



California ISO

Price Formation Enhancements

Working Group Session #8


11/16/2023

ISO PUBLIC

Housekeeping reminders

- This call is being recorded for informational and convenience purposes only. Any related transcriptions should not be reprinted without ISO's permission.
- These collaborative working groups are intended to stimulate open dialogue and engage different perspectives.
- Please keep comments professional and respectful.
- Note: The ISO encourages any verbal or written agreements to comments made during this working group session.
- You may also send your question via chat to either Brenda Corona or to all panelists.

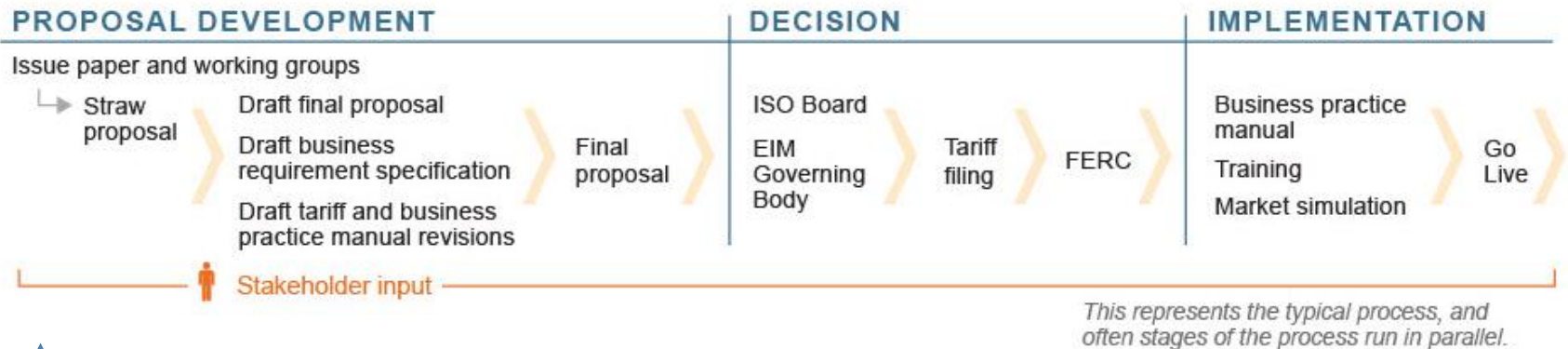
Instructions for WebEx

- The “raise hand” icon is located in the lower tool bar. You will hear a beep tone when you are un-muted; at that time please state your name, and question. Attendees dialed in on the phone only press #2 will hear a notification when you are un-muted; at that time please state your name and question. 
- WebEx platform will **LOCK** and mute you if you mute yourself once you have finished your question. Do not mute yourself until you have completed your question or comment.

Today's Working Group Agenda

Time	Topic	Presenter
9:00 – 9:05 AM	Welcome, Today's Agenda, Stakeholder Process Overview	Brenda Corona
9:05 – 9:10 AM	Today's Goals / Next Sessions	Juan Buitrago
9:10 – 9:15 AM	Review of BAA-Level MPM Discussion	James Friedrich
9:15 – 10:00 AM	Data Analysis : BAA-Level MPM in WEIM	Nicole Selling - DMM
10:00 – 11:00 AM	BAA-Level MPM 201 – Grouping Approach	George Angelidis
11:00 – 11:55 AM	Stakeholder Discussion : BAA-Level MPM Problem Statements	Juan Buitrago
11:55 - Noon	Next Steps	Brenda Corona

ISO Policy Initiative Stakeholder Process



Stakeholder meetings, working groups and workshops may occur throughout the stakeholder process.

We are here

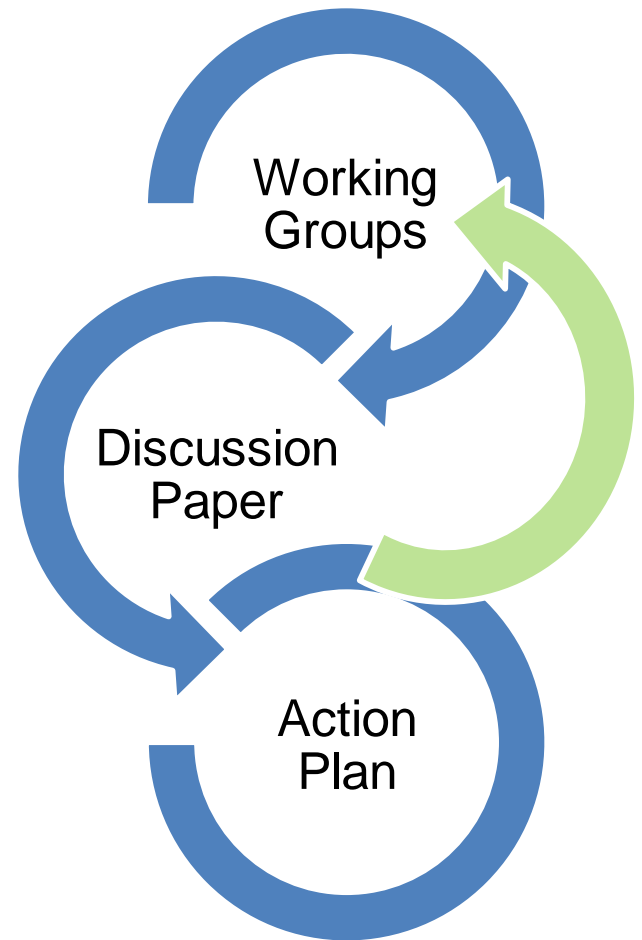
- Working groups will inform the Phase 1 straw proposal
- The ISO will take notes and produce reports of each of our working group meetings.

Working Group Deliverables

Action Plan: A bridge between the working groups and a straw proposal, the Action Plan will inform the policy direction for Price Formation Enhancements Phase 2 stakeholder initiative.

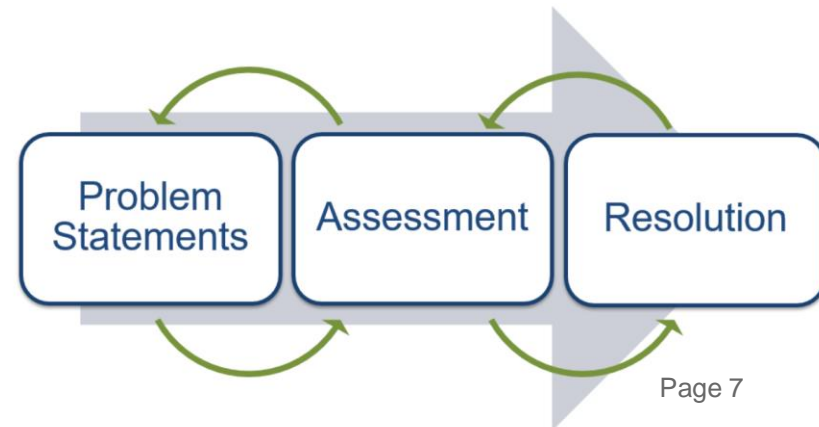
The action plan will recap all perspectives shared in the working group process and identify the policy direction/basis of the straw proposal

You will have an opportunity to provide written comment on the Action Plan



Working Group Progress to date – BAA Level MPM

- Frame/Level Set on Policy Area **[Done!]**
- Issue/Challenge Identification **[In progress]**
- Problem statements **[In progress]**
 - Problem Statements translate issues into actionable items
- Assessment **[Next step]**
 - Validate problem statements as represented
 - Identify ways to measure the issues or asses the impact of potential solutions
 - Align on priorities and prepare for solution development
- Resolving the issues **[Hold]**
 - Identify existing opportunities
 - Develop solutions



Goals of Today's Working Group Session

The Working Group structure is meant to embrace flexibility to allow organic and robust conversation on the topics at hand – it is still key for us to drive towards goals collaboratively

- **Continue Thematic Sessions: BAA-Level Market Power Mitigation**
 - Review of Stakeholder Requested Data to inform Problem Statement discussion
 - Explore concepts of BAA Grouping as potential enhancement
- **CAISO Drafted Problem Statements – BAA-Level MPM**
 - Meant to serve as conversation starters
 - Need stakeholder feedback!
 - Share your positions
 - Share if additional data is needed
 - Measurable actions that come to mind

BAA Level MPM Discussion to date

- 2022 (Pre Working Groups) – Price Formation Enhancements Issue Paper
- Working Group Session 1 ([here](#))
 - PFE Overview Review
- Working Group Session 3 ([here](#))
 - BAA-Level MPM Principles
- Revised PFE Overview with clarifications ([here](#))
- Working Group Session 4 ([here](#))
 - BAA-Level MPM Level Set



BAA-level mitigation in the WEIM

Price Formation Enhancements

Nicole Selling, Ph.D.

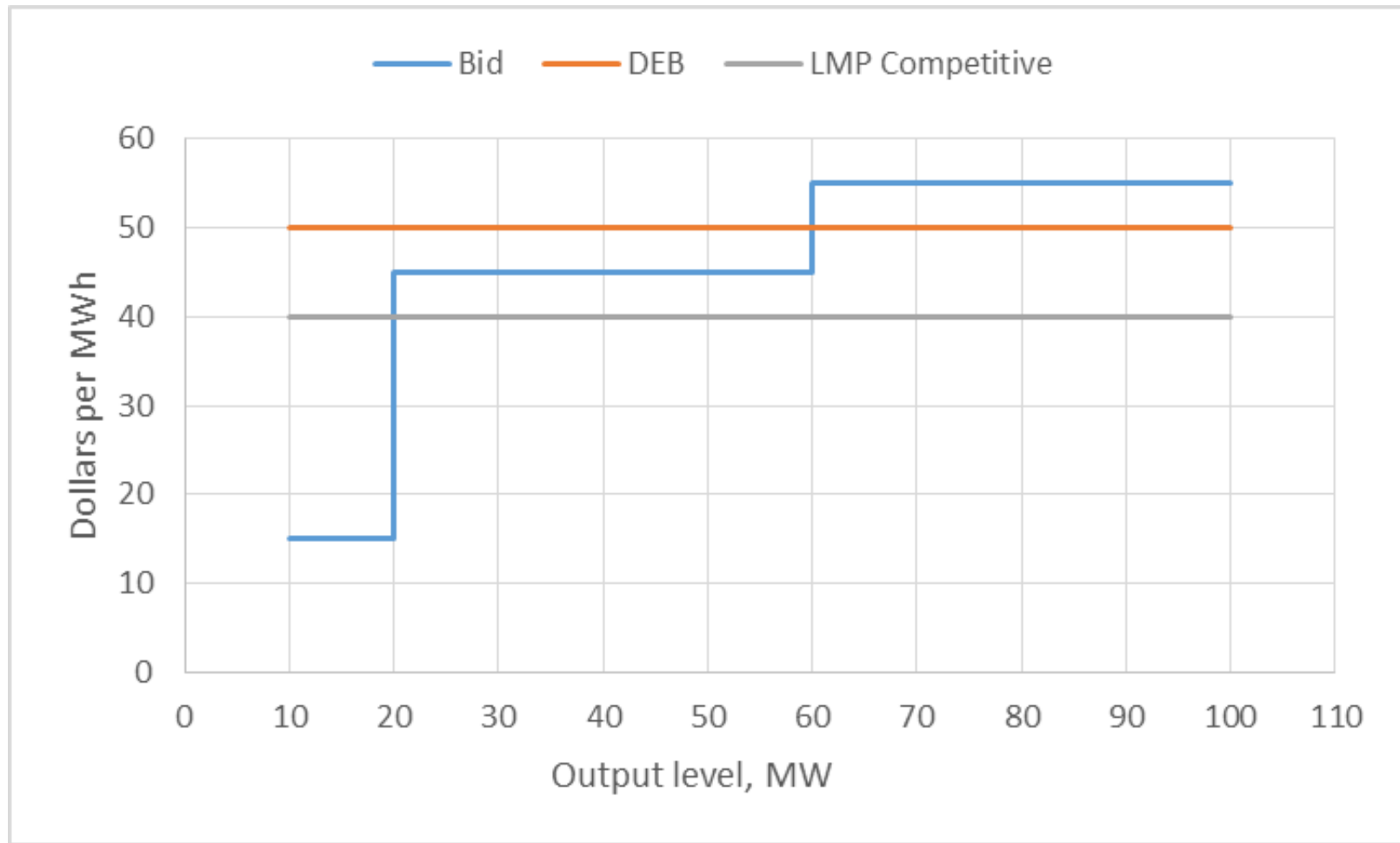
Department of Market Monitoring

California Independent System Operator

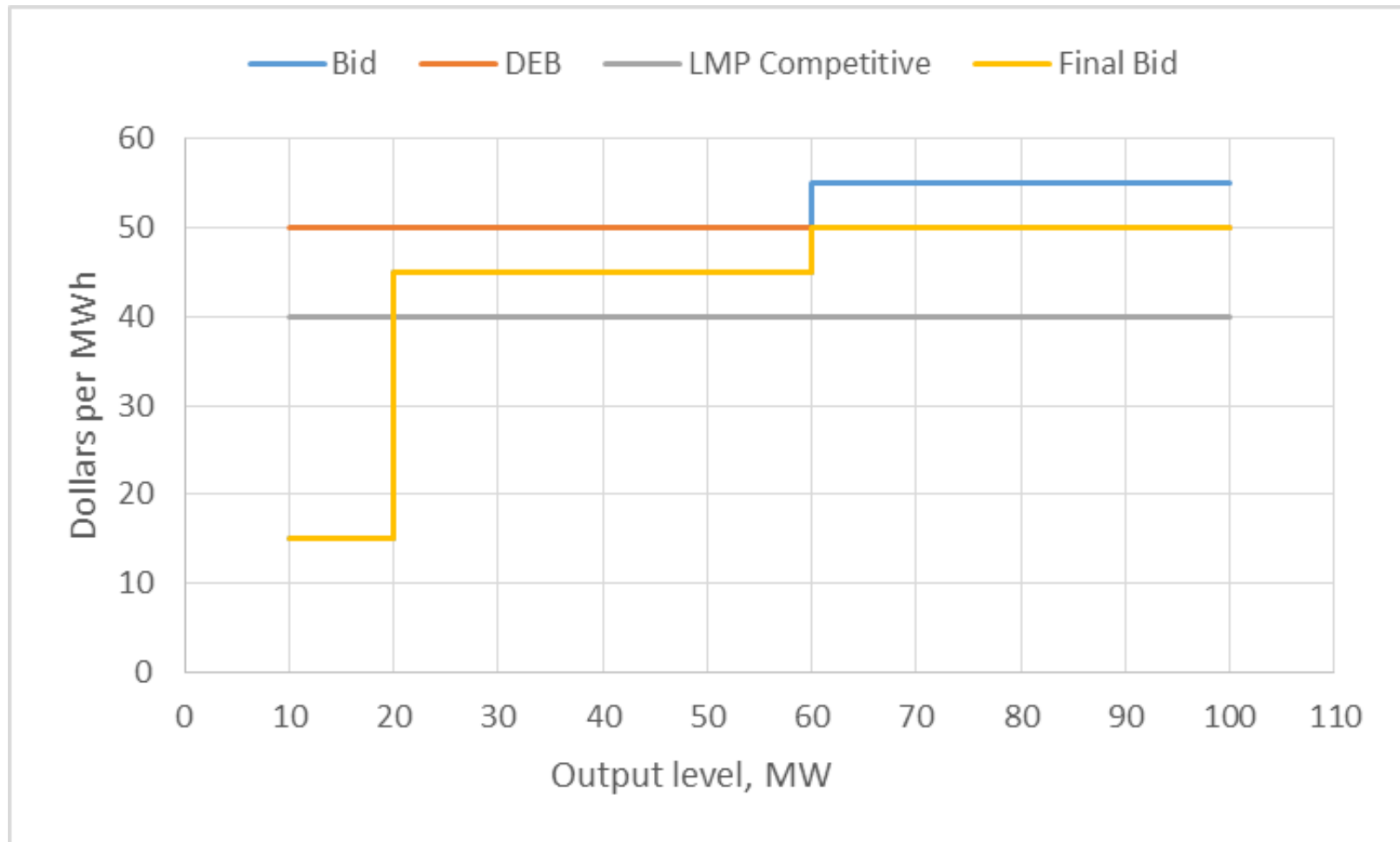
BAA-Level Mitigation Refresher

- When WEIM Transfers into a BAA are constrained, the BAA is tested for competitiveness
 - Using three pivotal supplier test
 - EIM BPM Section 11.3.5.2
- If assessment identifies non-competitive conditions, all bids in that BAA are **subject** to mitigation
 - BAAs almost always determined non-competitive when tested
 - Due to structure of most WEIM BAAs
 - Bids are only mitigated if they are higher than **both** the resource's default energy bid and competitive LMP
- WEIM resources are also subject to local market power mitigation (based on flow-based constraints)
 - However most instances of mitigation of WEIM resources is due to the triggering of BAA-level mitigation

Bids and mitigation examples: inputs



Bids and mitigation examples: mitigated bid



Data details

- Regions

Mountain Northwest	Desert Southwest	Pacific Northwest	California
PacifiCorp East	Arizona Public Service	PacifiCorp West	Turlock Irrigation District
Idaho Power	NV Energy	Seattle City Light	Balancing Area of Northern California
NorthWestern Energy	WAPA Desert Southwest	Bonneville Power Authority	Los Angeles Dept of Water and Power
Avista	Tucson Electric	Powerex	
	Salt River Project	Avangrid	
	El Paso Electric	Portland General	
	New Mexico	Puget Sound	
		Tacoma Power	

Timeframe: January – October, 2023

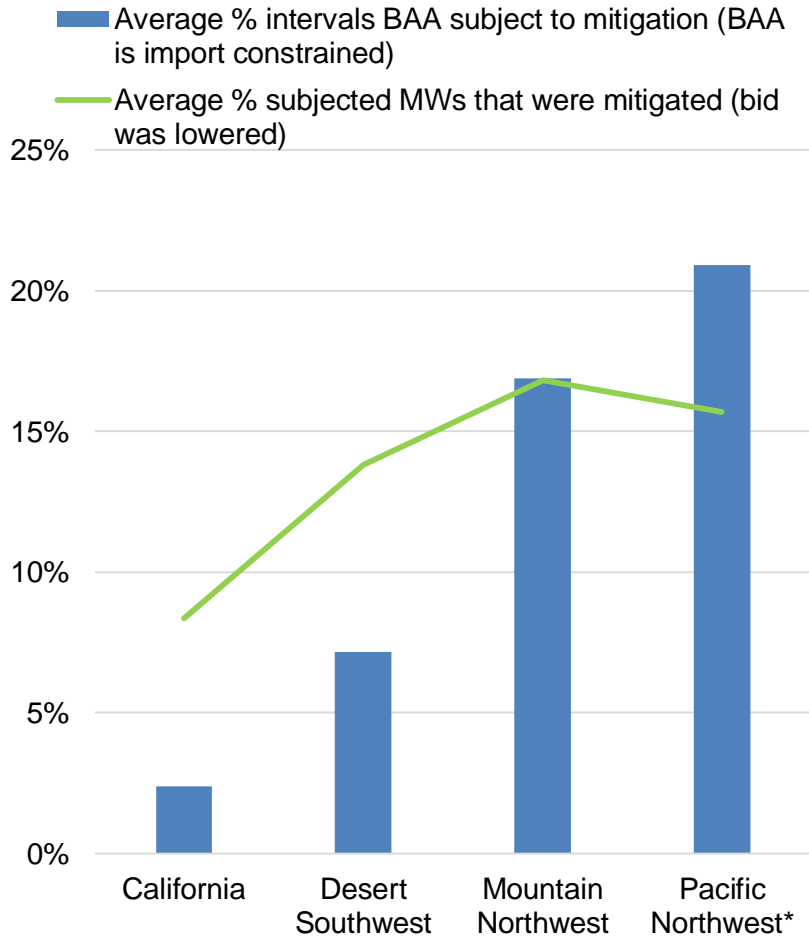
Mitigation terminology

- Interval subject to BAA-level mitigation
 - Interval where BAA is import constrained
 - And BAA is found to be structurally uncompetitive
 - BAAs in WEIM almost always fail this test (3 pivotal supplier)
- % of MW subject to mitigation (when BAA-level mitigation is triggered)
 - BAA-level mitigation is triggered
 - Resource(s) in BAA bid high enough to be mitigated
 - Bids only mitigated when higher than both DEB and competitive LMP

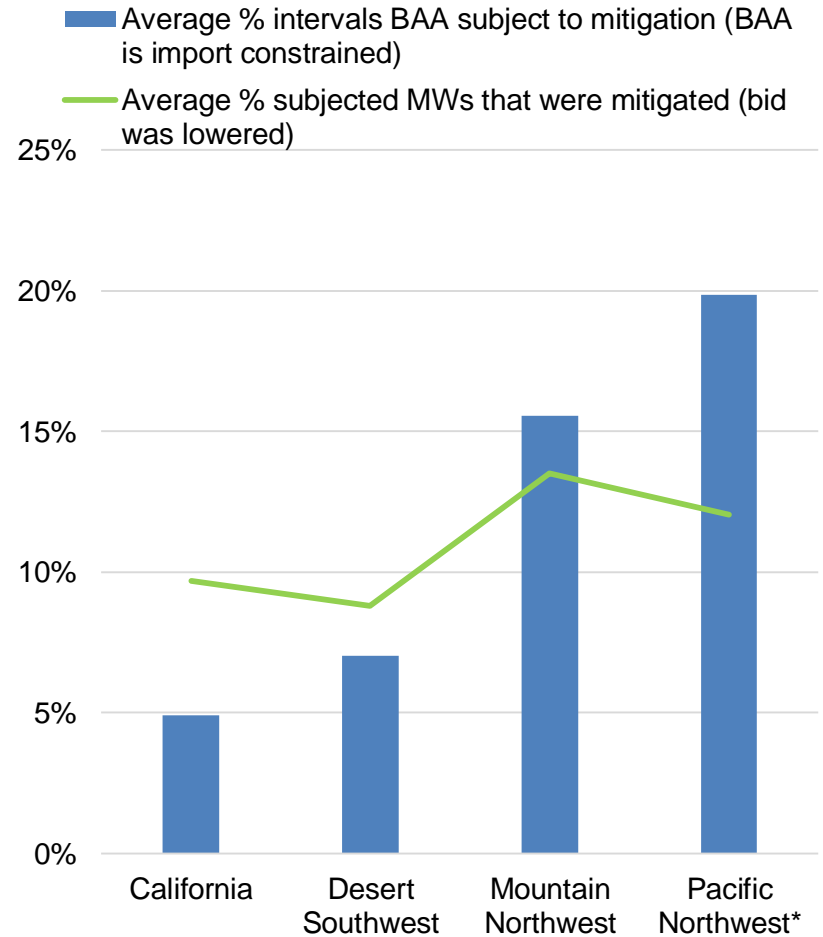
Resource Type	Average DEB
Gas (combined cycle)	\$55
Gas (gas turbine)	\$70
Hydro DEB	\$197

Frequency and magnitude of BAA-level mitigation

RTPD

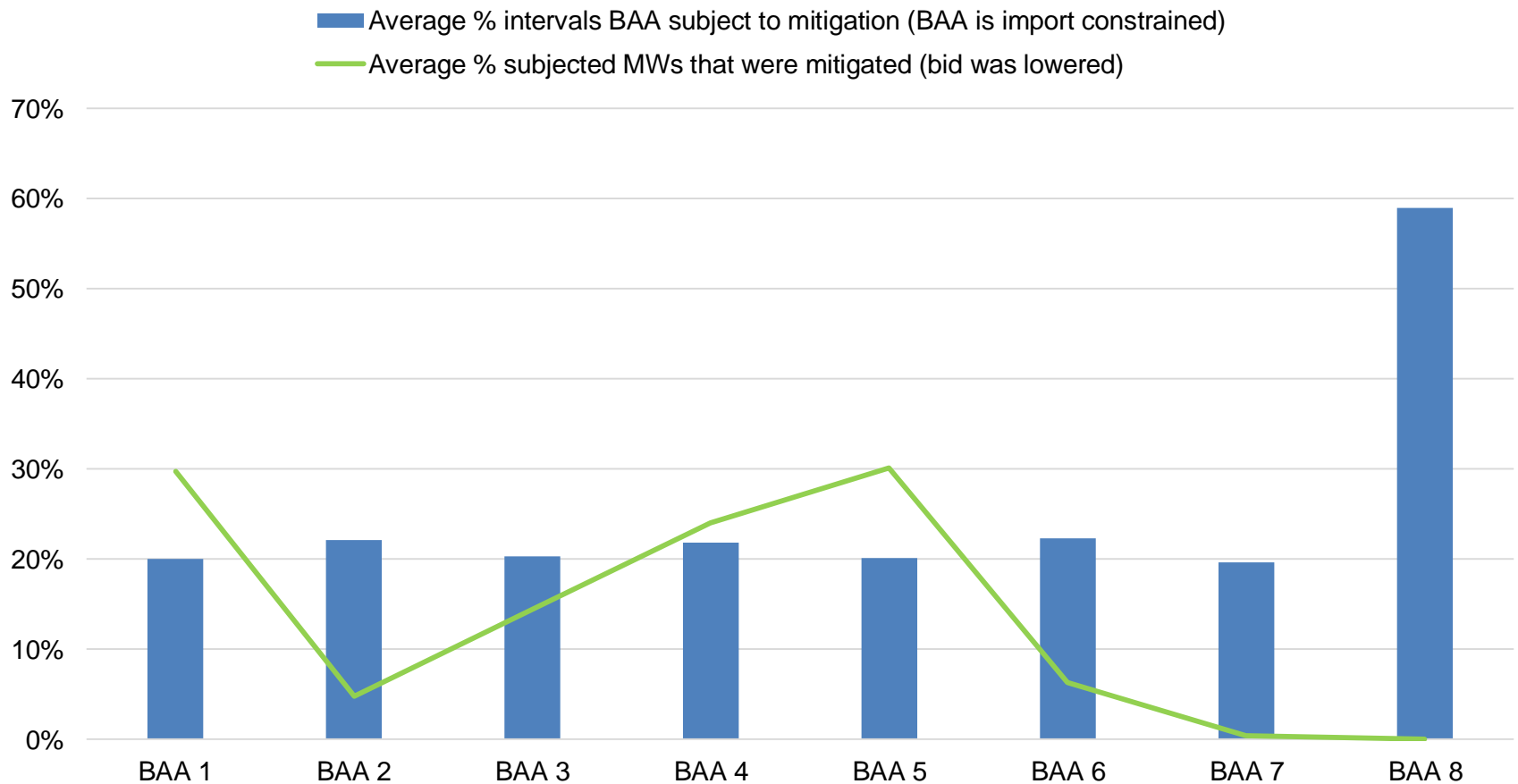


RTD



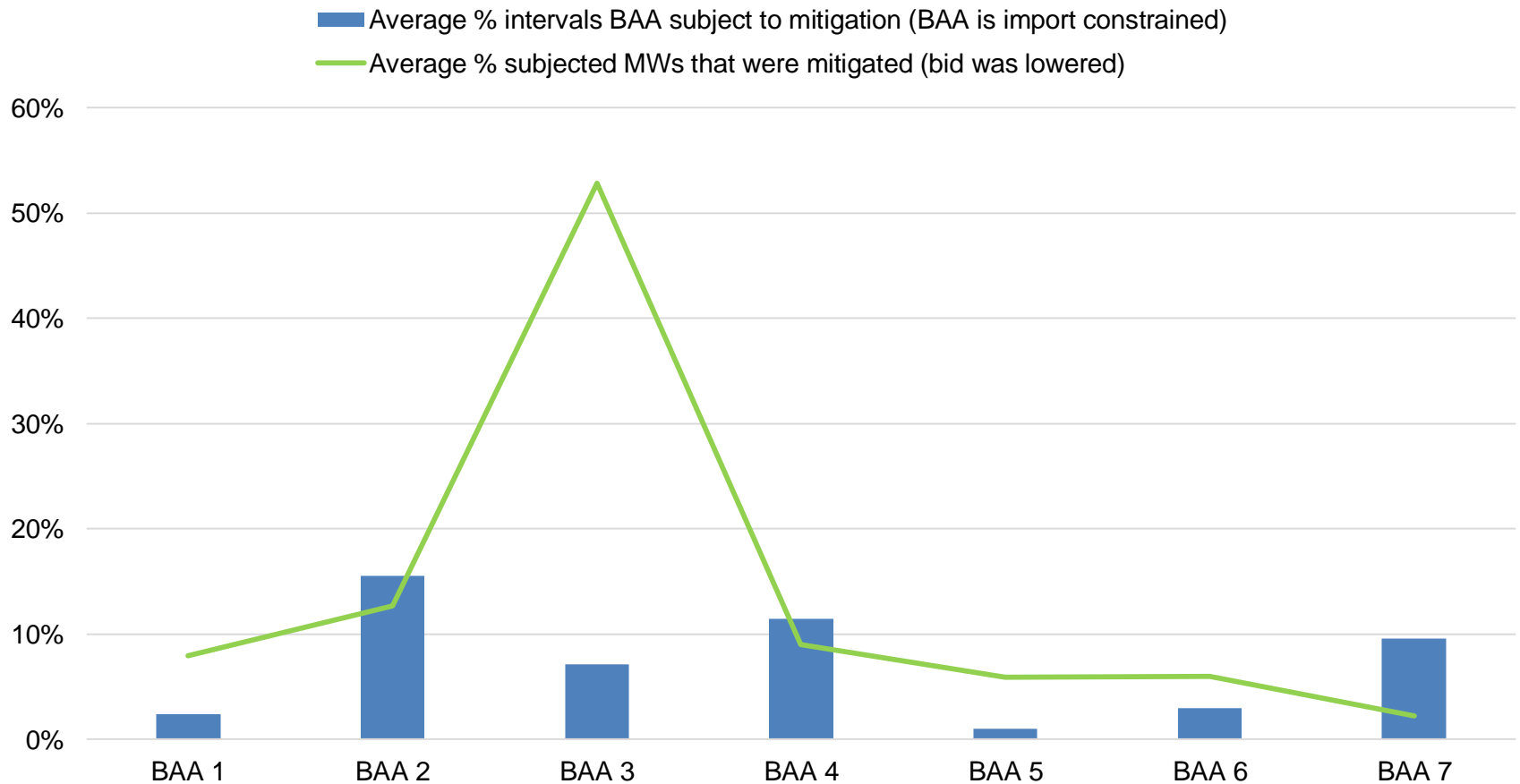
Frequency and magnitude of BAA – level mitigation

Pacific Northwest BAAs (in RTPD)



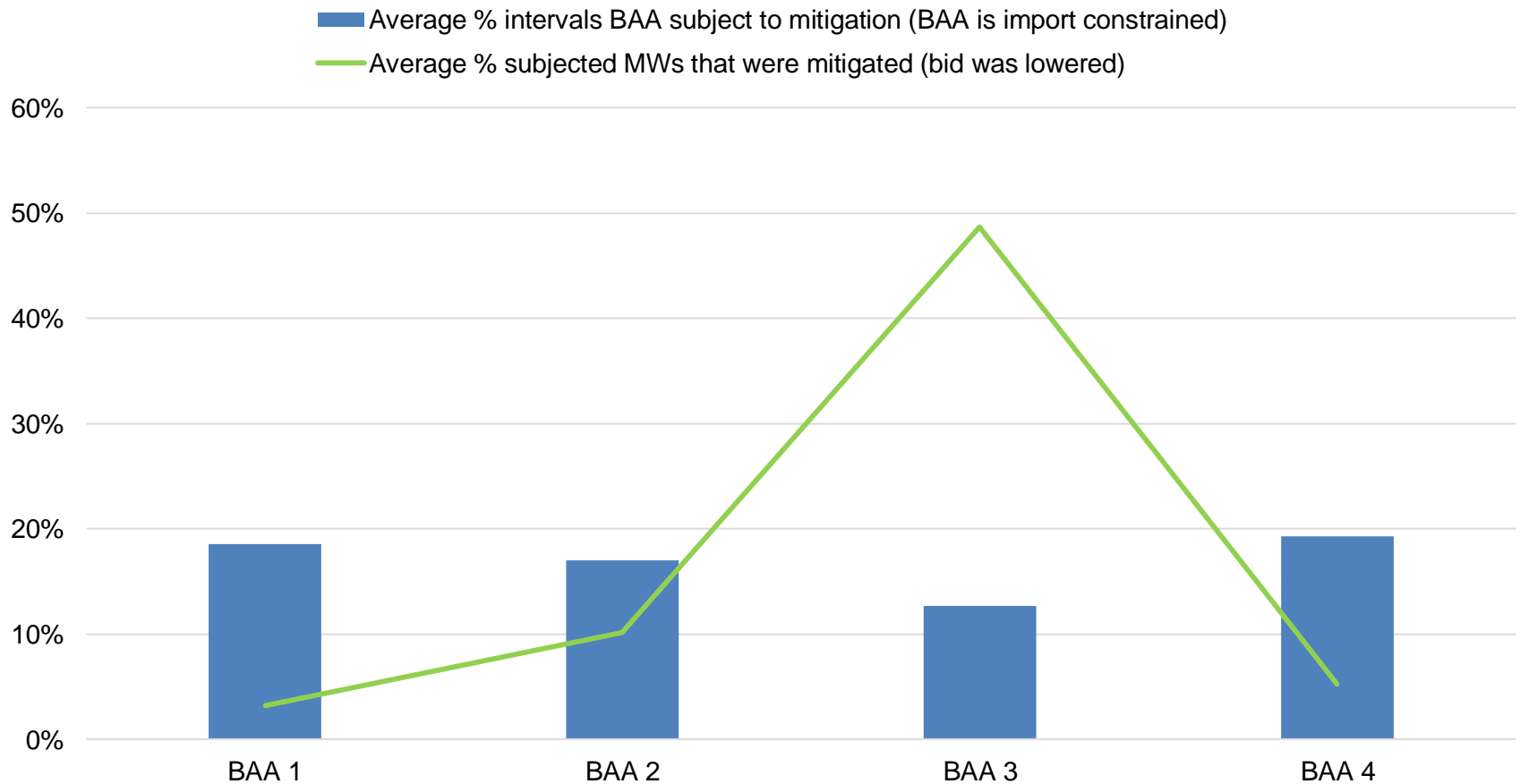
Frequency and magnitude of BAA – level mitigation

Desert Southwest BAAs (in RTPD)



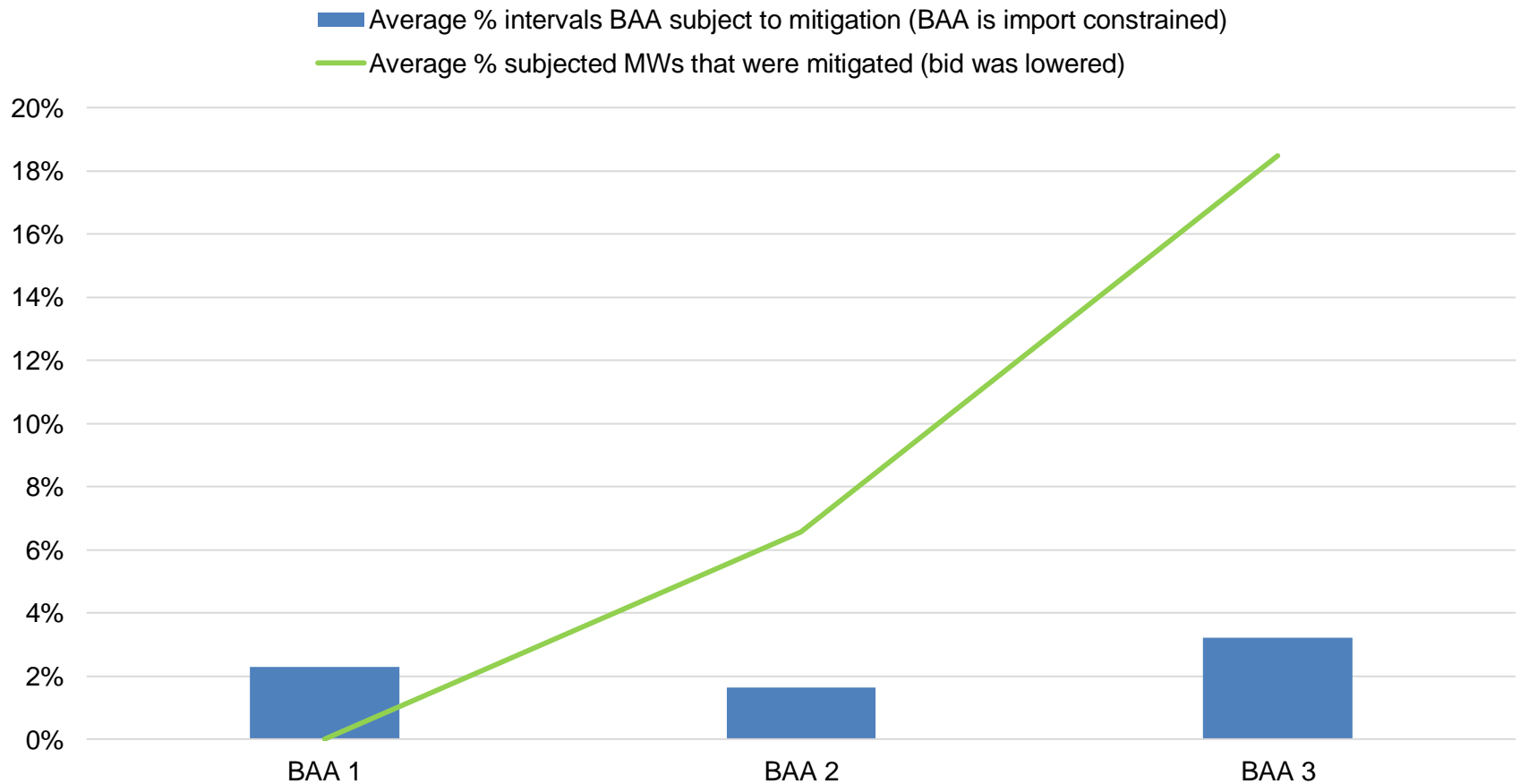
Frequency and magnitude of BAA – level mitigation

Mountain Northwest BAAs (in RTPD)



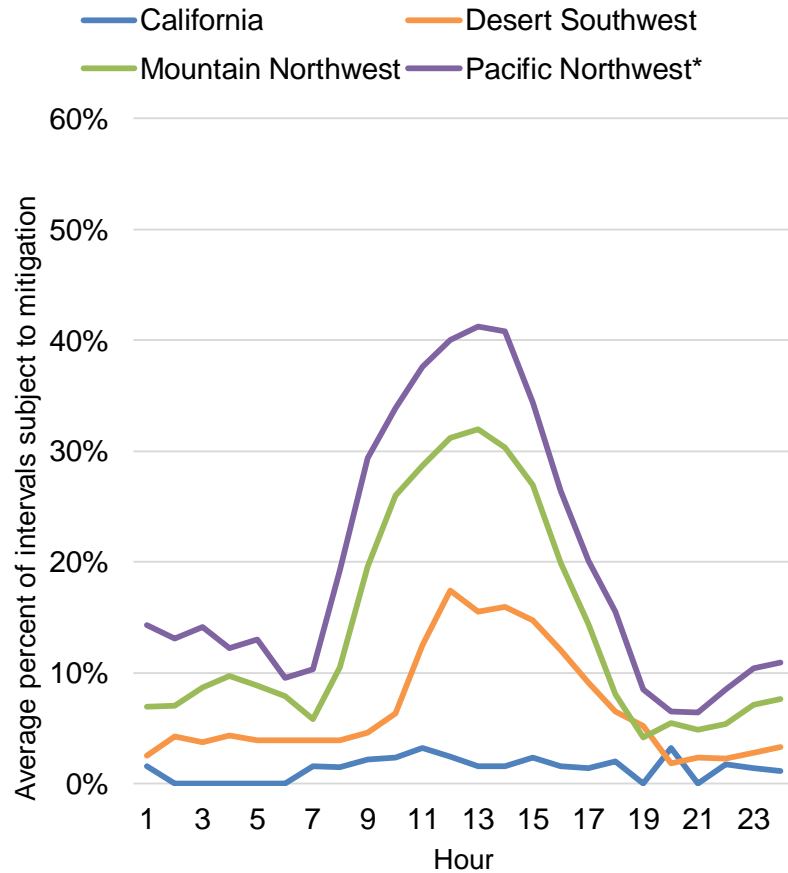
Frequency and magnitude of BAA – level mitigation

California BAAs (in RTPD)

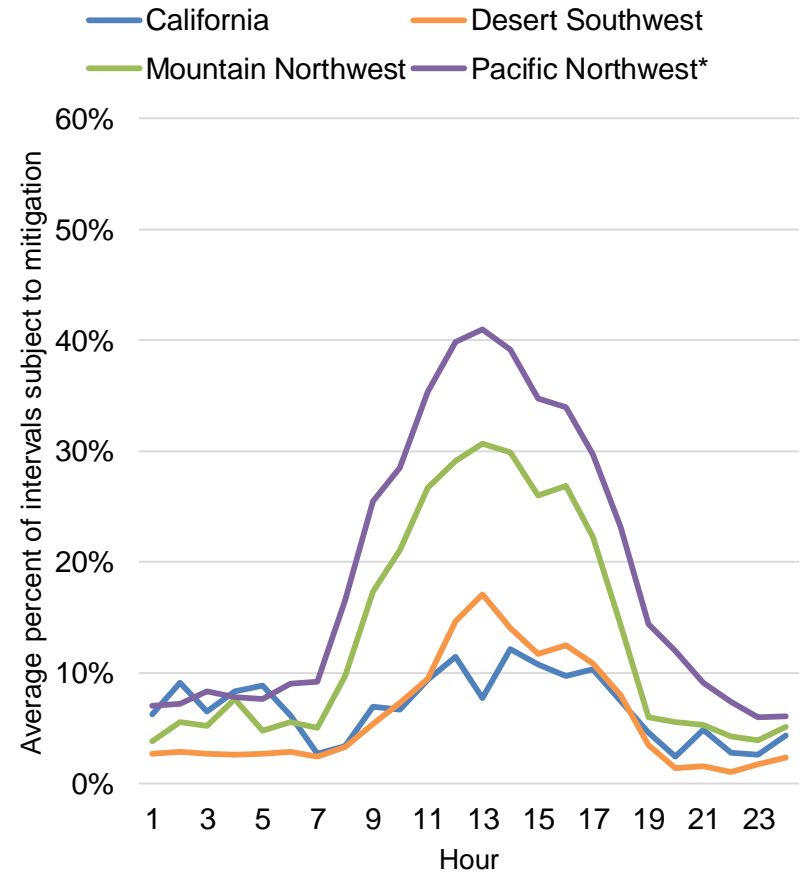


Frequency of areas subject to mitigation – by hour

RTPD

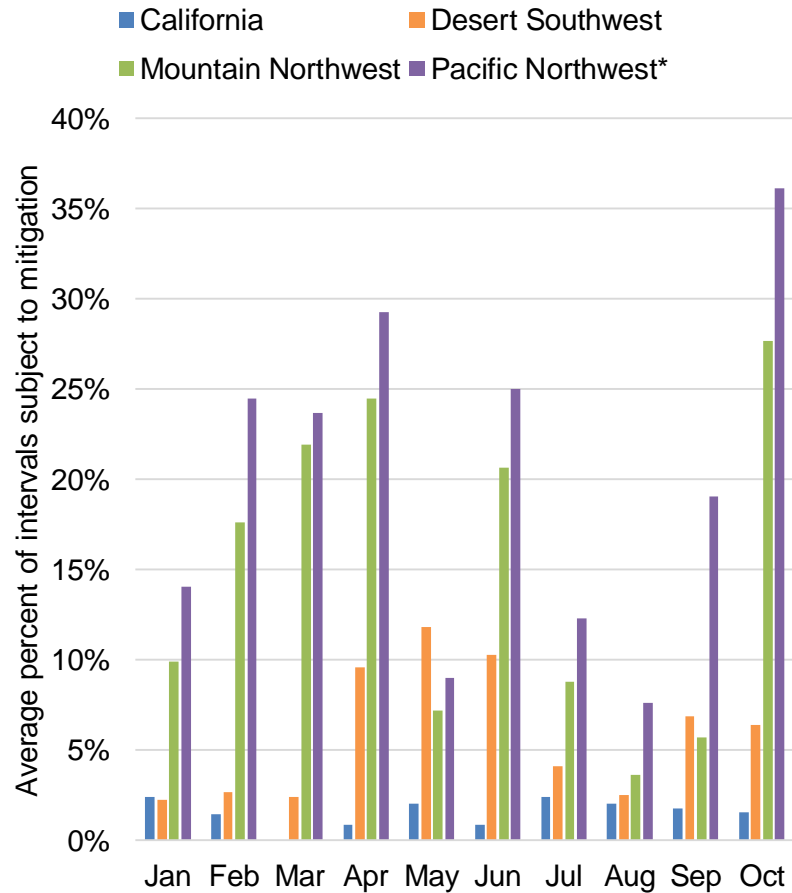


RTD

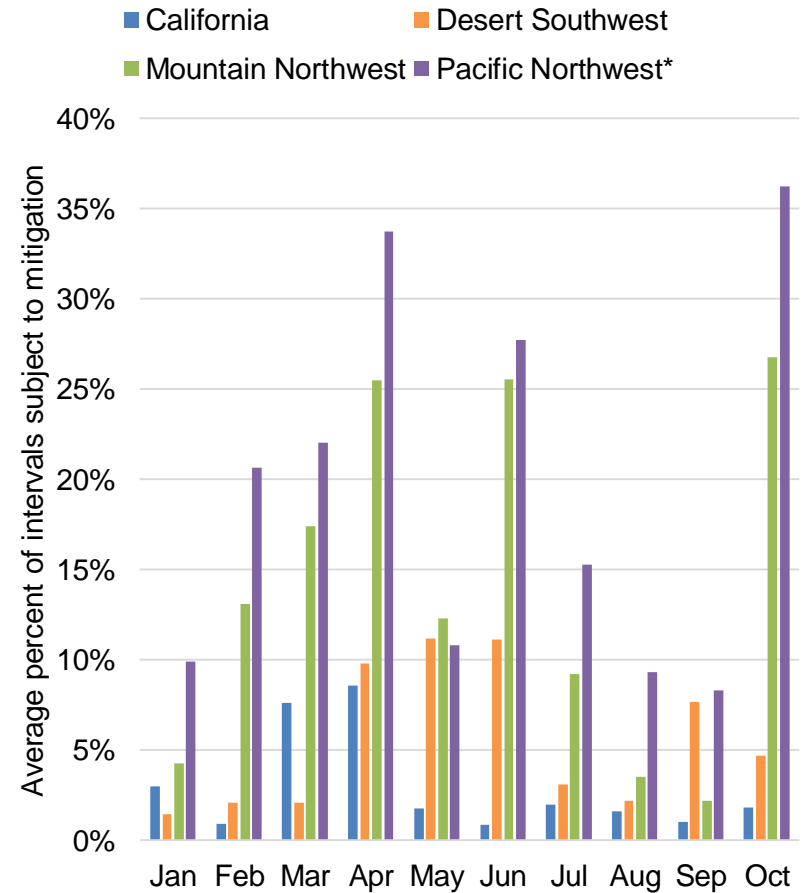


Frequency of areas subject to mitigation – by month

RTPD



RTD



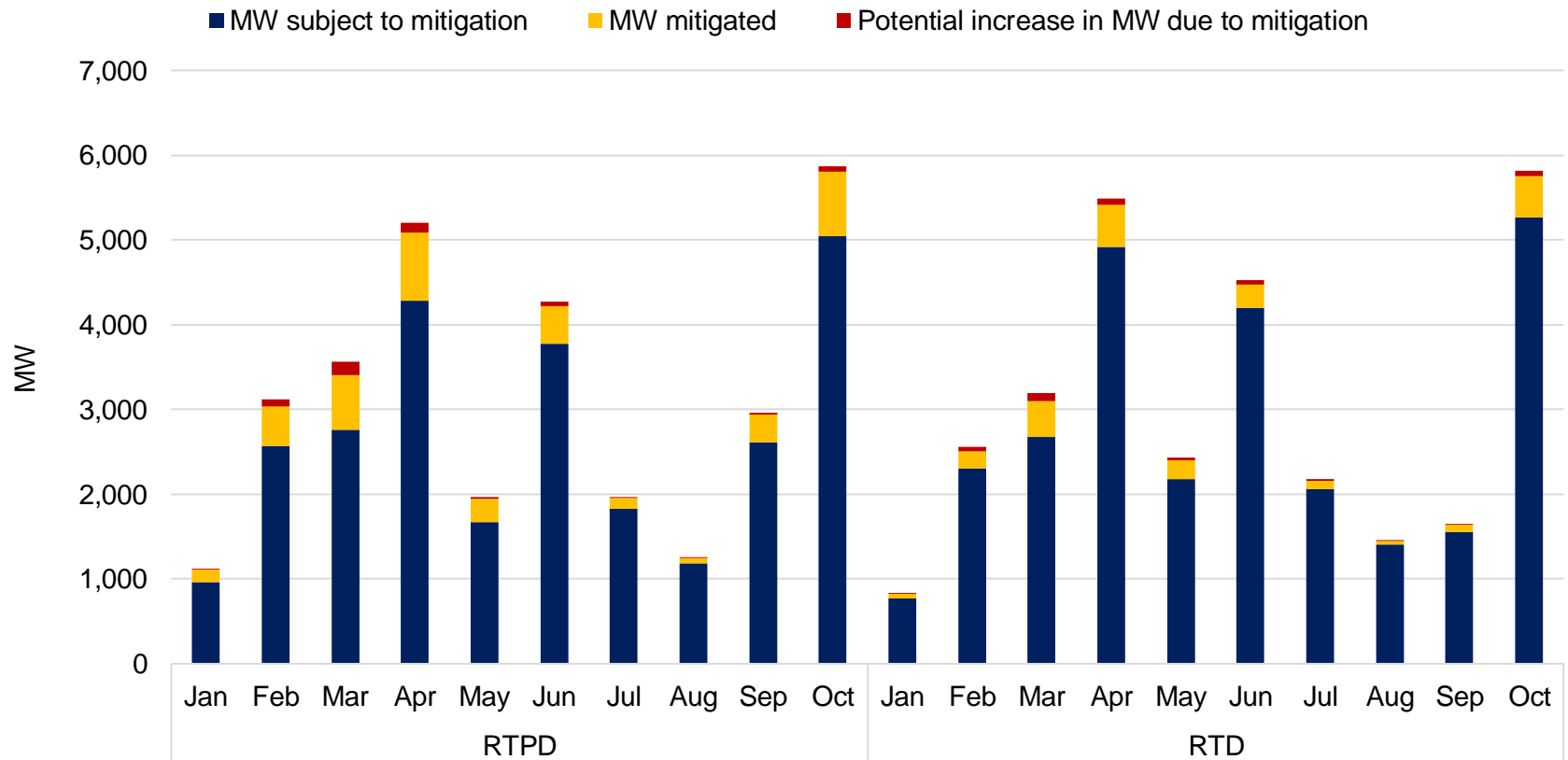
Mitigation terminology

- **MW subject to mitigation**
 - BAA is import constrained
 - And BAA failed the structural test (3 pivotal supplier test)
- **MW mitigated**
 - Bids were changed/lowered because bid was higher than both competitive LMP and default energy bid
- **Potential increase in MW due to mitigation**
 - Bid was lowered enough to potentially cause additional dispatch from that resource

Average monthly mitigation in WEIM

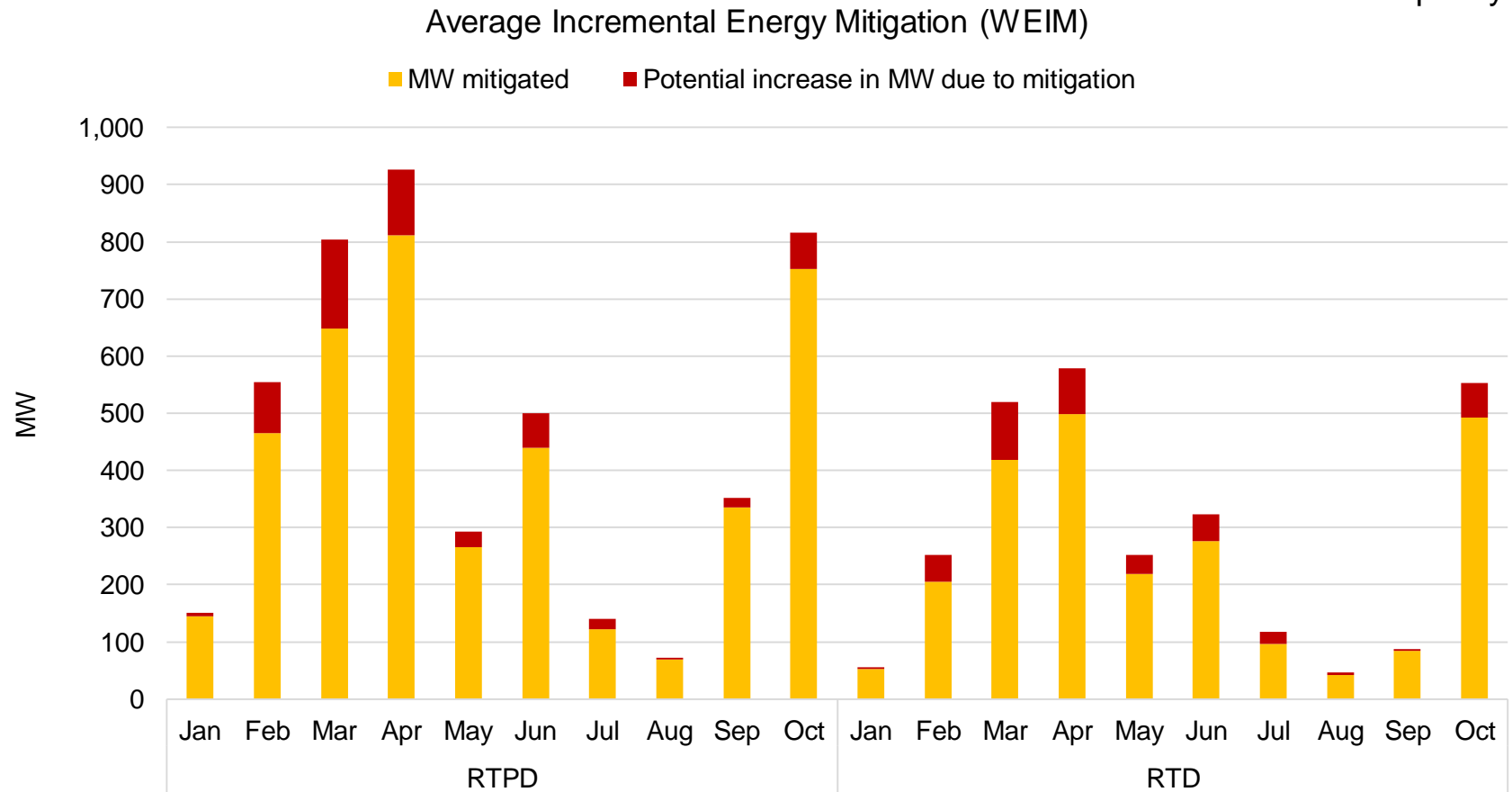
Around
87,000 MW of
participating
capacity

Average Incremental Energy Mitigation (WEIM)



Average monthly mitigation in WEIM

Around 87,000 MW of participating capacity



Questions?



BAA Group Market Power Mitigation

Stakeholder Working Group: Price Formation Enhancements

George Angelidis, Ph.D.

Executive Principal, Power Systems Technology Development

Thursday, November 16, 2023

Local Market Power Mitigation in EDAM

- MPM pass for IFM
 - DCPA RSI-3 for binding constraints in base and IRU/IRD deployment scenarios
 - Mitigate energy/IRU bids (above competitive LMP/IRUMP) providing counter flow to binding uncompetitive constraints (initially, no IRU bid mitigation)
- IFM with mitigated energy/IRU bids
- MPM pass for RUC (initially, no MPM-RUC pass)
 - DCPA RSI-3 for binding constraints in RCU and RCD deployment
 - Mitigate RCU bids (above competitive RCUMP) providing counter flow to binding uncompetitive constraints
- RUC with mitigated RCU bid

Local Market Power Mitigation in WEIM

- MPM pass for FMM
 - DCPA RSI-3 for binding constraints in base and FRU and FRD deployment scenarios
 - Mitigate energy bids (above competitive LMP) providing counter flow to binding uncompetitive constraints
- FMM with mitigated energy bids
- MPM for RTD advisory intervals (3)
 - DCPA RSI-3 for binding constraints in base and FRU and FRD deployment scenarios
 - Mitigate energy/FRU bids (above competitive LMP/FRUMP) providing counter flow to binding uncompetitive constraints
- RTD with mitigated energy bids

Current EIM BAA Market Power Mitigation

- Similar principles to LMPM
 - DCPA RSI-3 applies to the Power Balance Constraint (PBC) for each EDAM/EIM BAA, except CISO which is assumed competitive
 - Supply counter flow (SCF) includes all supply schedules
 - Demand for counter flow (DCF) is the scheduled load (IFM) or the demand forecast (RUC/RTM)
 - DCPA is triggered when the PBC shadow price (MEC) is higher than the CISO MEC due to import transfer congestion from CISO to the BAA



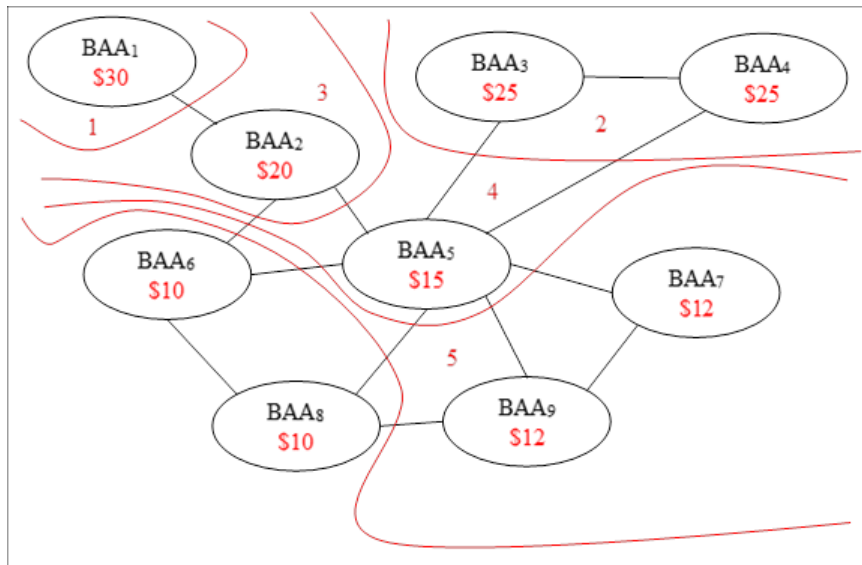
EDAM/WEIM BAA Market Power Mitigation enhancement

- CISO is not assumed competitive; treated like any BAA
- Group EDAM/EIM BAAs with equal MEC
 - Only if there is a direct transfer connection among the BAAs in the group
 - No transfer congestion among the BAAs in the group
- Sort BAA groups based on descending MEC
 - Top group is import-constrained
 - Bottom group is export-constrained
 - Intermediate groups are import-constrained from lower-priced groups and export-constrained to higher-priced groups

BAA group Market Power Mitigation method

- Start from the top BAA group and progressively move downward
 - Add the current BAA group to higher-priced BAA groups
 - Only if there is a direct transfer connection
 - Perform the RSI test for the expanded BAA group
 - If the RSI test fails, mitigate all energy bids in the current BAA group that was added
 - The competitive LMP is determined when the RSI test passes in a following step
 - If the RSI test passes
 - The current BAA group is competitive; no mitigation

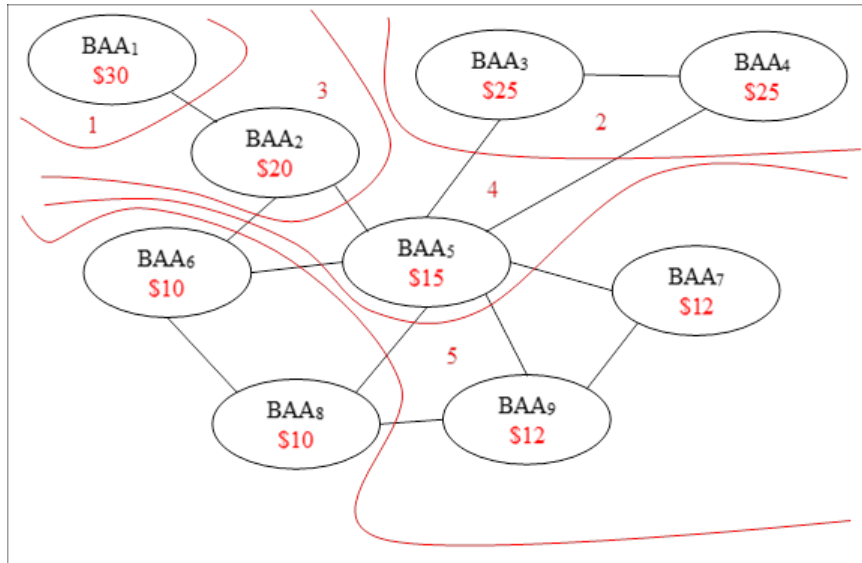
Graphical description of BAA grouping steps



■ BAA grouping steps

- 1 BAA 1
- 2 BAAs 3-4
- 3 BAAs 1-2
- 4 BAAs 1-5
- 5 BAAs 1-5, 7, 9
- 6 All

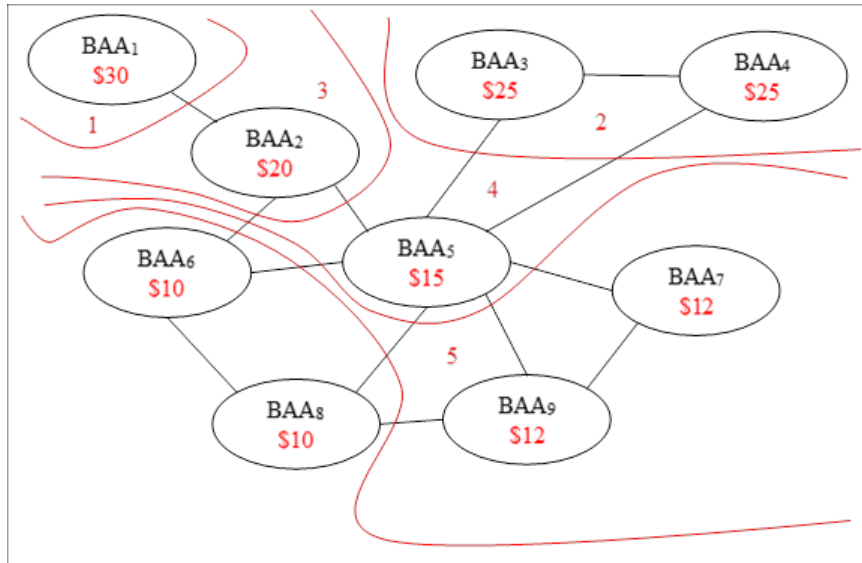
BAA group mitigation example 1



■ BAA grouping steps

- ❶ BAA 1 fail; mitigate BAA 1
- ❷ BAAs 3-4 pass; no mitigation
- ❸ BAAs 1-2 fail; mitigate BAA 2
- ❹ BAAs 1-5 pass
 - Competitive LMP: \$15/MWh
- ❺ BAAs 1-5, 7, 9 pass
- ❻ All pass

BAA group mitigation example 2



■ BAA grouping steps

- 1 BAA 1 fail; mitigate BAA 1
- 2 BAAs 3-4 pass; no mitigation
- 3 BAAs 1-2 fail; mitigate BAA 2
- 4 BAAs 1-5 fail; mitigate BAA 5
- 5 BAAs 1-5, 7, 9 pass
 - Competitive LMP: \$12/MWh
- 6 All pass

Additional BAA group MPM design details

- Intertie bids (CISO) are not subject to mitigation
 - Include SCF from intertie resources in pivotal supply determination?
 - SCF from intertie resources is limited by the applicable ISL/ITC
- Virtual bids (CISO) are included in SCF, but not mitigated
- SCF only from supply in excess of scheduled load for SC affiliates in pivotal supply determination?
- Mitigate bids only from pivotal suppliers?
 - Three highest pivotal suppliers and anyone replacing the 3rd while $RSI < 1$



California ISO

BAA Group Market Power Mitigation

Stakeholder Discussion

Problem Statement Refinement

Problem Statement #5

BAA-Level MPM

The Dynamic Competitive Path Assessment tests BAAs in isolation and does not consider external available supply.

Market impacts: Should result in a reduction of BAA level
DCPA test failures

Problem Statement #6

BAA-Level MPM

The CAISO BAA is always considered “competitive” and the DCPA does not apply to it.

Market impacts: May lead to under-mitigation in the CAISO and to WEIM areas during conditions where the CAISO BAA is not itself structurally competitive.

Next steps

Comment template for today's session – long comment window

Next Session - Fast Start Pricing (FSP) Analysis

- Presentation of initial analysis based off Stakeholder feedback in Working Group session # 6 (presentation linked here)
- Opportunity to provide additional feedback on FSP Analysis

Upcoming PFE Working Group Sessions

- January 2024 – Scarcity Pricing
 - Problem Statement Formulation and necessary analysis

For reference

- Visit initiative webpage for more information:
<https://stakeholdercenter.caiso.com/StakeholderInitiatives/Price-formation-enhancements>
- If you have any questions, please contact Brenda Corona at bcorona@caiso.com or isostakeholderaffairs@caiso.com



- *Energy Matters* blog provides timely insights into ISO grid and market operations as well as other industry-related news

<http://www.caiso.com/about/Pages/Blog/default.aspx>.

Read a recent article featured in the blog:



October 10, 2023

Leadership, Markets, Operations, Transmission

Working with stakeholders toward a “significantly reformed interconnection process”

By Danielle Osborn Mills Principal, Infrastructure Policy Development

Since working with stakeholders to identify the best ways to address overheated interconnection queues in 2022 and 2023, the California Independent System Operator (ISO) recently released its new Straw Proposal designed to greatly improve the overall efficiency ...

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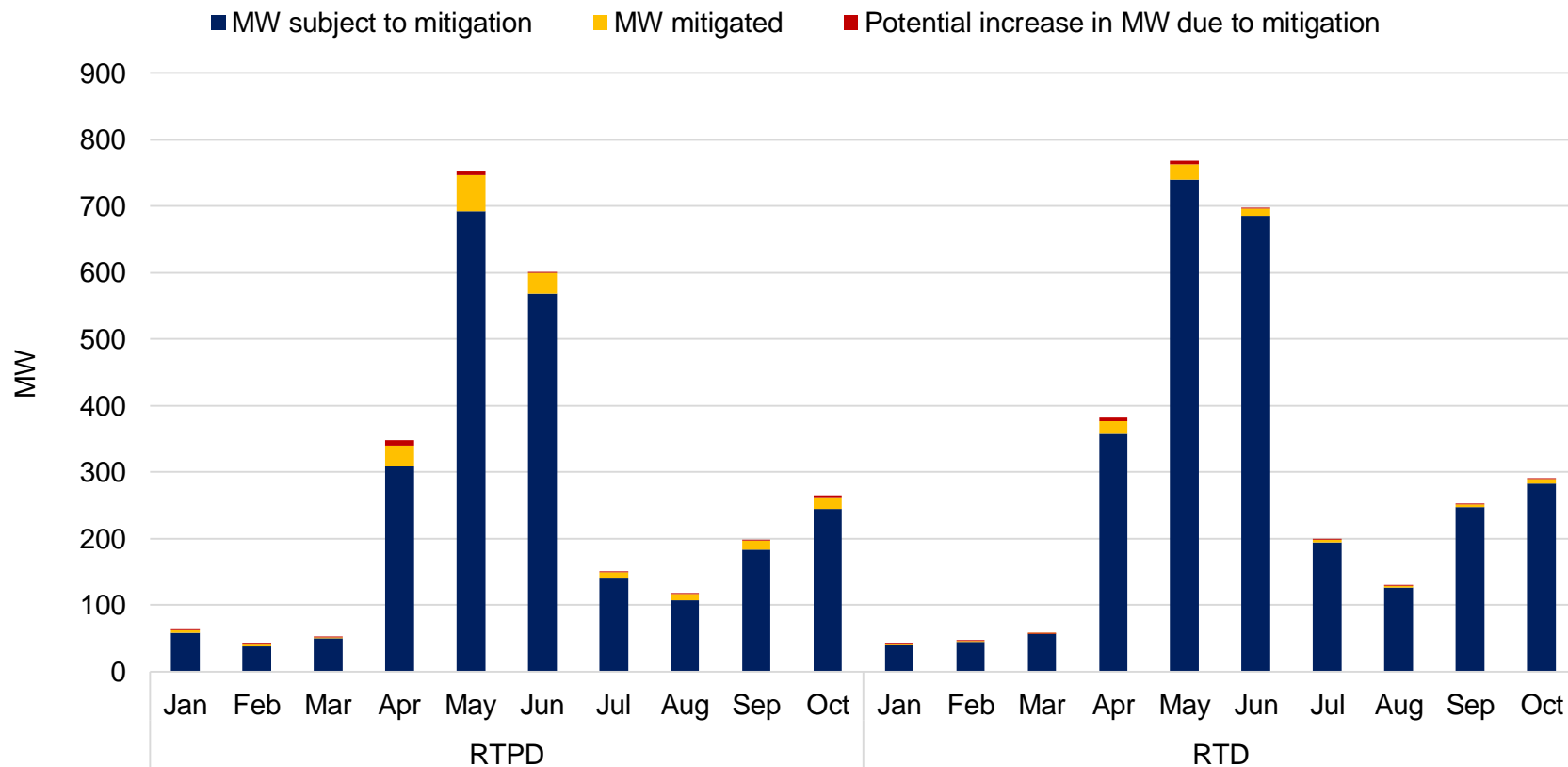
Appendix Slides

Average monthly mitigation by region

Average monthly mitigation by region

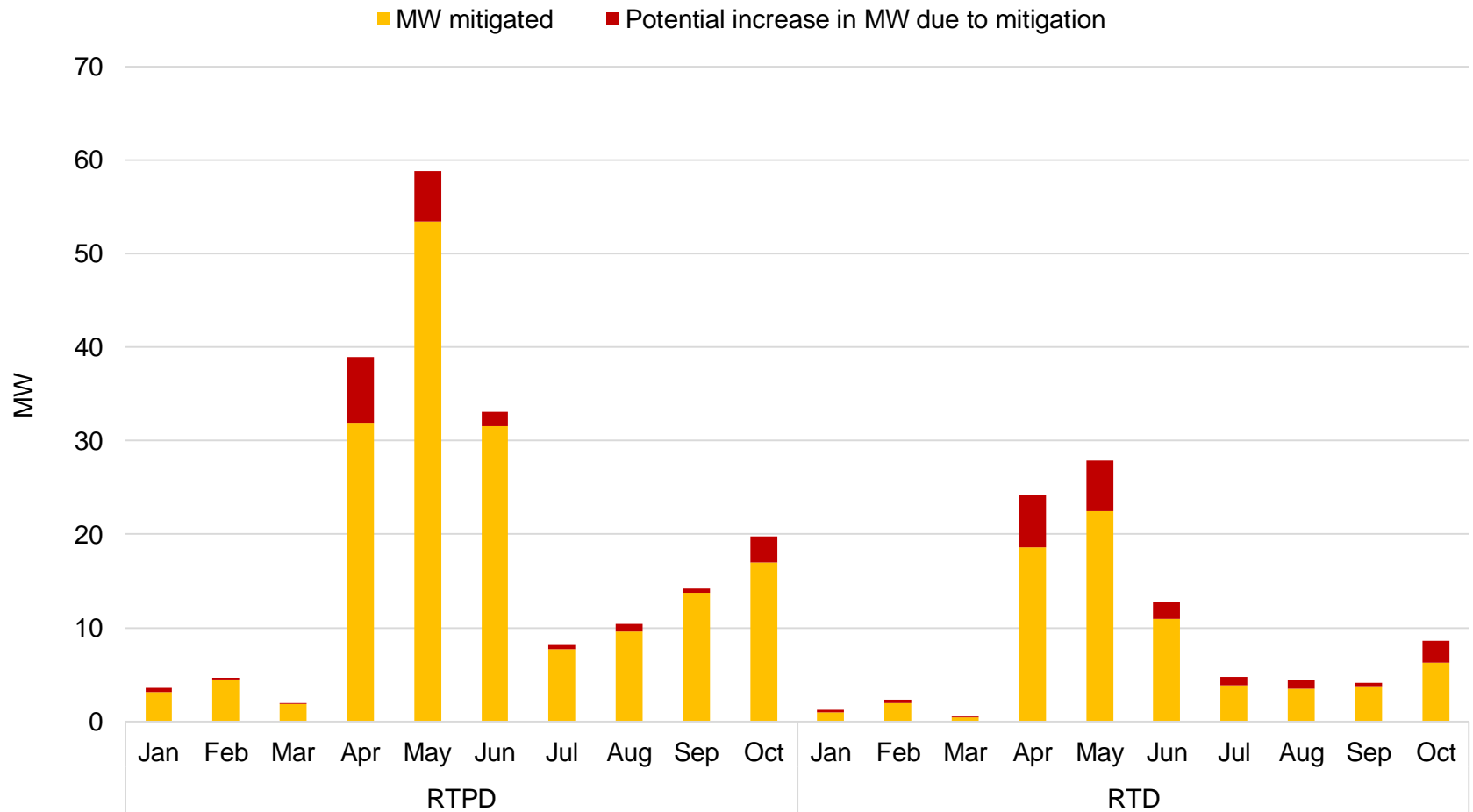
Around
33,000 MW of
participating
capacity

Average Incremental Energy Mitigation (Desert Southwest)



Average monthly mitigation by region

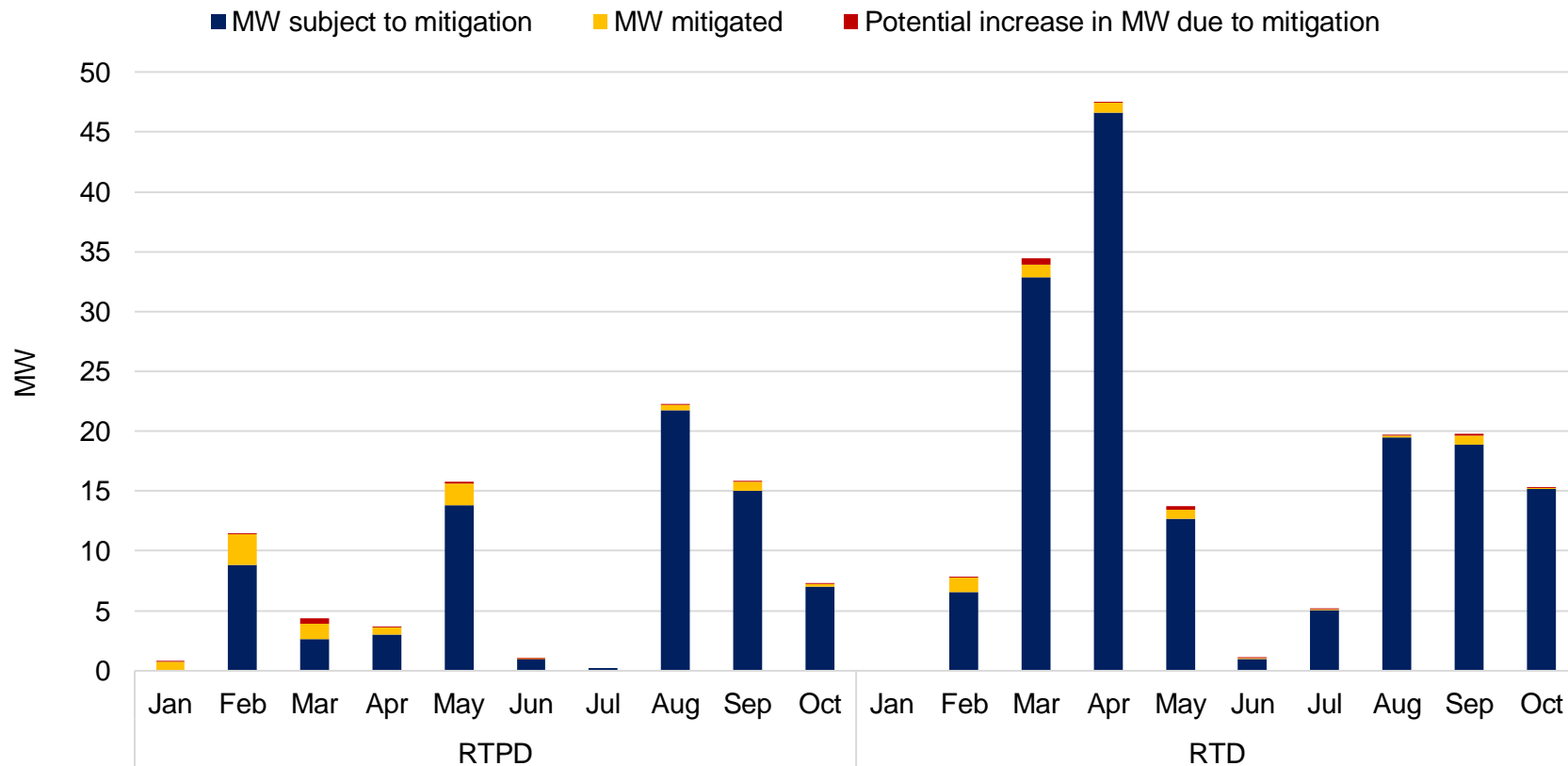
Average Incremental Energy Mitigation (Desert Southwest)



Average monthly mitigation by region

Around
15,000 MW of
participating
capacity

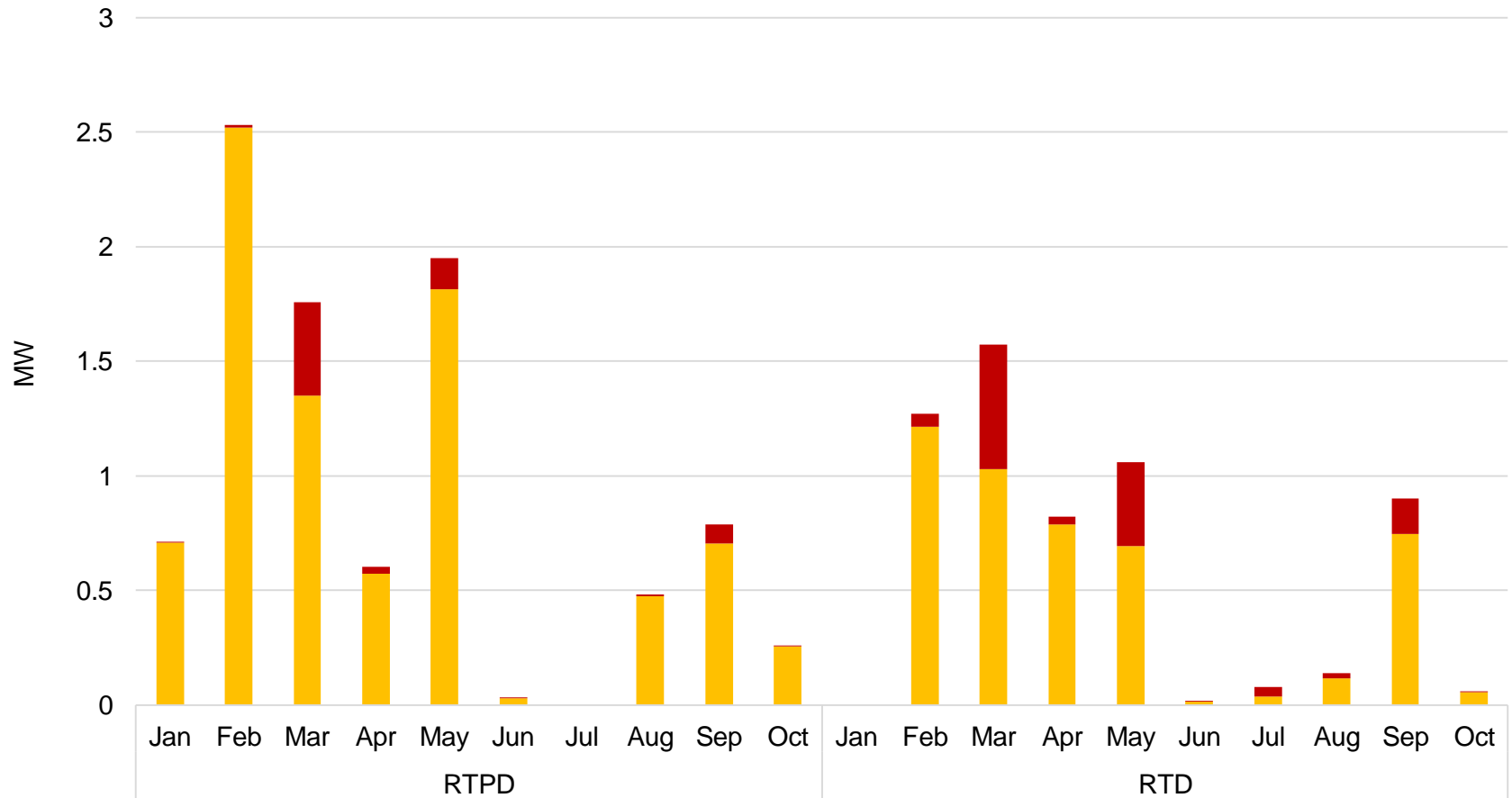
Average Incremental Energy Mitigation (California)



Average monthly mitigation by region

Average Incremental Energy Mitigation (California)

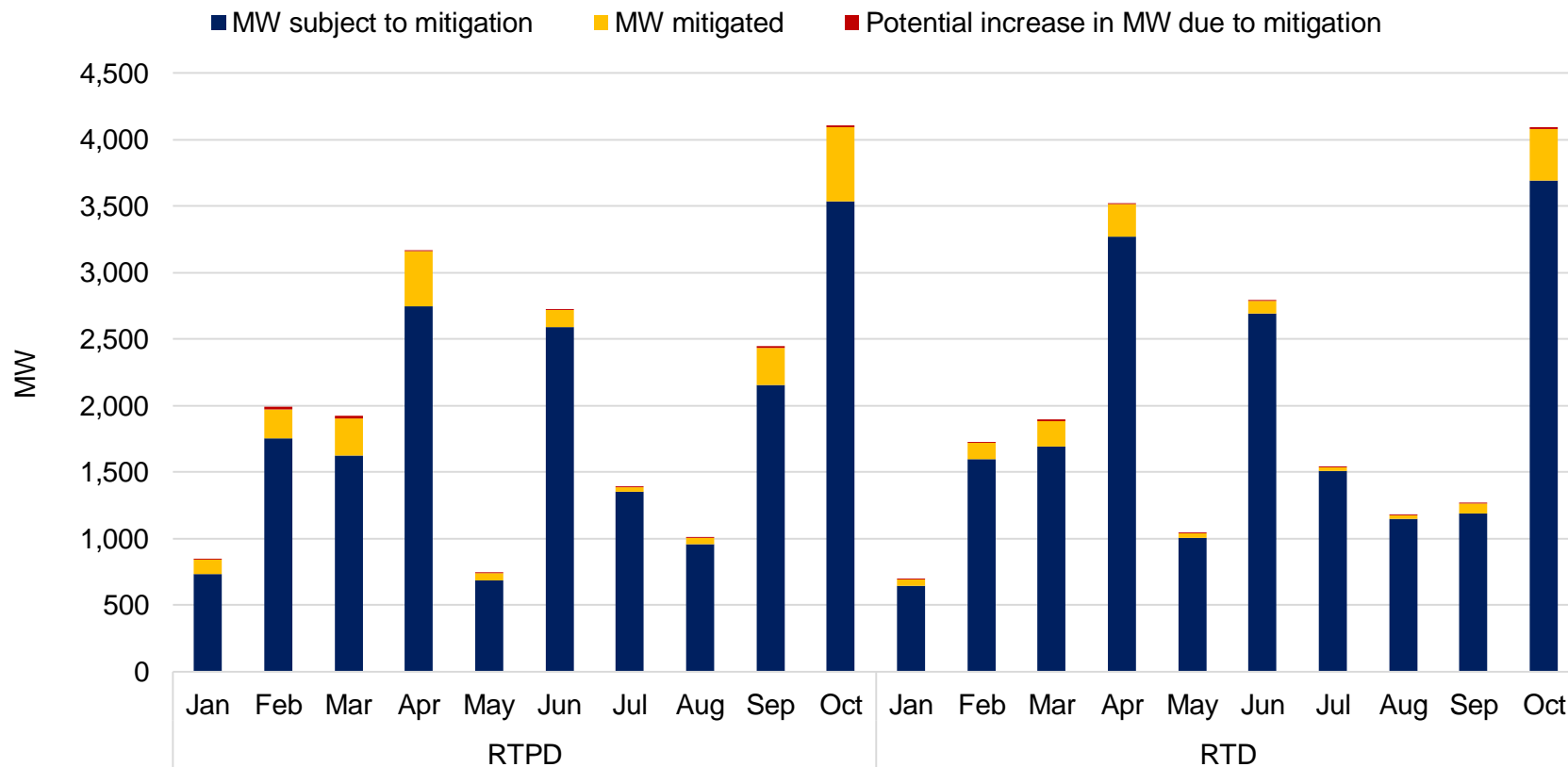
■ MW mitigated ■ Potential increase in MW due to mitigation



Average monthly mitigation by region

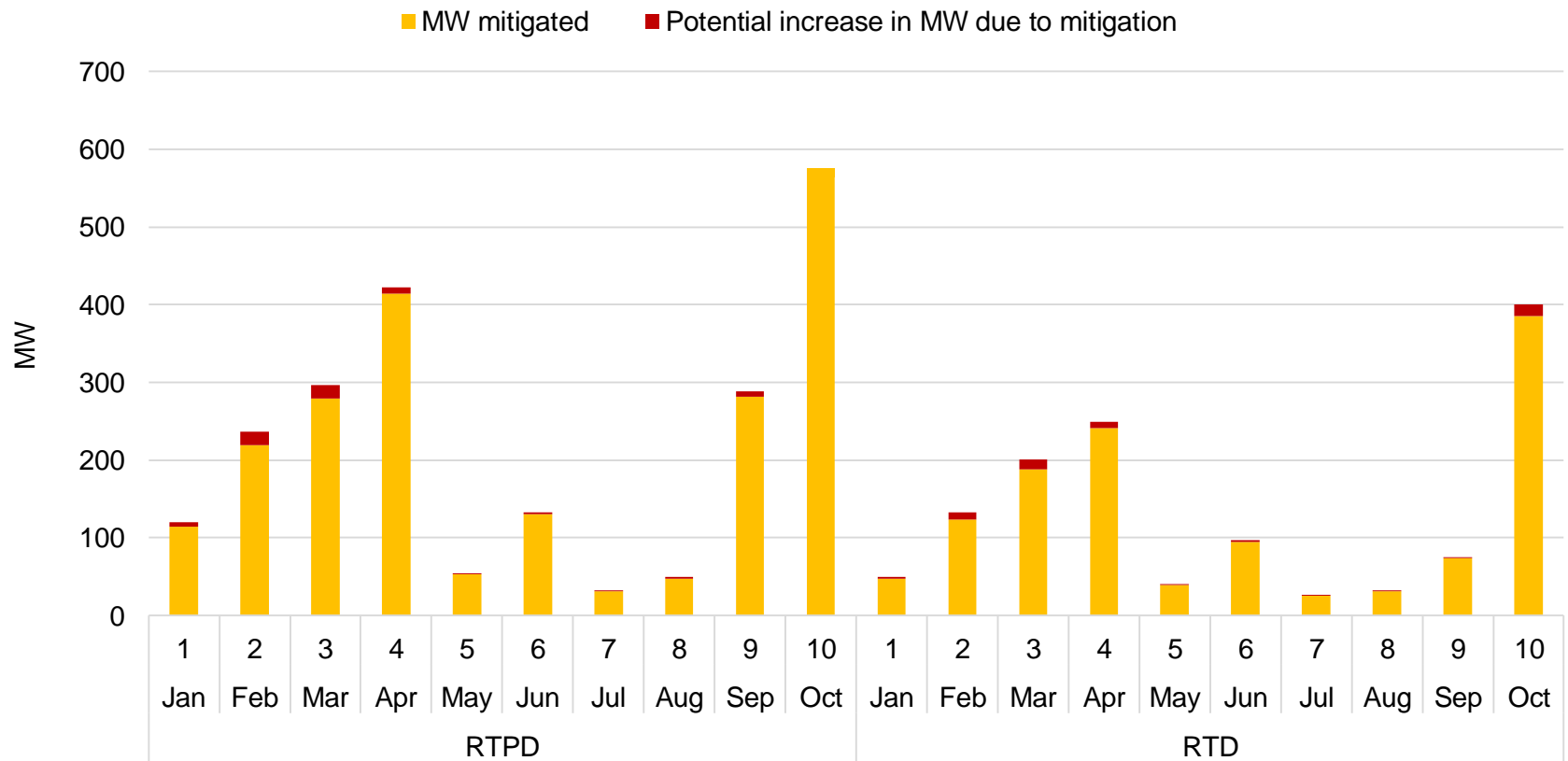
Around
20,000 MW of
participating
capacity

Average Incremental Energy Mitigation (Pacific Northwest)



Average monthly mitigation by region

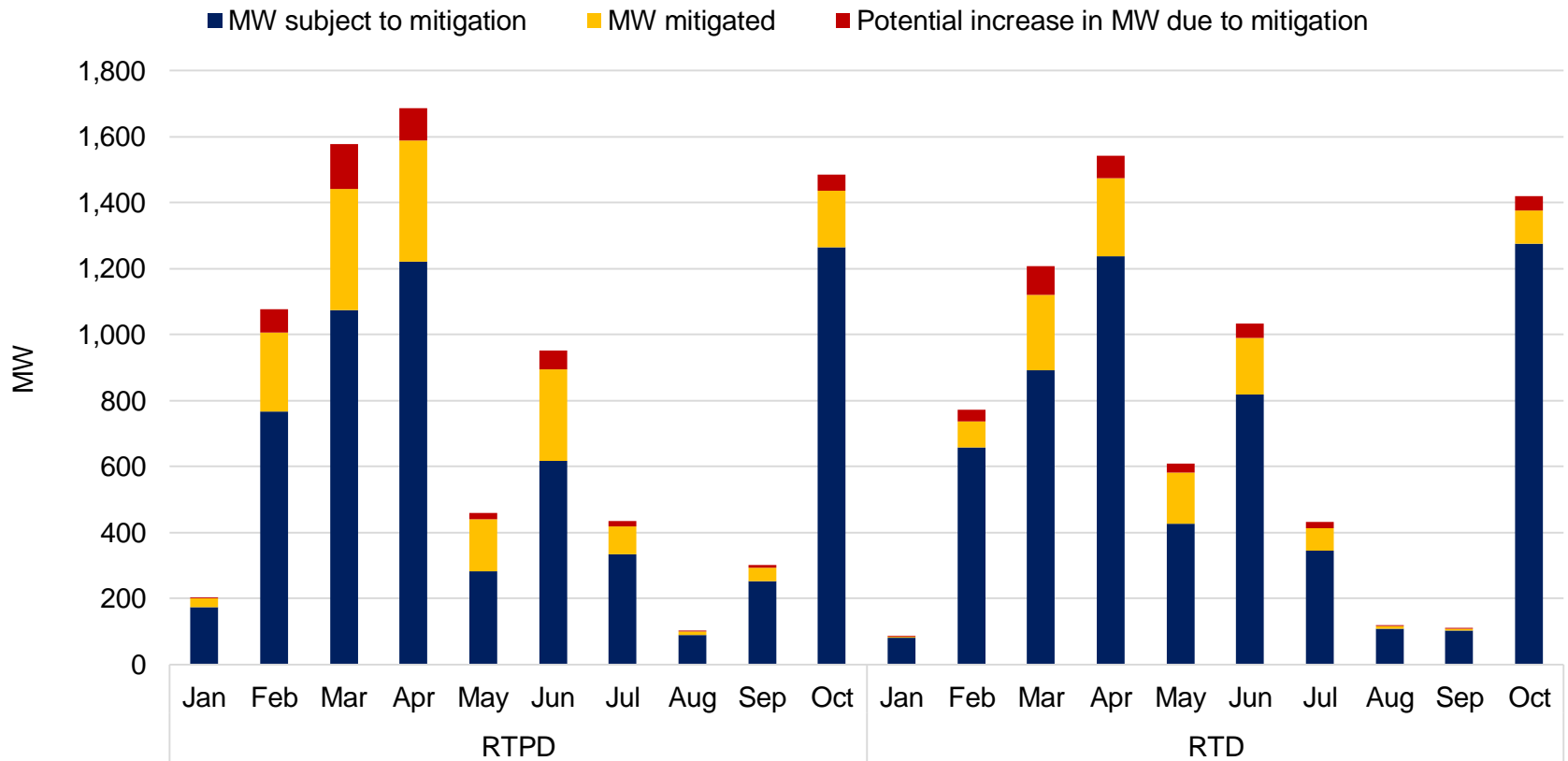
Average Incremental Energy Mitigation (Pacific Northwest)



Average monthly mitigation by region

Around
18,000 MW of
participating
capacity

Average Incremental Energy Mitigation (Mountain Northwest)



Average monthly mitigation by region

Average Incremental Energy Mitigation (Mountain Northwest)

