that meet (within tolerance) their VER Forecast. This is a simplification such that uncertainty movement only applies to supply resources with schedules based on a forecast. Intertie and Load category resources shall still have uncertainty movement calculated. All uncertainty movement is in RTD only. • No FRU/FRD bids or self-schedules allowed in RTM, rather FRP prices are set by the opportunity cost based on the submitted economic energy bid. • FRP awards are not reserved between markets and re-procured each new market run. <p><u>Market Optimization Constraint Additions/Changes:</u></p> <ul style="list-style-type: none"> • RTM enforces BAA-level and EIM Area FRU and FRD minimum requirements. • FRP Surplus Cost Function procures Flexible Ramping Product uncertainty awards up to the point where the LMP is less than the expected cost of not serving FRP • FRU price cap (\$247/MWh); FRD price cap (-\$152/MWh) • FRU/FRD awards prohibited for resources operating in Forbidden Region or undergoing MSG Configuration Transition • Resource Upper/Lower Operating Limits modified to consider FRP Awards; • Resource Up/Down Ramping Capability Constraint modified to include FRU and FRD awards, respectively • ISL/ITC import/export constraints will include FRU/FRD in addition to AS awards.

Fall 2016 – Flexible Ramping Product

System	Description
MasterFile	<ul style="list-style-type: none"> • <i>(existing field, read only)</i> MasterFile shall define resource eligibility for FRU and FRD awards. Resource eligibility parameters are maintained by CAISO (no additional certification required). Although FRP eligible, resources must also have a RTM energy economic bids to receive FRP awards.
EIM	<ul style="list-style-type: none"> • BSAP UI will provide uncertainty requirement and ramping capacity surplus demand curve information • Existing EIM Flexible Ramping Sufficiency Test will now also perform for downward flexible ramp capability over the next trading hour on a BAA-basis • Introduction of new BAA upward/downward Capacity Constraints, regarding Available Balancing Capacity (ABC) • Flexible Ramp Up (FRU) and Down (FRD) will be procured in RTUC • Net Demand Movement shall no longer be considered in the EIM Ramping Sufficiency Test (instead, Net Forecast Movement will be used) • BAAs shall only pass sufficiency tests (both upward and downward) if all intervals of trade hour have sufficient ramping capability in the respective direction. • As transfers may be retracted, partial fulfillment of FRU and FRD is provided for BAAs with net EIM transfers in the direction relevant to the FRP type
ADS	<ul style="list-style-type: none"> • FMM Energy Dispatch for Interties shall be provided in display (and API) • FMM and RTD FRU and FRD awards shall be provided in display (and API)

Fall 2016 – Flexible Ramping Product

System	Description
CMRI	<p>The following shall be provided by CMRI reports and APIs (movement amounts publish T+1):</p> <ul style="list-style-type: none"> • Movement Calculation Points (FMM and RTD binding and first advisory MW schedules used for both forecasted movement and uncertainty movement calculations) • Forecasted Movement by Resource (FMM and RTD) • Uncertainty Movement by Resource (RTD only) • FRU and FRD Uncertainty Awards by Resource (FMM and RTD) • FRU and FRD Price by Resource, including the following FRU and FRD price sub-components (that sum to the total FRU and FRD prices): <ul style="list-style-type: none"> • BAA Constraint Shadow Price • EIM Area Constraint Shadow Price • EIM Balancing, Capacity, and Upward/Downward Flexible Ramping Sufficiency Test results by BAA (provided whether pass or fail) <p>Note: Forecasted and Uncertainty Movements are calculated for MSG resources at the plant level.</p>
OASIS	<p>The following shall be provided by OASIS reports and APIs (movement amounts publish T+1):</p> <ul style="list-style-type: none"> • Demand Forecast by Forecast Zone (ex post) now includes first advisory interval • Hourly and 15-Minute Sufficiency Evaluation Demand Forecasts (ex ante) • Uncertainty Movement by Category Type (Supply, Intertie, Load) (RTD Only) • Histogram and Final Uncertainty Requirements by BAA and by EIM Area (FMM and RTD) • Histogram Surplus Demand Curves by BAA and by EIM Area (FMM and RTD) • FRU and FRD Aggregate Awards by BAA and by EIM Area (FMM and RTD) • FRU and FRD Shadow Price by BAA Group constraint (FMM and RTD; by individual BAA and by EIM Area)

Fall 2016 – Flexible Ramping Product

System	Description
Settlements	<ul style="list-style-type: none"> • Settlements shall receive and consume, if relevant, the FMM and RTD resource-specific flex ramp product awards (FRU and FRD) due to uncertainty, FMM and RTD forecasted movement, RTD uncertainty movement, and price information, including total FRP Price (FRU and FRD) and relevant constraint contribution. • Settlements shall also receive relevant category-specific (supply, inertia, and load) RTD uncertainty movement for FRU and FRD and by relevant constraint contribution. • Resource <i>Forecasted Movement</i> shall settle at the FMM FRP price (FRU and FRD), then settle the RTD incremental movement amount at the RTD FRP price (FRU and FRD). Rescission quantities settle at RTD FRP prices. • Resource <i>Uncertainty Movement</i> shall settle on a daily basis with a monthly resettlement • Any FRP rescission shall first apply to the uncertainty award, and then forecasted movement (if any remaining) • Both Forecasted Movement and FRP Award allocations shall apply to BCR • FRP rescission payments/charges shall not apply to BCR

Fall 2016 – Flexible Ramping Product

System	Description
BPM changes	<ul style="list-style-type: none"> • Market instruments • Market Operations • Definitions & Acronyms • Settlements & Billing

Milestone Type	Milestone Name	Dates	Status
Board Approval	Project Approved by Board of Governors	Feb 03, 2016	✓
BPMs	Post Draft BPM changes	May 24, 2016	
External BRS	External Business Requirements	May 11, 2016	✓
Tariff	File Tariff	June 08, 2016	
Config Guides	Post Draft Config guides	May 20, 2016	
Tech Spec	Publish CMRI Technical Specifications	Apr 15, 2016	✓
	Publish OASIS Technical Specifications	Apr 08, 2016	✓
	Publish ADS Technical Specifications	Mar 30, 2016	✓
Market Sim	Market Sim Window	8/2/16 - 8/19/16	
Production Activation	Flexible Ramping Product	Oct 01, 2016	

Fall 2016 – BCR Modifications and VER Settlements

Project Info	Details/Date
Application Software Changes: CMRI, Settlements	CMRI: Shall publish the Expected Energy Allocation records with a new market service type 'FCS'. Note: 'FCS' stands for 'forecast' and represents capacity above the forecast.
Proposed scope	<p>Policy Topics:</p> <ul style="list-style-type: none"> • Ramp rate for variable energy resources. • Residual imbalance energy settlement for economic bidding variable energy resources. • Persistent deviation metric applied to variable energy resources. • Default energy bids for economic bidding variable energy resources. • Day-ahead metered energy adjustment factor. • Tariff clarifications following market issues bulletin.
BPM Changes	Settlements and Billing

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval	Jul 01, 2015	✓
BPMs	Publish Final Business Practice Manuals (Settlements; Market Settlements Design and Configurations)	Jun 28, 2016	
External BRS	Post External BRS	Dec 31, 2015	✓
Tariff	File Tariff	May 13, 2016	
Config Guides	Settlements Configuration Guide	Apr 08, 2016	✓
Tech Spec	Publish Technical Specifications (CMRI)	Apr 15, 2016	✓
Market Sim	Market Sim Window	Jul 05, 2016 - Jul 22, 2016	
Production Activation	BCR Modification and VER Settlement	Oct 01, 2016	

Fall 2016 – Acceptable Use Policy – CMRI

Project Info0	Details/Date
Application Software Changes	Scope includes enforcement of Acceptable Use Policy for CMRI services to support the full implementation of 1 call per service per identity (as designated by certificate) every 5 seconds.

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval	N/A	
BPMs	BPMs	N/A	
External BRS	External BRS	N/A	
Tariff	Tariff	N/A	
Config Guides	Config Guide	N/A	
Tech Spec	Tech Spec	N/A	
Market Sim	Market Sim Window	8/2/16 - 8/19/16	
Production Activation	Acceptable Use Policy - CMRI	Oct 01, 2016	

Fall 2016 – OMAR Replacement

Project Info	Details/Date
Application Software Changes	<p>The scope of the project is to replace the current OMAR Online application with a new CUI framework based interface and provide standard B2B web services integration. B2B services will be modified to align with CIM standard and to convert to GMT, and the existing FTP solution will be replaced. The new solution will also remove the custom OMAR certificates by leveraging the CAISO Multiple Application (CMA) certificates.</p> <ul style="list-style-type: none"> • Targeted API review sessions to scheduled for February • API integration targeted for testing in April, in time for unstructured market sim • UI delivery targeted for end of May, with active CPG involvement
BPM Changes	Metering and Definitions & Acronyms (references to systems may need to change)
Business Process Changes	<p>Potential Level-II business process changes under –</p> <ul style="list-style-type: none"> • Manage Market & Reliability Data & Modeling • Manage Operations Support & Settlements

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval	N/A	
BPMs	Publish Final Business Practice Manuals	N/A	
External BRS	Publish External BRS	Oct 02, 2015	✓
Tariff	Tariff	N/A	
Config Guides	Configuration Guide	N/A	
Tech Spec	Publish Tech Specs	Dec 21, 2015	✓
Market Sim	Market Sim Window	Jul 05, 2016 - Jul 22, 2016	
Production Activation	Post-Mrkt Consol - OMAR Replacement	Oct 01, 2016	

Fall 2016 – PIRP Decommissioning and Data Transparency

Project Info	Details/Date
Application Software Changes: PIRP/CMRI	<ul style="list-style-type: none"> Forecast Data Reporting (resource-level) that was performed in PIRP will be done in CMRI. Rolling Hour Ahead, Locked Hour Ahead, and Rolling Day-Ahead forecasts CMRI to receive the Electricity Price Index for each resource and publish it to the Market Participants.
BPM Changes	CMRI Technical Specification; New APIs will be described.
Business Process Changes	MPs will receive the VER reports from CMRI rather than PIRP.

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval	N/A	
External BRS	External Business Requirements	Jun 29, 2015	✓
Tariff	Tariff Filing Activities	N/A	
Config Guides	Settlements Configuration	N/A	
Tech Spec	Publish Technical Specifications (CMRI: PIRP Decommissioning)	Feb 05, 2016	✓
Tech Spec	Publish Technical Specifications (CMRI: Data Transparency Improvements)	Apr 15, 2016	✓
Market Sim	PIRP Decommissioning, CMRI Reports	Jul 05, 2016 - Jul 22, 2016	
Production Activation	PIRP Decommissioning, CMRI Reports	Oct 01, 2016	

Fall 2016 – EIM Year 1 Enhancements Phase 2

System	Description
Master File	<p>EIM transfer limit congestion treatment:</p> <ul style="list-style-type: none"> • Define ISL/ITC for multiple ETSR scheduling limits • Define ISL/ITC for EIM BAA to support FMM • Remove GHG bid CAP from MF, always use ECIC/RLC
IFM/RTM	<p>EIM transfer limit congestion treatment</p> <ul style="list-style-type: none"> • EIM transfer congestion component by BAA share <ul style="list-style-type: none"> • EIM transfer limit subject to LMPM • Allow multiple ETSR limits in ISL/ITC constraint • Enforce ISL for EIM BAA by intertie <p>Include Loss component in LMP for SP-Tie</p>
BSAP	<p>EIM entity shall submit base schedule to reflect latest information from e-tags, not limited to approved e-tags.</p>
CMRI	<ul style="list-style-type: none"> • Publish GHG bid Cap (CMRI) • Publish after fact EIM interchange schedules
OASIS	<ul style="list-style-type: none"> • Publishing by type of constraints, include EIM Transfer Constraints, HVDC, and other constraints. • Allow API for GHG bid at public bids • Publish base NSI for EIM BAA along with Base schedule test results at T-75, T-55 and T-40 • Publish LMP with Loss component for SP-tie

Fall 2016 – EIM Year 1 Enhancements Phase 2 (cont.)

Project Info	Details/Date
BPM Changes	Energy Imbalance Market
Business Process Changes	Manage market and grid, Manage operations support and Settlements

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval occurred in year 1 phase 1	N/A	
BPMs	Post Draft BPM changes	Jul 01, 2016	
External BRS	External Business Requirements	Feb 16, 2016	✓
Tariff	File Tariff	Aug 01, 2016	
Config Guides	Post Draft Config guides	Jun 24, 2016	
Tech Spec	Publish CMRI Technical Specifications	Apr 12, 2016	✓
	Publish OASIS Technical Specifications	Apr 08, 2016	✓
	Publish Master File Technical Specifications	Apr 21, 2016	✓
Market Sim	Market Sim Window	Jul 05, 2016 - Jul 22, 2016	
Production Activation	EIM Year 1 – Phase 2	Oct 01, 2016	

Fall 2016 – EIM Puget Sound Energy

Project Info	Details/Date
Application Software Changes	Implementation of Puget Sound Energy as an EIM Entity. WebOMS - Provide Balancing Authorities with the ability to submit outages to WebOMS and the ability to submit PeakRC through their Coordinated Outage Scheduling System (COS).
BPM Changes	EIM BPM will be updated based on feedback from PSE.
Additional Market Sim Info	ISO promoted market network model including PSE area to non-production system and allow PSE exchange data in advance of Market Simulation on 3/7/16. Integration/Day in the Life Testing March 7 – May 30, 2016 Market Simulation July 5 – July 29, 2016
Parallel Operations	August 1 – September 30, 2016

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval	N/A	
BPMs	BPMs	N/A	
External BRS	OMS - BRS External Design	Jul 24, 2015	✓
Tariff	Tariff filing at FERC	Feb 12, 2016	✓
Config Guides	Settlements	N/A	
Tech Spec	Tech Specs	N/A	
Market Sim	Market Sim Window	Jul 05, 2016 - Jul 22, 2016	
Production Activation	EIM - Puget Sound Energy	Oct 01, 2016	

Fall 2016 - Energy Storage and Distributed Energy Resources (ESDER)

Project Info	Details/Date	Status
Scope and Application Changes	<p>2015 scope:</p> <ol style="list-style-type: none"> 1. NGR model enhancement: <ol style="list-style-type: none"> a. Update documentation on NGR to ISO BPMs to capture material and clarifications b. Clarify how the ISO uses state of charge in market optimization. c. Allow initial state of charge as a submitted parameter in the day-ahead market. (SIBR) d. Allow option to not provide energy limits or have ISO co-optimize an NGR based on state of charge (SIBR, IFM/RTM) 2. PDR/RDRP enhancement: <ol style="list-style-type: none"> a. Support alternative performance evaluation method: MGO b. Support Baseline Type-II 3. Multiple use applications: <ol style="list-style-type: none"> a. DERA provides services to distribution system and wholesale market b. DERA provides services to end-use customers and wholesale market <p>Include provisions:</p> <ol style="list-style-type: none"> 1. Daily SQMD for DERA; 2. Settle DERA deviation through UIE; 3. Not address potential double payment; 4. No limitation DERA for distribution system; 5. treat PDR/RDRR as serve end-use and wholesale market. 	

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval	Feb 04, 2016	✓
BPMs	Post Draft BPM changes	TBD	
External BRS	Post External BRS	May 05, 2016	✓
Tariff	File Tariff Submission	May 20, 2016	
Config Guides	Draft Configuration Guide	TBD	
Tech Spec	Create ISO Interface Spec (Tech spec)	N/A	
	Post Release Notes (No API Changes)	Jun 17, 2016	
Market Sim	Market Sim Window	8/2/16 - 8/19/16	
Production Activation	Storage and Aggregated DER	Oct 01, 2016	

TBD - ADS UI Replacement

Milestone	Details/Date	Status
Application Software Changes	Port client from Delphi to new common user interface (ADS Query Tool and Real Time Functionality)	
BPM Changes	N/A	
Business Process Changes	N/A	
Board Approval	N/A	
External Business Requirements	N/A	
Updated BPMs	N/A	
Technical Specifications	N/A	
Draft Configuration Guides	N/A	
Market Simulation	TBD	
Tariff	N/A	
Production Activation	TBD	

TBD - Additional Data Transparency Enhancements (OASIS API changes)

Project	OASIS
Data Transparency	<p>Atlas Reference:</p> <ol style="list-style-type: none"> 1) Price Correction Messages (ATL_PRC_CORR_MSG) 2) Scheduling Point Definition (ATL_SP) 3) BAA and Tie Definition (ATL_BAA_TIE) 4) Scheduling Point and Tie Definition (ATL_SP_TIE) 5) Intertie Constraint and Scheduling Point Mapping (ATL_ITC_SP) 6) Intertie Scheduling Limit and Tie Mapping (ATL_ISL_TIE) <p>Energy</p> <ol style="list-style-type: none"> 1) EIM Transfer Limits By Tie (ENE_EIM_TRANSFER_LIMITS_TIE) 2) EIM Transfer By Tie (ENE_EIM_TRANSFER_TIE) 3) Wind and Solar Summary (ENE_WIND_SOLAR_SUMMARY) <p>Prices</p> <ol style="list-style-type: none"> 1) MPM Default Competitive Path Assessment List (PRC_MPM_DEFAULT_CMP) 2) Real-Time Load Aggregation Point Settlement Prices

- Independent changes, won't impact existing services
- Will be made available in Production and cutover schedule is discretionary

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval	N/A	
External BRS	External Business Requirements	N/A	
Tariff	Tariff Filing Activities	N/A	
Config Guides	Settlements Configuration	N/A	
Tech Spec	Publish Technical Specifications (OASIS): Additional Data Transparency Enhancements)	Apr 08, 2016	✓
Market Sim	Additional Data Transparency Enhancements	TBD	
Production Activation	Additional Data Transparency Enhancements	TBD	

2017 – Real Time Dispatch Local Market Power Mitigation

Project Info	Details/Date
Application Software Changes	<ul style="list-style-type: none"> • CMRI – Display mitigated bids from RTD process • Oasis (Open Access Sametime Information System): Display RTD reports for Market Clearing, the Pnode clearing, similar to current RTPD reports • RTM (Real Time Market) <ul style="list-style-type: none"> • RTPD: Perform the LMPM run as an integral part of the binding interval RTPD run • RTD: Proposed mitigation in RTD run would work the same way as the current RTPD run
BPM Changes	<ul style="list-style-type: none"> • Energy Imbalance Market (EIM): under the proposed RTD method, bids are not necessarily mitigated for the whole hour • RTD MPM will work the same way as the current RTPD MPM
Business Process Changes	<ul style="list-style-type: none"> • Manage Markets & Grid • ATF – System Operations: Add MPM Application to Real Time and annotate inputs and outputs • ATF – System Operations, Real Time: Add MPM to diagram with inputs and outputs • Level II – Manage Real Time Operations – maintain balancing area

2017 - Real Time Dispatch Local Market Power Mitigation – RTD LMPM

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board of Governors (BOG) approval	Mar 24, 2016	✓
BPMs	Post Draft BPM changes (EIM)	Sep 01, 2016	
BPMs	Post Draft BPM changes (RTD MPM)	Sep 01, 2016	
External BRS	Post External BRS	Apr 08, 2016	✓
Tariff	File Tariff	Jul 06, 2016	
Tariff	Receive FERC order	Sep 30, 2016	
Tariff	Pre-Tariff Filing QRB	Jun 28, 2016	
Tech Spec	Publish Technical Specification - OASIS	Apr 08, 2016	✓
Tech Spec	Publish Technical Specification - CMRI	Apr 14, 2016	✓
Market Sim	Market Sim Window	Nov 01, 2016 - Dec 15, 2016	
Production Activation	RTD - Local Market Power Mitigation Enhancement	Jan 30, 2017	

Fall 2017 - Bidding Rules Enhancements – Part B

Project Info	Details/Date
Application Software Changes	<p>Developments under consideration include:</p> <ul style="list-style-type: none"> • Extend a filing right @ FERC for resources to seek recovery of marginal fuel procurement costs exceeding the commitment cost bid cap not recovered through market revenues • SIBR: <ul style="list-style-type: none"> • Allow resources without a DA schedule to redid commitment costs in the real-time market. (Policy Section 7.2.2) • No longer insert bids for STUC for non-RA resources that do not have a DA market award and do not resubmit bid into RT market (Policy Section 7.2.3.) • MasterFile: <ul style="list-style-type: none"> • Provide ability to submit requests for new fuel regions (Policy Section 8.1.1.3) • Include resource-specific start-up electricity costs in proxy costs based on wholesale projected electricity price, unless resource verifies costs incurred are retail rates (RDT change) • Allow ability to submit a weighting when using a more than one fuel region. • OASIS: <ul style="list-style-type: none"> • Publish fuel regions (public information) • Settlements: <ul style="list-style-type: none"> • After fact cost recovery is required.
Business Process Change	Manage Transmission & Resource Implementation, Manage Entity & Resource Maintenance Updates, Manage Full Network Model Maintenance, manage Market Quality System (MQS)
BPMs	Market Instruments, Market Operations, Reliability Requirements, Settlements & Billing

Note: Some scope items have moved to Aliso Canyon

Fall 2017 - Bidding Rules Enhancements – Part B (cont.)

Milestone Type	Milestone Name	Dates	Status
Board Approval	BOG Approval	Mar 25, 2016	✓
BPMs	Post Draft BPM changes	TBD	
External BRS	External Business Requirements	Jul 15, 2016	
Tariff	File Tariff	Oct 10, 2016	
	Receive FERC order	Dec 14, 2016	
Config Guides	Prepare Draft Configuration Guides	TBD	
Tech Spec	Create ISO Interface Spec (Tech spec)	TBD	
Market Sim	Market Sim Window	TBD	
Production Activation	Bidding Rules Part B	Oct 01, 2017 (Updated)	

Fall 2017 - Reliability Services Initiative Phase 1B

Project Info	Details/Date	Status
Application Software Changes	<p>Scope:</p> <ul style="list-style-type: none"> • Default flexible qualifying capacity provisions for phase 2 consideration (we might need data collection performed in order to support RSI Phase 2) • Redesign of Replacement Rule for System RA and Monthly RA Process • RA Process and Outage Rules for implementation for 2017 RA year • Scope not delivered in RSI Phase 1A (Grandfathered Contracts, RAAM Decommissioning – SCP & CPM screens from RAAM to CIRA, Acquired Contracts, OASIS reporting, web services related to APIs for CSP offers, APIs for Generic/Flex Substitutions, and Release of Generic/Flex Subs – UI & API) <p>Impacted Systems:</p> <ul style="list-style-type: none"> • CIRA • OMS • OASIS • Integration (B2B) • Decommission RAAM 	
Business Process Changes	Manage Market & Reliability Data & Modeling	

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval	May 12, 2015	✓
BPMs	Post Draft BPM changes - Outage Management	TBD	
	Post Draft BPM changes - Reliability Requirements	TBD	
External BRS	External Business Requirements	Aug 04, 2016 (Updated)	
Tariff	File Tariff	TBD	
	Receive FERC order	TBD	
Config Guides	Issue Draft Configuration Guides	TBD	
Tech Spec	Create ISO Interface Spec (Tech spec)	TBD	
Market Sim	Market Sim Window	TBD	
Production Activation	Reliability Services Initiative Phase 1b	Oct 01, 2017	

Fall 2017 - Commitment Cost Enhancements Phase 3

Project Info	Details/Date
Application Software Changes	<p><u>Scope:</u></p> <ol style="list-style-type: none"> 1. Clarify use-limited registration process and documentation to determine opportunity costs 2. Each submission evaluated on a case-by-case basis to determine if the ISO can calculate opportunity costs <ul style="list-style-type: none"> • ISO calculated; Modeled limitation • Market Participant calculated; Negotiated limitation 3. Enhanced definition of “use-limited” in response to FERC’s rejection of the proposed definition in Cost Commitment Enhancements Phase 2 4. Change Nature of Work attributes (Outage cards) <ol style="list-style-type: none"> 1. Modify use-limited reached for RAAIM Treatment 2. Add new demand response nature of work attribute for RDRR and PDR <p><u>Impacted Systems:</u></p> <ol style="list-style-type: none"> 1. CIRA 2. CMRI 3. IFM/RTN 4. SIBR 5. MasterFile 6. OASIS 7. OMS 8. Settlements
BPM Changes	Market Instruments, Outage Management, Reliability Requirements, Market Operations
Business Process Changes	Level II – Manage Reliability Requirements Level II – Manage Day Ahead Market

Fall 2017 - Commitment Cost Enhancements Phase 3 (cont.)

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board of Governors (BOG) Approval	Mar 25, 2016	✓
BPMs	Post Draft BPM changes	TBD	
External BRS	Post External BRS	Jul 05, 2016	
Tariff	File Tariff	TBD	
	Receive FERC order	TBD	
Config Guides	Config Guide	TBD	
Tech Spec	Create ISO Interface Spec (Tech spec)	TBD	
Market Sim	Market Sim Window	TBD	
Production Activation	Commitment Costs Phase 3	Oct 01, 2017	

Fall 2017 - Contingency Modeling Enhancements

Project Info	Details/Date
Application Software Changes	<ul style="list-style-type: none"> • IFM/RTN: Adds a preventive-corrective constraint to the market co-optimization • OASIS/CMRI: Publish preventive-corrective capacity awards with associated LMPC • Settlements: Payment and charges for corrective capacity awards, allocation of cost of the corrective capacity constraint, no-pay provisions, bid cost recovery
BPM Changes	Manage Full Network Model, Market Operations, Market Instruments, Settlement and Billing, Definitions and Acronyms

Milestone Type	Milestone Name	Dates	Status
Board Approval	Present Draft Final Proposal at BOG	Jun 23, 2016	
External BRS	External Business Requirements	TBD	
	Post External BRS	TBD	
Config Guides	Complete ClearTrust Configuration document	TBD	
	Config Guide	TBD	
Market Sim	Market Sim Window	TBD	
Production Activation	Contingency Modeling Enhancement - Fall 2017 Release	Oct 01, 2017	