



California ISO

# Market Performance and Planning Forum

February 20, 2019

ISO PUBLIC

## 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



# Market Performance and Planning Forum

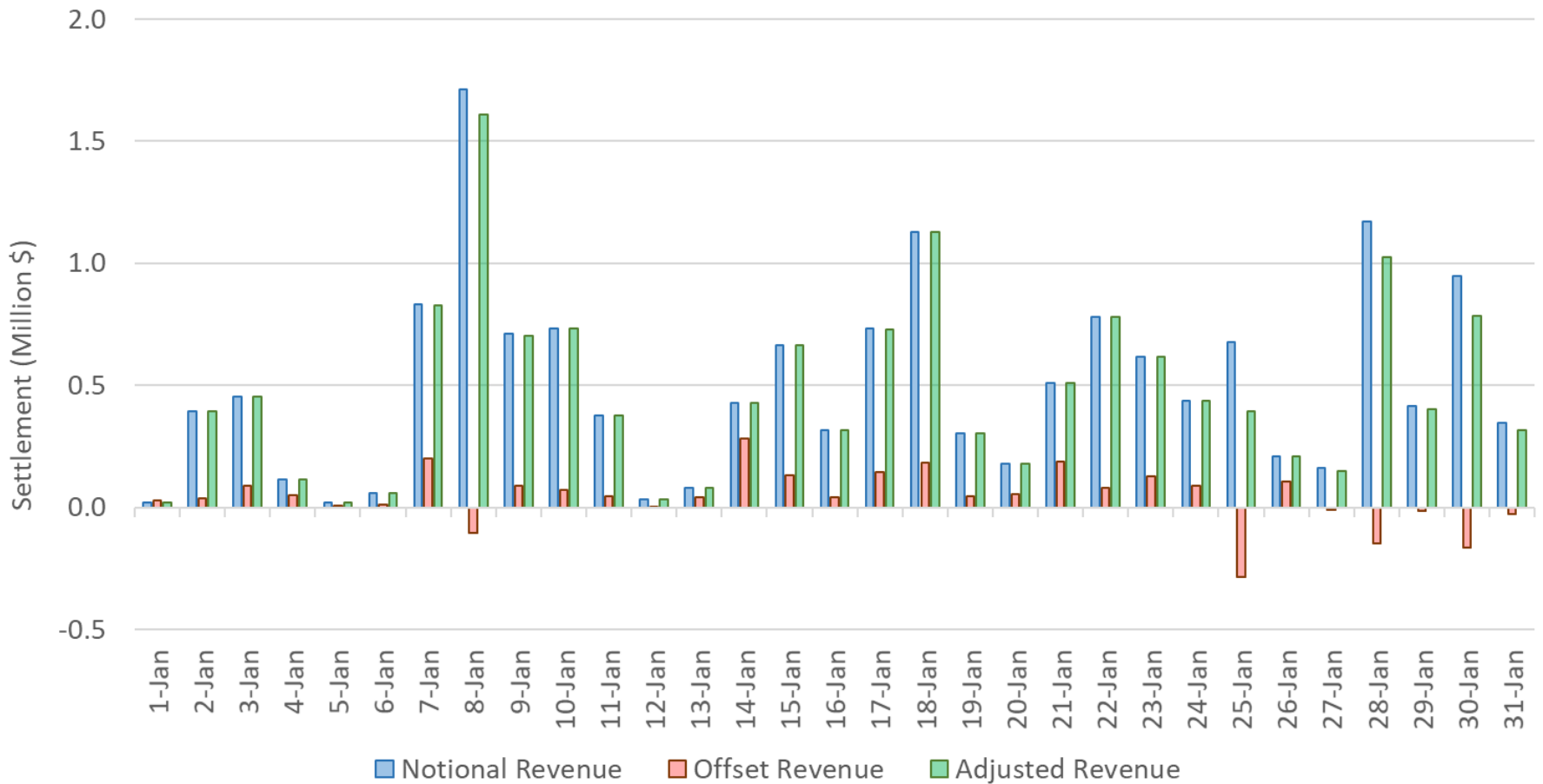
Agenda – February 20, 2019

Time:	Topic:	Presenter:
10:00 – 10:05	Introduction, Agenda	Kristina Osborne
10:05 – 12:00	Market Performance and Quality Update	Guillermo Bautista Alderete
12:00 – 1:00	Lunch	
1:00 – 1:30	Policy Update	John Goodin Brad Cooper
1:30 – 2:00	Release Update	Adrian Chiosea

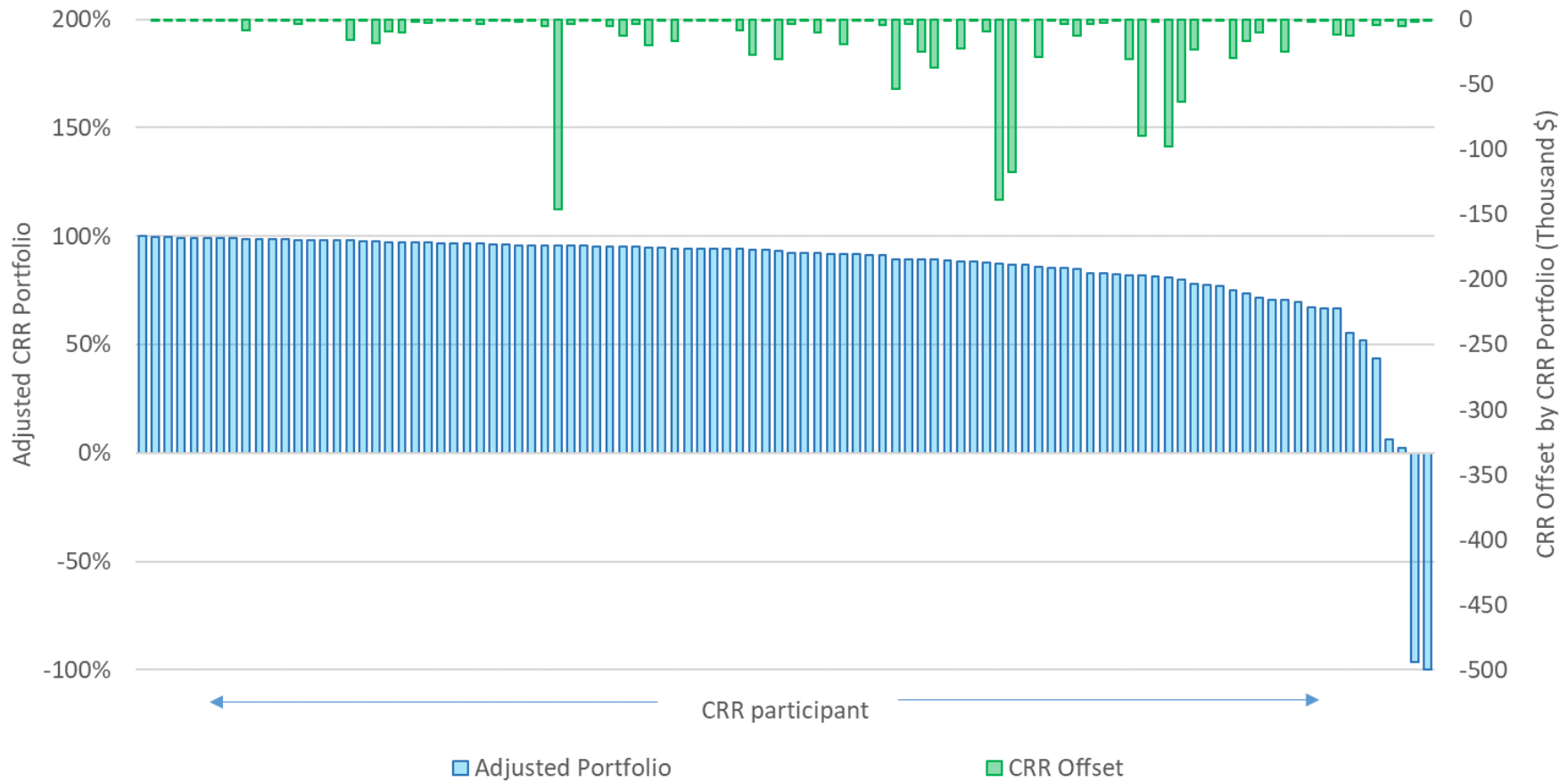
# Market Performance and Quality Update

Market Analysis & Forecasting Department

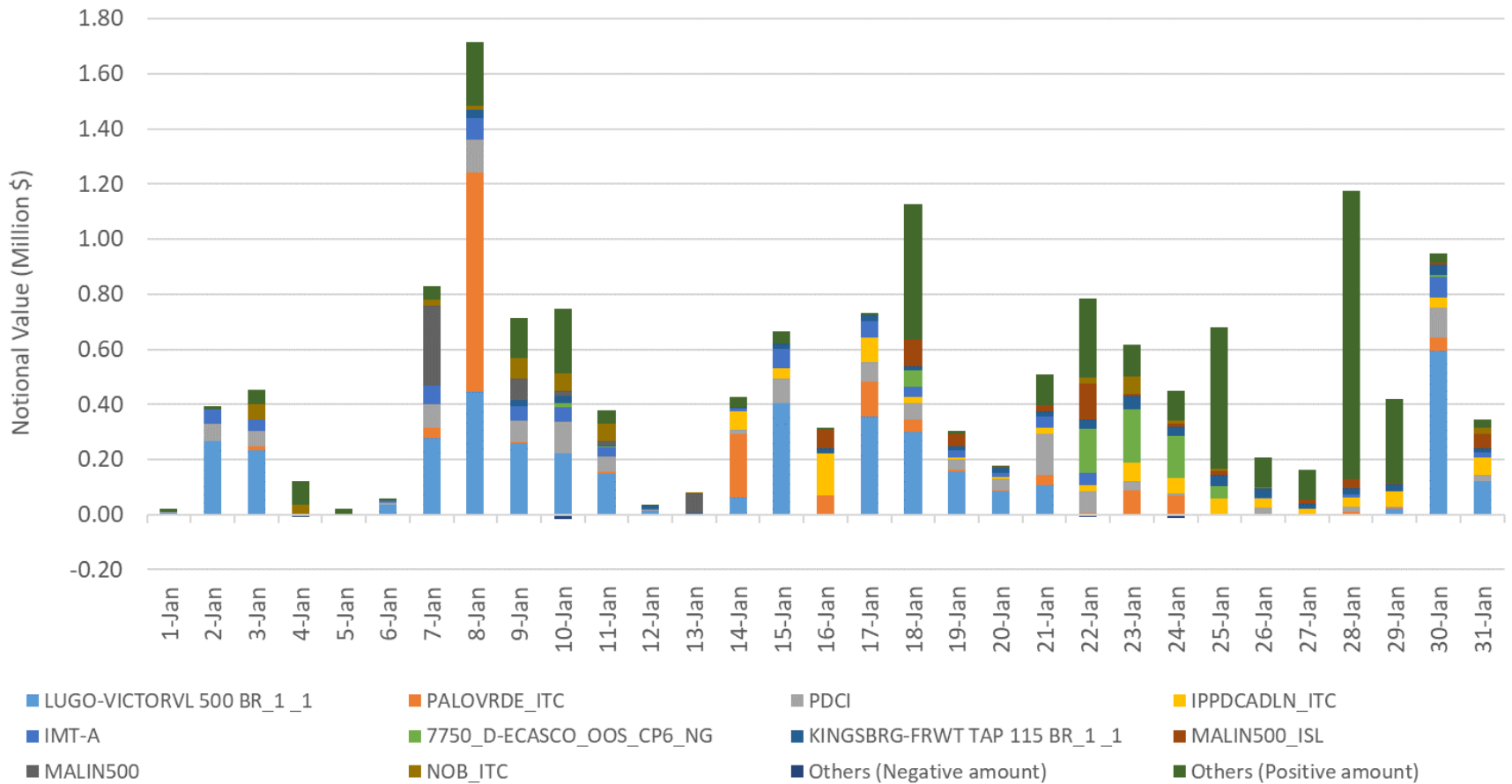
# Pro-rata funding logic for CRRs took effect in January 2019. January generally observed a CRR surplus



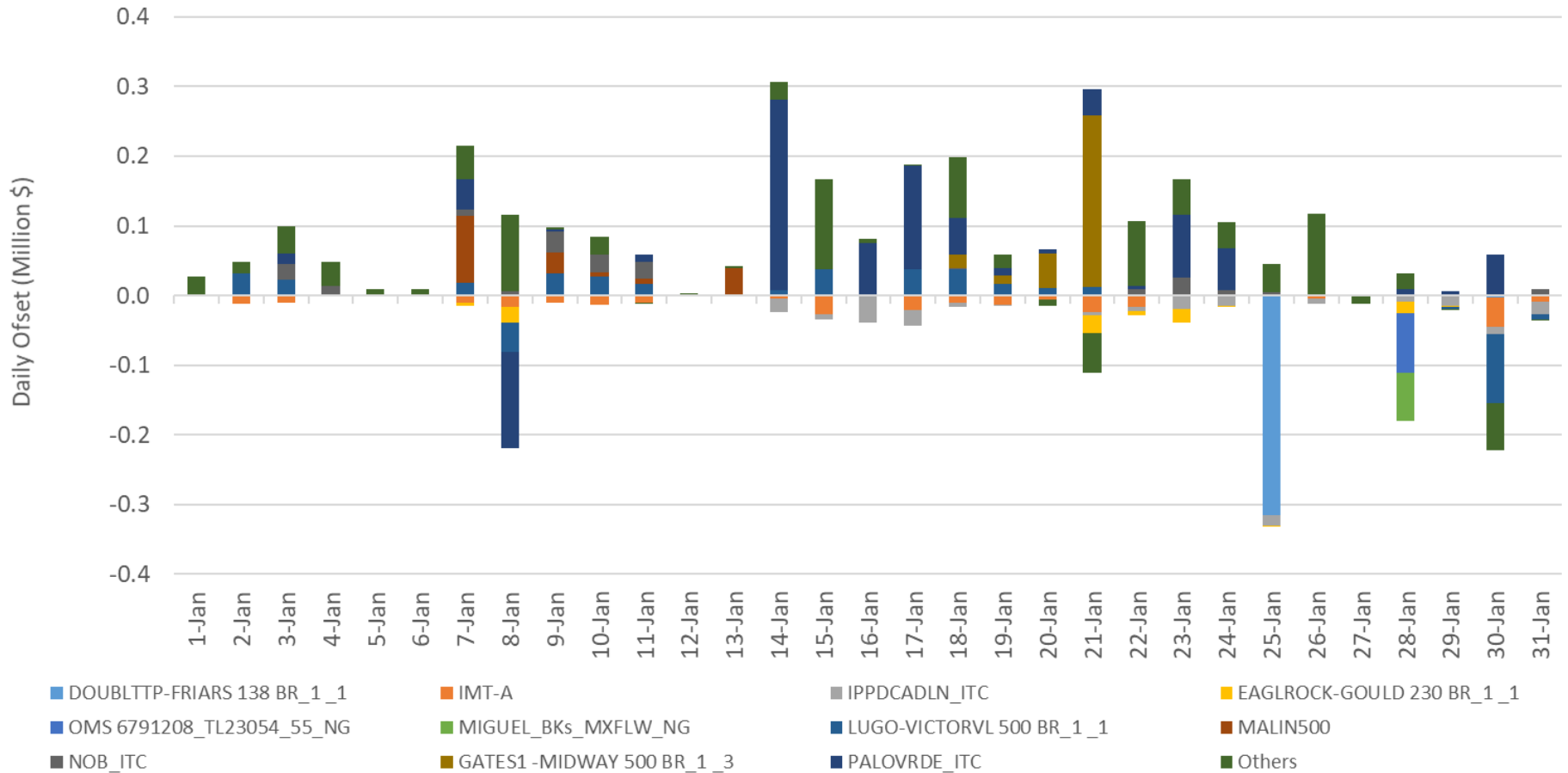
# Based on its contribution to deficits, each CRR portfolio saw accordingly a pro-rata adjustment



# CRR notional value is now estimated for each transmission constraint

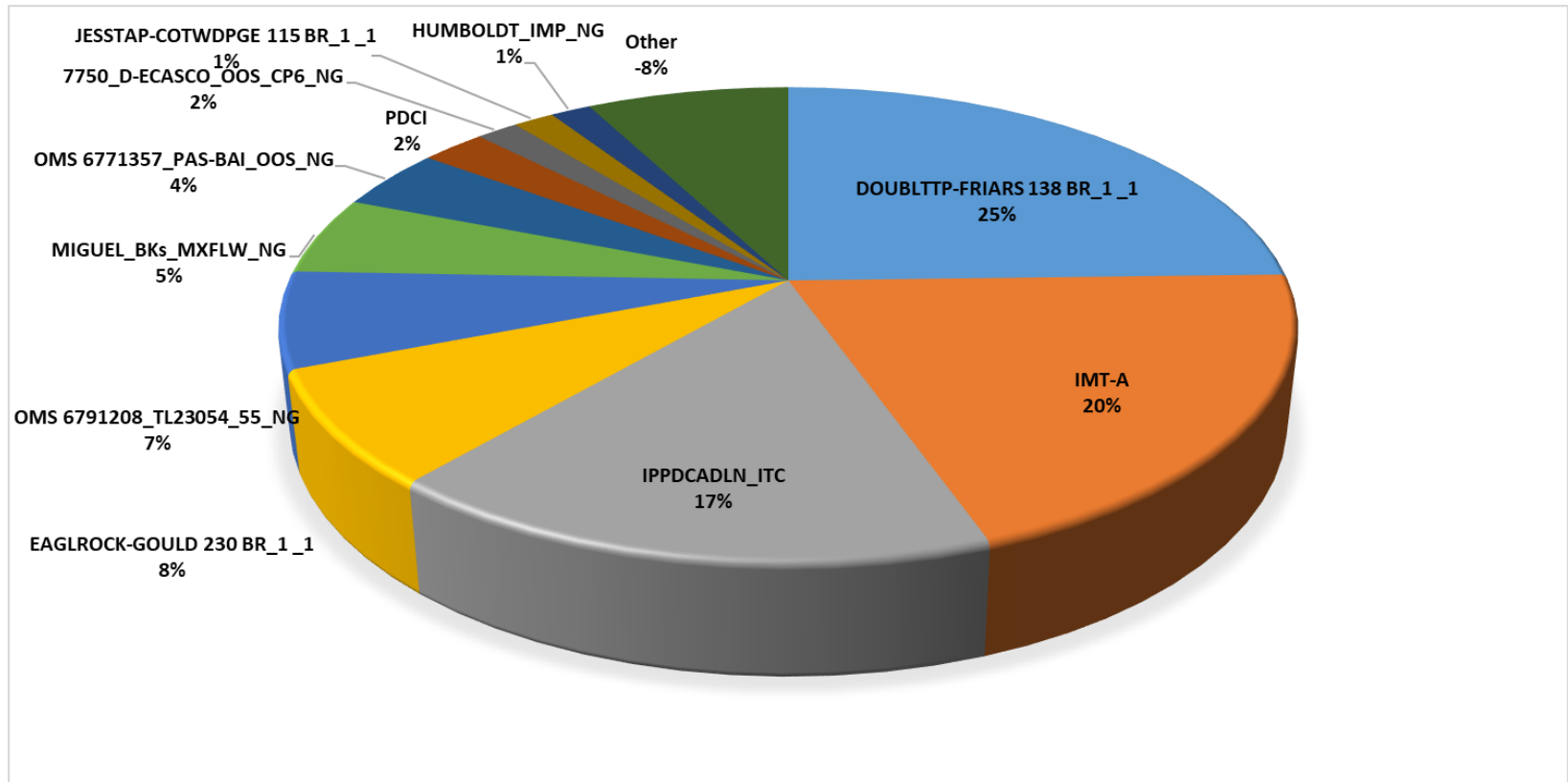


# CRR deficits are tracked separately by constraint

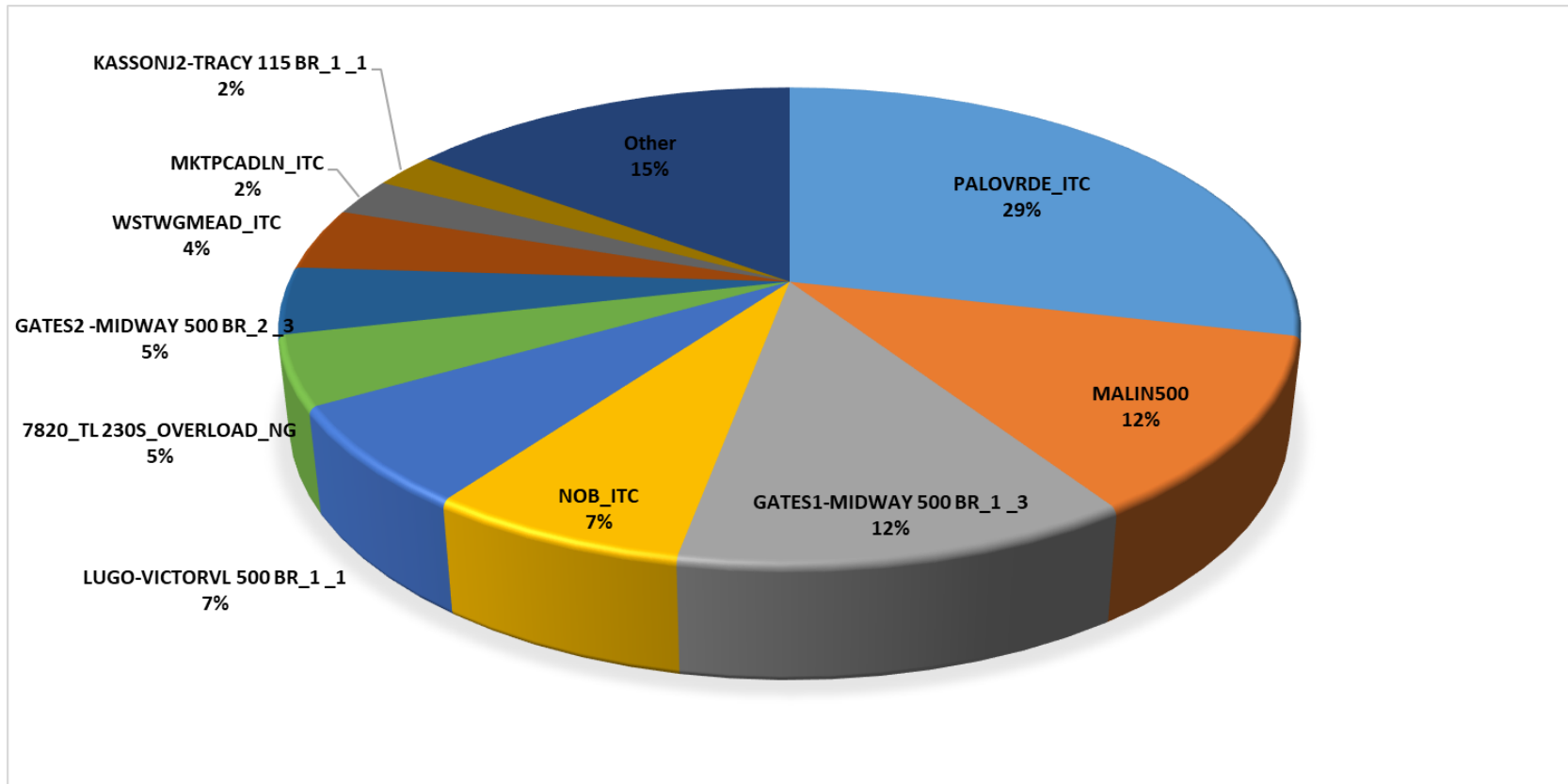




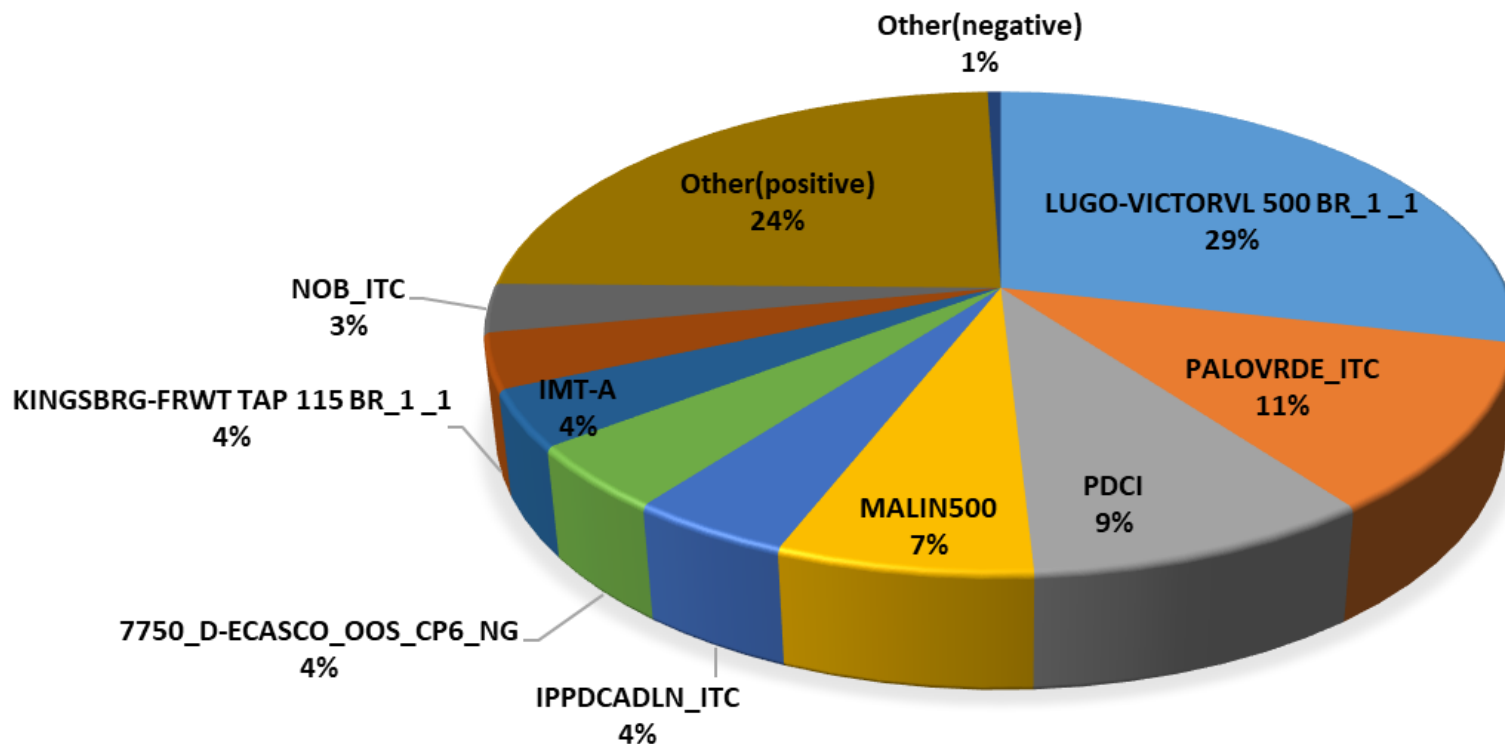
CRR deficit in January was about \$1.2 million and is pro-rata allocated by constraint to all impactful CRRs



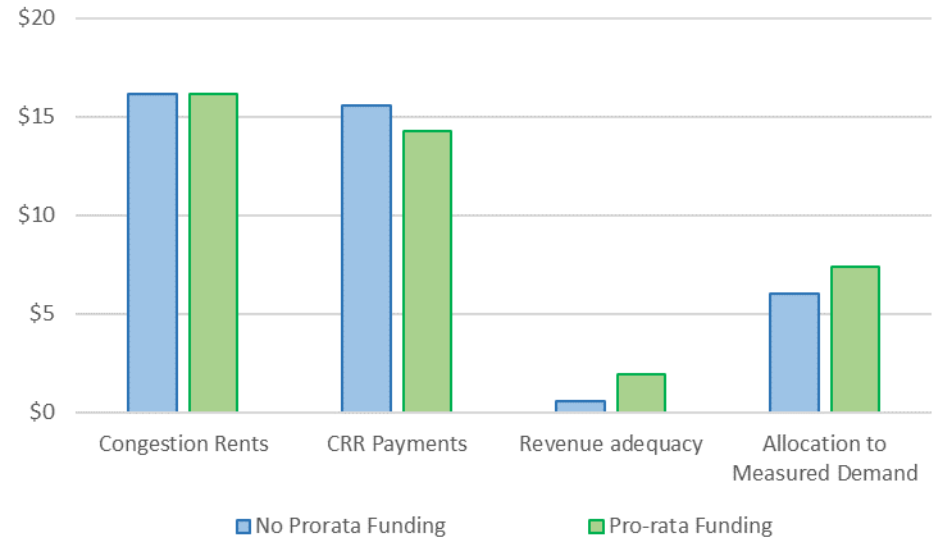
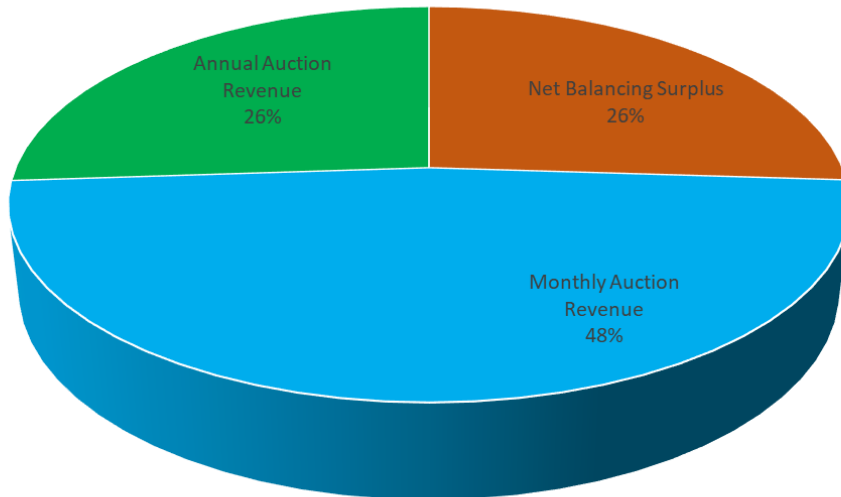
# CRR offset surplus in January was about \$2.6 million and is allocated to measured demand



Total CRR payment in January after pro-rata adjustments was about \$14 million.

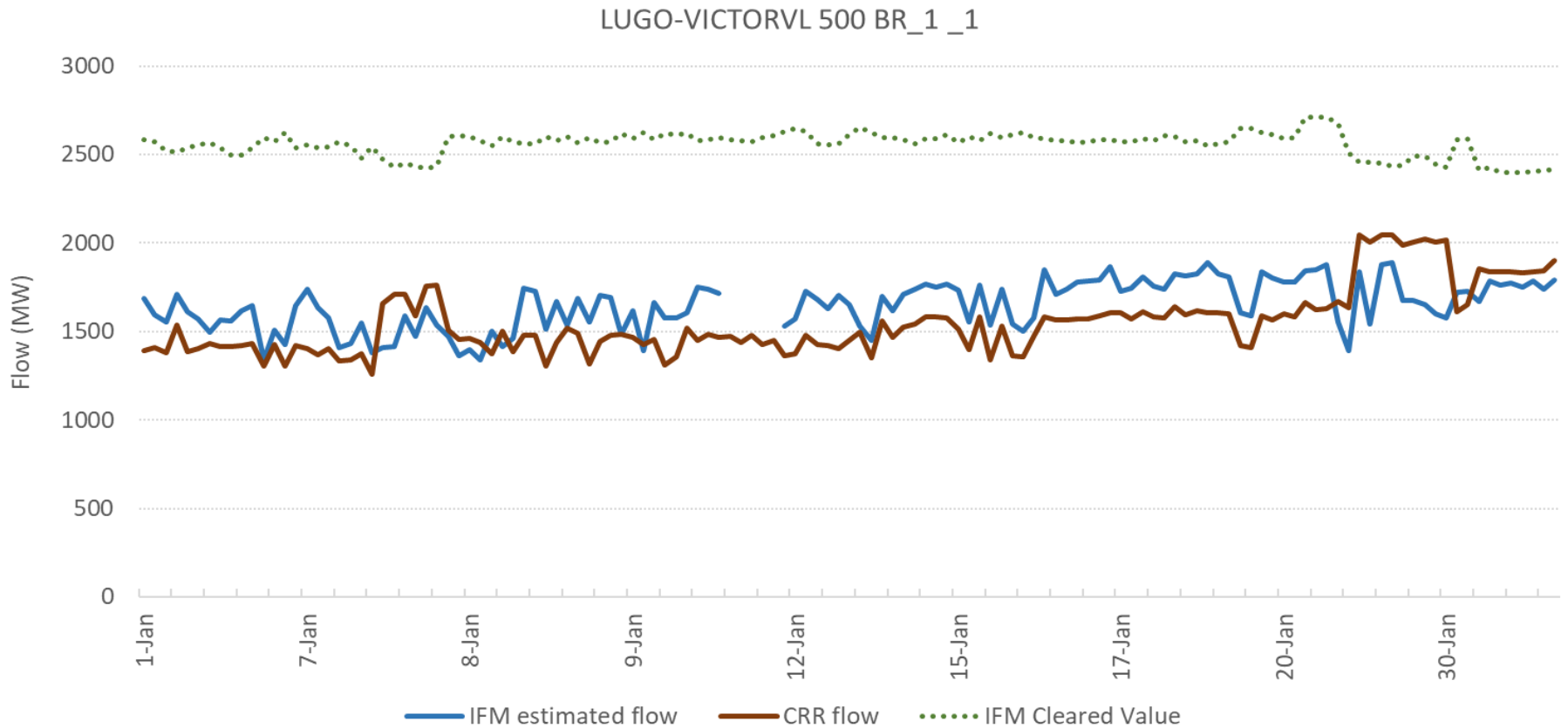


# Total CRR surplus includes both auction revenues and balancing surpluses, and all of that is allocated to measured demand

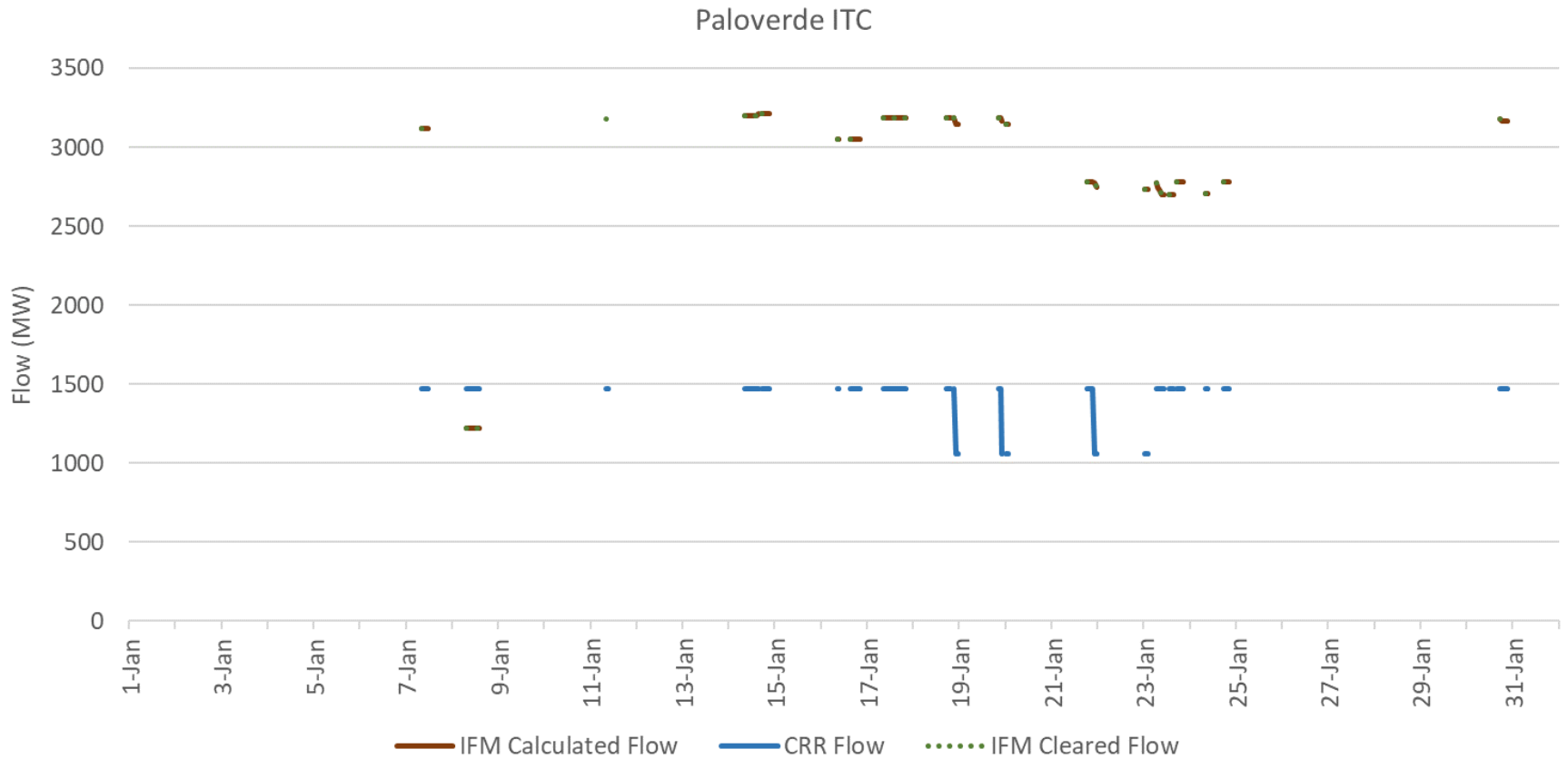


Total surplus allocated to measured demand in January is about \$7.4 Million

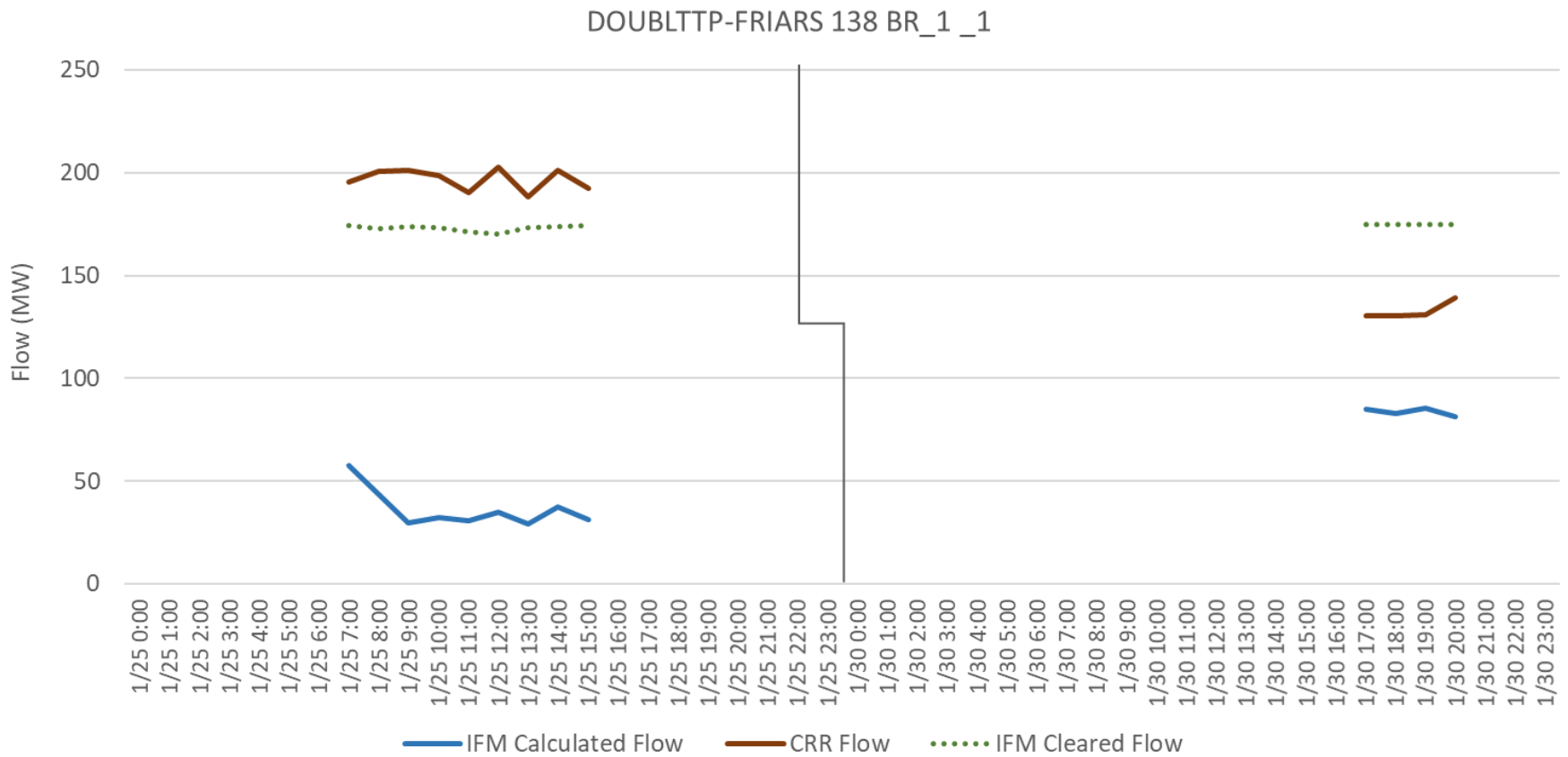
# Day-ahead estimated flows, which accrue congestion rents, and CRR flows were both below the day-ahead cleared flow due largely to accounting for unscheduled flows



# Paloverde Intertie largely observed a CRR surplus since less capacity was released in the CRR processes



# Double Tap-Friar constraint observed a deficit offset due to lower day-ahead flows in which congestion rents are accrued, driven by accounting for unscheduled flows and shift factor threshold effect



# Pro-rata funding implemented in 2019 is calculated by constraint and CRR portfolio

- The effect of each portfolio is based on the net flow (impact) of all CRRs per constraint –counter-flows offsetting prevailing flows
- The pro-rata assignment of deficiency (offset) is estimated and settled by portfolio
- In order to further analyze the performance of the pro-rata funding, the CAISO disaggregates the offsets from portfolio level to individual CRRs
- The disaggregation is no more than a second- and third-level of pro-rata allocation of offsets from CRR portfolio to the individual cleared CRR



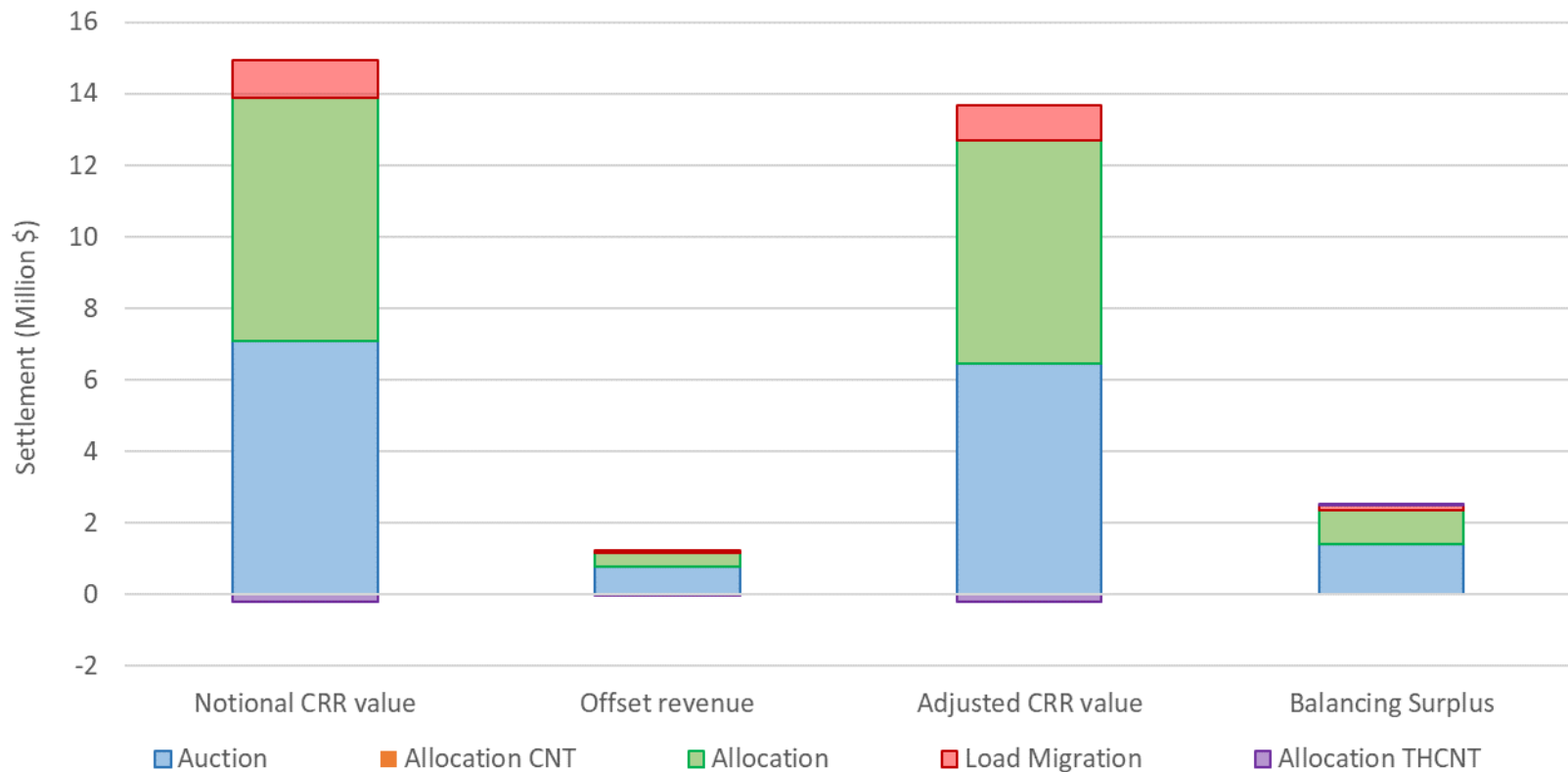
# Pro-rata funding implemented in 2019 at portfolio level shows no insights into impact on individual CRRs

- There may be multiple ways to disaggregate the CRR deficit from the portfolio level to the individual CRR
- Depending on what logic is used, different estimates and thus conclusions can be attained regarding the effectiveness of the pro-rata funding on the auction efficiency
- The disaggregation at CRR level implemented by the CAISO only for analysis purposes follows the same principle of the pro-rata funding applied at the portfolio level
- This logic is only for purposes of analyzing performance and has no impact on the actual settlements of CRRs, which continue to be at the portfolio level

# Pro-rata funding implemented in 2019 at portfolio level shows no insights into impact on individual CRRs

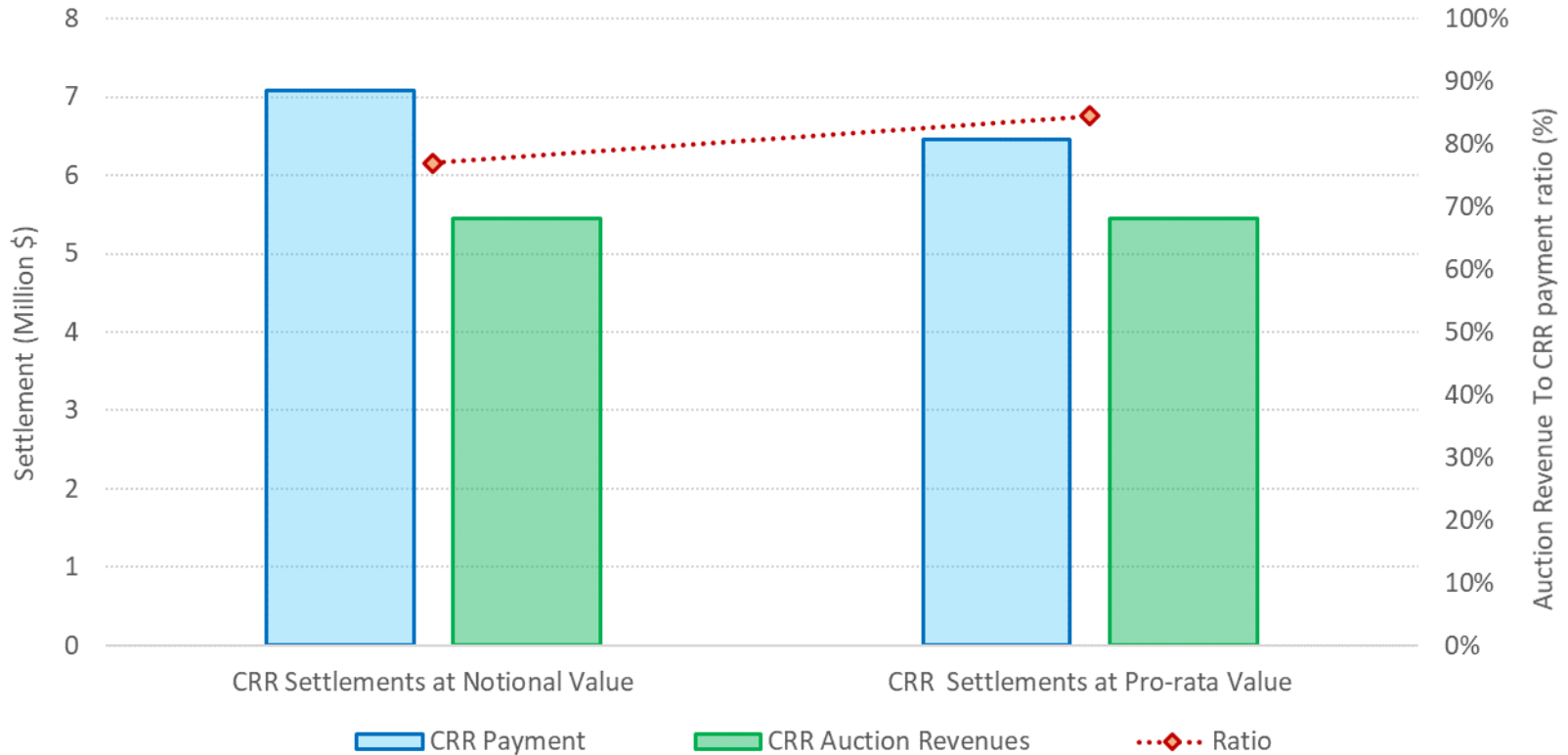
- Implementing a logic to disaggregate deficits from portfolio level to each individual CRR requires data at the granular CRR level, which is the underlying data used to settle CRRs under new policy
- CAISO's estimates provided in subsequent slides are estimates using intermediate and more granular data.
- Through this analysis CAISO has identified some data quality items at the granular level which are currently being addressed
- These estimates are not settlement-quality and will be subject to changes as more data becomes available

# CRR payments were evenly distributed between Auction and Allocation CRRs, and about 60% of offsets were on auctioned CRRs



These estimates reflect Obligation CRRs only and reflect a gross disaggregation by CRR type; some leakage among types of CRRs may exist.

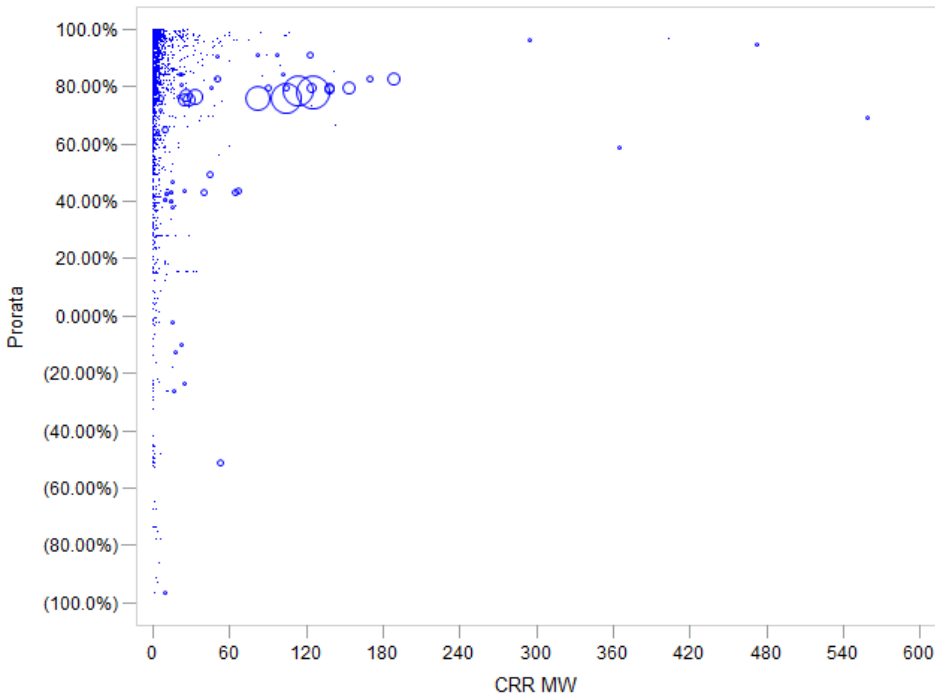
# Auction Revenue shortfall decreased modestly with the inclusion of the deficit offset \*



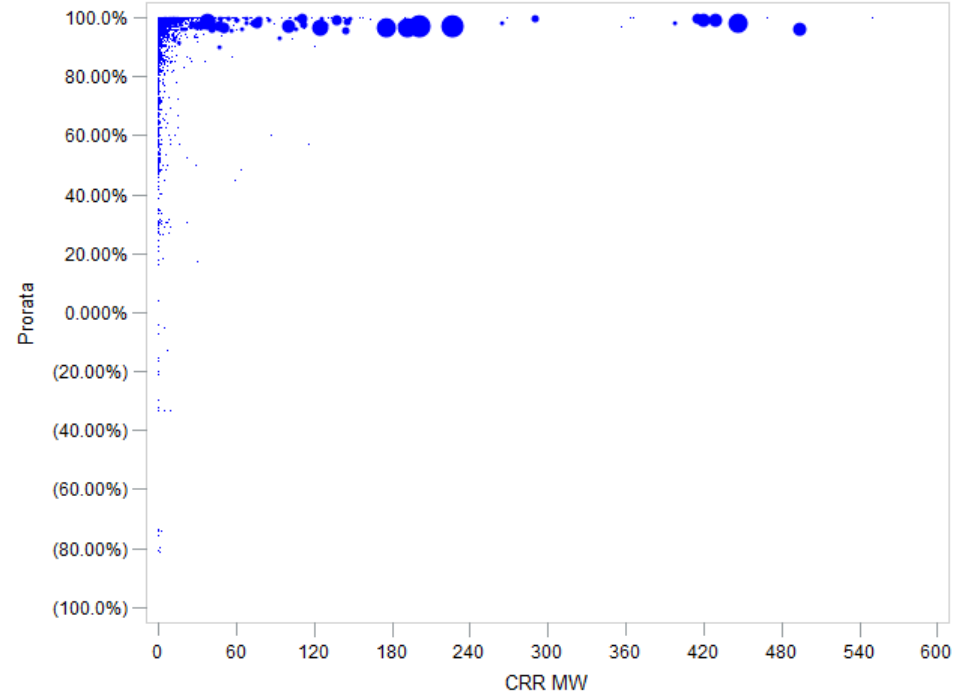
\*The CRR payments, and thus the ratio, will be revised once data for all constraints for all days are included

Since January was generally revenue adequate, over 70 percent of offsets were related to surplus

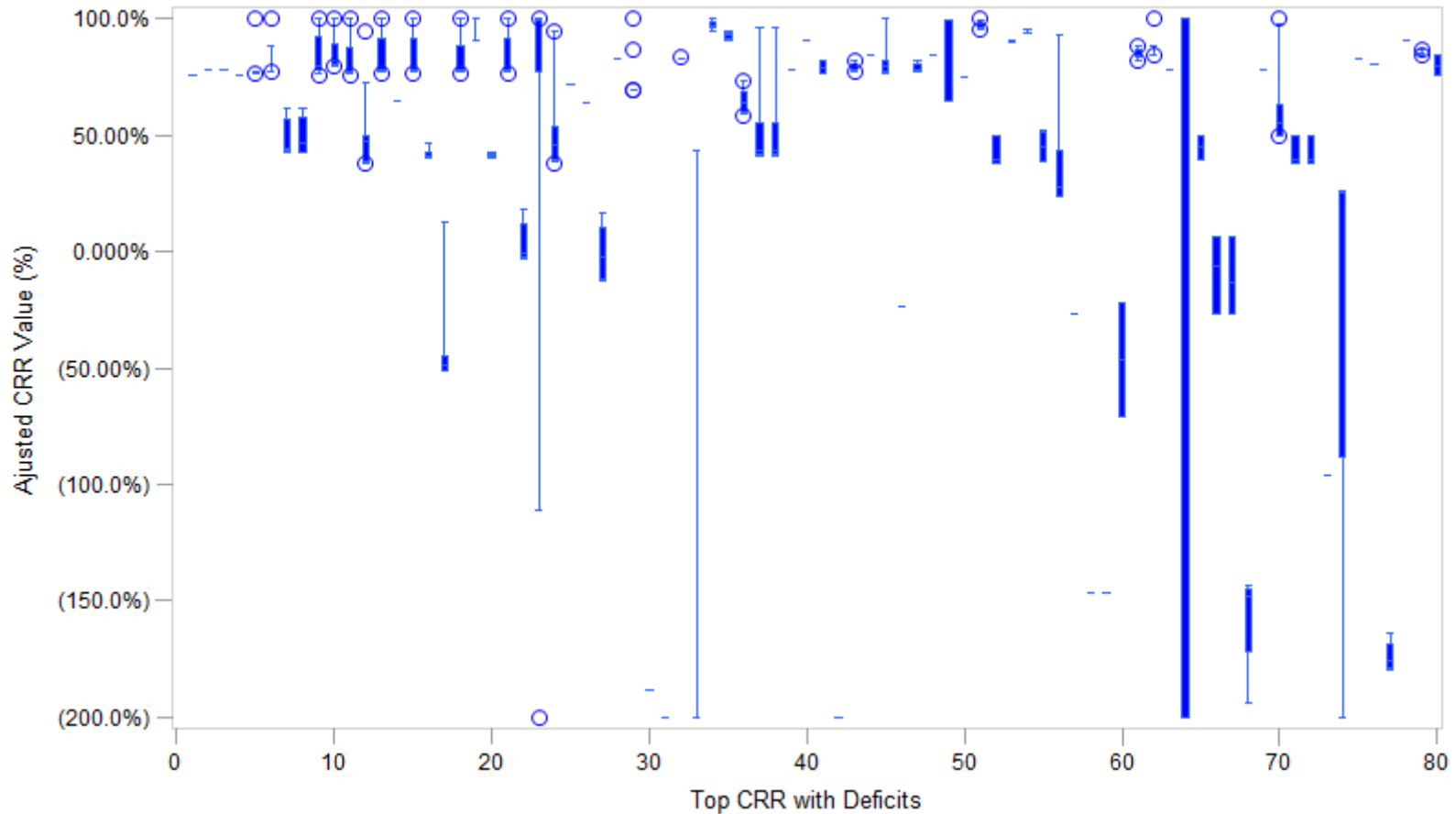
Deficit Offset



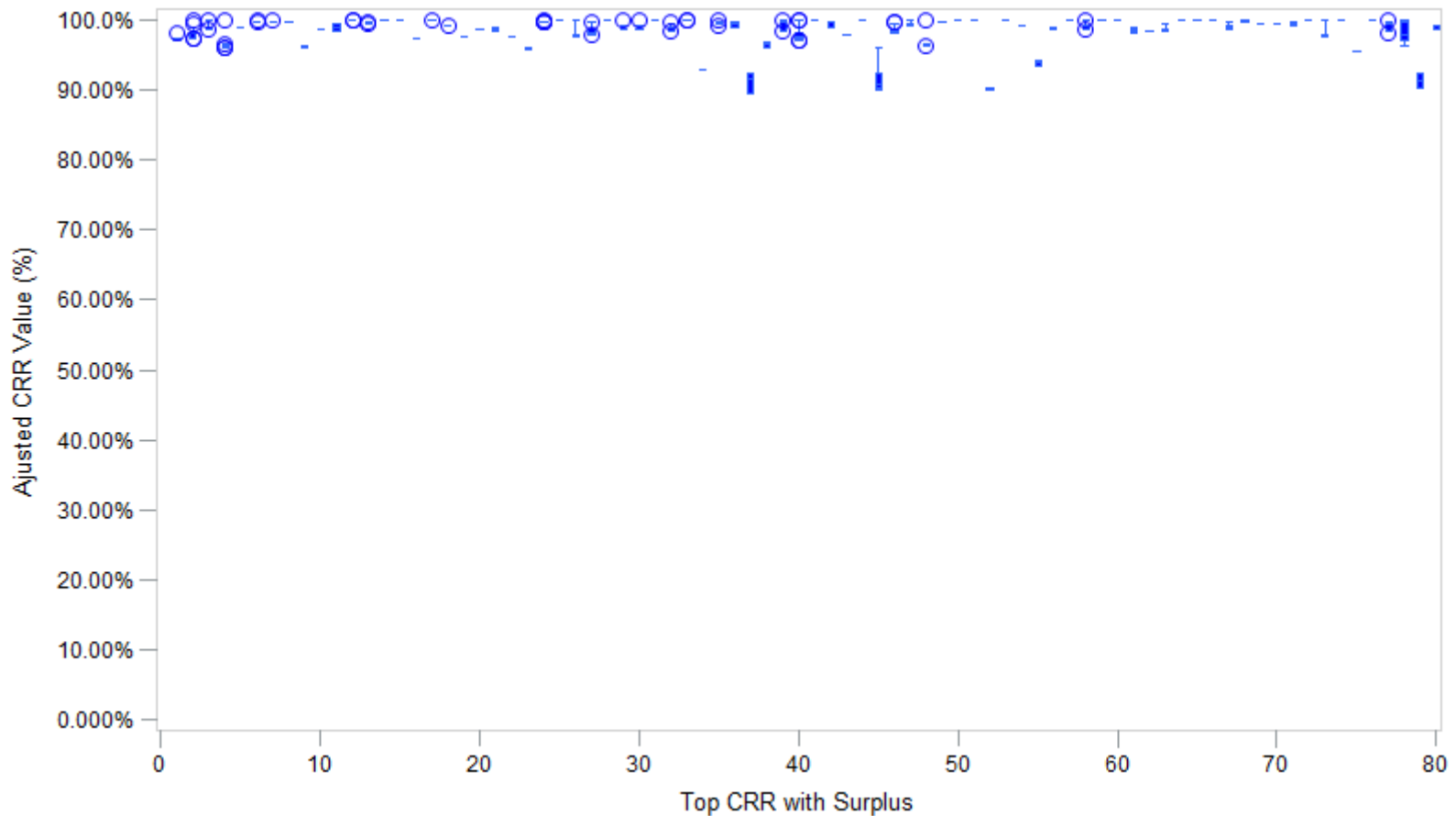
Surplus Offset



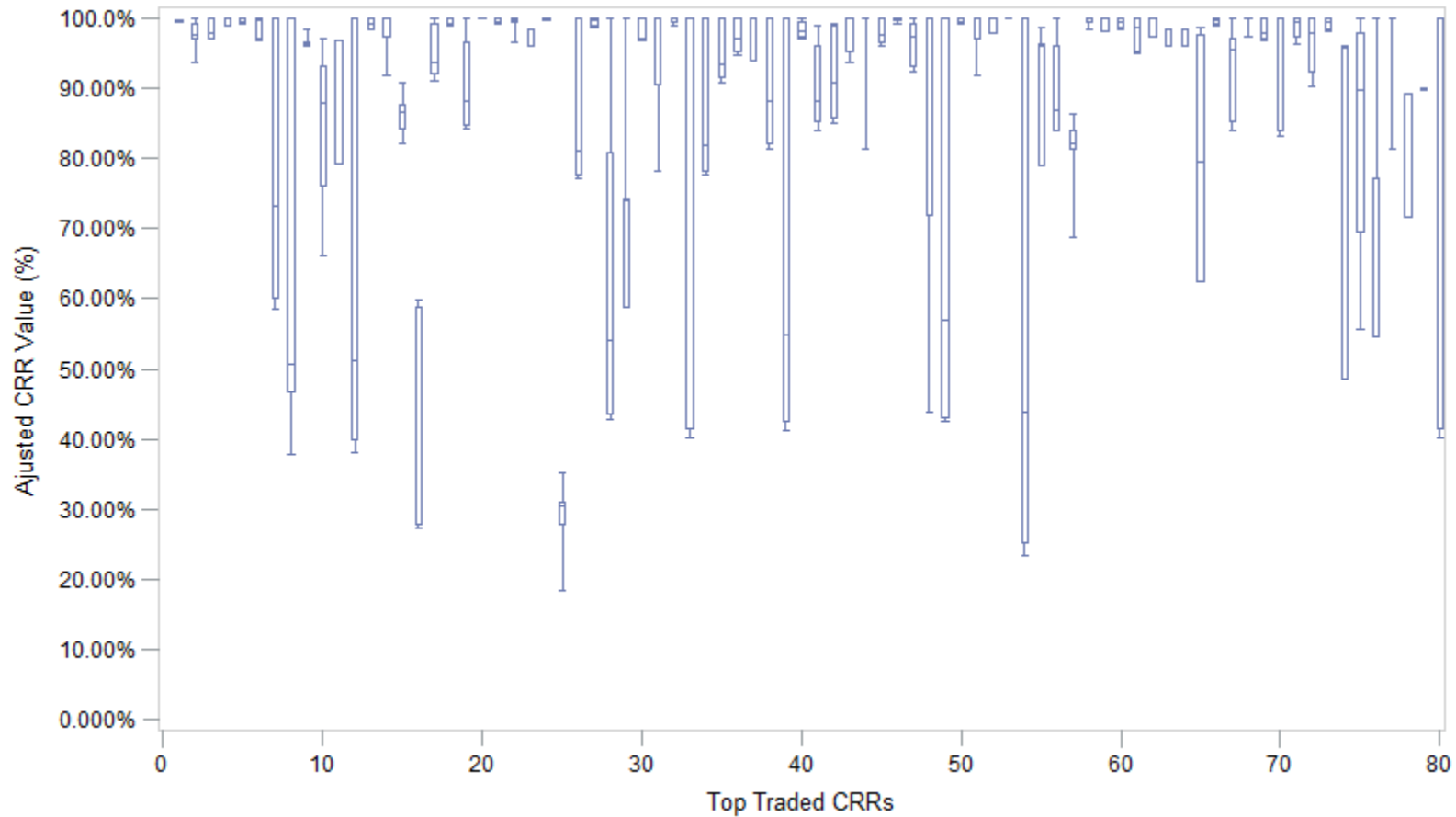
With the pro-rata funding based on net portfolio impact, CRRs with the same definition observed different level of pro-rata adjustment



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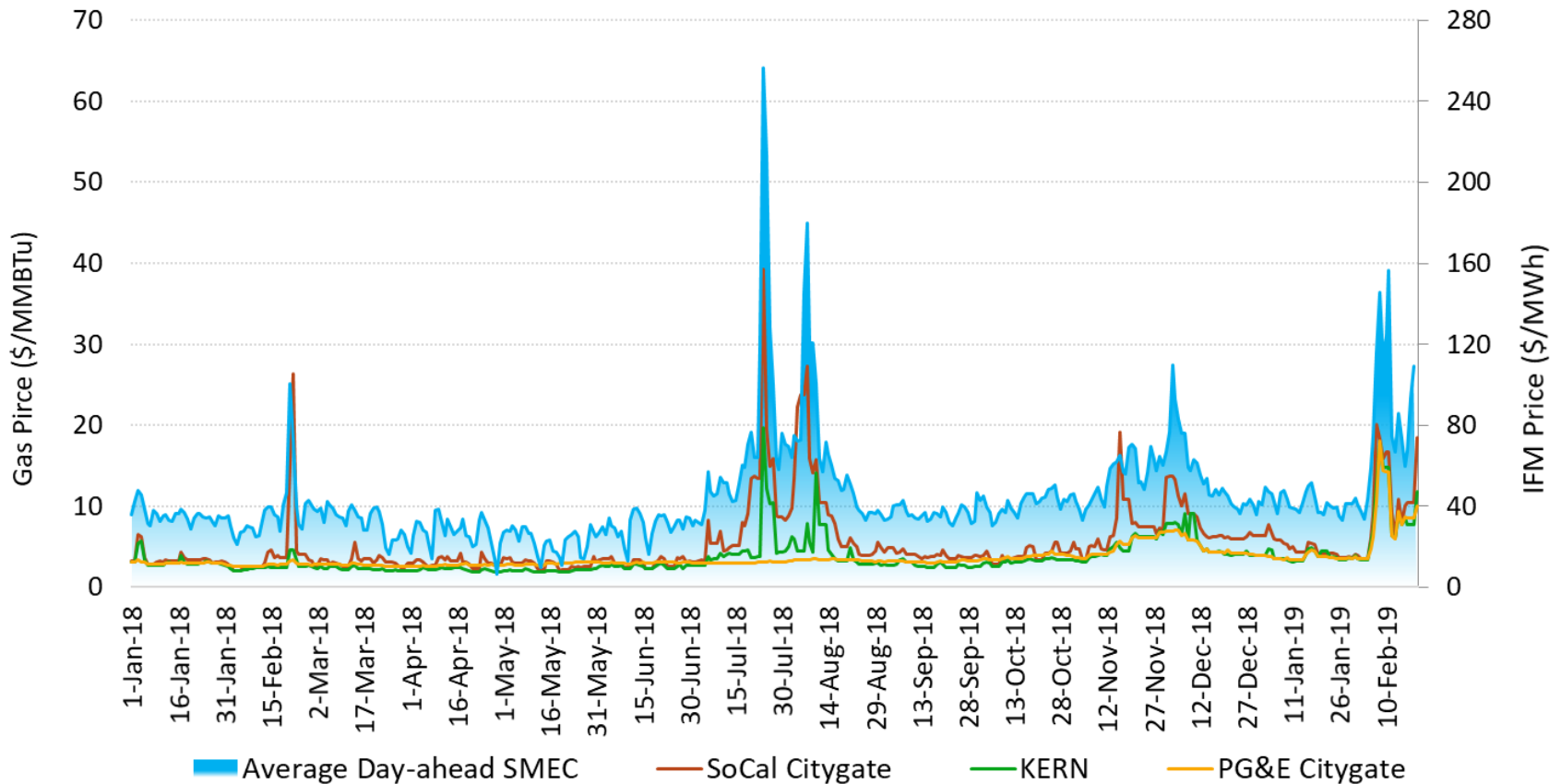


With the pro-rata funding based on net portfolio impact, CRRs with the same definition observed different level of pro-rata adjustment



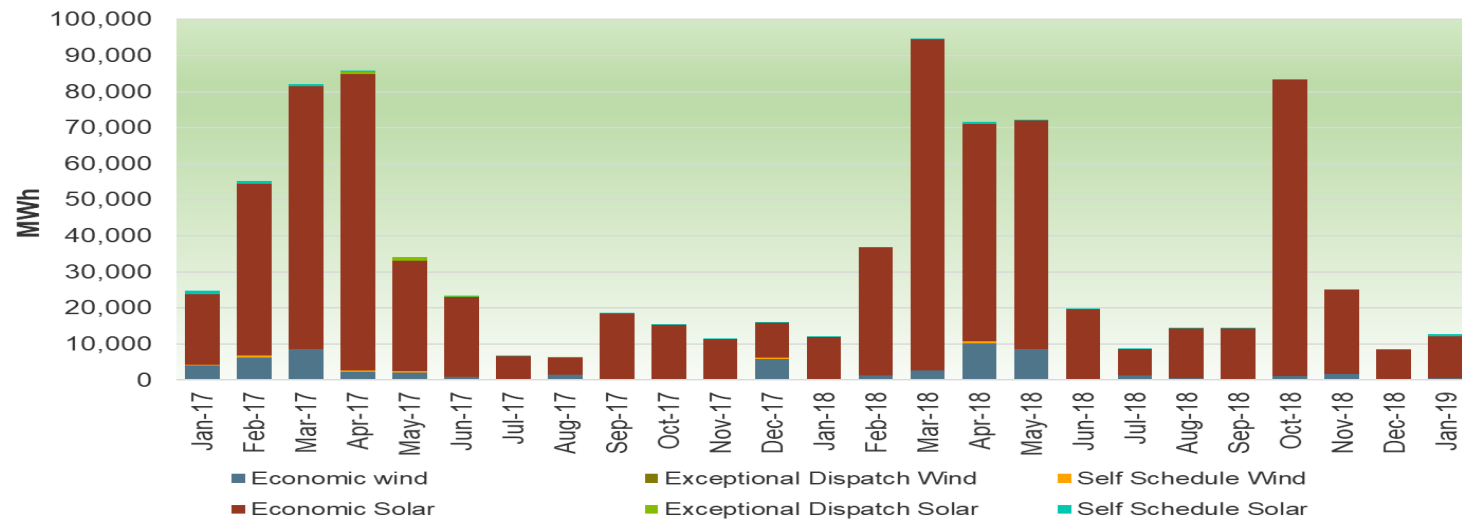
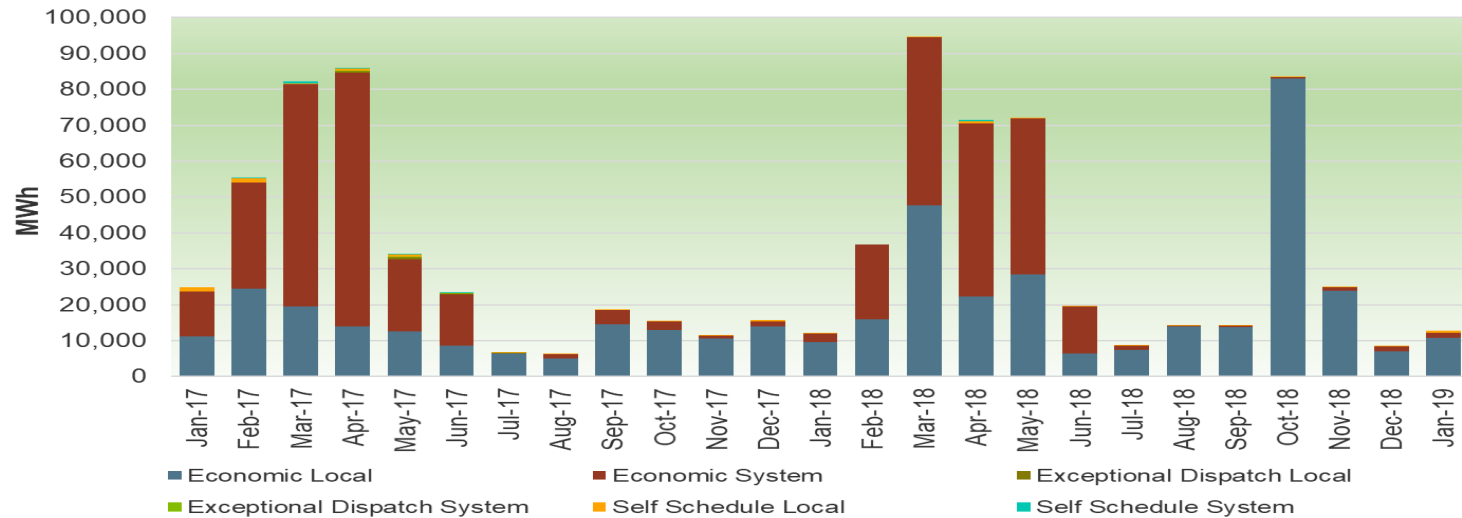


# Gas prices have been more volatile in recent months, driving higher energy prices in the CAISO markets

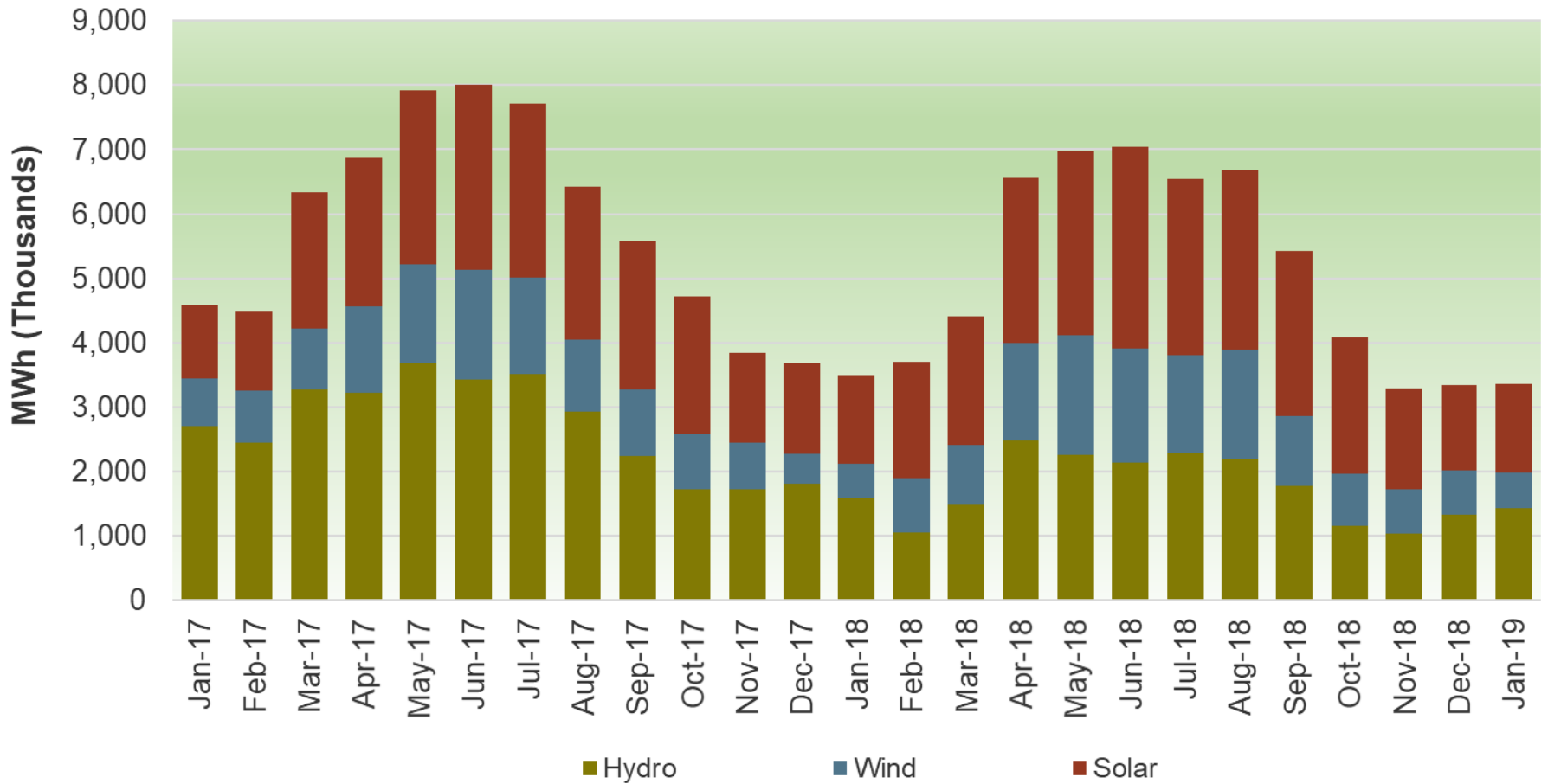


Gas nomograms were enforced in the day-ahead market of February 6-8 and 20 and they bound mildly.

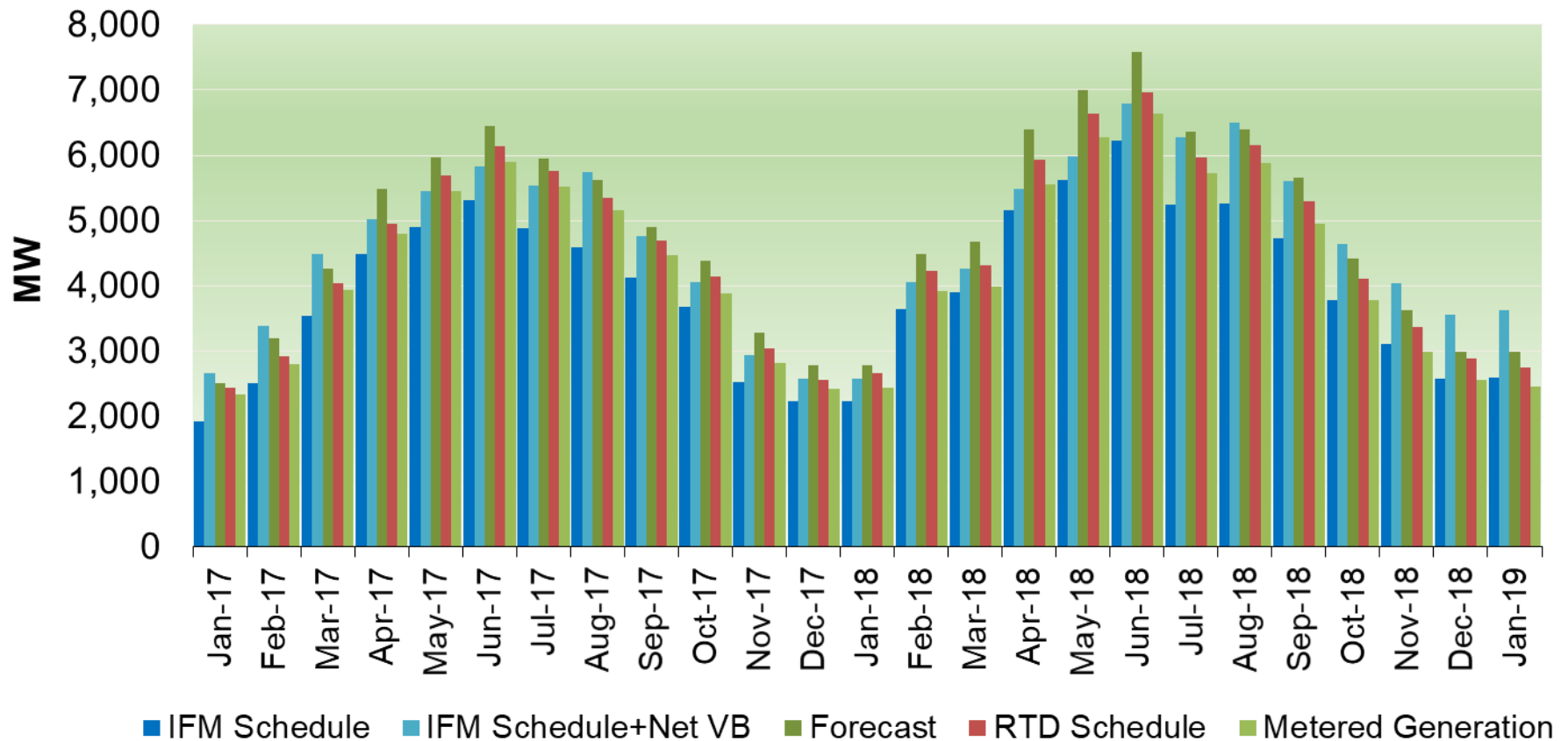
# RTD renewable (VERs) curtailment was low in December and January, mainly due to local congestion



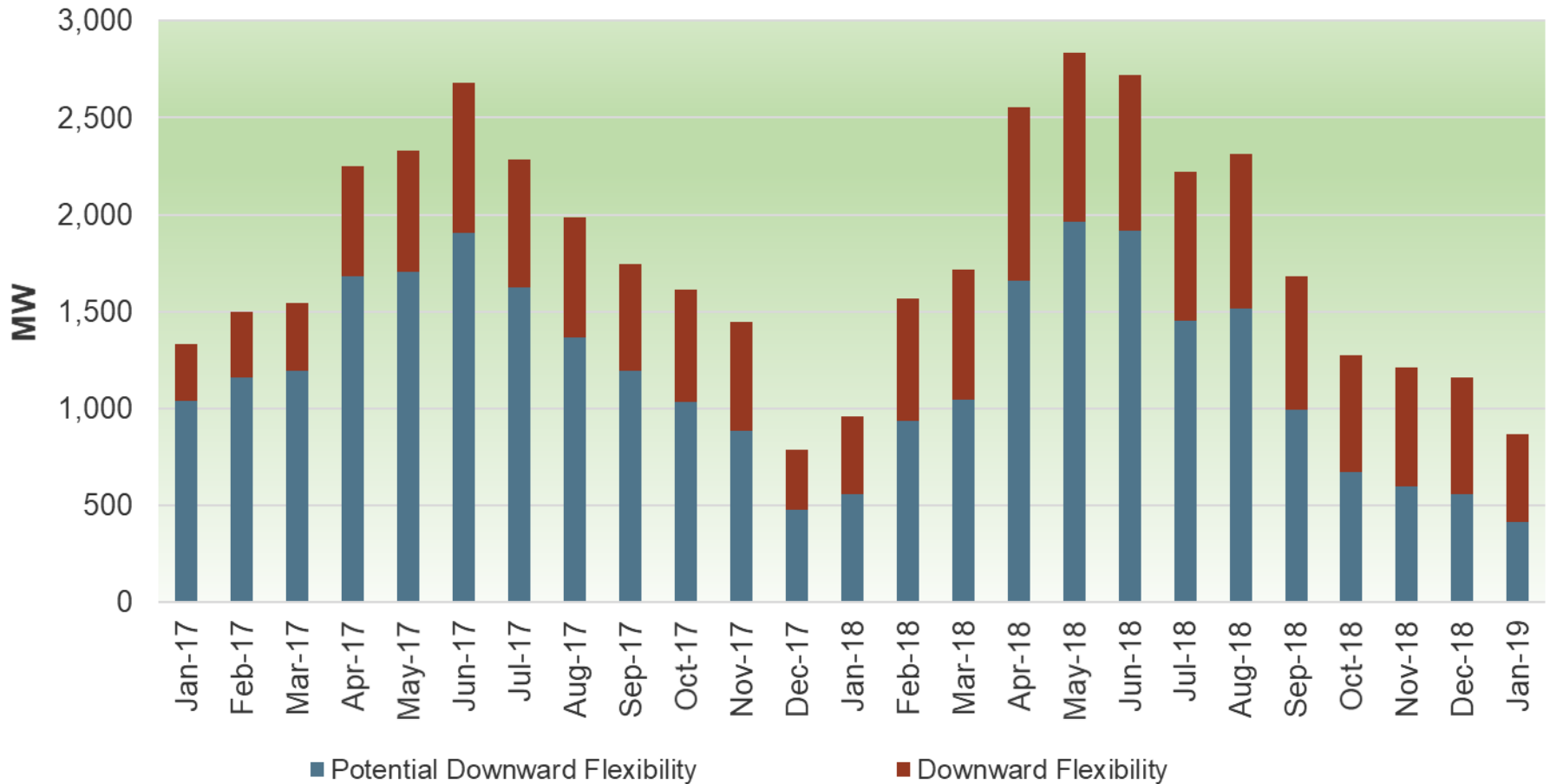
# Hydro production lower than previous years in December and January



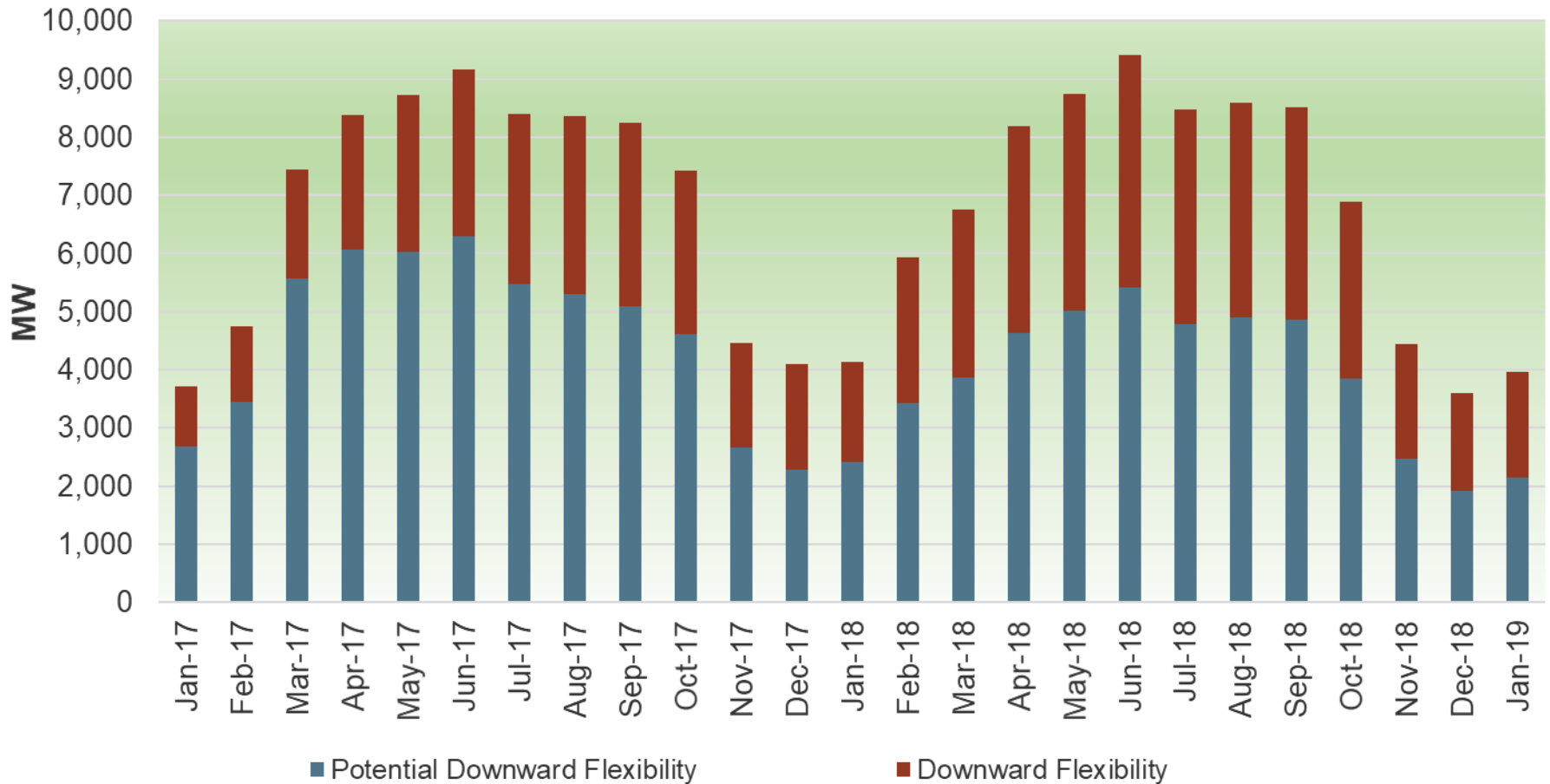
# ISO total monthly VERS schedules and forecasts compared to actuals



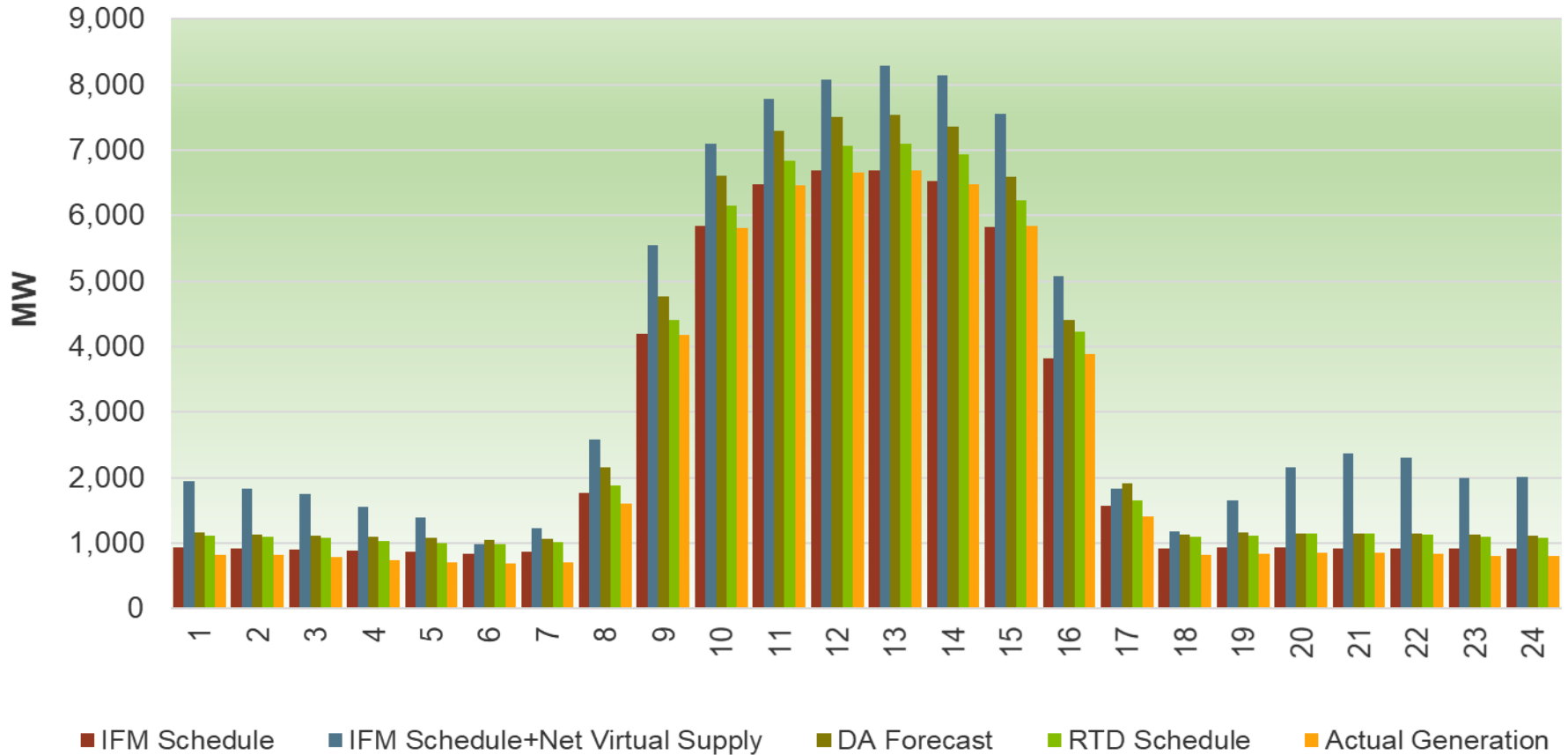
# Monthly wind (VERs) downward flexibility in FMM



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

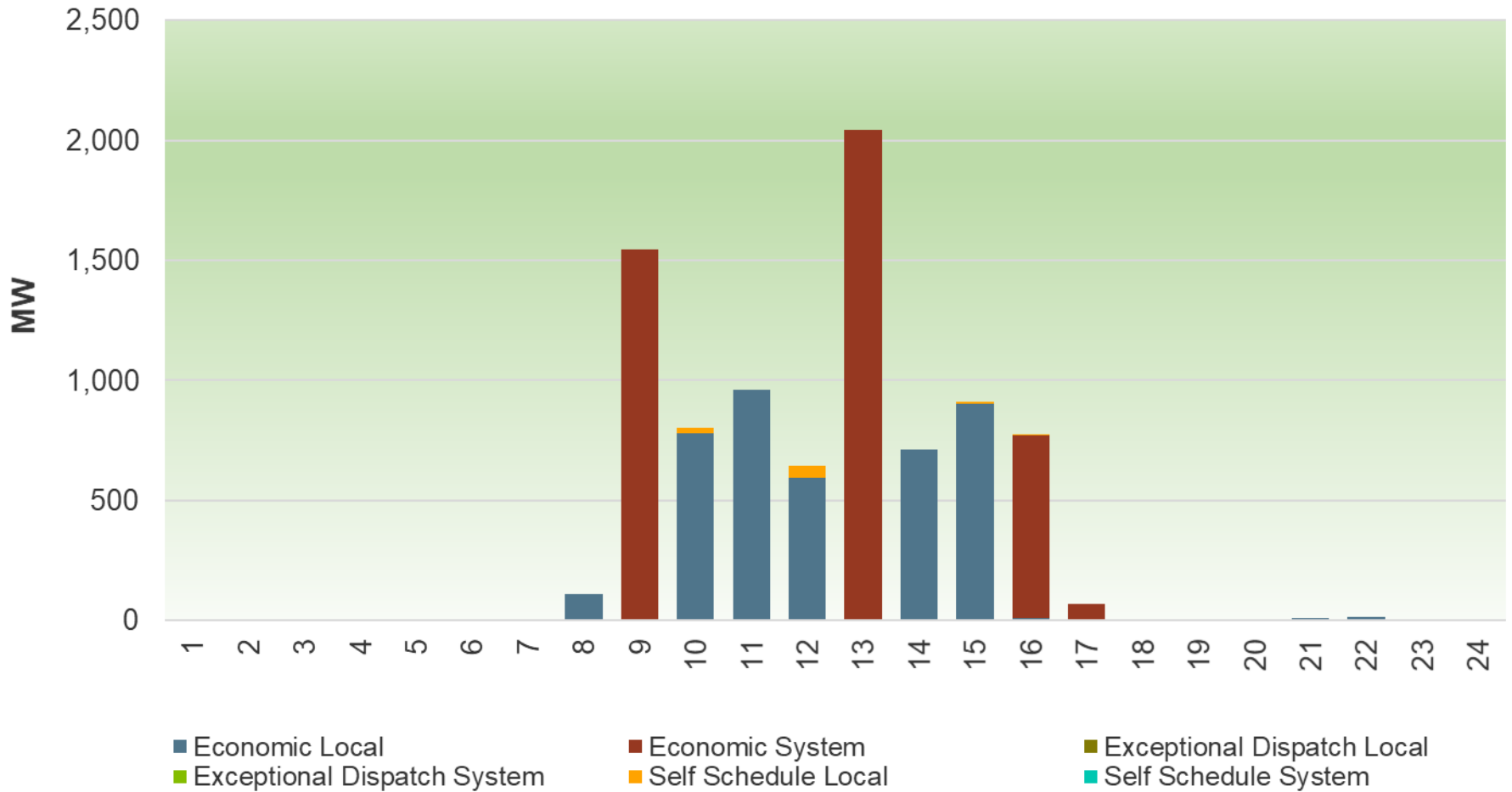


# Renewable (VERs) schedules including net virtual supply aligns with VER forecast in December and January



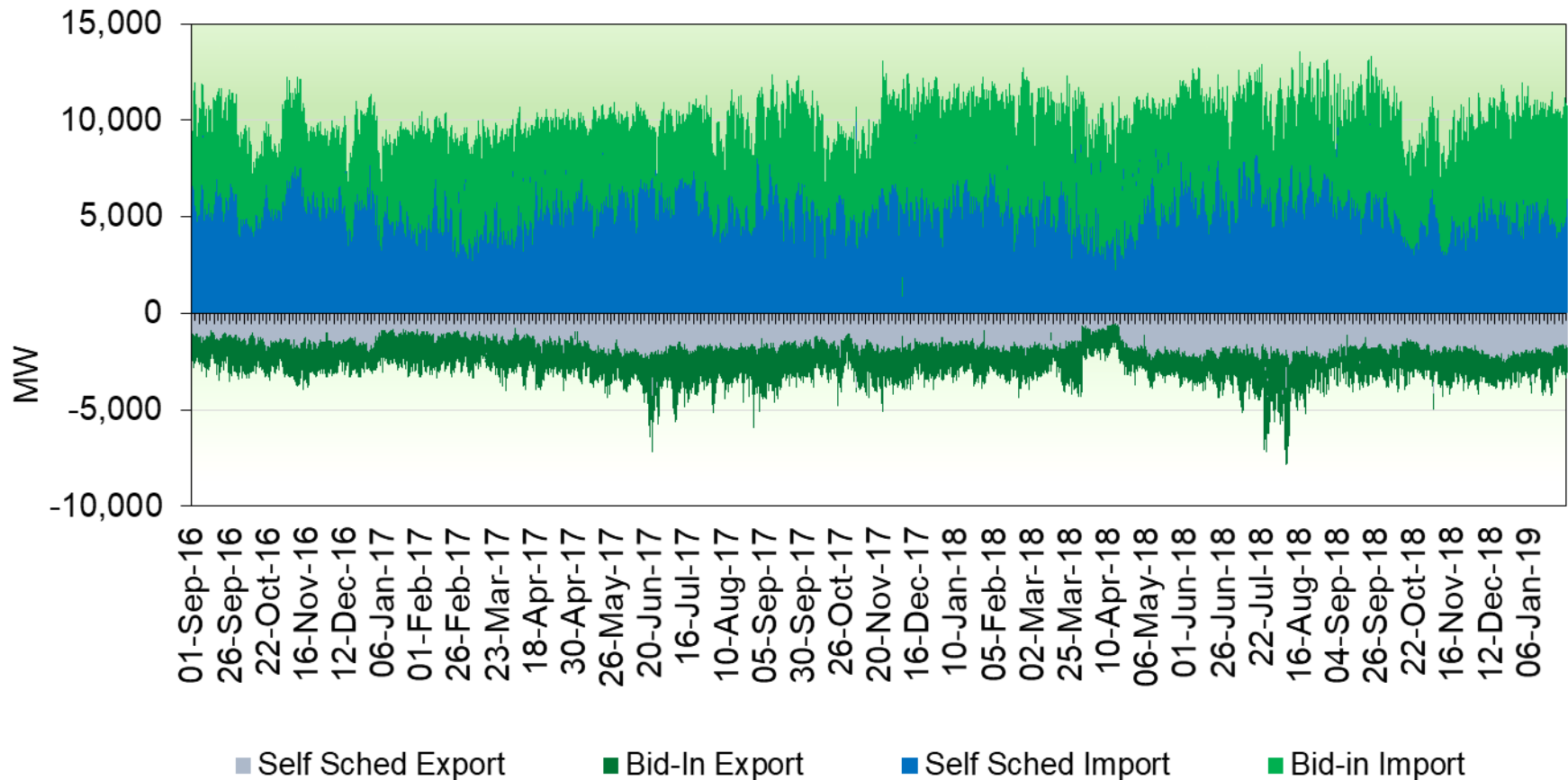
<http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=EFF75C2E-F28E-4087-B88B-8DFFAED828F8>

# Hourly distribution of maximum RTD renewable (VERS) curtailment in January

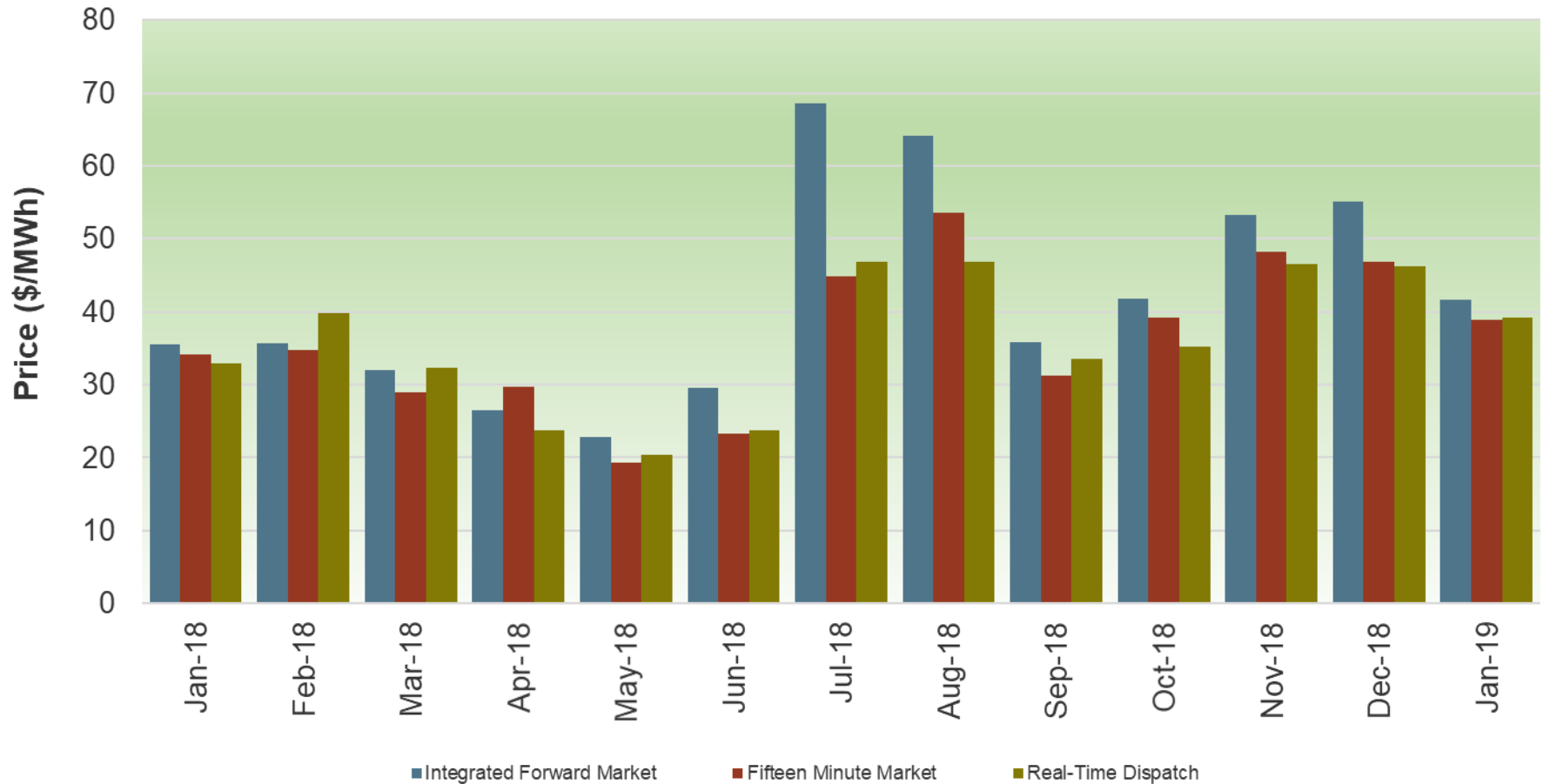




# Self scheduled interties in the real-time market stayed high

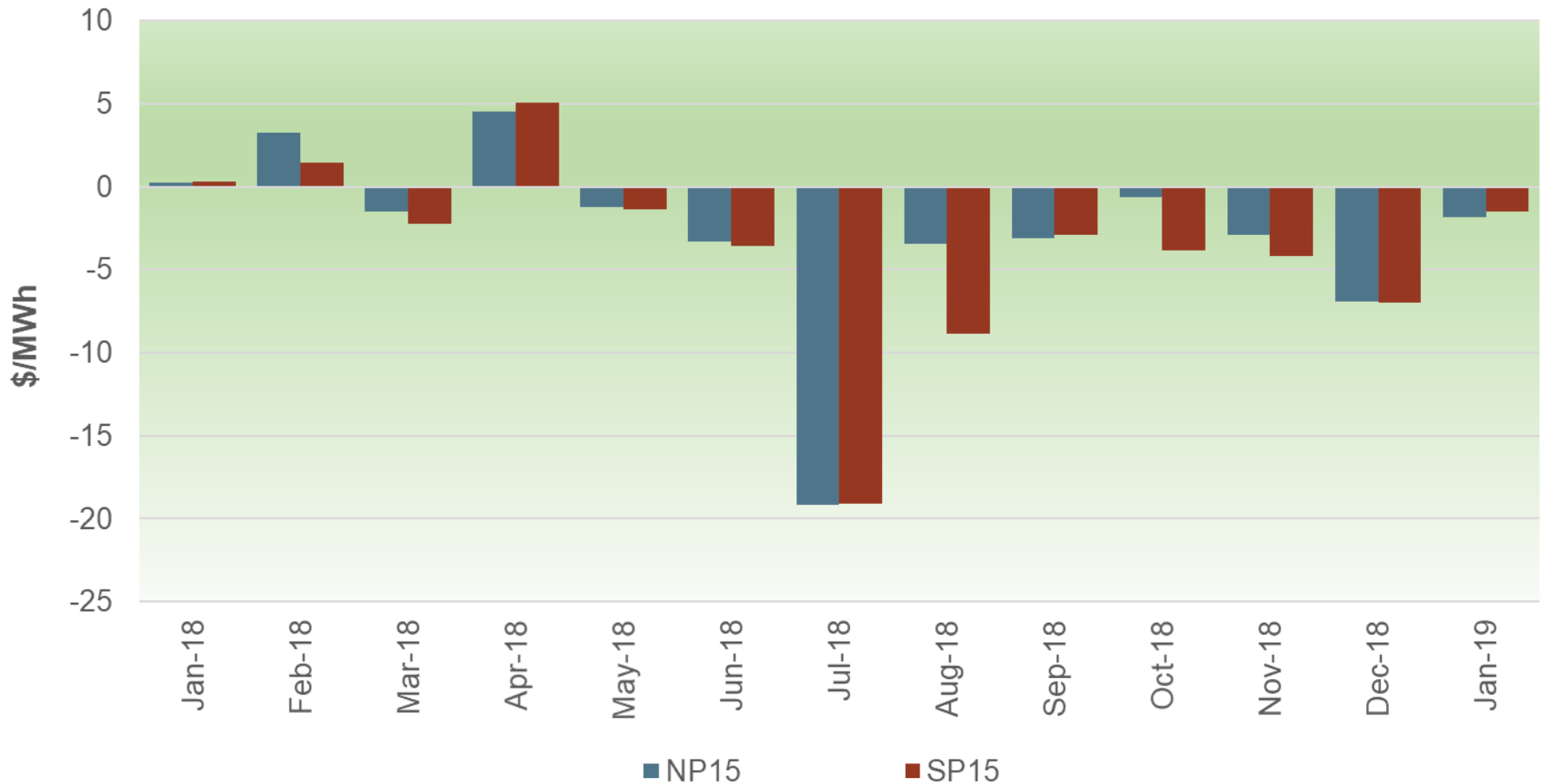


# Good price convergence in January

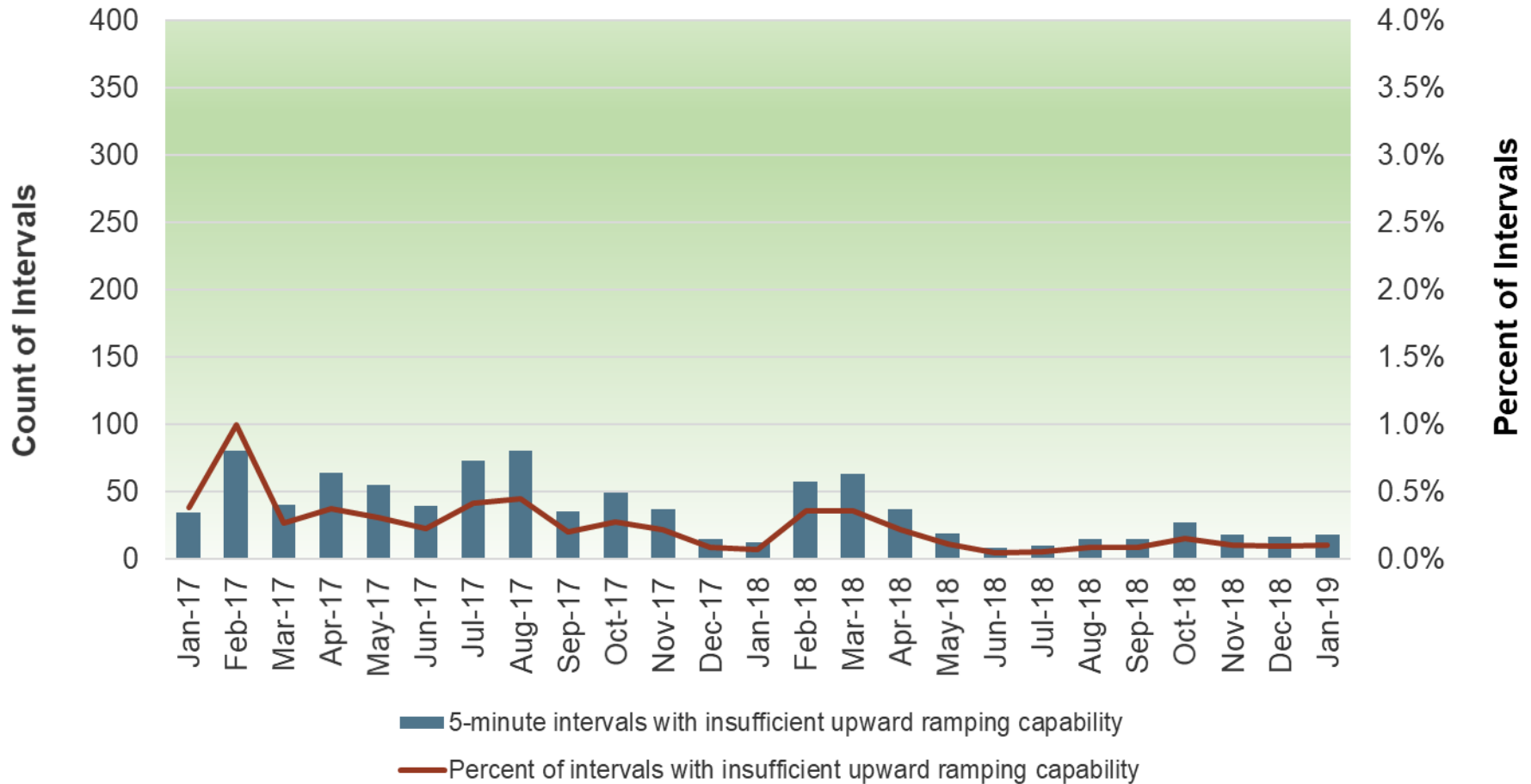


Note: Metric Based on System Marginal Energy Component (SMEC)

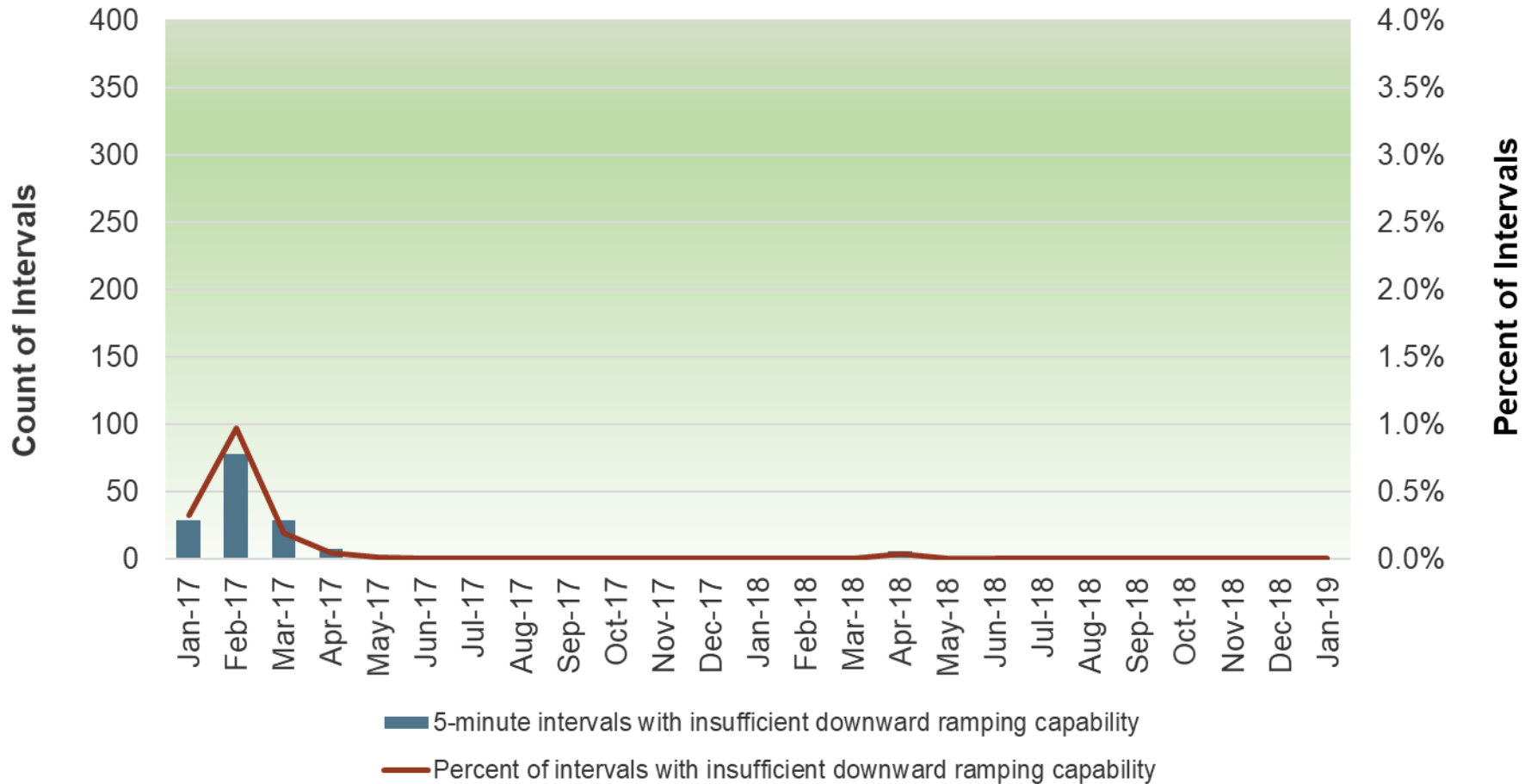
# RT prices lower than DA prices for both NP15 and SP15 in December and January



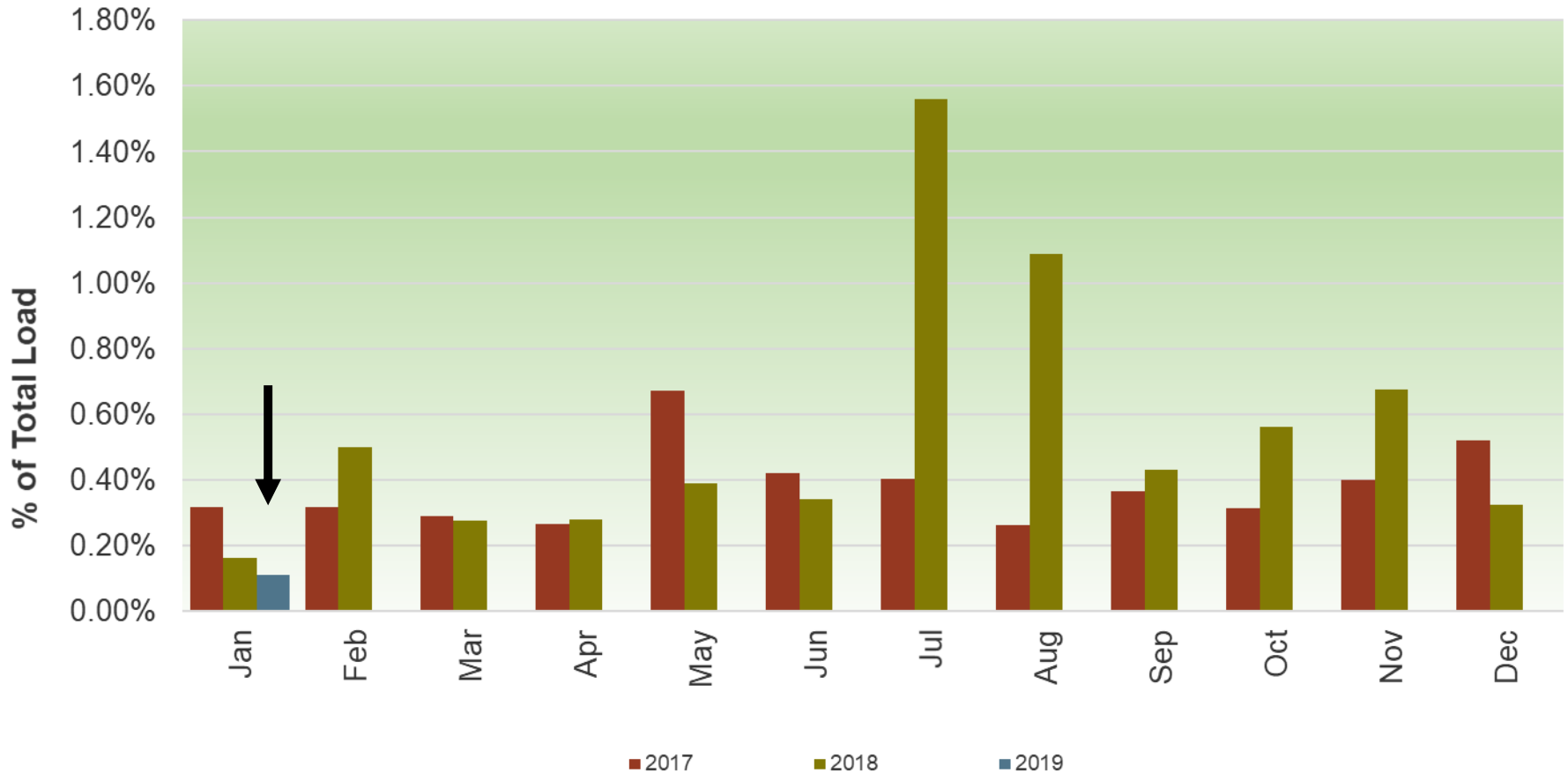
# Insufficient upward ramping capacity in ISO real-time remained low in December and January



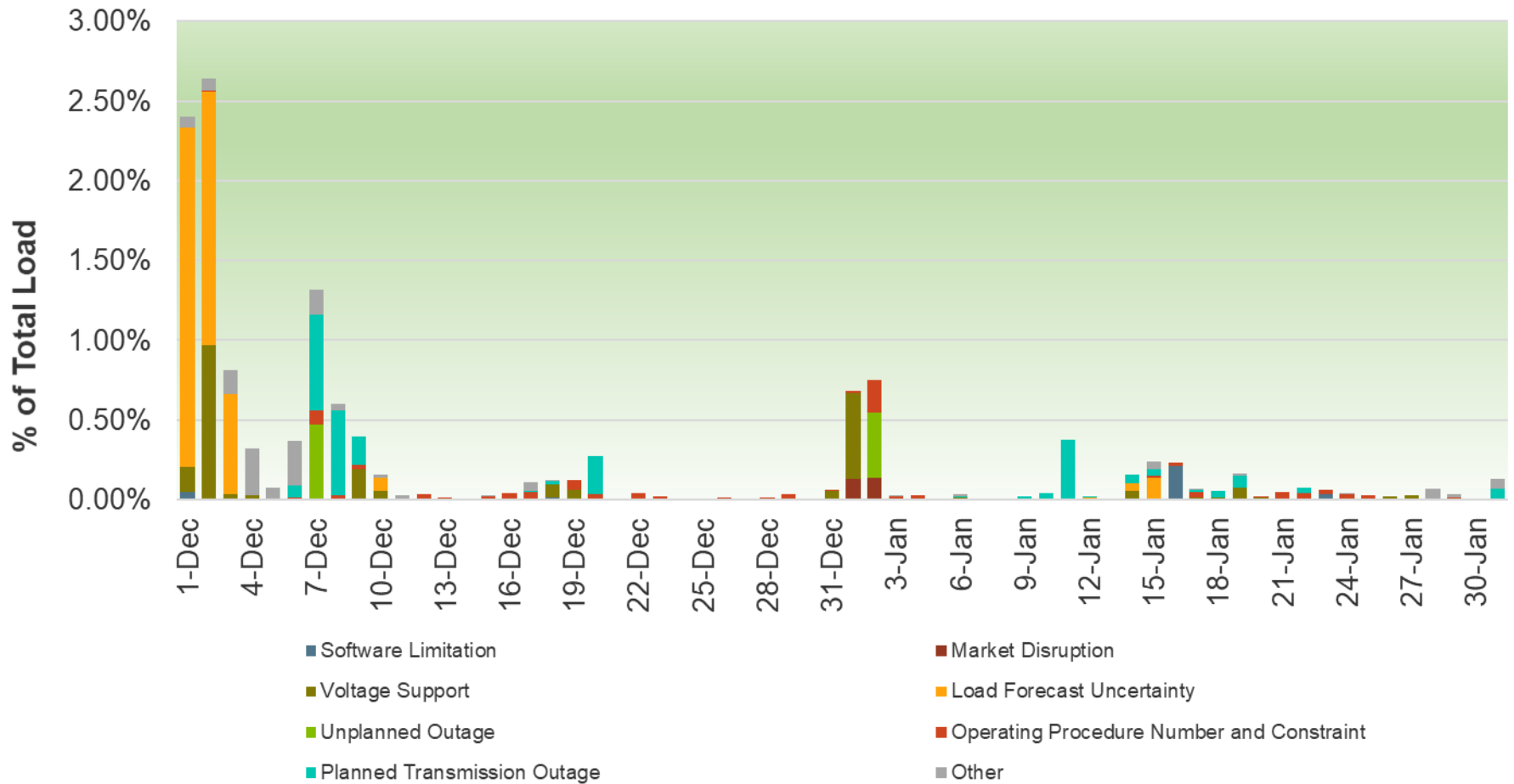
# Insufficient downward ramping capacity in real-time continued to be low in December and January



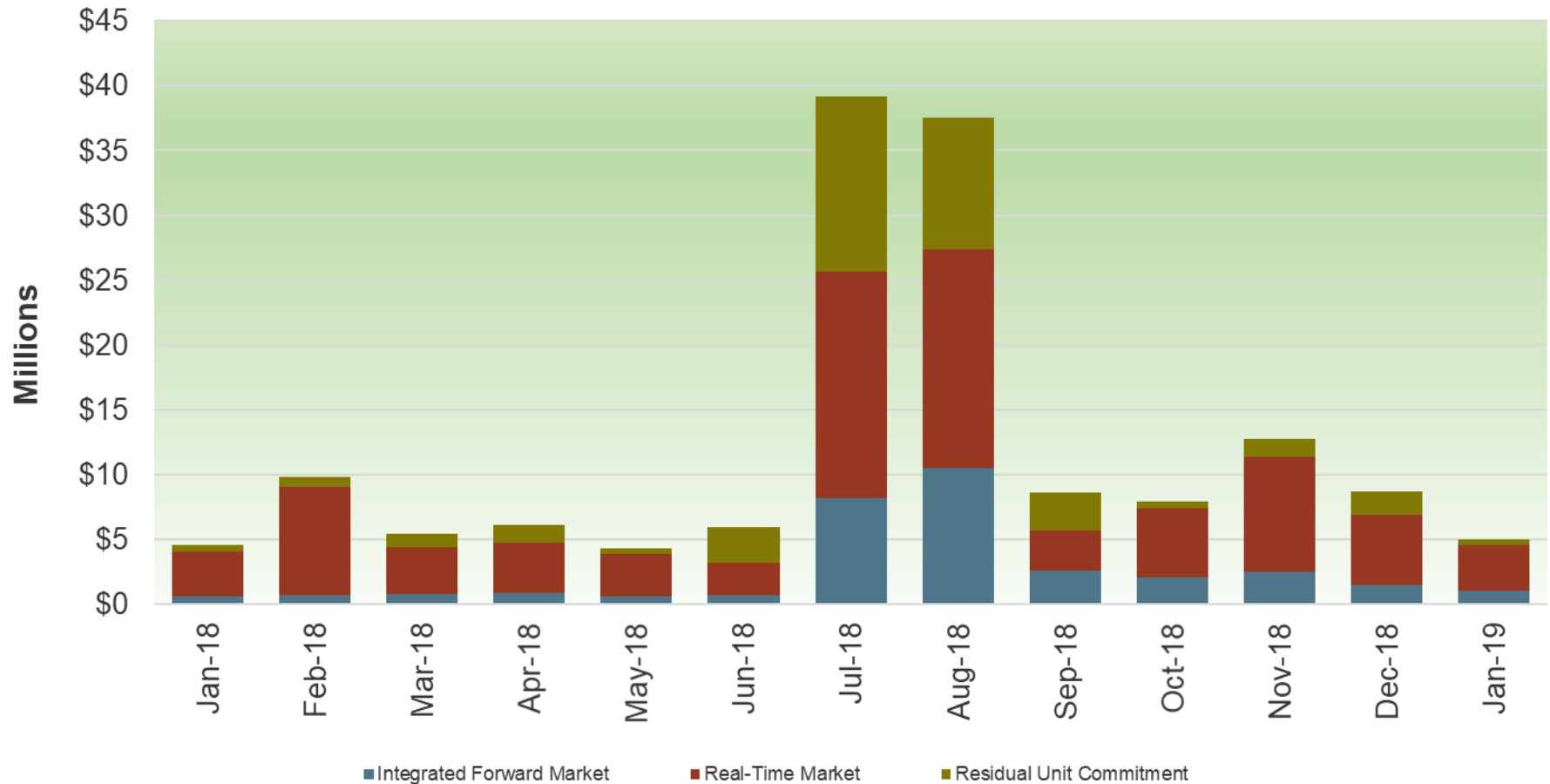
# Exceptional dispatch volume in the ISO area dropped in January.



# Exceptional dispatches declined since early December.

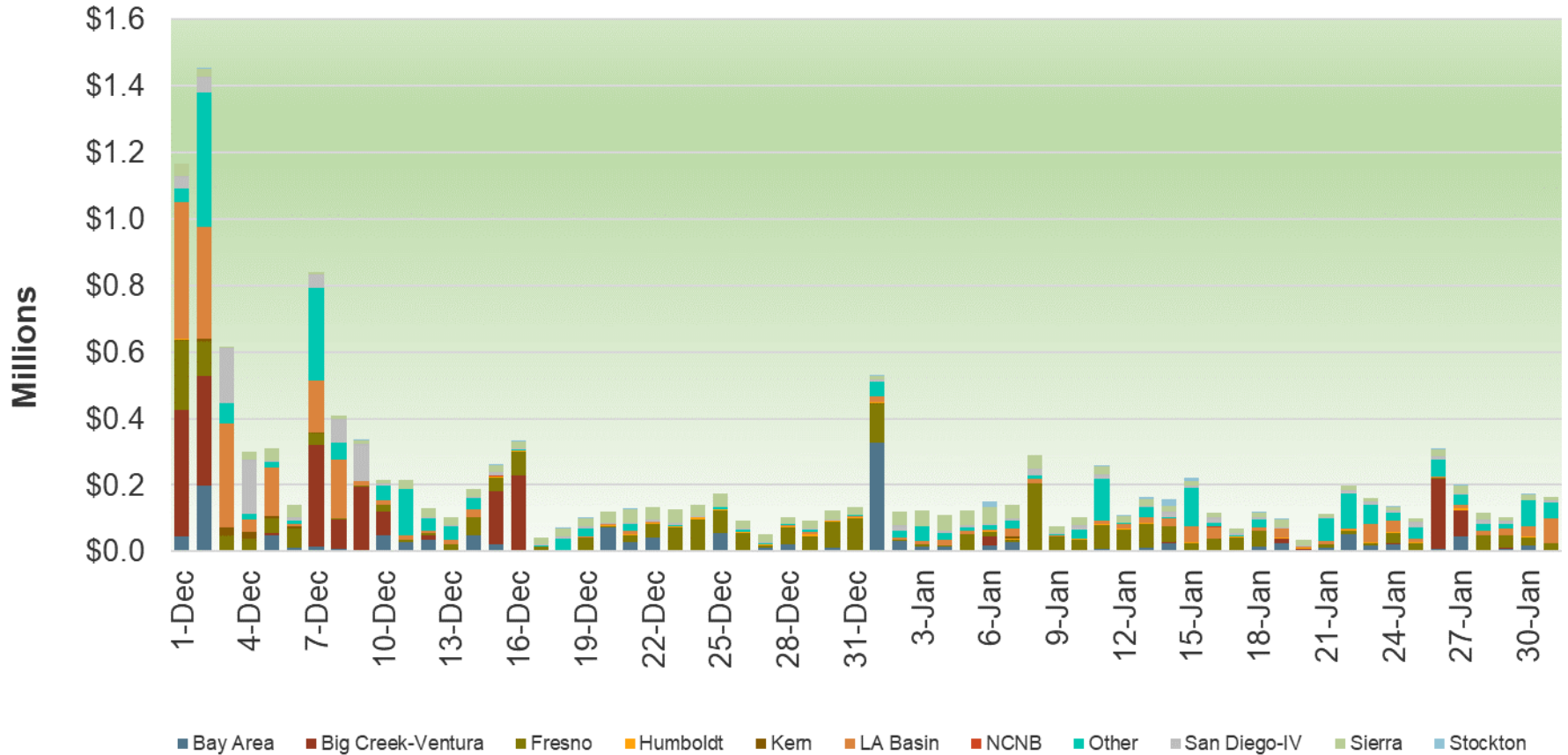


# Bid cost recovery trended downward since last November.

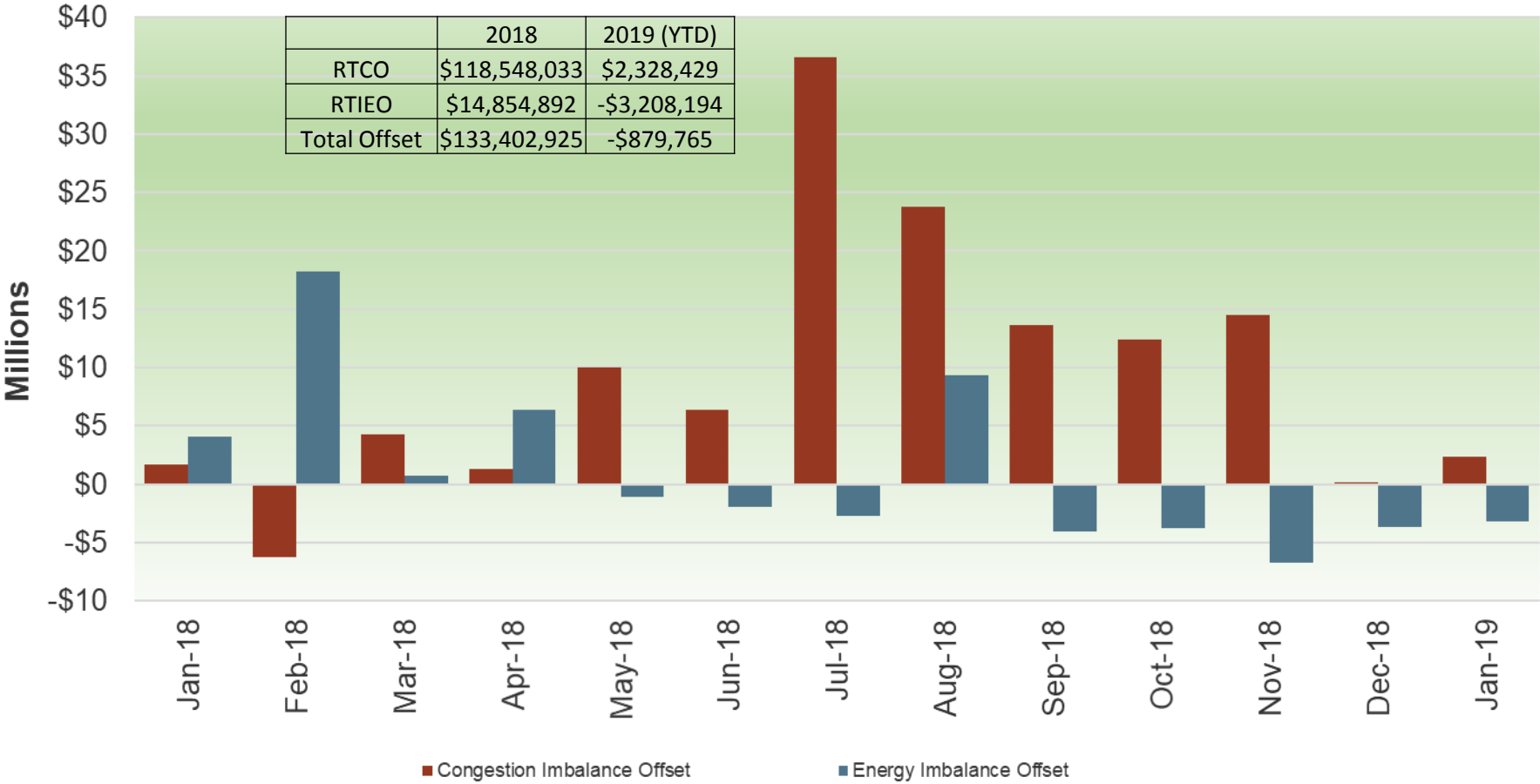




# Bid cost recovery (BCR) by Local Capacity Requirement area



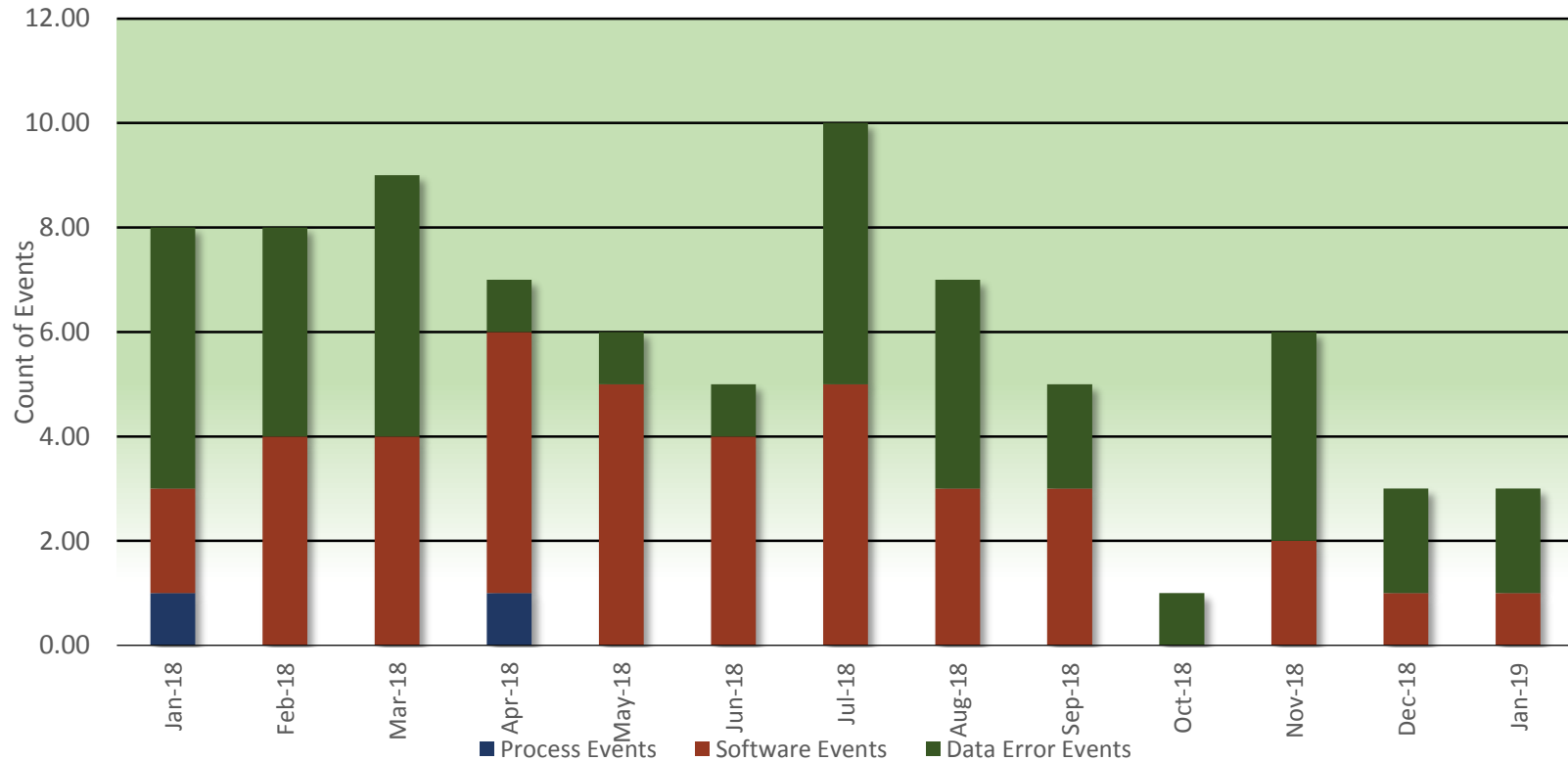
ISO area RTCO was low in December and January while RTIEO was still negative.



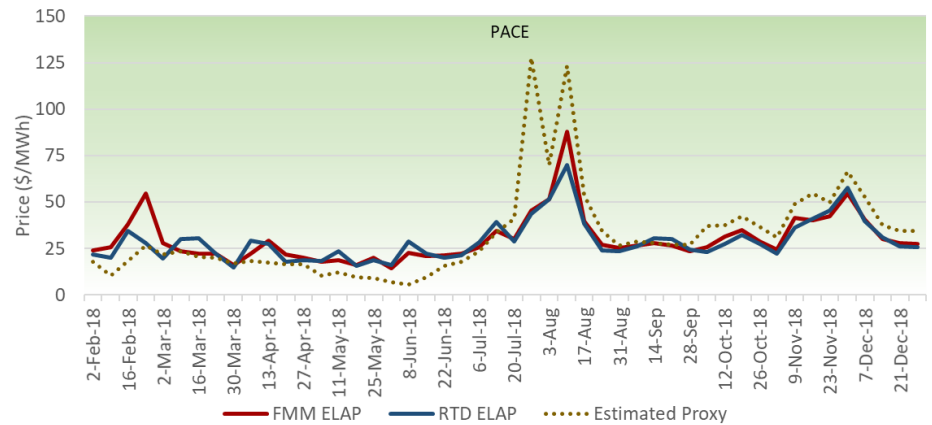
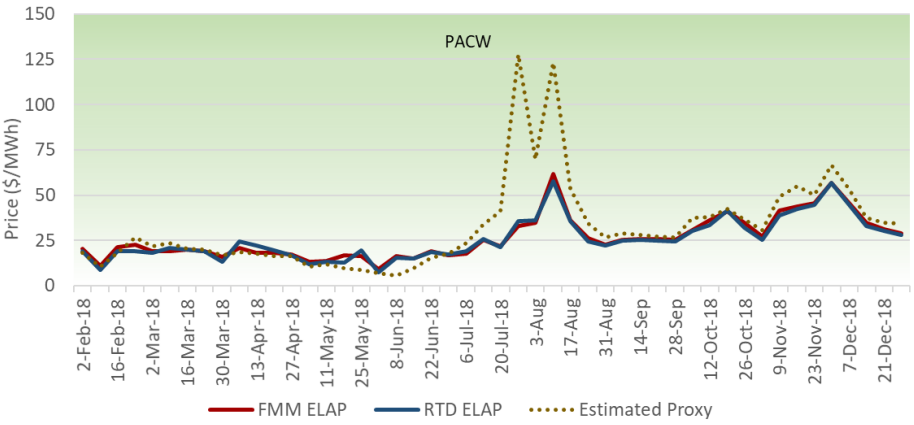
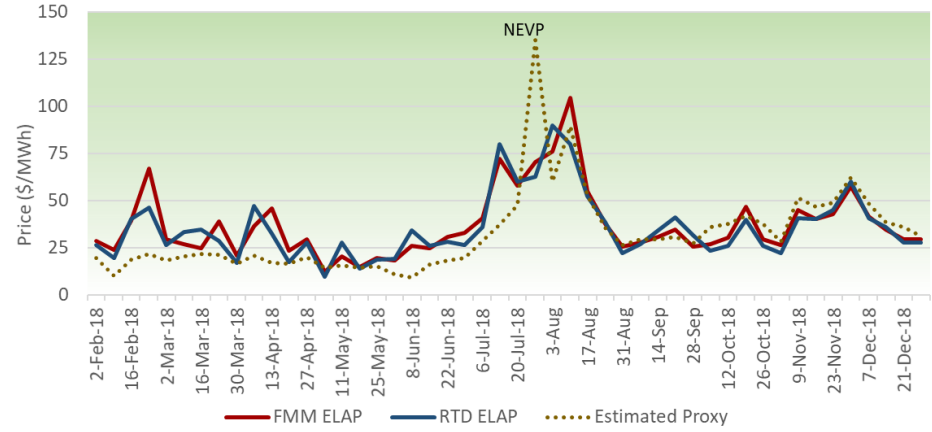
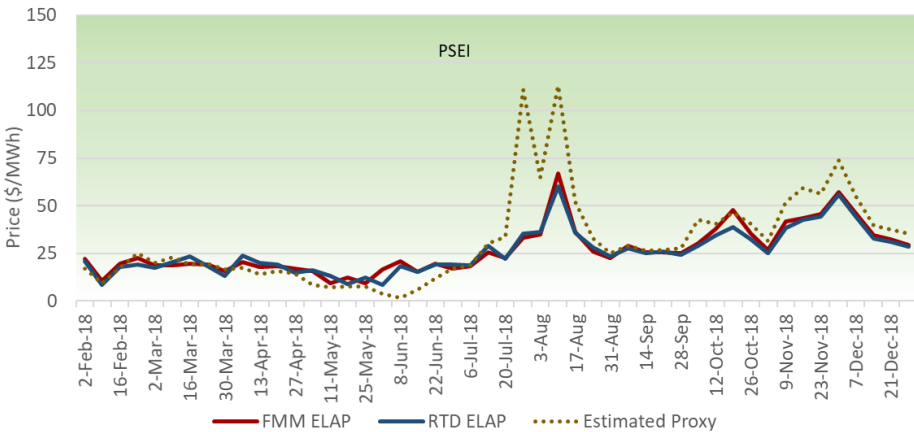
# CAISO price correction events remain low in December and January



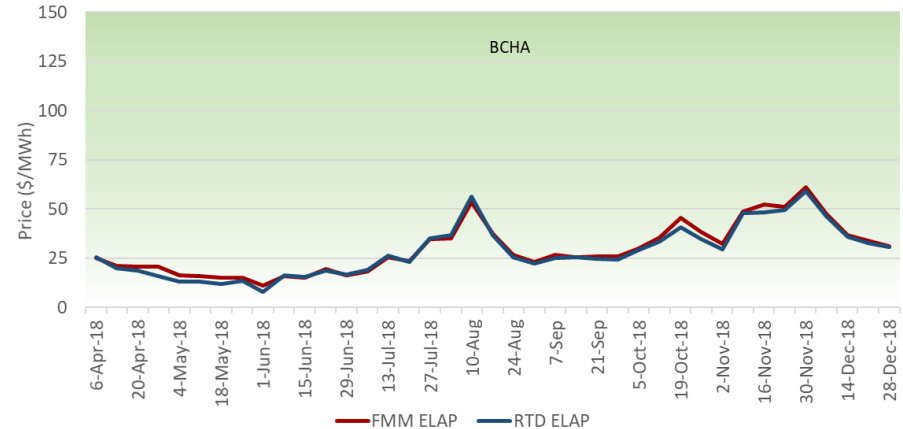
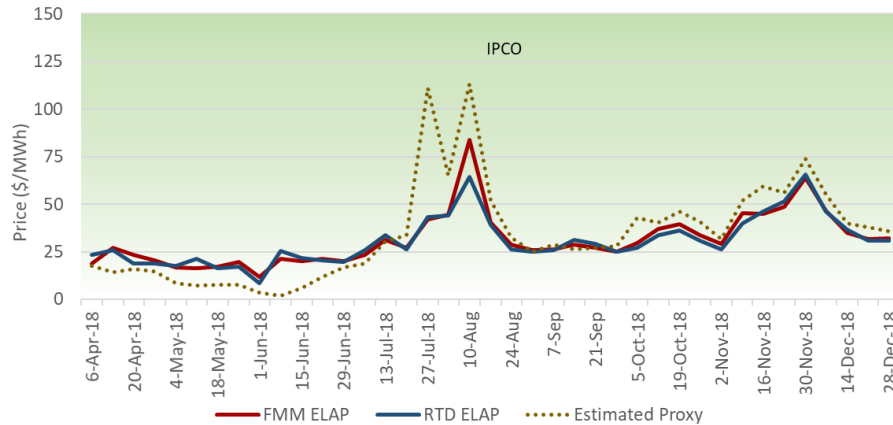
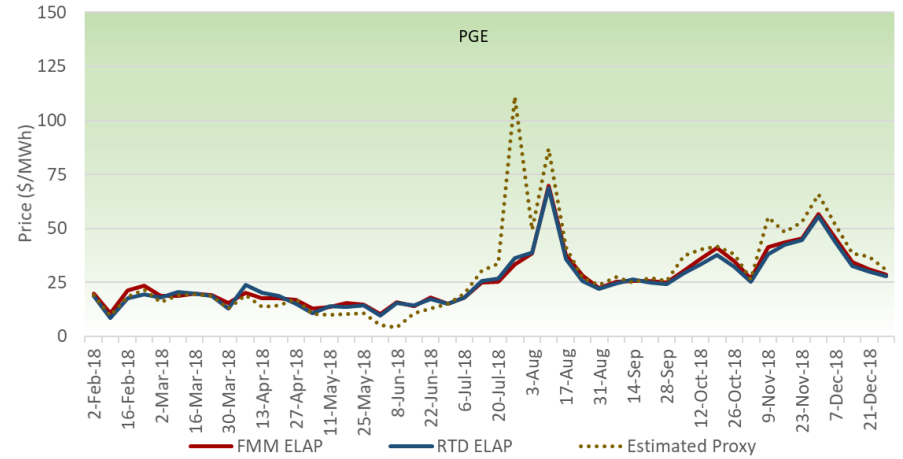
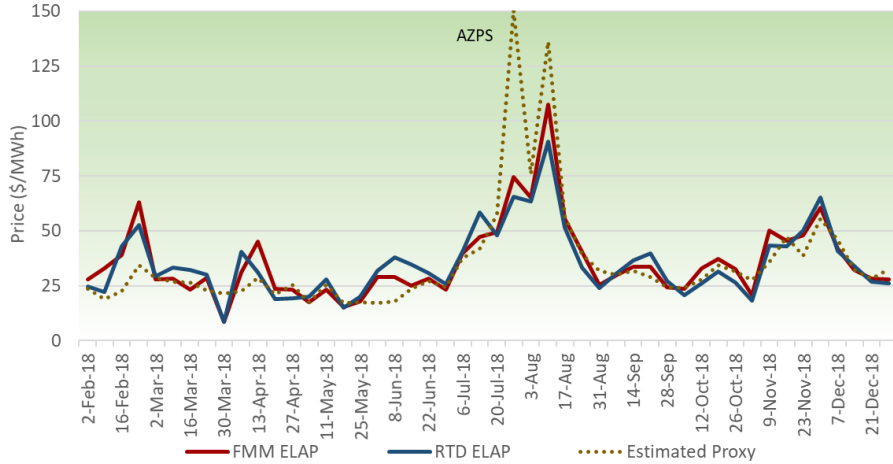
# EIM-Related price correction events remain low in December and January



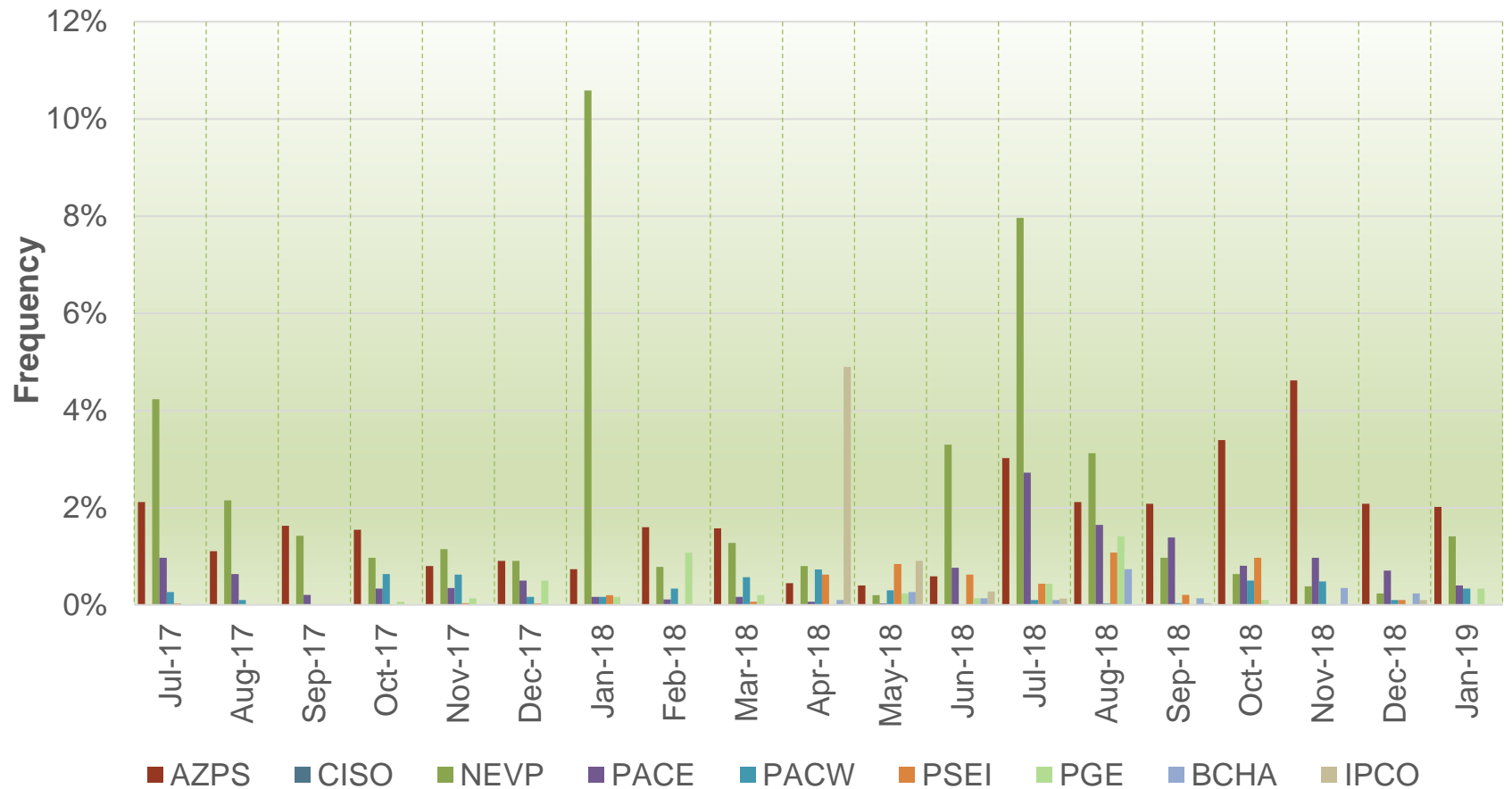
# EIM prices were generally tracking system wide conditions with higher gas prices



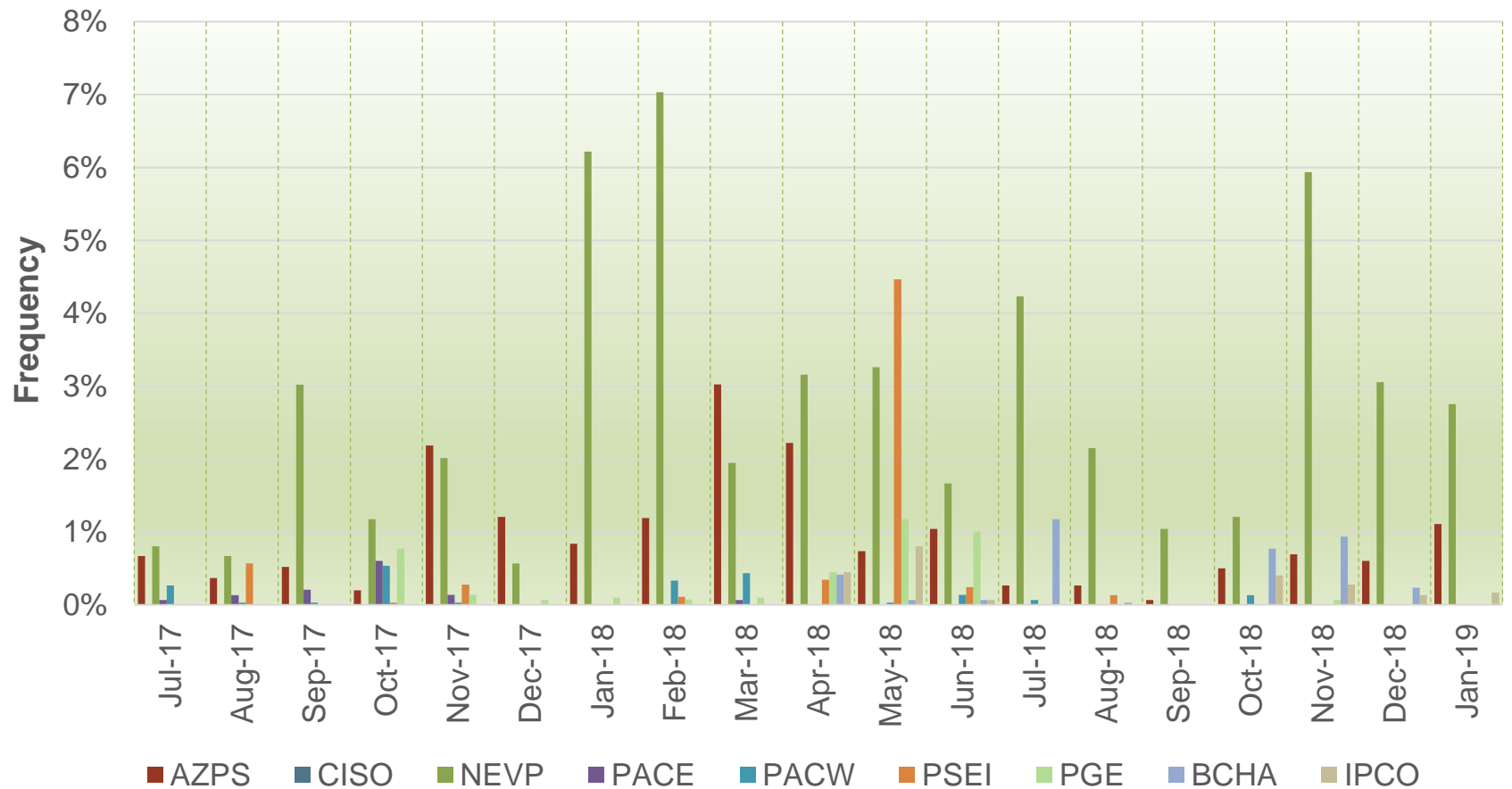
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# Flexible Ramp Up Sufficiency Test Results

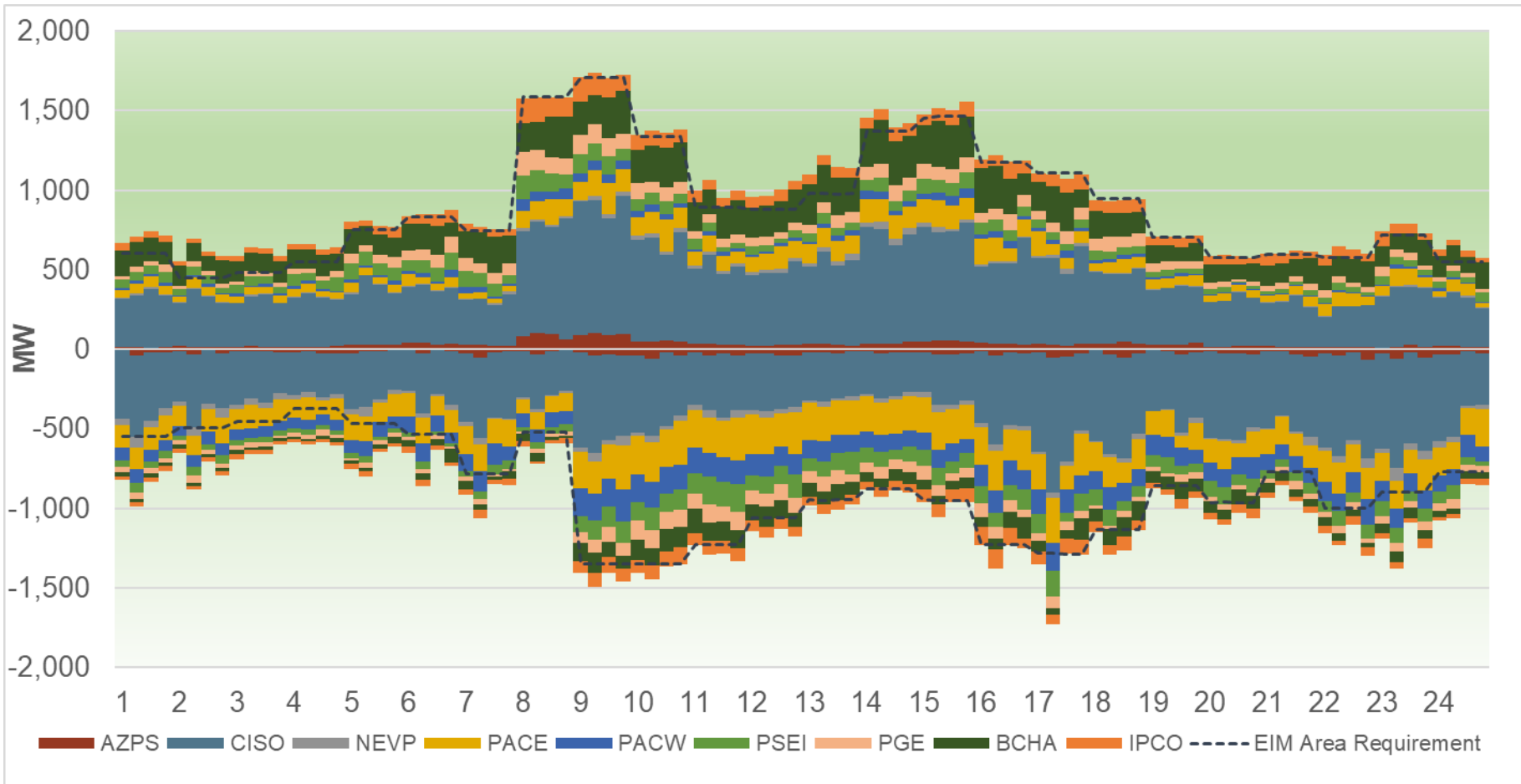


# Flexible Ramp Down Sufficiency Test Results

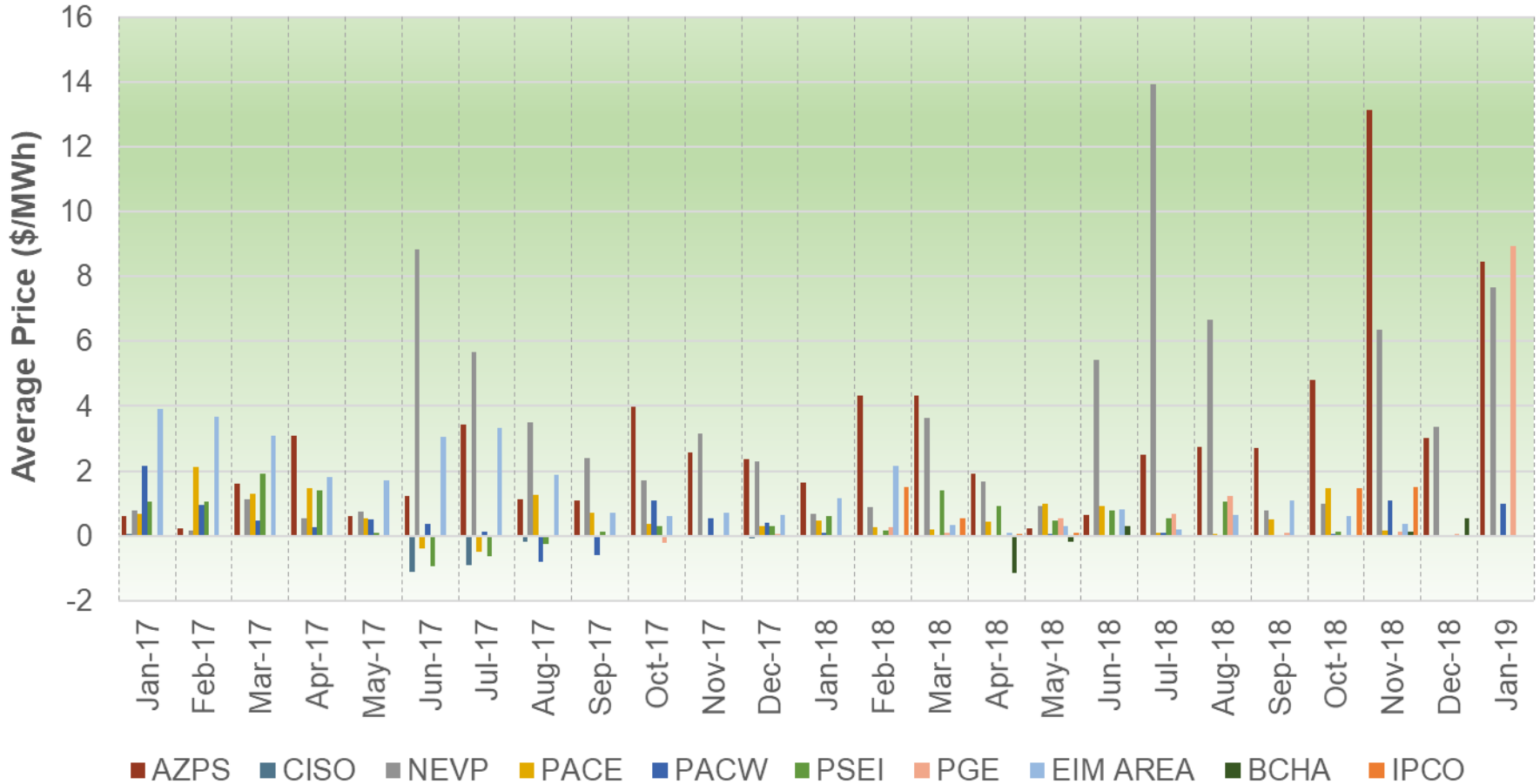




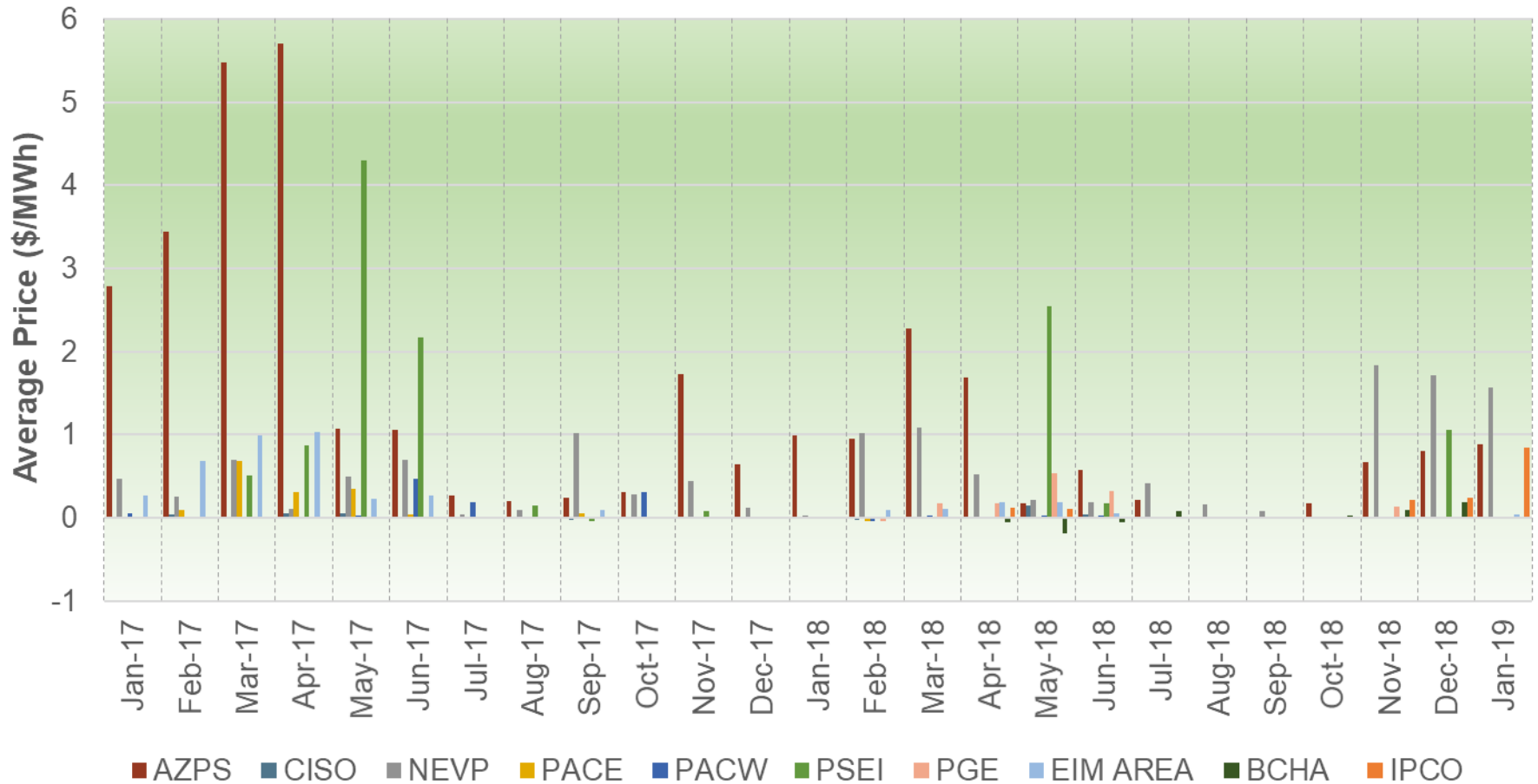
# Average Flexible Ramp Product Cleared Awards for each area with EIM Area Requirement - Dec 2018 to Jan 2019



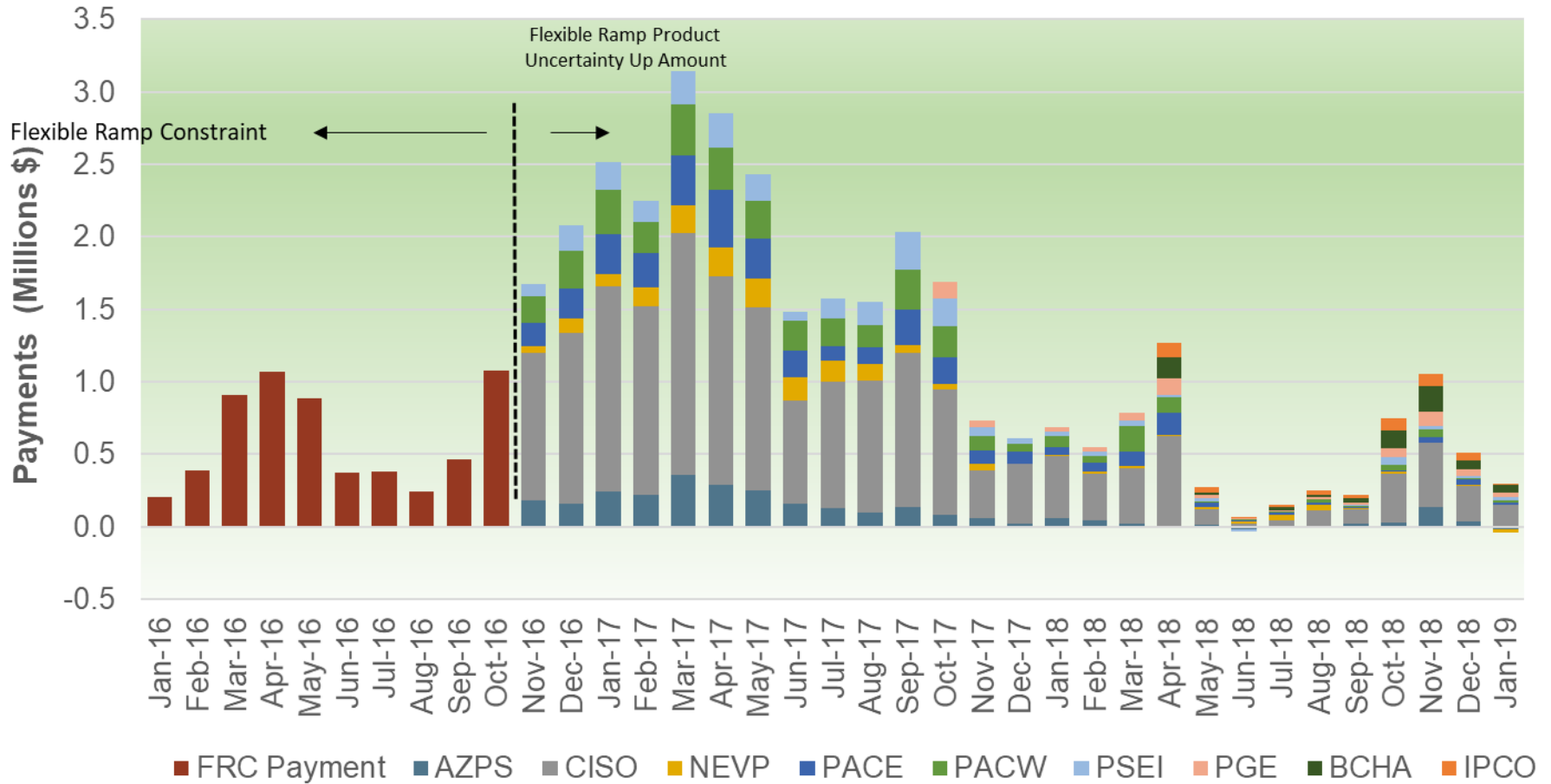
# Average Flexible Ramp Up Price (\$/MWh)



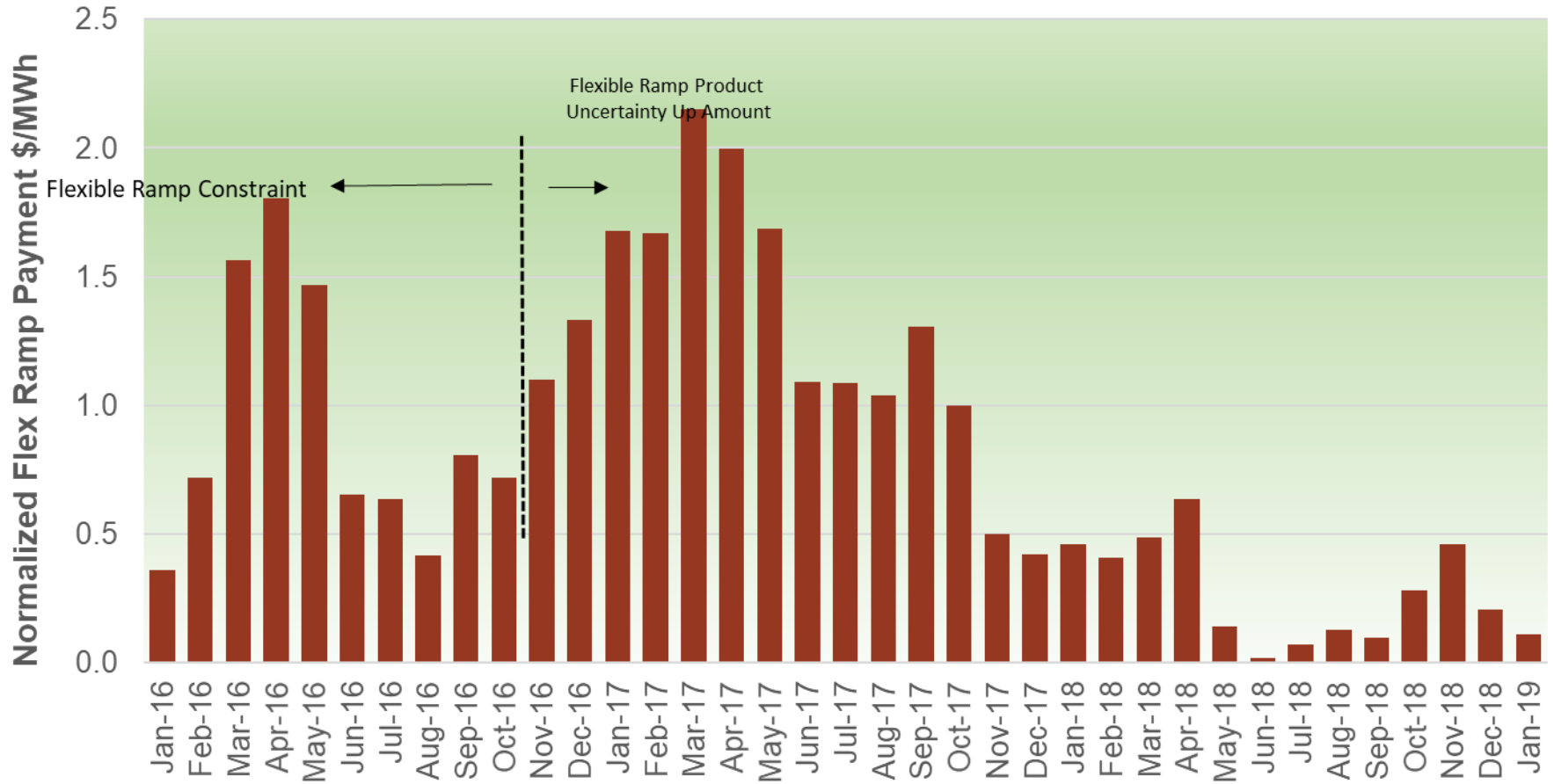
# Average Flexible Ramp Down Price (\$/MWh)



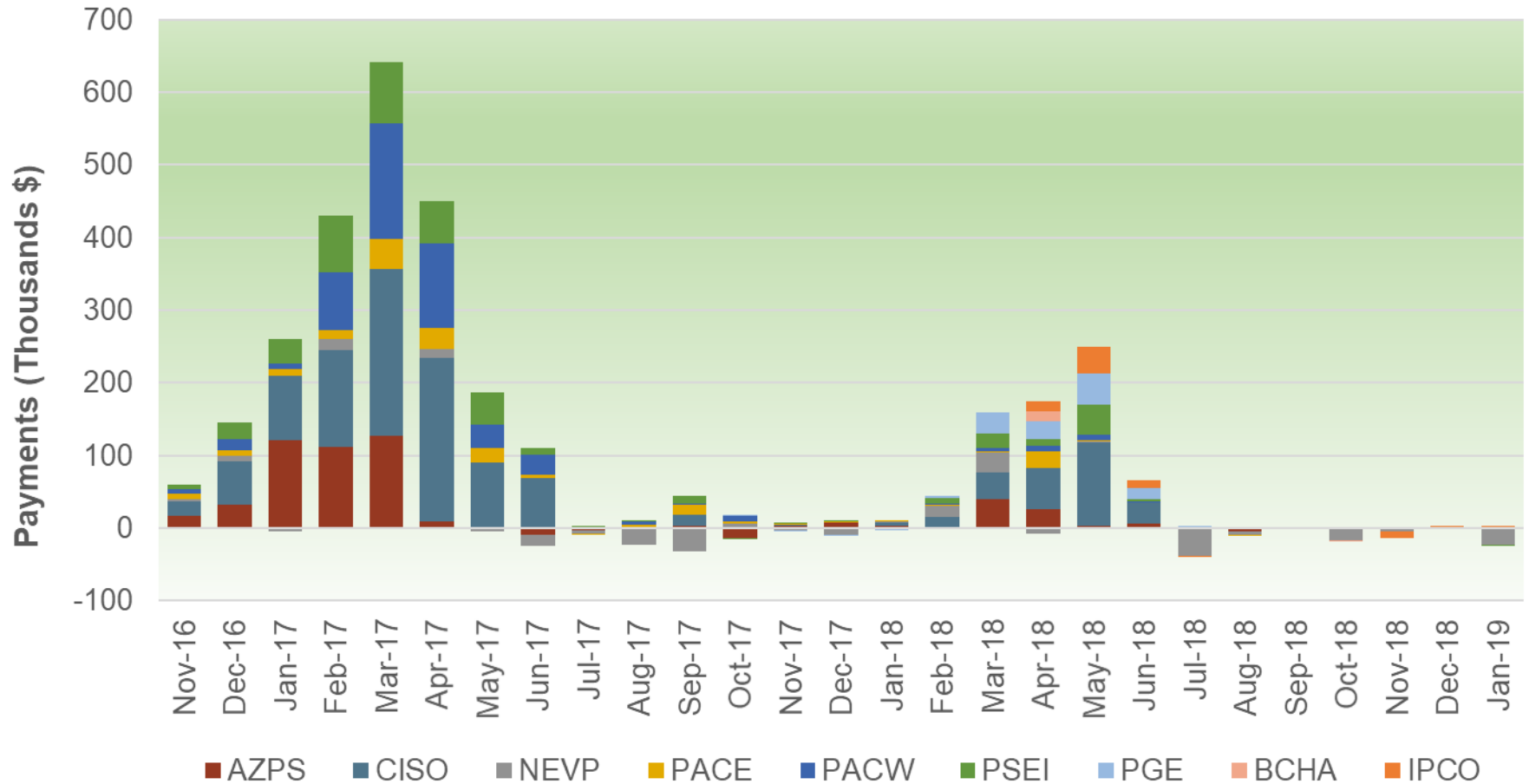
# Uncertainty Up Settlement Amount



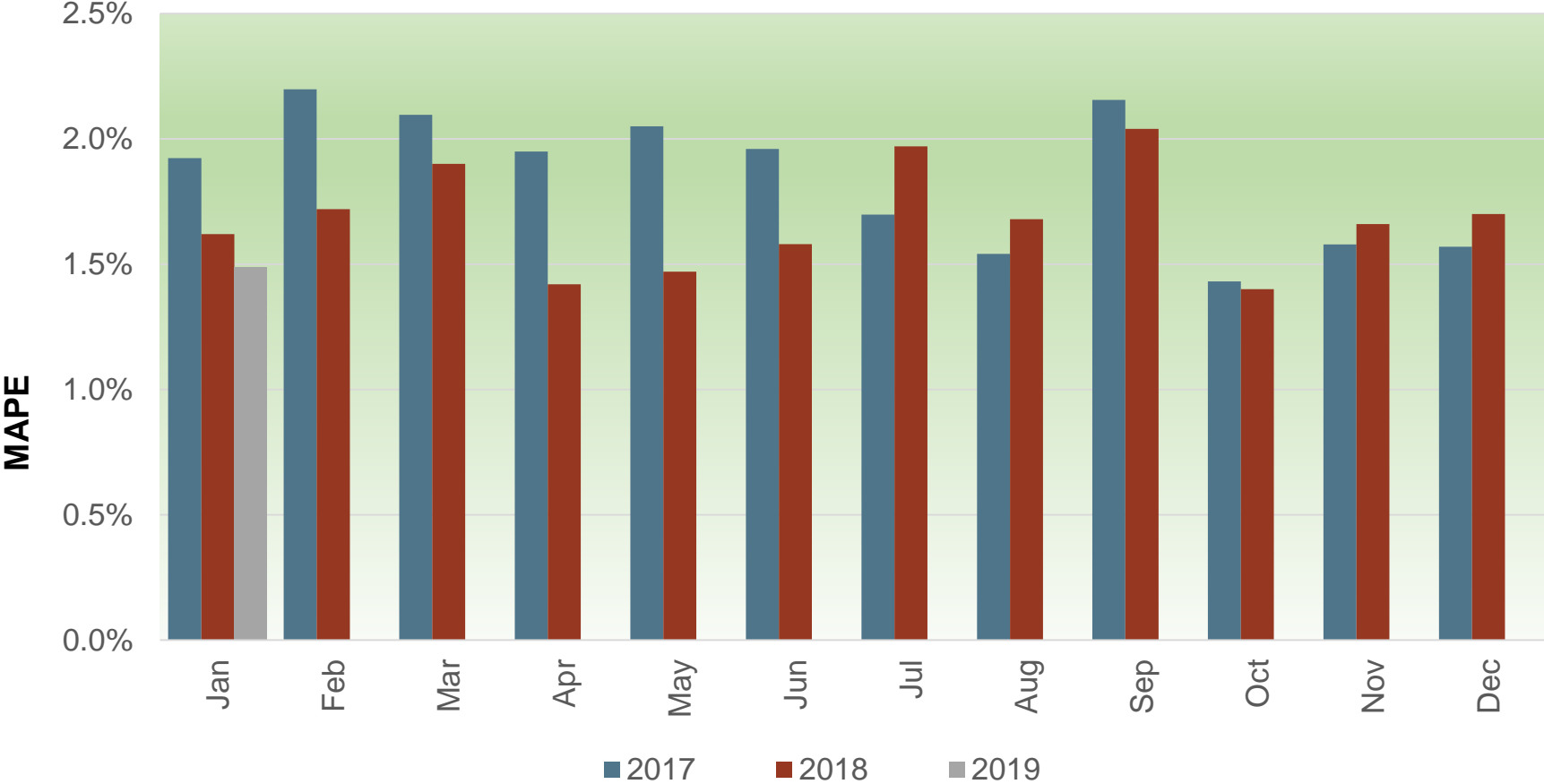
# Normalized Flex Ramp Up Payment



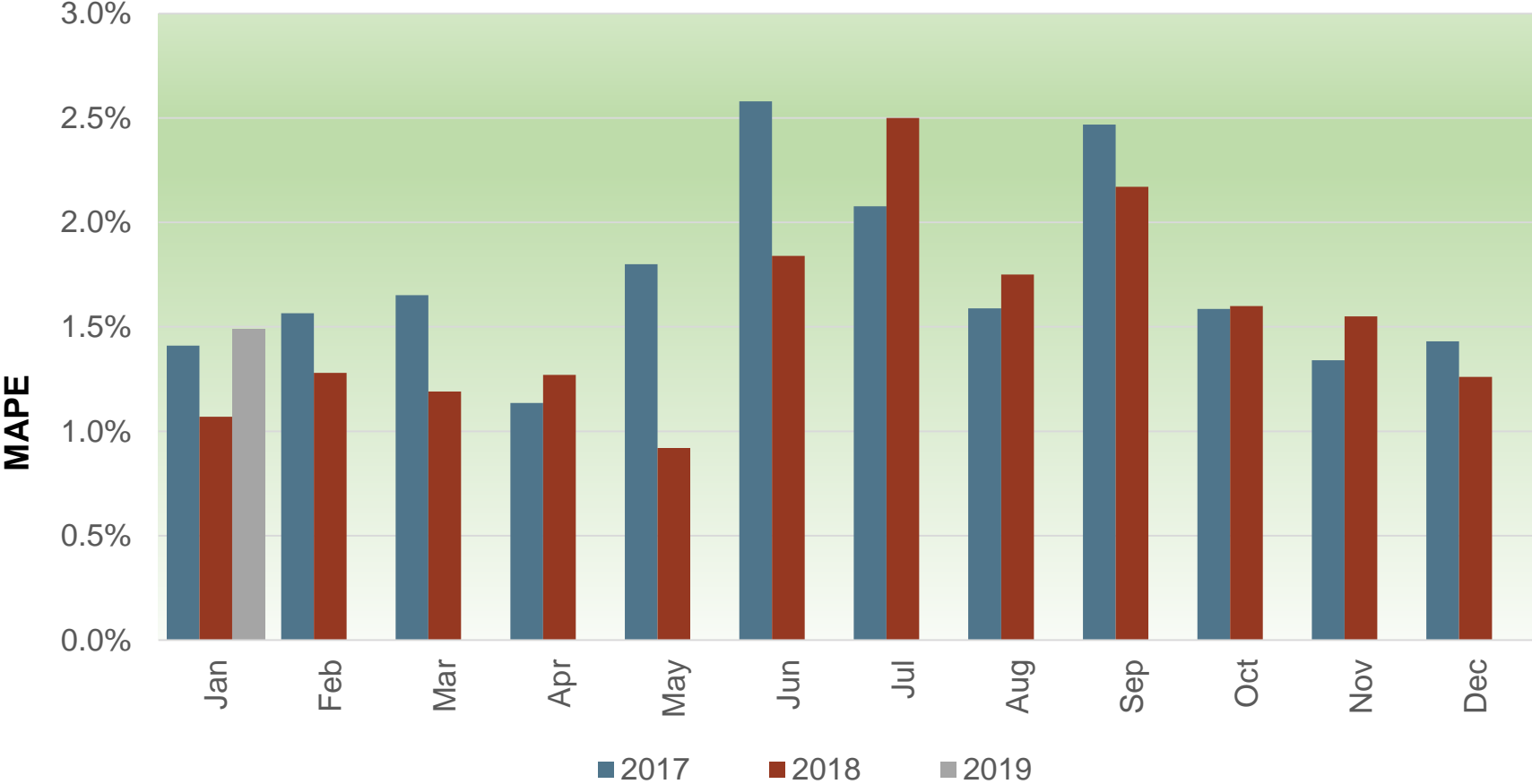
# Uncertainty Movement Down Settlement



# Day-ahead load forecast



# Day-ahead peak to peak forecast accuracy



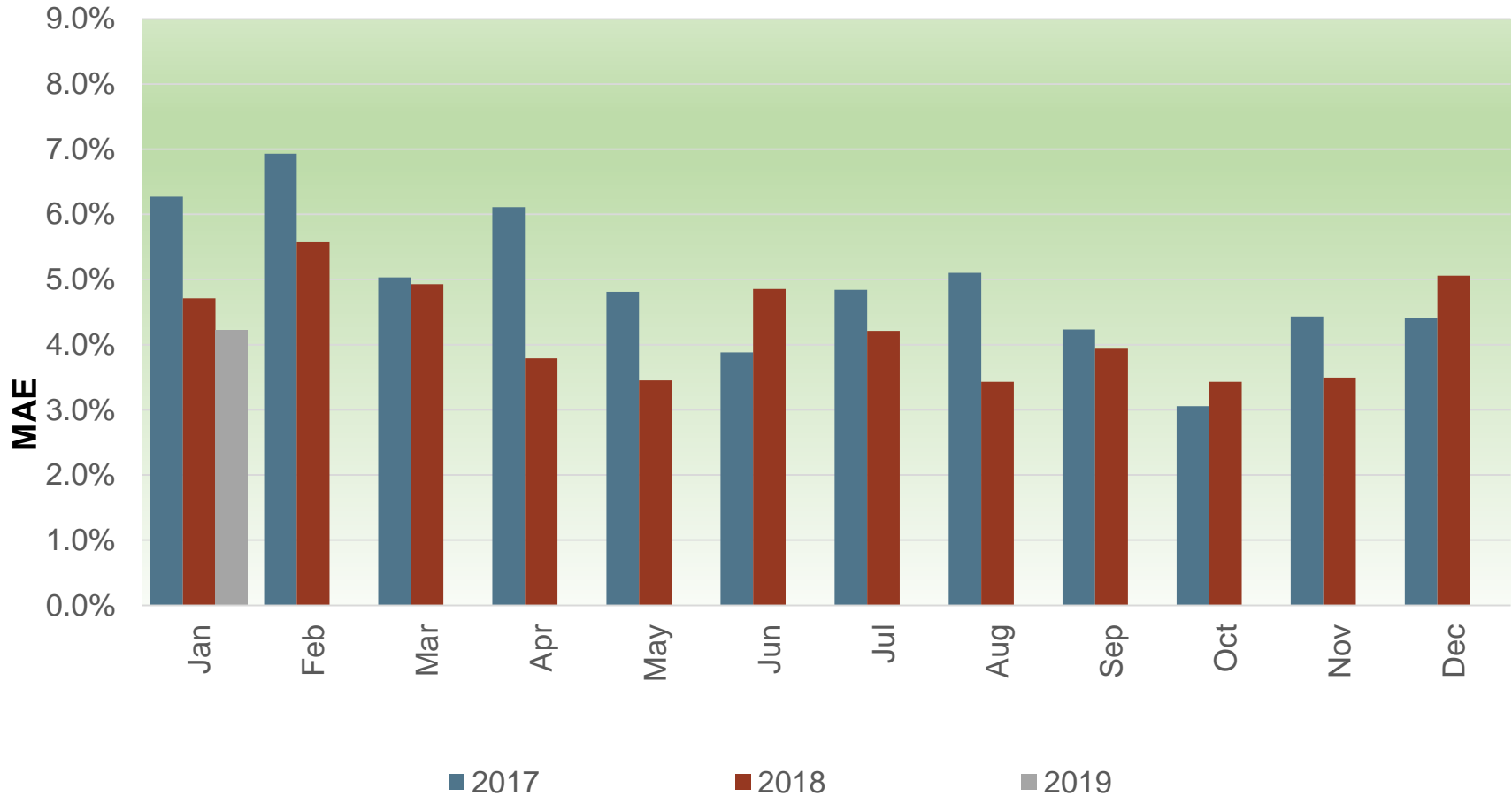


# Day-ahead wind forecast



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

# Day-ahead solar forecast



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

# 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.

# Real-time solar forecast



\*\*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.

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

# Policy Update

John Goodin

Senior Manager, Infrastructure & Regulatory Policy

Brad Cooper

Senior Manager, Market Design Policy

# Policy stakeholder initiatives

- **Reliability Must Run and Capacity Procurement Mechanism Enhancements**
  - Stakeholder meeting on draft final proposal January 30, 2019
  - March 2019 ISO Board of Governors Meeting
- **Transmission Access Charge Structure Enhancements**
  - Policy development completed
  - May 2019 ISO Board of Governors Meeting
- **Resource Adequacy Enhancements**
  - Straw proposal – Part 2 late February
  - Stakeholder meeting on straw proposal early March
  - November 2019 ISO Board of Governors Meeting

## Ongoing policy stakeholder initiatives (continued)

- **Excess Behind the Meter Production**
  - Draft final proposal posted on December 12
  - Stakeholder call on draft final proposal
  - May 2019 ISO Board of Governors meeting
- **Energy Storage and Distributed Energy Resources Phase 4**
  - Issue paper introducing scope posted on February 6
  - Stakeholder call held on February 13
  - Working group meeting in mid-March (tentative)
- **Storage as a Transmission Asset**
  - Policy development on hold pending completion of ESDER 4 policy development

## Ongoing policy stakeholder initiatives (continued)

- **Local Market Power Mitigation Enhancements**
  - EIM Governing Body's role consists of primary approval authority for one element and an advisory for the other elements, severable for decisional purposes
  - Draft final proposal posted January 2019
  - March 2019 EIM Governing Body Meeting
  - March 2019 ISO Board of Governors Meeting



## Ongoing policy stakeholder initiatives (continued)

- Day-Ahead Market Enhancements - Phase 1  
(15-minute granularity)
  - EIM Governing Body hybrid approval role. Primary approval role regarding EIM 15-min base schedules
  - Technical study to validate market system performance
  - 3<sup>rd</sup> revised straw proposal to be posted February 28
  - Stakeholder meeting scheduled for March 7
  - June 2019 EIM Governing Body Meeting
  - July 2019 ISO Board of Governors Meeting

## Ongoing policy stakeholder initiatives (continued)

- Day-Ahead Market Enhancements - Phase 2  
(day-ahead flexible ramping product)
  - EIM Governing Body advisory role
  - Straw proposal / issue paper to be posted in February 28
  - Stakeholder meeting scheduled for March 7
  - Targeting Q3 Governing Body and Board decision

# Upcoming policy stakeholder initiatives

- System Market Power Mitigation
  - Report/Straw Proposal – March 2019
- Maximum Gas Constraint
  - Issue Paper – March 2019
- Extended day-ahead market (EDAM)
  - Q2/Q3 2019 – Schedule TBD
- Market Settlement Timeline Enhancements
  - Q1 2019 – Schedule TBD

# Release Plan Update

**Adrian Chiosea**

**Manager, Strategic Initiative Management**

# The ISO offers innovative training programs

Date	Training courses and workshops
March 14	EIM Resource Sufficiency Enhancements webinar
April 11	Welcome to the ISO webinar
April 23 -25	ISO Training Workshop (ISO Headquarters)



CustomerTraining@caiso.com

## New Modules (recorded webinar and slides)

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

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

# Release Plan Summary: Spring 2019 – Fall 2019

## Spring 2019

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

## Independent 2019

- FERC Order 844 Uplift Cost Allocation & Transparency
- Congestion Revenue Right Auction Efficiency 1B – CMRI report with CRR information
- Generator Contingency and Remedial Action Scheme (RAS) Modeling
- Imbalance Conformance Enhancements (ICE)
- EIM Resource Sufficiency Enhancements

## Fall 2019 – tentative, subject to impact assessment

- Commitment Costs and Default Energy Bid Enhancements
- Energy Storage and Distributed Energy Resources Phase 3
- RMR and CPM Enhancements (March 2019 BOG)
- Intertie Deviation Settlement (Feb 2019 BOG)
- Local Power Mitigation Enhancements (Mar 2019 BOG)
- EIM 2019 Enhancements

# Release Plan Summary: Spring 2020 – Spring 2021

## Spring 2020

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

## Independent 2020

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

## Fall 2020

- Contingency Modeling Enhancements - Transmissions
- DAME 15 Minute Granularity – Phase 1 (Jul 2019 BOG)
- Dispatch Operating Target Tariff Clarifications
- Storage as a Transmission Facility (TBD)
- RA Enhancements Track 2 (Nov 2019 BOG)
- Excess Behind the Meter Production (May 2019 BOG)
- TAC Structure Enhancements (May 2019 BOG)

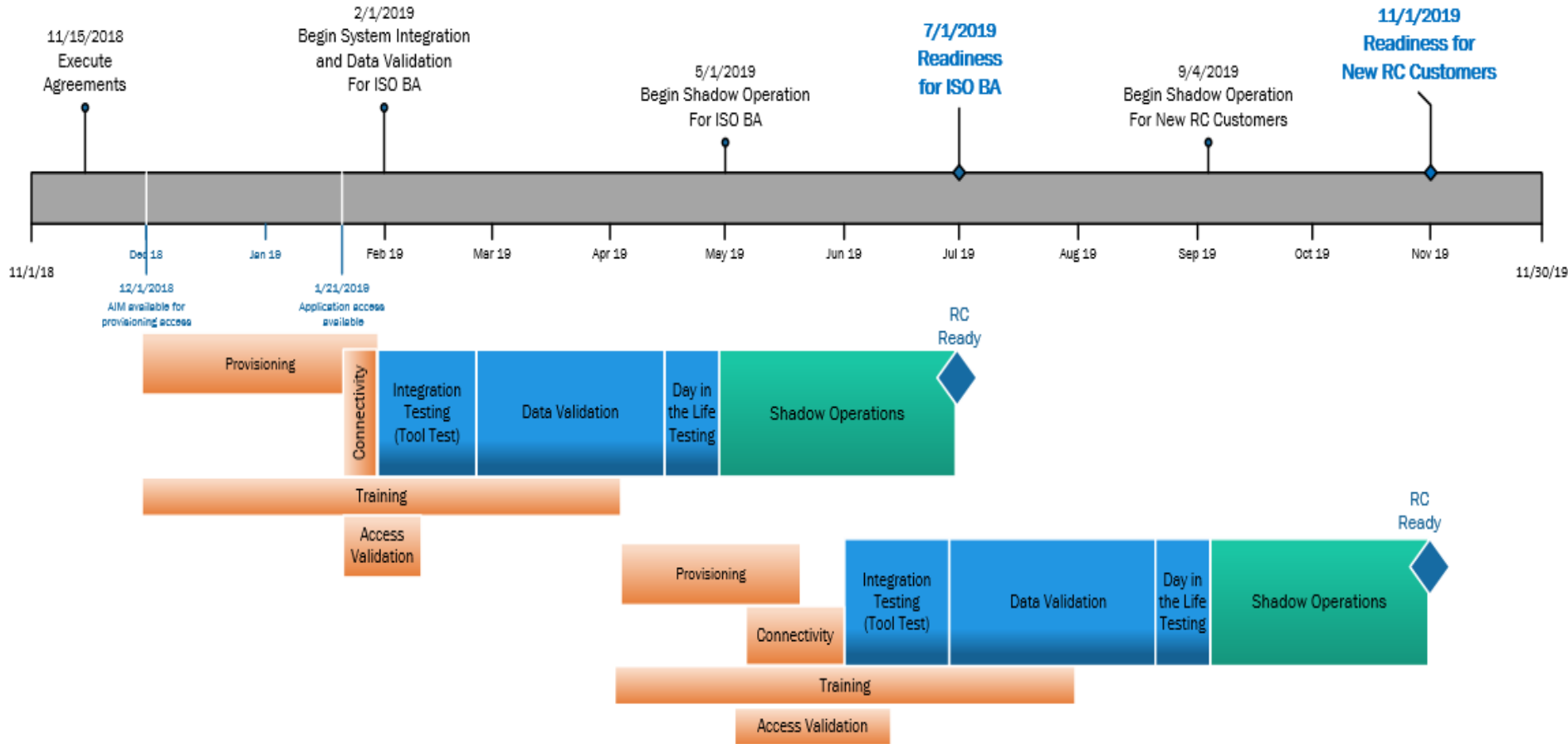
## Spring 2021

- Energy Imbalance Market (EIM) 2021 Public Service Company of New Mexico
- Energy Imbalance Market (EIM) 2021 NorthWestern Energy

## TBD – tentative, subject to impact assessment

- DAME - Flexible Ramping Product (Jul 2019 BOG)

# RC Participant Onboarding Timeline – please attend RC Onboarding webinars for more information.





# RC Onboarding Guidance Documents available

- 01 - RC Overall Onboarding Plan
- 02 - CAISO Reliability Coordinator Area Full Network Model
- 03 - Outage Coordination Overview for RC Services
- 04 - Architecture Overview for Reliability Coordination Services
- 05 - RC System Integration and Data Validation Overview
- 06 - Day in the Life Reliability Coordination Services
- 07 - Hosted Advance Network Applications (HANA) Overview
- 08 - Schedule Submission Overview for RC Services
- 09 – Reliability Coordination Communication Plan
- 10 – RC Progress Tracking - Example
- 11 – RC Onboarding Training Plan
- 12 – RC Readiness Criteria checklist
- 13A – Grid Messaging System User Guide
- 13B – Grid Messaging System Administrator Guide
- RCSA information Request Sheet
- Supplemental Generator Information Template (SGIT)

*Note: Technical specifications are available; please be aware of web service version updates.*

# Release Schedule 2019

Date of Data Refresh: 2/8/19 8:53 AM



Legend	
Market Simulation	CA ISO Holiday
External Testing	Deployment Week



## MAP Stage Environment Window

EIM Resource Sufficiency Enhancements - 1% Threshold	EIM Resource Sufficiency Enhancements - 1% Threshold (12/20-02/15)
Generator Contingency and RAS Modeling	Generator Contingency and RAS Modeling (09/10-02/27)
FERC 844 Uplift Cost Allocation and Transparency	FERC 844 Uplift Cost Allocation and Transparency (02/07-03/01)
EIM Resource Sufficiency Enhancements - 1% External Testing starts	EIM Resource Sufficiency Enhancements - 1% External Testing starts (02/08-02/08)
FERC 844 - External Testing starts	FERC 844 - External Testing starts (02/19-02/19)
CRR Auction Efficiency 1B – CMRI Report	CRR Auction Efficiency 1B – CMRI Report (03/01-03/21)
CRR Auction Efficiency 1B – CMRI Report External Testing starts	CRR Auction Efficiency 1B – CMRI Report External Testing starts (03/01-03/01)
EIM Resource Sufficiency Enhancements - Cap & Sufficiency	EIM Resource Sufficiency Enhancements - Cap & Sufficiency (12/20-04/16)
EIM Resource Sufficiency Enhancements - Cap & Sufficiency External Testing starts	EIM Resource Sufficiency Enhancements - Cap & Suff External Testing starts (03/27-03/27)
CCDEBE	CCDEBE (07/15-08/30)
CCDEBE - Market Sim	CCDEBE - Market Sim (07/15-08/30)
ESDER Phase 3	ESDER Phase 3 (07/15-08/30)
ESDER Phase 3 - Market Sim	ESDER Phase 3 - Market Sim (07/15-08/30)
RMR and CPM Enhancements	RMR and CPM Enhancements (07/10-09/05)
RMR and CPM Enhancements - Market Sim	RMR and CPM Enhancements - Market Sim (07/15-08/30)
Intertie Deviation Settlement	Intertie Deviation Settlement (07/15-08/30)
Intertie Deviation Settlement - Market Sim	Intertie Deviation Settlement - Market Sim (07/15-08/30)
LMPM - Enhancements	LMPM - Enhancements (07/15-08/30)
LMPM - Enhancements - Market Sim	LMPM - Enhancements - Market Sim (07/15-08/30)
EIM Enhancements 2019	EIM Enhancements 2019 (07/15-08/30)
EIM Enhancements 2019 - Market Sim	EIM Enhancements 2019 - Market Sim (07/15-08/30)

## Production Environment Window

EIM Resource Sufficiency Enhancements - 1% Threshold	EIM Resource Sufficiency Enhancements - 1% Threshold (02/15-02/15)
FERC 844	FERC 844 (02/20-02/20)
Imbalance Conformance Enhancements	Imbalance Conformance Enhancements (02/28-02/28)
Generator Contingency and RAS Modeling	Generator Contingency and RAS Modeling (03/01-03/01)
CRR Auction Efficiency 1B – CMRI Report	CRR Auction Efficiency 1B – CMRI Report (03/21-03/21)
Commitment Costs Phase 3 Activation	Commitment Cost Activation (04/01-04/01)
EIM - BANC-SMUD	EIM - BANC-SMUD (04/03-04/03)
EIM Resource Sufficiency Enhancements - Cap & Sufficiency	EIM Resource Sufficiency Enhancements - Cap & Sufficiency (04/16-04/16)
LMC Transparency Enhancement	LMC Transparency Enhancement (05/01-05/01)
CCDEBE	CCDEBE (10/01-10/01)
ESDER Phase 3	ESDER Phase 3 (10/01-10/01)
RMR and CPM Enhancements	RMR and CPM Enhancements (10/01-10/01)
Intertie Deviation Settlement	Intertie Deviation Settlement (10/01-10/01)
LMPM - Enhancements	LMPM - Enhancements (10/01-10/01)
EIM Enhancements 2019	EIM Enhancements 2019 (10/01-10/01)

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



ISO PUBLIC

# 2019 Spring Release

# Spring 2019 Release – Overview

	Board Approval	External BRS	Config Guide	Tech Spec	Draft Tariff**	BPMs	External Training	Market Sim	Production Activation
<b>Spring 2019 Release - Overview</b>									
Commitment Costs Phase 3	03/25/16	08/21/17	05/17/18	08/02/18	07/31/17	12/07/18	09/10/18	09/05/18 - 10/12/18	04/01/19
EIM - BANC-SMUD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12/03/18 - 01/31/19	04/03/19
LMC Transparency Enhancement	N/A	11/19/18	10/19/18	N/A	N/A	10/19/18	N/A	N/A	05/01/19

## Notes:

Items in **BLUE** are complete

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

\*TBD items may be inapplicable, or they may have undetermined dates

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

# Spring 2019 - Commitment Cost Enhancements Phase 3

Project Info	Details/Date
Application Software Changes	<p><b>Scope:</b></p> <ol style="list-style-type: none"> <li>1. Clarify use-limited registration process and documentation to determine opportunity costs</li> <li>2. Determine if the ISO can calculate opportunity costs               <ul style="list-style-type: none"> <li>• ISO calculated; Modeled limitation Start/run hour/energy output</li> <li>• Market Participant calculated; Negotiated limitation</li> </ul> </li> <li>3. Clarify definition of “use-limited”; add MSG Configuration ID to ULPDT</li> <li>4. Change Nature of Work attributes (Outage cards)               <ul style="list-style-type: none"> <li>• Modify use-limited reached for RAAIM Treatment</li> <li>• Allow PDR to submit use-limit outage card for fatigue break.</li> </ul> </li> <li>5. Market Characteristics (added to GRDT in Spring 2018) shall be Read-Only and set to Null               <ul style="list-style-type: none"> <li>• Maximum Daily Starts</li> <li>• Maximum MSG transitions</li> <li>• Ramp rates</li> </ul> </li> </ol> <p><b>Impacted Systems:</b></p> <ol style="list-style-type: none"> <li>1. Master File: Set use-limited resource types and limits</li> <li>2. ECIC: Process use limited resource input values for and Receive opportunity cost adders from opportunity cost tool</li> <li>3. CIRA: RAAIM exempt rule for “use-limited reached”</li> <li>4. CMRI: Publish opportunity cost</li> <li>5. SIBR: Add Opportunity cost adders on bid caps</li> <li>6. OMS: “Use-Limited Reached” nature of work attribute for Generation Outage Card</li> <li>7. Settlements: Publish the actual start up, run hour and energy output for the use-limited resources</li> <li>8. Opportunity cost calculator (OCC): Calculate and publish opportunity costs for start-up, MLC and DEB</li> </ol>
BPM Changes	Market Instruments, Outage Management, Reliability Requirement, Market Operations

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

Project Info	Details/Date
<p>FERC ruling: CCE3 changes</p>	<p><b>Updates:</b></p> <ol style="list-style-type: none"> <li>1. As a result of FERC’s ruling against CAISO’s proposal to allow scheduling coordinators to register market values for resource characteristics in the Master File, changes have been made to prevent the collection of this data.</li> <li>2. This resulted in Technical Specification, RDT, and validation rule changes, which have been posted to the CAISO website.</li> </ol>
<p>Additional category of bid exemption</p>	<p>It is necessary to have an additional category of bid exemption for resources that are currently meeting the definition of Use Limited Resource but will not meet the new narrower Use Limited definition accepted in CCE3. These are resources that have one or more limits that do not meet the CCE3 definition of Use-Limited but have operational/regulatory limits that are better managed through bid exemption rule rather than outage cards. This category will be “Conditionally Available resource”.</p> <p>The ISO will implement this new category for RA resources eligible to be exempt from bid insertion: Conditionally-Available resource</p> <p>These Conditionally-Available resource conditions are:</p> <ul style="list-style-type: none"> <li>• Should be designated RA</li> <li>• Should be exempt from bid generation rules</li> <li>• Is not designated as Use-Limited resource</li> </ul> <p>References</p> <ul style="list-style-type: none"> <li>• Draft tariff language posted</li> <li>• BPMs (OM, RR) to be updated</li> <li>• External BRS to be updated</li> </ul>

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

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board of Governors (BOG) Approval	Mar 25, 2016	✓
External BRS	Post Updated External BRS	Aug 21, 2017	✓
Config Guides	Config Guide	May 17, 2018	✓
Tech Spec	Publish Updated Master File Technical Specification, GRDT/IRDT Definitions	Jul 13, 2018	✓
	Publish updated CMRI Tech Spec, updated API for Use Limit Type Enumeration update	Aug 02, 2018	✓
Tariff	Draft Tariff	Jul 31, 2017	✓
	File Tariff	Mar 23, 2018	✓
BPMs	Publish Draft BPM: Market Instruments	Oct 19, 2018	✓
	Publish Draft BPM: Market Operations	Oct 19, 2018	✓
	Publish updated Draft BPMs	Dec 07, 2018	✓
External Training	Deliver external training	Sep 10, 2018	✓
Market Simulation	Full Market Simulation Testing	Sep 05, 2018 - Oct 12, 2018	✓
Production Activation	Commitment Costs Phase 3	Apr 01, 2019	

### **Additional category of bid exemption: “Conditionally Available resource”**

#### **Interim solution for CCE3 activation**

- Participants with a Conditionally Available Resource will need to submit a CIDI case with documentation or justification that their resource is a CAR.
- Upon approval, ISO will set the existing MOO\_QUALIFIED flag to N in Master File, which will exempt the resource from bid insertion.
- ISO will track the CAR resources manually
- The existing MOO\_QUALIFIED flag is in the current RDT, so participants will be able to confirm that a resource has been flagged as exempt from the bid insertion.

#### **Final solution in CCDEBE**

- The CAR flag will be added to the RDT structure



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

## Conditionally-Available Resource (CAR)

- Additional category of bid exemption for RA resources that are currently meeting the definition of Use Limited Resource but will not meet the new narrower Use Limited definition accepted in CCE3
- Resource not available 24x7 (e.g. use-limited), but does not fall under existing use-limited categories
- Resources that have one or more limits that do not meet the CCE3 definition of Use-Limited but have operational/regulatory limits that are better managed through bid exemption rule rather than outage cards
- Resource conditions
  - Should be designated RA
  - Should be exempt from bid generation rules
  - Is not designated as Use-Limited resource
- Examples:
  - Resources limited due to noise abatement
  - Resources that are hybrid (e.g. solar or wind resources associated with a battery component)

	Conditionally-Available Resources	Use-Limited Resources
<b>Bid Generation</b>	No	No
<b>Subject to RAIM</b>	Yes	Yes (depends on outage NoW)
<b>Manage with Outages</b>	No	Yes
<b>Manage with Bidding*</b>	Yes	No
<b>Opportunity Costs</b>	No	Yes
<b>Access to Use-Limited Outage NoW</b>	No	Yes
<b>Use Plan Submission Required</b>	No	Yes

# Spring 2019 – EIM BANC/SMUD

Project Info	Details/Date
Application Software Changes	Implementation of SMUD as an EIM Entity
BPM Changes	EIM BPM will be updated if needed to reflect new modeling scenarios identified during implementation and feedback from SMUD.
Market Simulation	December 3, 2018 – January 31, 2019
Parallel Operations	February 1, 2019 – March 31, 2019
Notes:	Started Parallel Operations successfully as planned on 02/01/2019

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

# Spring 2019 – LMC Transparency Enhancement

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

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

# 2019 Independent

# Independent 2019 – Overview

	Board Approval	External BRS	Config. Guide	Tech Spec	Draft Tariff**	BPMs	External Training	Market Sim	Production Activation
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## Independent 2019 - Overview

FERC 844 - Uplift Cost Allocation and Transparency	11/14/18	12/19/18	N/A	12/21/18	12/07/18	01/03/19	02/04/19	External Testing starts 02/19/19	02/20/19
CRR Auction Efficiency 1B – CMRI Report with CRR Info	N/A	01/18/19	N/A	02/08/19	N/A	N/A	N/A	External Testing starts 03/01/19	03/21/19
Generator Contingency and RAS Modeling	09/19/17	03/16/18	N/A	N/A	11/16/18	11/27/18	09/12/18	09/17/18 - 10/12/18	02/01/19 for 03/01/19
Imbalance Conformance Enhancements	05/16/18	07/10/18	N/A	N/A	12/12/18	12/27/18	N/A	N/A	02/28/19
EIM Resource Sufficiency Enhancements - 1%	N/A	01/25/19	N/A	N/A	N/A	01/22/19	N/A	External Testing starts 02/08/19	02/15/19
EIM Resource Sufficiency Enhancements – Cap & Sufficiency	N/A	01/25/19	N/A	02/22/19	N/A	02/15/19	03/14/19	External Testing starts 03/27/19	04/16/19

### Notes:

Items in **BLUE** are complete

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

\*TBD items may be inapplicable, or they may have undetermined dates

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

# 2019 – FERC 844 Uplift Cost Allocation & Transparency

Project Info	Details/Date
Application Software Changes	<ul style="list-style-type: none"> <li>Order No. 844 directs CAISO to post three monthly OASIS reports:                             <ol style="list-style-type: none"> <li>A zonal uplift report of all uplift payments categorized by transmission zone, day, and uplift category that must be posted within 20 calendar days of the end of each month;</li> <li>A resource-specific report of the total amount of uplift paid to each resource, aggregated across the month, that must be posted within 90 calendar days of the end of each month; and</li> <li>An operator-initiated commitment report listing the commitment size, transmission zone, commitment reason, and commitment start time of each operator-initiated commitment that must be posted within 30 calendar days of the end of each month.</li> </ol> </li> <li>CAISO must include in its tariff the transmission constraint penalty factors used in its market software, as well as any circumstances under which those penalty factors can set locational marginal prices, and any process by which CAISO can temporarily change the penalty factors.</li> <li>Reports begin publication in February for January 2019 data</li> </ul>
BPM Changes	Market Instruments
Business Process Changes	<ul style="list-style-type: none"> <li>Manage Operations Support &amp; Settlements (MOS)</li> </ul>

Report	Publication	Granularity	Publication Schedule	First Date Available
Zonal Uplift	Monthly	Daily	End of trade month + 20 days, and +80 days	The January 2019 report will be available on or before 2/20/19
Operator-Initiated Commitment	Monthly	<ul style="list-style-type: none"> <li>Per exceptional dispatch</li> <li>Per close of day-ahead market for RUC</li> </ul>	End of trade month + 30 days	The January 2019 report will be available on or before 3/4/19
Resource-Specific Uplift	Monthly	Monthly	End of trade month + 90 days	The January 2019 report will be available on or before 5/2/19

# 2019 – FERC 844 Uplift Cost Allocation & Transparency

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Nov 14, 2018	✓
External BRS	Republish External Business Requirements with FERC deficiency letter changes	Dec 19, 2018	✓
Config Guides	Post Configuration Guide Updates	N/A	
Tech Spec	Publish Technical Specifications	Dec 21, 2018	✓
Tariff	File Tariff	Sep 07, 2018	✓
	Tariff clarification; response to deficiency letter	Dec 07, 2018	✓
BPMs	Post Draft BPM changes for Market Instruments	Jan 03, 2019	✓
External Training	Deliver external training	Feb 04, 2019	✓
External Testing	External Testing starts (reports available; adopt when ready)	Feb 19, 2019	✓
Production Activation	FERC 844 - Uplift Cost Allocation and Transparency	Feb 20, 2019	✓

# 2019 - CRR Auction Efficiency 1B – CMRI Report with CRR Info

Project Info	Details/Date
Application Software Changes	<p>CAISO will provide the following CRR-specific information in a new CMRI report, per binding constraint and time interval</p> <ul style="list-style-type: none"> <li>• CRR ID</li> <li>• Hedge Type (option or obligation)</li> <li>• CRR Type (LSE, AUC, etc.)</li> <li>• Hourly Notional Revenue</li> <li>• Hourly CRR Clawback Revenue</li> <li>• Hourly Circular Scheduling Revenue</li> <li>• De-rate factor (applies to merchant TOR CRRs)</li> <li>• CRR award MW</li> <li>• Offset Revenue</li> </ul> <p>This information will be provided for each CRR at a unique source and sink location. If an SC has multiple CRRs at the same source and sink, result will be based on the net award value</p>

Milestone Type	Milestone Name	Dates	Status
External BRS	Post Updated External Draft BRS	Jan 18, 2019	✓
Tech Spec	Publish ISO Interface Spec (Tech spec)	Feb 8, 2019	✓
External Testing	External Testing starts (tentative)	Mar 01, 2019	
Production Activation	CMRI Report with CRR Info	Mar 21, 2019	



# 2019 – Generator Contingency and Remedial Action Scheme Modeling

Project Info	Details/Date
Application Software Changes	<ul style="list-style-type: none"> <li>Enhance the Security Constrained Economic Dispatch                             <ul style="list-style-type: none"> <li>Model generation/load loss in the dispatch</li> <li>Model transmission loss along and generation/load loss due to RAS operation dispatch</li> <li>Model transmission reconfiguration due to RAS operation in the dispatch</li> </ul> </li> <li>Update the congestion component of LMP so that it considers the cost of positioning the system to account for generator contingencies and RAS operations</li> <li>Enhance DAM, RTM and EIM to support generator contingencies</li> </ul> Impacted systems: <ul style="list-style-type: none"> <li>CRR, IFM/RTM, Integration.</li> </ul>
BPM Changes	Managing Full Network Model      CRR Market Operations                      EIM

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Sep 19, 2017	✓
External BRS	Complete and Post External BRS	Mar 16, 2018	✓
Config Guides	Post Draft Config Guides	N/A	
Tech Spec	Create ISO Interface Spec (Tech spec)	N/A	
Tariff	File Tariff	Nov 16, 2018	✓
BPMs	Post Draft BPM changes	Nov 27, 2018	✓
External Training	Deliver external training	Sep 12, 2018	✓
Market Sim	Market Sim Window	Sep 17, 2018 - Oct 12, 2018	✓
Production Activation	Generator Contingency and RAS Modeling	Feb 01, 2019	✓
Effective Date	GCARM Effective Date	Mar 01, 2019	

**Implementation Plan:** <http://www.caiso.com/Documents/ImplementationPlan-GCARM.pdf>

# 2019 – Imbalance Conformance Enhancements

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

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	May 16, 2018	✓
External BRS	Post External BRS	Jul 10, 2018	✓
Config Guides	Post Configuration Guides	N/A	
Tariff	File Tariff	Dec 12, 2018	✓
BPMs	Post Draft BPM changes	Dec 27, 2018	✓
External Training	External Training Complete	N/A	
Market Simulation	Market Sim Window	N/A	
Production Activation	Imbalance Conformance Enhancements - Market	Feb 28, 2019	

# 2019 – EIM Resource Sufficiency Enhancements

Project Info	Details/Date
Application Software Changes	<p><b>EIM:</b> Perform Capacity Test and Flex Ramp Up/Down Sufficiency Test Enhancements</p> <ul style="list-style-type: none"> <li>• Apply Tolerance Threshold to Flex Ramp Sufficiency Test of 1% or 1MW threshold, whichever greater</li> <li>• Both Bid Range Capacity and Flex Ramp Sufficiency Test evaluations shall independently pass/fail for each 15min interval of next trade hour at T-70, T-55, and T-40</li> <li>• Apply new Bid Range Capacity Test rule where failure of one 15min interval of trade hour results in failure of same 15-minute interval for Flex Ramp Sufficiency Test</li> </ul> <p><b>BAAOP:</b> EIM Operator displays shall be modified to:</p> <ol style="list-style-type: none"> <li>1) Present EIM BAA Sufficiency Test status results in 15min granularity for Bid Range Capacity and Flex Ramp Up/Down Sufficiency Tests (Balancing or Feasibility Test status results remain hourly)</li> <li>2) Provide Bid Range Capacity Test results with 15min granularity</li> </ol> <p><b>RTM (RTPD, RTD):</b> Apply EIM transfer limits based on 15-minute Sufficiency Test results:</p> <ul style="list-style-type: none"> <li>• EIM Transfer for 15min interval failing FRU/FRD limited from below/above (import/export) to least restrictive of: <ul style="list-style-type: none"> <li>○ EIM Transfer in previous 15min interval from last successful FMM, or</li> <li>○ Base EIM Transfer schedule in current 15min interval from current FMM</li> </ul> </li> </ul> <p><i>See Technical Specifications note below regarding CMRI and OASIS impacts to data. No changes will be made to the data structure of API technical specifications (e.g. same data schema and broadcast service), but the data context and, in the case of OASIS, enumerations will change with the transition to 15min granularity.</i></p> <p><i>Note: No settlement impact.</i></p>
BPM Changes	<ul style="list-style-type: none"> <li>• Energy Imbalance Market</li> <li>• Market Instruments</li> <li>• Market Operations</li> </ul>

# 2019 – EIM Resource Sufficiency Enhancements

Project Info	Details/Date
Technical Specifications	<p>CMRI and OASIS API technical specifications will <i>not</i> be modified, although the following changes in data context will occur:</p> <p><b>CMRI:</b></p> <ul style="list-style-type: none"><li>• <i>Energy Imbalance Market &gt; Bid Range Capacity Test Results</i> report shall transition from reporting hourly result in either UP or DOWN direction (one record) to reporting the most-insufficient 15-minute time interval of trade hour in both UP and DOWN direction (two records)</li><li>• Bid Capacity and Flex sufficiency values (reported as negative insufficiency) will be provided for each 15min interval (instead of zero value) to clarify EIM BAA’s proximity to insufficiency thresholds</li></ul> <p><b>OASIS:</b></p> <ul style="list-style-type: none"><li>• <i>Energy &gt; EIM Transfer Limits</i> report (which was previously deprecated in 2015) will be re-purposed to provide the IMPORT and EXPORT Net EIM Transfer Limits for binding 15min/5min RTM intervals impacted by Flex Ramp Up/Down Sufficiency Test failure (by EIM Balancing Authority Area)</li><li>• The API name (existing) for the OASIS report is “ENE_EIM_TRANSFER_LIMITS”</li><li>• Pre-existing report data (from 2015) reflecting “High” and “Low” Limit Types will remain; this implementation will provide “Import” and “Export” Limit Types for the report’s re-purposed use</li></ul> <p>No formal structured scenarios will be schedule for Market Simulation, but test environment will be available to allow external participants to test impacts to their business processes.</p> <p><i>Example results will be provided in forthcoming external business requirements specification (External BRS) document.</i></p>

# 2019 – EIM Resource Sufficiency Enhancements

Milestone Type	Milestone Name	Dates – 1/% Threshold	Status	Dates – Cap & Sufficiency	Status
Board Approval	Obtain Board of Governors Approval	N/A		N/A	
External BRS	Milestone: Post External BRS (v1.0)	Jan 16, 2019	✓	Jan 16, 2019	✓
	Milestone: Post External BRS (v1.1)	Jan 25, 2019	✓	Jan 25, 2019	✓
Config Guides	Post Draft Configuration Guides	N/A		N/A	
Tech Spec	Create ISO Interface Spec	N/A		Feb 22, 2019	
Tariff	File Tariff	N/A		N/A	
BPMs	Post Draft Business Practice Manual changes	Jan 22, 2019	✓	Feb 15, 2019	✓
External Training	Deliver External Training	N/A		Mar 14, 2019	
External Testing	External Testing starts	Feb 08, 2019	✓	Mar 27, 2019	
Production Activation	EIM Resource Sufficiency Enhancements	Feb 15, 2019	✓	Apr 16, 2019	

# 2019 Fall Release

# Fall 2019 Release – Overview

	Board Approval	External BRS	Config Guide	Tech Spec	Draft Tariff**	BPMs	External Training	Market Sim	Production Activation
<b>Fall 2019 Release - Overview</b>		<b>04/01/19</b>	<b>05/17/19</b>	<b>05/17/19</b>	<b>06/14/19</b>	<b>07/12/19</b>	<b>07/12/19</b>	<b>07/15/19 - 08/30/19</b>	<b>10/01/19</b>
CCDEBE	03/22/18	01/22/19	05/17/19	05/17/19	06/14/19	07/12/19	07/11/19	07/15/19 - 08/30/19	10/01/19
ESDER Phase 3	09/05/18	02/11/19	05/17/19	TBD	TBD	TBD	TBD	07/15/19 - 08/30/19	10/01/19
RMR and CPM Enhancements	03/28/19	TBD	TBD	TBD	TBD	TBD	TBD	07/15/19 - 08/30/19	10/01/19
Intertie Deviation Settlement	02/07/19	TBD	TBD	TBD	TBD	TBD	TBD	07/15/19 - 08/30/19	10/01/19
LMPM - Enhancements	03/28/19	TBD	TBD	TBD	TBD	TBD	TBD	07/15/19 - 08/30/19	10/01/19
EIM Enhancements 2019	N/A	02/05/19	TBD	TBD	N/A	TBD	TBD	07/15/19 - 08/30/19	10/01/19

## Notes:

Items in **BLUE** are complete

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

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

\*TBD items may be inapplicable, or they may have undetermined dates

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

# Fall 2019 – Commitment Cost and Default Energy Bid

Project Info	Details/Date
<p>Enhancements</p> <p>Application Software Changes</p>	<p><b>Scope:</b></p> <p>Enhances the ability to submit market-based commitment cost bids in order to reflect unique costs and volatility:</p> <ul style="list-style-type: none"> <li>• Support integration of renewable resources through incentivizing flexible resources participation during tight fuel supply</li> <li>• Account for costs of flexible resources (gas and non-gas) to reduce risk of insufficient cost recovery</li> <li>• Encourage participation of non-RA and voluntary EIM resources; compliance with FERC Order 831</li> <li>• Raises energy bid cap from \$1,000/MWh to \$2,000/MWh:</li> <li>• Requires supporting verified costs of energy bids above \$1,000/MWh</li> <li>• Introduces market power mitigation (MPM) measures for commitment costs.</li> </ul> <p><b>Impacted Systems:</b></p> <ul style="list-style-type: none"> <li>• SIBR: Incorporate negotiated default commitment bids, allow the submittal of Ex Ante cost adjustments. Increase commitment cost caps, increase energy bid caps, incorporate soft energy bid cap. Allow for hourly submittal of minimum load bids into day-ahead market.</li> <li>• IFM/RTM: Add MPM tests for commitment costs. Mitigate commitment costs where tests indicate market power. Incorporate MPM (both energy and commitment) in short term unit commitment process. Recalibrate the penalty price parameters in response to raising energy bid cap to \$2,000/MWh.</li> <li>• CMRI: Provide resource-specific reporting on mitigation results for commitment costs. Provide additional source information for default bids.</li> <li>• MQS/PCA: Incorporate mitigation of commitment costs for specific exceptional dispatch (ED) types. Incorporate bid locking of commitment costs for ED instructions and for certain cases where resources are uneconomic to operating.</li> <li>• Master File: Allow submittal of resource-specific minimum load costs for costs that are independent of the Pmin level. Add the ability to indicate preference for new negotiated cost basis type. Provide a view of resource-specific scalars used for validating Ex-Ante cost adjustments.</li> <li>• CIDI: Incorporate templates for submitting request for manual consultation and ex-post default bid adjustments.</li> </ul>



# Fall 2019 – Commitment Cost and Default Energy Bid Enhancements

Project Info	Details/Date
BPM Changes	<ul style="list-style-type: none"> <li>Market Instruments</li> <li>Market Operations</li> </ul>
Business Process Changes	<ul style="list-style-type: none"> <li>Maintain Major Maintenance Adders (MMG LIII)</li> <li>Maintain Negotiated Default Energy Bids (MMG LIII)</li> <li>Maintain Negotiated O_Ms (MMG LIII)</li> <li>Manage Day Ahead Market (MMG LII)</li> <li>Manage Market Billing Settlements (MOS LII)</li> <li>Manage Real Time Hourly Market (RTPD) (MMG LII)</li> <li>Manage Real Time Operations – Maintain Balance Area (MMG LII)</li> </ul>

Milestone Type	Milestone Name	Dates	Status
Draft Policy	Publish Draft Business Rules externally	Jan 31, 2018	✓
Board Approval	Obtain Board of Governors Approval	Mar 22, 2018	✓
External BRS	Publish revised external BRS	Jan 22, 2019	✓
Config Guides	Config Guide	May 17, 2019	
Tech Spec	Publish Technical Specifications	May 17, 2019	
Tariff	File Tariff	Jun 14, 2019	
BPMs	Post Draft BPM changes	Jul 12, 2019	
External Training	Deliver external training	Jul 11, 2019	
Market Sim	Market Sim Window	Jul 15, 2019 - Aug 30, 2019	
Production Activation	CCDEBE	Oct 01, 2019	

# Fall 2019 – ESDER 3

Project Info	Details/Date
Application Software Changes	<p><b><u>Scope:</u></b> The ESDER 3 initiative will include four (4) demand response enhancements:</p> <ul style="list-style-type: none"><li>• New bidding options for demand response resources</li><li>• Removal of single LSE requirement for PDR registrations &amp; removal of default load adjustment (DLA)</li><li>• 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.</li><li>• Enable sub-metered electric vehicles supply equipment (EVSE) to participate in load curtailment</li></ul> <p><b><u>Impacted Systems (Overview):</u></b></p> <p><b>Master File:</b></p> <ul style="list-style-type: none"><li>• RDTs for PDR registrations in MF will require selection of an effective Bid Option to be used for market optimization and dispatch</li><li>• 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</li><li>• Two (2) Resource IDs will be assigned to the same Resource to allow Consumption versus Curtailment participation (PDR-LSR)</li></ul> <p><b>DRRS:</b></p> <ul style="list-style-type: none"><li>• PDR registrations will not require all service accounts to have the same LSE</li><li>• Allow two resource IDs to be selected for registrations with LSR baseline methods</li><li>• New baseline methods for PDR-LSRs and EVSEs</li><li>• New attribute for locations to indicate BTM device</li></ul> <p><b>SIBR:</b></p> <ul style="list-style-type: none"><li>• Will apply Net Benefit Test price criteria for PDR bids and reject those not meeting the applicable criteria</li><li>• Will not allow Bid Options to be changed in SIBR</li><li>• New rules for self schedules for PDR-LSRs</li></ul> <p><b>HASP/RTM:</b></p> <ul style="list-style-type: none"><li>• Will use effective Bid Option registered in MF (e.g., 5-min, 15-min or Hourly) for market optimization and dispatch instructions</li><li>• Will broadcast new PDR energy schedules/awards and instructions to downstream applications</li><li>• When a LSR consumption resource is exceptionally dispatched, if the corresponding curtailment resource has an active bid, it will be zeroed out. This is true vice versa.</li></ul>

# Fall 2019 – ESDER 3 (cont.)

Project Info	Details/Date
Application Software Changes (continued)	<p><b>Settlements:</b></p> <ul style="list-style-type: none"> <li>• Will remove the default load adjustment (DLA) application</li> <li>• Will provide Bid Cost Recovery for PDRs with 15-Minute Bids but not Hourly Bids</li> </ul> <p><b>CMRI:</b></p> <ul style="list-style-type: none"> <li>• Will include energy schedules and awards for PDRs with new Bid Options</li> </ul> <p><b>CIRA:</b></p> <ul style="list-style-type: none"> <li>• Will prevent the request of NQC for PDR-LSR Consumption resources</li> </ul>
BPM Changes	Market Operations, Market Instruments, Outage Management, Settlements and Billing
Tariff Change	4.13 and 11.6

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Sep 05, 2018	✓
External BRS	Post External BRS	Feb 11, 2019	✓
Config Guides	Post Draft Config Guides	May 17, 2019	
Tech Spec	Create ISO Interface Spec (Tech spec)	TBD	
Tariff	File Tariff	TBD	
BPMs	Post Draft BPM changes	TBD	
External Training	External Training	TBD	
Market Sim	Market Sim Window	TBD	
Production Activation	ESDER Phase 3	Oct 01, 2019	

# Fall 2019 – RMR and CPM Enhancements

Project Info	Details/Date
<p>Application Software Changes</p>	<p><b><u>Scope:</u> POLICY STAKEHOLDER REVIEW STILL IN PROGRESS</b></p> <p>RMR and CPM Enhancements will address the following policy and tariff amendment scope:</p> <ul style="list-style-type: none"> <li>• Risk-of-Retirement will transition from CPM to RMR Tariff section</li> <li>• RMR units with new contracts shall:               <ul style="list-style-type: none"> <li>Have reliability capacity allocated by TAC Area (for PTOs, not LSEs), Flex RA credit shall be applied</li> <li>Receive Must-Offer Obligation (MOO)</li> <li>Subject to RAAIM</li> <li>Streamline RMR invoicing, settlement process through inclusion in ISO Settlement process</li> </ul> </li> </ul> <p>CPM units shall have pricing formulation for resources offering CPM above soft-offer cap (<a href="#">formulation TBD</a>)</p> <p><b><u>Impacted Systems (Overview):</u></b></p> <p><b>Master File:</b></p> <ul style="list-style-type: none"> <li>• New resource RMR contract type flag to distinguish RMR units with contracts signed prior to (“pre-existing”) vs. after (“new”) the Interim RMR Agreement Tariff Amendment was enacted.</li> </ul> <p><b>CIRA:</b></p> <ul style="list-style-type: none"> <li>• New features to both qualify (e.g. confirm EFC is defined) and allocate System/Local/Flex reliability capacity by TAC Area (for PTOs) for RMR units with new contract type:               <ul style="list-style-type: none"> <li>• Apply Flex RA credit by TAC Area (for PTOs)</li> <li>• Perform RMR Substitution</li> <li>• Support RMR Risk-of-Retirement</li> </ul> </li> <li>• Like RA resources, new contract type RMR units will receive RAAIM status determination</li> </ul> <p><b>SIBR</b></p> <ul style="list-style-type: none"> <li>• Like RA resources, automatically generates cost-based energy bids for new contract type RMR units for un-submitted bid range below RMR contract capacity               <ul style="list-style-type: none"> <li>• Bids will reflect applicable GHG Compliance costs, SC charges, Major Maintenance Adder (MMA), or Opportunity Costs (OC); Note: MMA and OC will only be applied for Unit Commitment/Economic Dispatch decisions in market (will not be recovered in settlement)</li> </ul> </li> <li>• Removes self-schedule requirement for new contract type RMR units scheduled/dispatched in Day-Ahead Market</li> </ul>

# Fall 2019 – RMR and CPM Enhancements (cont.)

Project Info	Details/Date
Application Software Changes	<p><b><u>Impacted Systems (Continued):</u></b></p> <p><b>IFM/RTM:</b></p> <ul style="list-style-type: none"> <li>• Unit Commitment, Economic Dispatch decisions will include applicable MMA and OC</li> <li>• Like RA resources, new contract type RMR units will have automatic RA Obligation (\$0/MWh bids in RUC)</li> </ul> <p><b>Settlements:</b></p> <ul style="list-style-type: none"> <li>• RMR units under new contract type will receive: <ul style="list-style-type: none"> <li>• Replacement of existing RMR invoice and settlement with standard ISO settlement process</li> <li>• Monthly RMR capacity payment (by resource) and cost allocation (by PTO)</li> <li>• RAAIM settlement/allocation</li> <li>• Bid Cost Recovery (does not include MMA or OC)</li> <li>• True-ups for RMR Condition 2 overpayment (does not include MMA or OC)</li> </ul> </li> <li>• CPM units with offers above soft-offer cap may receive true-up based on CPM pricing formulation (<a href="#">formulation TBD</a>)</li> </ul>
BPM Changes	Reliability Requirements, Market Operations, Market Instruments, Settlements and Billing
Tariff Change	11.13, 31.2.2, 34.1, 40.9, 41, 43, 43A, Appendix G

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board of Governors Approval	Mar 28, 2019	
External BRS	Post External BRS	TBD	
Config Guides	Publish Config Guide	TBD	
Tech Spec	Publish Technical Specifications	TBD	
Tariff	File Tariff	TBD	
BPMs	Post Draft BPM changes	TBD	
External Training	Deliver external training	TBD	
Market Sim	Market Sim Window	Jul 15, 2019 - Aug 30, 2019	
Production Activation	RMR and CPM Enhancements	Oct 01, 2019	

# Fall 2019 – Intertie Deviation Settlement

Project Info	Details/Date		
Application Software Changes	<p><b>Scope:</b> Implement a new Under/Over Delivery Charge for intertie deviations from Market Schedule and After-The-Fact (ATF) E-Tag, to replace Decline charge</p> <p><b>Impacted Systems:</b> <b>Settlements</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Remove the decline charge calculation and Decline Threshold</li> <li>• Allocate Over/Under delivery charge to measured demand</li> </ul>		
BPM Changes	Settlements and Billing		
Tariff Change	Section 11.31		
Milestone Type	Milestone Name	Dates	Status
Board Approval	Board of Governors Approval	Feb 07, 2019	
External BRS	Post External BRS	TBD	
Config Guides	Post Draft Config Guide	TBD	
Tech Spec	Publish Technical Specifications	TBD	
Tariff	File Tariff	TBD	
BPMs	Post Draft BPM changes	TBD	
External Training	Deliver external training	TBD	
Market Sim	Market Sim Window	Jul 15, 2019 - Aug 30, 2019	
Production Activation	Intertie Deviation Settlement	Oct 01, 2019	

# Fall 2019 – Local Market Power Mitigation Enhancements

Project Info	Details/Date
Application Software Changes	<p><b>Scope:</b> Prevent Flow reversal, Limits transfer, DEB for Hydro, Reference level adjustment process, Gas price Indices</p> <p><b>Impacted Systems:</b></p> <p><b>RTM: prevent flow reversal</b>            Eliminate rule mitigate in FMM carry to RTD            Eliminate rule mitigate for balance of hour for FMM, balance 15 minute for RTD            Use current market competitive LMP for mitigation            Add a nominal parameter to mitigated bids            Mitigated bid = MAX (DEB, Competitive LMP + \$0.xx parameter)</p> <p><b>RTM: Limit transfers to limit Economic Displace</b>            Optional rule for EIM BAA            Limit transfers to the greater of exports in MPM and flexible ramping requirements            Export Limit = MAX [ExportsBase, ExportsMPM, <math>\Sigma FRUMPMAward</math>]            The exporting BAA will receive congestion rents created by this proposed rule</p> <p><b>OASIS: publish Export limit</b></p> <p><b>ECIC:</b> Default Energy Bid for Hydro resource with storage short-term and long-term            Use DA index, BOM index, Monthly future Index, Gas Heat Rate, GPI with customizable inputs on maximum storage horizon and long term bilateral hubs, apply short-term or long-term scalar            Update the reasonableness thresholds            Reference level adjustments gas resource GAS price Indices in DAM: for Mondays by including ICE's Monday-only index            Gas Price Indices to allow as few as one index</p>
BPM Changes	Market Operations, Market Instruments
Tariff Change	Section 29.39, 31.2.1, 39.7

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

Milestone Type	Milestone Name	Dates	Status
Board Approval	Board Approval	Mar 28, 2019	
External BRS	Post External BRS	TBD	
Config Guides	Post Draft Configuration Guides	TBD	
Tech Spec	Publish Technical Specifications	TBD	
Tariff	File Tariff	TBD	
	Receive FERC order	TBD	
BPMs	Post Draft BPM changes	TBD	
	Publish Final Business Practice Manuals	TBD	
External Training	Deliver external training	TBD	
Market Sim	Market Sim Window	Jul 15, 2019 - Aug 30, 2019	
Production Activation	LMPM - Enhancements	Oct 01, 2019	



# Fall 2019 – Energy Imbalance Market Enhancements 2019

Project Info	Details/Date
Application Software Changes	<p><b>Scope:</b> Implement 21 EIM enhancements requested by EIM entities through Customer Inquiry, Dispute and Information system (CIDI)</p> <p><b>Impacted Systems:</b>  <b>BAAOP:</b> 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.  <b>BSAP:</b> Enhance capability for Base schedule modification, Add aggregated BS deviation in API.  <b>OASIS:</b> Display ROC limits  <b>RTM/ADS:</b> prevent ETSR swing using explicit triggers. Publish current DOP in the MSG transition period.  <b>Settlement:</b> Publish data for UFE shadow calculation</p>
BPM Changes	Market Instruments Energy Imbalance Market

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	N/A	
External BRS	Milestone: Post External BRS	Feb 05, 2019	✓
Config Guides	Design review - BPM and Tariff SMEs	TBD	
Tech Spec	Create ISO Interface Spec (Tech spec)	TBD	
Tariff	File Tariff	N/A	
BPMs	Post Draft BPM changes	TBD	
External Training	External Training	TBD	
Market Sim	Market Sim Window	Jul 15, 2019 - Aug 30, 2019	
Production Activation	EIM Enhancements 2019	Oct 01, 2019	

# 2020 Independent

# 2020 – ADS Replacement

Project Info	Details/Date
Application Software Changes	<ul style="list-style-type: none"> <li>• Transition to web-based user interface to eliminate the need to install thick client</li> <li>• Transition ADS provisioning to the Access and Identity Management (AIM) application including Resource Level Access Controls (RACL) access</li> <li>• The query tool will provide 30 days of historical data</li> <li>• Various user interface enhancements adding content per Operation's request</li> <li>• ADS B2B services changes - TBD.</li> </ul>
BPM Changes	<ul style="list-style-type: none"> <li>• Market Instruments</li> <li>• Market Operations</li> </ul>

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	N/A	
External BRS	Post External BRS	Aug 06, 2018	✓
ADS Update	ADS Update Meeting	Aug 15, 2018	✓
Config Guides	Design review - BPM and Tariff SMEs	N/A	
Tech Spec	Publish Technical Specifications	TBD	
BPMs	Post Draft BPM changes	TBD	
External Training	Conduct External Training	TBD	
Market Sim	Market Sim Window	Q1/Q2 2020	
Production Activation	ADS Replacement	Q1/Q2 2020	
Production	ADS Parallel Operations	Q1/Q2 2020	
Decommission	Old ADS Decommission	TBD	

# 2020 Spring Release

# Spring 2020 – EIM integrations for SCL, LADWP, and SRP

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

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

# 2020 Fall Release

# Fall 2020 – Day-Ahead Market Enhancements Phase 1

Project Info	Details/Date
Application Software Changes	<p><b>Scope:</b>  <b>Phase 1: 15-minute Granularity DAM</b></p> <ul style="list-style-type: none"> <li>• 15 minute bids in DAM and RTM</li> <li>• 15 minute scheduling and settlement in DAM</li> <li>• 15 minute Base schedule in RTM</li> </ul> <p><b>Impacted Systems:</b>  <b>AFLS:</b> 15 minute Load and VER forecasts  <b>SIBR:</b> SC submit bids for energy, AS in 15 min interval in DAM and RTM, InterSC Trade is in 15 minute  <b>MPM:</b> Market Power Mitigation in 15 minute in DAM  <b>ETCC:</b> <i>Transmission Contract limits in 15 minute interval for DAM</i>  <b>IFM/RUC:</b></p> <ul style="list-style-type: none"> <li>• Calculate AS (RegU, RegD, Spin, NSP) requirements in 15 minute interval</li> <li>• Co-optimize Energy, AS, TD: 15 minute interval</li> <li>• TD+X: hourly intervals, need normalize the cost for mixed intervals</li> <li>• Hourly Block energy scheduling constraint for eligible resources elect the block option, intertie, RDRR and PDR.</li> <li>• AS on interties can only be procured from 15-minute dispatch-able resources</li> </ul> <p><b>BSAP:</b> <i>Submit Base Schedules in 15 minute interval, energy and AS</i>  <b>BASI:</b> <i>Balance test, capacity test, and sufficiency test are in 15 minutes in RTM</i>  <b>RTM:</b> Receive DAM 15 minute award Energy, AS; Receive EIM BAA submit 15 minute base Schedule.  <b>CMRI:</b> report 15 minute IFM awards, include Energy and AS. Base schedule test results by 15 minute interval  <b>OASIS:</b> Display IFM Energy and AS requirements and results in 15 minute intervals; 15-Minute RTM LAP Price report  <b>Settlement:</b></p> <ul style="list-style-type: none"> <li>• All energy, include physical energy supply, virtual supply/demand, load from all resources are settled at the LMP: <math>\lambda + MCC + MLC</math> in 15 minute interval</li> <li>• AS is settled in 15 minute interval</li> <li>• CRR Settled at DAM congestion cost component in 15-minute interval</li> <li>• GMC \$1 divided by 4 for IST</li> <li>• GMC market service portion will apply to AS bids</li> <li>• Administrative price use relevant DAM 15 minute price.</li> <li>• Make whole payment for price correction made to load and block export.</li> <li>• 15 minute bidding exports get BCR</li> </ul> <p><b>EMS:</b> receive DAM schedule in 15 minute interval</p>
BPM Changes	Market Instruments, Market Operations, Energy Imbalance Market (EIM), Settlements & Billing
Tariff Change	Yes

# Fall 2020 – Dispatch Operating Target Tariff Clarification

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

Milestone Type	Milestone Name	Dates	Status
Board Approval	Obtain Board of Governors Approval	Jul 26, 2018	✓
External BRS	Milestone: Post External BRS	Dec 26, 2018	✓
Config Guides	Design review - BPM and Tariff SMEs	N/A	
Tech Spec	Create ISO Interface Spec (Tech spec)	TBD	
Tariff	Draft Tariff	TBD	
BPMs	Post Draft BPM changes	TBD	
External Training	Deliver external training	TBD	
Market Sim	Market Sim Window	TBD	
Production Activation	Dispatch Operating Target Tariff Clarification	Oct 01, 2020	



# 2021 Spring Release

# Spring 2021 – EIM integrations for PSC-NM and NWE

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

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

# Stay Informed

# Ways to participate in releases

- Visit the Release Planning page
  - <http://www.caiso.com/informed/Pages/ReleasePlanning/Default.aspx>
- Attend meetings
  - Release Users Group (RUG) bi-weekly meetings
    - Initiative status updates
    - System change updates on independent releases
  - Market Simulation calls
    - Visit the ISO calendar at [www.caiso.com](http://www.caiso.com) for meeting dates and times and add events to your calendar
    - Typically held on Mondays and Thursdays
    - Market sim calls for major releases will be market noticed
  - Market Performance and Planning Forum
    - Bi-monthly review of market performance issues
    - High level discussion of release planning, implementation and new market enhancements

# What to look for on the calendar...

## Calendar of Meetings, Training and Events

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

February 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	5 WebCONF: Market Simulation 2:00pm - 3:00pm	6 Training: Get to Know the ISO - Day 1 9:00am - 4:00pm WebCONF: Imbalance Conformance Enhancements 10:00am - 12:00pm WebCONF: Technical User Group 10:00am - 11:00am	7 Deadline: Comments - Interconnection Process Enhancements 2018 - Issue Paper and Meeting Discussion Training: Get to Know the ISO - Day 2 9:00am - 4:00pm Meeting: Flexible Resource Adequacy Criteria Must Offer Obligation Phase 2 - Revised Draft Flexible Capacity Framework 10:00am - 4:00pm WebCONF: Market Settlement User Group 10:00am - 11:00am	8 Meeting: Audit Committee Teleconference (Executive) 8:30am - 9:30am Training: Settlements 101 9:00am - 4:00pm Meeting: 2017-2018 Transmission Planning Process 10:00am - 4:00pm WebCONF: Market Simulation 2:00pm - 3:00pm	9 Training: Settlements 201 9:00am - 4:00pm	10
11 WebCONF: Participating Transmission Owner Per Unit Cost Guides 10:30am - 12:00pm WebCONF: Market Simulation 2:00pm - 3:00pm	12 Meeting: Congestion Revenue Rights Auction Efficiency 10:00am - 4:00pm WebCONF: Release User Group 10:00am - 11:00am Call: Energy Imbalance Market Governing Body Teleconference (Executive) 11:30am - 12:30pm	13 Deadline: Submissions - April 2018 Monthly Resource Adequacy and Supply Plans Call: Congestion Revenue Rights 11:00am - 11:30am WebCONF: Outage Management System Customer Partnership Group 2:00pm - 3:00pm	14 Deadline: Comments - Review Transmission Access Charge Structure Straw Proposal and Meeting Discussion Call: Board of Governors Teleconference (General) 8:15am - 9:00am Call: Board of Governors Teleconference (Executive) 9:00am - 10:00am Call: Market Update 10:15am - 11:00am WebCONF: Market Simulation	15	16	17

Market Sim



WebCONF: Market Simulation  
2:00pm - 3:00pm

Market Sim



WebCONF: Market Simulation  
2:00pm - 3:00pm

Release Users Group (RUG)



WebCONF: Release User Group  
10:00am - 11:00am

## 2019 Meeting Schedule

- April 18 – In person/webinar
- June 20 – Webinar only
- August 20 – In person/webinar
- October 23 – Webinar only
- December 11 – In person/webinar

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](mailto:isostakeholderaffairs@caiso.com).