

WESTERN ENERGY MARKETS

Regional Issues Forum

April 9, 2025

9:00 a.m. – 12:30 p.m. (Pacific Time)



Agenda

9:00 a.m. – 9:10 a.m.	Welcome, Opening Remarks & Announcements
9:10 a.m. – 10:10 a.m.	Roundtable Discussion – CAISO Policy Initiatives Catalog and Roadmap
10:10 a.m. – 11:00 a.m.	RIF Enhancements
11:00 a.m. – 11:15 a.m.	Break
11:15 a.m. – 12:30 p.m.	Market Seams
12:30 p.m.	Closing Remarks and wrap up

WESTERN ENERGY MARKETS

Regional Issues Forum Policy Initiative Roundtable

April 9, 2025



Regional Issues Forum Roundtable – Overview and Agenda

- Provide an open and transparent stakeholder forum to review and discuss sector-level priorities for the 2025 Policy Initiatives Catalog and Roadmap
- Agenda:

Review of process and outcomes	~2 minutes
Sector Presentations	30 minutes
Comments by stakeholders not assigned to sectors and public comments	5 minutes
Summary of input, themes, and priorities	10 minutes
Body of State Regulators, EIM Governing Body, and ISO management remarks	15 minutes
Closing and next steps	~2 minutes

Regional Issues Forum Roundtable – Process and Work Product

- Sector liaisons have compiled feedback from members regarding themes, issues, and priorities for consideration in the 2025 process.
 - Review of stakeholder proposals submitted to the CAISO
 - Communication and coordination with sector members
 - Requests for input on process and approach
- Following today's discussion, the RIF will prepare a written report.
- Roundtable discussion will be iterative and annual.
 - Please provide input following this meeting to sector liaisons to inform subsequent years' process

EIM Entity Sector – RIF Roundtable

Policy Initiatives Process Feedback

- Appreciates the CAISO's effort to revise the catalog and roadmap process to become more receptive to stakeholder feedback within that process. This will be the second year following this new process, which worked well in response to concerns regarding Battery Energy Storage resources and prioritization of other initiatives that were important to stakeholders.
- The catalog timeline and initiative grouping methodology were well-structured and transparent.

Current Policy Initiatives Roadmap Priorities

- It was noted that the 2024 policy roadmap appears to underrepresent WEIM initiatives, particularly those proposed by entities outside the CAISO BAA.
- Supports the current roadmap prioritization as it is reflective of issues that are important to multiple sectors.
- Commends CAISO for demonstrating a nimble stakeholder process that can move quickly when topics or concerns are brought forward. This has most recently been demonstrated with the congestion allocation topic that has been brought forward and proposed by multiple stakeholders. This is an excellent example that the CAISO stakeholder process is working and receptive to stakeholder feedback.

New Initiative Priorities

- **EDAM Congestion Revenue Allocation Enhancements:** The EDAM stakeholder process indicated a framework for transmission rights holders to maintain firm transmission rights without priority degradation. As implementation progresses across entities, we require clear CAISO guidance regarding: Preservation of firm priority status and Standardized congestion revenue methodology.
- **EDAM Inter-tie Bidding:** This requires elevated priority to optimize market efficiency through: enhanced generation asset utilization and improved transmission asset management.
- **Market Seams:** It is apparent that there will be two markets in the West and we think it is important to address what the seams will be and how they will be handled when both markets go live sooner rather than later. This conversation will also help as other entities are preparing for their respective OATT changes and market implementations.
- **No additional topics:** Recommends that CAISO be cognizant of the time and effort required to participate within the stakeholder process and to not pursue too many initiatives at once that would result in less participation.

Other High Priority Issues

- *None*

California ISO Participating Transmission Owner Sector – RIF Roundtable

Policy Initiatives Process Feedback

- Within CAISO Participating Transmission Owner sector no member submitted any proposals for policy initiatives.
- Given current set of Working Groups, along with new EDAM Congestion Allocation effort, sector members recommend CAISO consider pausing efforts in some Working Groups to ensure more substantive participation.
 - Some members have recommended concluding certain efforts in the Price Formation Enhancements Working Group, especially Fast-Start Pricing and Scarcity Pricing.
 - Members have also recommended that CAISO maintain focus on efforts to ensure a successful launch of EDAM in May 2026.

Current Policy Initiatives Roadmap Priorities

- *The numerous in-process working groups are straining available stakeholder resources to properly address. CAISO is encouraged to continue to evaluate opportunities to pause or conclude working groups as appropriate.*

New Initiative Priorities

- *No new initiatives were submitted in 2025 initiative prioritization process.*
- *CAISO is encouraged to maintain focus on EDAM implementation and not allow adjacent and tertiary issues diminish that focus.*

Consumer Owned Utility Sector – RIF Roundtable

Policy Initiatives Process Feedback

- COU Sector observed limited feedback in this year's process.
- Yearly updates may be too frequent for meaningful stakeholder engagement.
- Potential for a lighter lift “mid-cycle” review in a bi-annual process.
- Stakeholders appreciate the opportunity to provide feedback.
 - Initiatives process is not the only forum.
 - Priority issues often find alternative routes to getting addressed.
 - Strategic plan refresh and linking to roadmap would be helpful.

Current Policy Initiatives Roadmap Priorities

- COU sector supports the addition of the EDAM Congestion Rent initiative.
 - Would like to better understand interim vs. long-term solutions.
 - The sector understands and supports pausing other initiatives between now and conclusion of the effort in May to allow for more stakeholder and CAISO staff engagement.
 - Storage modeling enhancements
 - Price formation
 - Need to cross walk what, if any, relationship this has to CRR enhancement initiative.

New Initiative Priorities

- Submitted written comments – COU Sector
 - Transmission Access Charge (TAC) Structure Enhancement
 - Real-Time Congestion Offset (RTCO) Enhancements
- Support for issues raised by other sectors
 - Internal and External Market Seams Issues
 - Scoping of issues should be incorporated into the roadmap.
 - Delineating between operational and commercial seams is a helpful first step.

Other High Priority Issues

- COU Sector strongly supports the efforts of CAISO staff to utilize stakeholder “working groups.”
- Continued COU Sector interest in maturation of the working group process.
 - How do working groups advance to policy formation stage?
 - How can we prevent rehashing issues addressed in the working group as part of this transition?
- Areas of opportunity
 - More structured project management around working groups including established deadlines and commitments from stakeholders on participation.
 - CAISO working papers could serve as a starting point for the discussion (subject to stakeholder feedback).
 - Select/concentrated in-person sessions could enable productive discussions.

Independent Power Producers and Marketers Sector – RIF Roundtable

IPP and Marketer Sector – “Competitive Sector”

- IPP and Marketer sector is incredibly diverse with a voluntary registration of eighty-six entities.
- Connecting belief is that well-functioning competitive wholesale electricity markets are the best foundation to reliably power our grid at the lowest cost and meet environmental policy goals.
- This sector includes:
 - Competitive power providers operating a diverse mix of resources including renewable, fossil, and storage
 - Competitive electricity service providers
 - Power marketers and financial institutions
 - Demand response and virtual power plant developers
 - Trade associations representing the above

Policy Initiatives Process Feedback

- Well understood with sufficient time for responses
- Annual process useful for assuring time sensitive items can be pursued
- Recommendations for Improvement
 - Greater transparency into what proposals are accepted or rejected
 - Assure both near-term and mid-term (2-3 years forward) plans are defined

2024 Sector Recommendations

Potential Initiatives (Vehicles for Scope Items)	Designation	Issues #
Governance Enhancements		
Stakeholder process enhancements	Joint Authority	1 Urgent
Intertie trading enhancements*		
Load conformance impacts on intertie transactions and bidding on CAISO or external WEIM interties	Joint Authority	2 Urgent 3 Others
Non-Generator Resource Enhancements*		
Bidding and mitigation rules**, foldback modeling, and outage improvements among other issues	Joint Authority	4 Urgent 12 Others
Price formation enhancements		
Scarcity pricing, fast start pricing, greenhouse gas functionality impact on pricing, and emergency assistance energy pricing	Joint Authority	4 Urgent
Transmission Planning Process Enhancements	Advisory Authority	1 Urgent
Total		12 Urgent 15 Others

*Note, Other issues fit into each of the high-level groupings and range from medium to low urgency but should be reviewed in scoping any initiatives in light of whether addressing sooner is best path for addressing the collective issues in a reasonable timeframe.

**Bidding rules include challenges reflecting opportunity costs when Hard Energy Bid Cap is in effect, which many entities flagged as an issue.

2024 Roadmap Highest Priority Initiatives

Active CAISO Initiatives

- Governance Enhancements
- Non-Generating Resource Enhancements
- Price Formation Enhancements

Initiatives not selected by CAISO

- Intertie Trading Enhancements
- Transmission Planning Process Enhancements

2025 Initiative Priorities

Enhancements

EDAM

Allocation of Congestion Revenues
Intertie Bidding, Seams, Convergence Bidding

Energy Storage

Long Duration Storage as a Transmission Asset
BCR Reform, Co-located Resource Ancillary Dispatch

Transmission Planning Process Enhancements

Grid Enhancing Technology Integration into the TPP

Stakeholder Process Improvements

- Transparency: Provide a venue for market participants to make formal data requests
- Examples:
 - Documentation and examples on how the AGC algorithm determines which resources to use for regulation
 - Data on regulation deployment at a more granular level than provided by the attenuation factors
 - Full hourly load distribution factors
 - Shift factors for DA binding constraints
 - Data on outage modeling in the DAM (similar to what is provided in ERCOT)

Public Interest Sub-Sector – RIF Roundtable

Policy Initiatives Process Feedback

Describe any sector feedback on the 2025 process as described in the January 30th meeting

- *The Public Interest sub-sector has no specific concerns/feedback to offer.*

Current Policy Initiatives Roadmap Priorities

Describe sector feedback on prioritization of current roadmap initiatives (from 2024 Roadmap)

- *Sustain /maintain momentum on the following initiatives:*
 - *Long term duration storage as a transmission asset*
 - *CAISO congestion revenue enhancements*
 - *EDAM congestion revenue allocation*
 - *EDAM GHG initiative with greater focus on reporting, and role of Market Monitoring*

New Initiative Priorities

Prioritization of new initiatives submitted in 2025 initiative prioritization process.

- *PIOs propose two priorities for consideration:*
 - *Develop a **seams framework** that allows for intertie optimization to be set in place by 2028, and to allow for economic bidding at the interties between EDAM and adjoining day-ahead markets. (Support Vitol Inc. and 2024, WPTF).*
 - *Support for WATT Coalition submission – framework for integrating **grid enhancing technologies** into CAISO's Transmission Planning (but with an eye toward seeking efficiencies in the existing CAISO paths, rather than as an alternative to new transmission buildout).*

Other High Priority Issues

Describe high priority issues not covered in the previous sections. For example, in 2024 many sectors listed market seams.

- *Emphasizing seams*
 - *Develop a **seams framework** that allows for intertie optimization to be set in place by 2028, and to allow for economic bidding at the interties between EDAM and adjoining day-ahead markets. (Support Vitol Inc. and 2024, WPTF).*

Consumer Advocates Sub-Sector – RIF Roundtable

Policy Initiatives Process Feedback

Describe any sector feedback on the 2025 process as described in the January 30th meeting.

- *The Consumer Advocates sub-sector has no specific feedback to offer.*

Current Policy Initiatives Roadmap Priorities

Reliability demand response resources (“RDRRs”) minimum on times and fixed cost dispatch.

- Accepted by the ISO. Considered within upcoming initiative.
- The ISO is starting a new DR/DER policy initiative in Q1 2025 beginning with scoping demand flexibility working groups. Current DR products will be considered within the scoping working groups. This topic should be proposed for further discussion in this venue.

Current Policy Initiatives Roadmap Priorities

Add scheduling incentive clause to the Approved Project Sponsor Agreement (“APSA”).

- Considered a process improvement by the ISO.
- This proposed change is closely related to the scope of issues encompassed in FERC Order No. 1920 and therefore, the ISO will need to consider how best to respond to this proposal as it establishes a path forward for its FERC Order No. 1920 compliance.

Current Policy Initiatives Roadmap Priorities

Add enforcement of cost containment terms to the APSA.

- Considered a process improvement by the ISO.
- Again, this proposed change is closely related to the scope of issues encompassed in FERC Order No. 1920 and therefore, the ISO will need to consider how best to respond to this proposal as it establishes a path forward for its FERC Order No. 1920 compliance.

Current Policy Initiatives Roadmap Priorities

Allow competitive bidding on transmission projects over 100kV.

- Considered a non-catalog item by the ISO.
- This proposed change is closely related to the scope of issues encompassed in FERC Order No. 1920 and therefore, the ISO will need to consider how best to respond to this proposal as it establishes a path forward for its FERC Order No. 1920 compliance.

New Initiative Priorities

- *No new initiatives were submitted in 2025 initiative prioritization process.*

Other High Priority Issues

- *Seams*

Power Marketing Administration Sector – RIF Roundtable

Policy Initiatives Process Feedback

- Appreciate the opportunity for stakeholder-driven policy initiative proposals.
- Annual process is timely for introduction of critical issues.

Recommendations for improvement:

- Consider adding a step for stakeholder review and comment on the draft or final roadmap prior to presentation to the Governing Body.

Current Policy Initiatives Roadmap Priorities

High Priority:

- Price Formation Enhancements: Scarcity Pricing and market power mitigation and Fast Start Pricing
- Greenhouse Gas Coordination: WEIM/EDAM GHG Design, Non-priced approaches to GHG reduction and Additional GHG-related metrics

Medium Priority:

- Resource Sufficiency Evaluation Enhancements Phase 3

New Initiative Priorities

High priority initiatives

- EDAM:
 - Congestion Allocation Enhancements (now underway)
 - EDAM Enhancements (submitted by WPTF)
 - Emphasis on economic intertie bidding in EDAM
- WEIM
 - Settlements Enhancements in the WEIM
- Internal and external market seams issues

Medium Priority:

- Flexible Ramping Product Enhancements

Other High Priority Issues

- Ongoing transparency effort recommended by WPTF
 - Consider this as more of a CAISO stakeholder process opportunity than a discrete initiative.
 - Data accessibility continues to increase in importance with EDAM launch.

EDAM Sector – RIF Roundtable

Policy Initiatives Process Feedback

- Prioritization is of particular interest
 - EDAM sector stakeholders would like to better understand how CAISO uses feedback from the prioritization survey
 - It would be helpful to see a hierarchy of proposals based on the stakeholders' prioritization surveys
 - How can we use prioritization process to help ensure stakeholders can fully participate in stakeholder initiatives?
 - Sector prioritizes quality of market designs over quantity of design changes

Current Policy Initiatives Roadmap Priorities

- Greenhouse gas and demand response initiatives are high priorities
- WEIM Resource Sufficiency Evaluation Enhancements
 - Support extending assistance energy transfers with current design
 - Enhancements are worth exploring, but sector probably doesn't have bandwidth to add another full initiative at this time
- Price Formation Enhancements
 - Support for slowing down initiative to accommodate the congestion revenue allocation initiative
 - Market power mitigation track seems to be closest to finding enhancements and so it can continue
- Support for keeping storage initiative on schedule

New Initiative Priorities

- EDAM Enhancements
 - Support moving quickly in the congestion revenue allocation initiative
 - Sector's priority is to focus on critical market function improvements after go-live
 - Need experience before considering enhancements
- Seams discussions will be important
 - Difficult to determine now what exactly initiative would focus on

Other High Priority Issues

- For EDAM sector, top priority is on EDAM implementation
 - Staff sometimes work across policy and implementation teams, which can create challenges for participating in policy initiatives

Input from Stakeholders Not Identified with a Sector and Public Comment

Summary of Sector Input, Themes, and Priorities

Summary and Discussion Synopsis

- Widespread support for Initiative to evaluate EDAM Congestion Rent Allocation
 - Initiative commenced with accelerated timeline for completion and with anticipated presentation to Board for approval in May
- Support among sectors for consideration of Seams and Inter-tie Bidding
- Few submitted new policy issues may be a signal that current set of Initiatives has stakeholders near or at resource capacity for participation
 - Sector comments include a proposal for moving to bi-annual process (COU) or pausing/concluding some working groups (PTO, EDAM)
 - Other sectors highlight benefits of new process as more engaging and transparent

Remarks on behalf of the WEIM Body of State Regulators, the WEIM Governing Body, and the CAISO

Closing and Next Steps

- Questions or comments by stakeholders following today's discussion may be submitted to sector liaisons
 - [WEIMRegionalIssuesForumSectorLiaison.pdf \(westerneim.com\)](http://WEIMRegionalIssuesForumSectorLiaison.pdf(westerneim.com))
 - Stakeholders not assigned to a sector may contact RIF Chair or Vice Chair
- RIF liaisons to prepare written report summarizing sector input and documenting common issues and themes

WESTERN ENERGY MARKETS

Regional Issues Forum Enhancement Project

Meg McNaul, Chair and CAISO PTO Sector Liaison

Allie Mace, Vice Chair and Federal PMA Sector Liaison

Rahul Kalaskar, Independent Power Producers and Power Marketers Sector Liaison

Vijay Singh, EDAM Entities Sector Liaison

Mary Wiencke, Consumer Owned Utility Sector

April 9, 2025



Agenda

Topic	Presenter
RIF Enhancements Project Overview	Meg McNaul
SRC Transition and Process	Meg McNaul
Potential Sector Revisions	Meg McNaul
Policy Initiative Identification and Prioritization	Rahul Kalaskar
Stakeholder Initiative Phase	Allie Mace and Vijay Singh
Indicative Voting	Allie Mace
Function and Purpose of the RIF	Mary Wiencke
Questions and Discussion	Vijay Singh
Next steps	Meg McNaul

RIF Enhancements Project Overview

Introduction and Background

- West-Wide Governance Pathways Step 2 Final Proposal (November 2024)
 - Comprehensive proposal to evolve governance of the Western Energy Markets under “Regional Organization” or “RO”
 - Included extensive discussion of stakeholder process reforms
 - Proposed “Stakeholder Representatives Committee” or “SRC”
 - Analogous to WEM Regional Issues Forum
 - Expanded role in RO stakeholder initiatives
 - Objective to facilitate, enhance, and coordinate role of stakeholders within RO stakeholder proceedings
- Legislation needed to fully implement Step 2 Final Proposal, however
 - Step 2 proposal elements related to stakeholder process align with ongoing efforts by CAISO to evolve its stakeholder process and are beneficial to stakeholders; and
 - The RIF is well-positioned to begin implementation of the SRC’s responsibilities consistent with its existing responsibilities and authorities

Key Objectives of the RIF Enhancements Project

- Facilitate transition of the RIF into the SRC
- Prepare for transitions involving new and revised sectors
- Consider how to implement elements of the Step 2 Final Proposal related to the stakeholder process
 - Role in the Policy Initiatives Catalog and Roadmap
 - Involvement in the stakeholder process, during both the initial stage (issue evaluation and problem statement identification) and the policy development stage
 - Engaging in more regular and robust reporting to WEM Governing Body on initiative issues
 - Transition to indicative voting

Process and Timing for the RIF Enhancements Project

- April 7 – Publication of Discussion Paper and identification of areas for stakeholder feedback
- April 9 – Presentation and discussion at the RIF meeting
- April/May – RIF sector liaisons to conduct sector outreach and stakeholder comment period
- June/July – RIF liaisons review stakeholder input and develop an updated proposal detailing next steps

Evaluation Criteria for Proposed Changes to the RIF

- Not require legislative change or creation of the RO Board
- Require limited or no modifications to the existing WEM Charter
- Require minimal or no additional support from the CAISO staff
- Be consistent with the direction proposed by the Pathways Launch Committee
- Be consistent with the stakeholder process enhancements being pursued by CAISO staff
- Place limited additional workload on RIF liaisons
- Provide benefits to the RIF stakeholder community through additional transparency, representation, or increased stakeholder engagement
- Prioritize the areas of greatest benefit to the broader RIF community
- Be supported or not opposed by participating stakeholders

Stakeholder Representatives Committee (SRC) Transition and Process

SRC Transition Approach and Process

- Proposal is to create a process and begin implementation of steps that will transition the RIF into the SRC
 - Would consider and be calibrated to legislative process and timing
- RIF may adopt elements of the SRC and Step 2 Final Proposal into RIF activities, but formal transition would not occur until:
 - Pathways-related legislation is passed and findings of relevant transition criteria made
 - Pathways Formation Committee and/or Transitional Board determine that the SRC should be established under RO framework
- Pending formal establishment of the SRC, RIF will continue to function as the RIF
 - Proposed reforms under consideration should be consistent with interests of WEM and stakeholders even if Step 2 Final Proposal were not implemented

Potential Sector Revisions

Potential Revisions to Sectors

- Current sectors of the RIF are set forth in the WEM Charter at Section 7.2:

- WEIM entities (as defined in the Tariff under EIM Entity);
- ISO participating transmission owners (as defined in the tariff);
- Consumer-owned utilities located within an WEIM balancing authority area that are not included in another sector;
- Public interest groups and consumer advocate groups that are actively involved in energy issues within the WEIM footprint; and
- Independent power producers and marketers who engage in transactions within the WEIM footprint.

In addition, federal power marketing administrations may select one liaison.

EDAM Entities may also select one liaison after an executed EDAM implementation agreement is filed with FERC.

- Sectors (other than Federal PMA and EDAM Entities) – 2 liaisons

Potential Revisions to Sectors

- The sectors in the Pathways Step 2 Final Proposal:

	RO Sectors for Stakeholder Voting	Sector-based seats on SRC
1	EDAM Entities	2 seats
2	WEIM Entities	3 seats
	[no PMA standalone sector]	*1 additional seat reserved for PMAs in either EDAM or WEIM sector, assuming the PMA is either a WEIM or EDAM Entity
3	ISO PTOs	2 seats
4	Non-IOU load serving entities serving load from WEIM or EDAM	4 seats *If an entity participates collectively through an EDAM entity (e.g. BANC members), they cannot also participate in a different sector as individual entities (i.e., generators or munis)
5	PIOs	2 seats
6	Consumer advocates	2 seats
7	Large C&I customers	2 seats
8	IPPs, independent transmission developers, and marketers	3 seats
9	Distributed Energy Resources (including distributed generation, storage and demand response resources, aggregators, and enabling hardware and software providers)	1 seat
		Total: 21 seats on committee

Potential Revisions to Sectors

- Key differences:
 - New sectors for Large Commercial/Industrial Customers and Distributed Energy Resources
 - Changes to existing sectors
 - Independent transmission developers in CAISO, currently in CAISO PTO sector → IPPM sector
 - Demand response providers, currently in the IPPM sector → Distributed Energy Resources sector
 - PIOs/Consumer Advocates, currently one combined sector → separate sectors
 - Community Choice Aggregators → Non-IOU LSEs serving load in WEIM/EDAM
 - Power Marketing Administrations → WEIM or EDAM entities (no standalone PMA sector)

Potential Revisions to Sectors

- Proposal – develop a process to transition the sectors of the RIF into the sectors of the SRC
 - New sectors – one liaison on RIF during transition period
 - RIF would maintain communication lists for RIF sectors and SRC structure
 - Implementation of “roster” at organizational level
 - Individual sectors of RIF may consider updated processes (at discretion of sector)
- Timing consideration
 - SRC new sector formation necessary for RO Nominating Committee efforts (anticipated to begin no earlier than Q4 2025)

Policy Initiative Identification and Prioritization

Policy Initiatives Identification and Prioritization

- Under the Step 2 Final Proposal, elements of policy initiative identification and prioritization are similar to current CAISO processes:
 - Policy Initiatives Catalog
 - Policy Initiatives Roadmap
 - Roundtable discussion of stakeholder and sector priorities
- Several enhancements to existing approaches:
 - More active role for the SRC in collaborating with the RO to prioritize initiatives for the Roadmap
 - Stakeholders undertake indicative voting on Catalog/Roadmap
 - If adopted, would inform RIF reporting to WEM Governing Body
 - RO would inform SRC of reprioritization needs
- RIF proposes to maintain and build on existing processes for the Catalog, Roadmap, and Roundtable

Stakeholder Initiative Phase

Stakeholder Initiative Phase – Issue Evaluation, Problem Statements, and Policy Development

- The Step 2 Final Proposal envisions an expanded role for the SRC in the issue evaluation, problem statement formulation, and policy development phases of the stakeholder process
 - The current stakeholder process does not include a formal role for the RIF
- Changes under the Step 2 Final Proposal include:
 - “Sector sponsor” role
 - Increased use of smaller working groups
 - Advisory/indicative voting

Stakeholder Initiative Phase – Issue Evaluation, Problem Statements, and Policy Development

- Sector sponsors:
 - Partner with CAISO to identify issues, create problem statements and develop policy solutions
 - Engagement at key points throughout a stakeholder initiative
 - Sponsors would not need to be RIF liaison or SRC representative
 - Sponsor should have an understanding of issues and interest in facilitating stakeholder engagement, but need not be technical expert
 - Sponsor role is not intended as an avenue for advocacy of own stakeholder positions
 - Could have more than one sponsor per initiative
 - Purpose:
 - Facilitate engagement among stakeholders and assist with outreach between stakeholders and CAISO staff
 - Help ensure the initiative is progressing in a constructive manner, that stakeholder voices (both majority and minority perspectives) are considered, and facilitate substantive discussions among stakeholders with differing perspectives

Stakeholder Initiative Phase – Issue Evaluation, Problem Statements, and Policy Development

- Work groups:
 - Smaller group of stakeholders to help identify issues and problem statements, work through technical or complex issues, and help shape policy development
 - Formed after collaboration between the sector sponsors and the CAISO or RO staff determines that smaller work groups would be beneficial
 - Expected to provide results of work and proposals back to the larger stakeholder community to ensure appropriate transparency

Stakeholder Initiative Phase – Issue Evaluation, Problem Statements, and Policy Development

- The RIF proposes the following:
 - Sector sponsors
 - Beginning with 2025 Roadmap, RIF liaisons would self-nominate or nominate other sector members to act as sponsor
 - If multiple stakeholders express interest, the RIF would hold a discussion to determine the best path forward, potentially including joint sponsorship
 - Sponsoring stakeholder need not be a technical expert but should have an interest in supporting stakeholder engagement
 - Work groups
 - Sponsor would help establish and manage
 - Sponsor to partner with CAISO staff to define and recruit members
 - Sponsor assists CAISO staff with presenting the results of the work group back to the broader stakeholder initiative for review and feedback
 - Focus would be on discrete technical task or policy element

Indicative Voting

Implementation of and Reporting on Indicative Voting

- Step 2 Final Proposal includes indicative voting throughout the stakeholder process
 - SRC reviews results of the vote and reports each sector's position
- CAISO has used indicative position statements in stakeholder initiatives
- RIF proposal is to resume use of indicative voting through position statements by stakeholders during comment periods
 - Request of the CAISO to begin implementing basic indicative voting
 - Inclusion of question in the stakeholder comment template:
 - “Please provide a one word reply to indicate whether your organization supports, opposes, or holds a neutral position with respect to” the relevant issue, paper, or proposal element
- Represents incremental step toward more comprehensive indicative voting approach in the Step 2 Final Proposal
 - Re-introduces the concept of voting to stakeholders
 - Provides insight to the RIF liaisons on sector perspectives
 - Enables more robust reporting of stakeholder/sector positions to the WEM Governing Body

Function and Purpose of the RIF

Function and Purpose of the RIF

- Historically, the RIF has focused on educational and informational content and discussions
- Authority of the RIF has evolved to include consideration of issues in pending stakeholder initiatives and involvement in initiative identification and prioritization
- Additionally, the RIF may:
 - Assign sub-teams of subject matter experts to evaluate proposals and report on recommendations for solutions
 - Produce documents and opinions for the WEM Governing Body or the CAISO
 - Communicate RIF-related information and/or perspectives to the WEM Governing Body or the CAISO

Function and Purpose of the RIF

- The Step 2 Final Proposal emphasizes
 - The role of the SRC as providing advice and input in connection with the stakeholder process
 - The SRC's responsibility to facilitate and support stakeholder participation, both individually and in sectors
- The Step 2 Final Proposal also reiterates that SRC representatives should be
 - Committed to supporting and facilitating the participation of the stakeholder community in the stakeholder process
 - Even if a particular stakeholder's perspective or position does not necessarily align with the position of the SRC representative or the SRC representative's company

Function and Purpose of the RIF

- The Step 2 Final Proposal also establishes an expectation of regular SRC reporting to the RO Board
 - Existing authority of the RIF, but exercised episodically
 - The RIF envisions increased reporting on pending issues, supplemented by indicative voting if adopted
- RIF proposes to
 - Expand its involvement in the stakeholder process consistent with the Discussion Paper
 - Sector sponsor role, working groups, helping to facilitate stakeholder participation and consensus building
 - Undertake increased reporting to the WEM Governing Body
 - Eventually transition away from informational/educational content
 - Under the Pathways RO framework, the Office of Public Participation may undertake this activity

Questions and Discussion

Next Steps

- Stakeholder comments, due May 15, 2025
- Please refer to comments template – Attachment A to Discussion Paper
- Send to EIMRIF@caiso.com
- Contact sector liaisons with any questions:
 - Sector liaison contact list available at:
<https://www.westerneim.com/Documents/WEM-Regional-Issues-Forum-Sector-Liaison.pdf>

WESTERN ENERGY MARKETS

Break

11:00 a.m. – 11:15 p.m. (Pacific Time)



Market Benefits and Seams: Options and Implications

PREPARED BY

John Tsoukalis
Johannes Pfeifenberger
Kai Van Horn

PRESENTED AT

WEM Regional
Issues Forum

April 9, 2025



Experience in the Eastern U.S.

While seams between RTOs will generally be more efficient than seams between non-market regions, five sources of inefficiencies associated by market seams are well documented:

1. **Interregional transmission planning** is ineffective
2. **Generator interconnection** delays and cost uncertainty created by affected system impact studies (effective coordination, such as the SPP-MISO JTIQ, can reduce costs by 50%)
3. **Resource adequacy** value of interties (often not considered in resource adequacy programs) and barriers to capacity trades (often created by RTOs' restrictive capacity import requirements and incompatible resource accreditations)
4. **Loop flow management** inefficiencies through market-to-market coordinated flowgates (with shares of firm flow entitlements) under the markets' Joint Operating Agreements
5. **Inefficient trading** across contract-path market seams and the need for intertie optimization (as discussed next)

Lessons from the East: Poor Utilization of Interties has a Long History and Continues Today

Potomac Economics has documented inefficient utilization of interregional transmission interties since 2003.

- David Patton, Coordinated Interchange Recommendations, March 13, 2003 (Presentation to New England RTO Working Group).

In 2010, Potomac Economics estimated that optimizing interties between MISO, PJM, NYISO, ISO-NE, and Canadian system operators would conservatively yield between \$160-300 million in annual cost savings.

- See [Analysis of the Broader Regional Markets Initiatives](#), pp. 10-13

In 2011, NYISO and ISO-NE proposed to address these seams-related inefficiencies through intertie optimization

- See [Interregional Interchange Scheduling \(IRIS\) Analysis and Options](#)

Yet, little has changed and interregional interties continue to be utilized poorly (see next slides)

The 2011 Intertie Optimization Proposal by NYISO & ISO-NE

In 2011, NYISO and ISO-NE proposed to implement intertie optimization to address the inefficiencies from poor utilization of interregional transmission.

- ISOs agreed with concerns raised by its Market Monitor since 2003
- The ISOs' analysis showed that “too little power is flowing in the correct direction more than 4000 hours per year.” “Nearly half of the time that New England has higher-cost generation on the margin than New York, the net scheduled flow is westbound into New York”
- “The price difference exceeds \$5 per MWh (in absolute value) more than half of the year and exceeds \$10 per MWh (in absolute value) nearly one-third of the year [when] there is transmission capacity available to schedule additional transfers across the interface.” “[T]otal energy expenditures would be on the order of one to two hundred million dollars lower annually—or perhaps half a million dollars per day lower—if the real-time inter-regional interchange system produced efficient tie schedules.”
- The three root causes are:
 - **1. Latency Delay.** The time delay between when the tie is scheduled and when power flows, during which time system conditions and LMPs may change.
 - **2. Non-Economic Clearing.** The ISOs make decisions about which tie schedule requests to accept without economic coordination, producing inefficient schedules.
 - **3. Transaction Costs.** The fees and charges levied by each ISO on external transactions serve as a disincentive to engage in trade, impeding price convergence and raising total system costs

NYISO/ISO-NE Recommended Intertie Optimization but CTS was Implemented Instead

NYISO and ISO-NE offered designs for two possible solutions:

- Intertie Optimization: similar to the least-cost economic dispatch system used internally for each ISO's energy market, it relies on the bid-based supply offers from generators and demand resources to determine real-time LMPs and transmission flows within and between the two ISOs' networks.
- Coordinated Transaction Scheduling (CTS): facilitates bilateral trading in real time through a simplified bid format (called an interface bid) and coordinated acceptance of interface bids by the ISOs (using an improved clearing rule).

The ISOs recommended the Intertie Optimization because:

- Intertie optimization is the more efficient solution
- The CTS system was not expected to produce as complete a price convergence between regions

Only CTS was implemented between NYISO and ISO-NE (and later PJM and MISO):

- Concerns were raised that intertie optimization may unnecessarily displace bilateral trading
- It was hoped that CTS might be almost as efficient as intertie optimization

CTS has not been Successful in Reducing Seams Inefficiencies

The Potomac Economics (the NYISO and MISO Independent Market Monitor) has documented the ineffectiveness of CTS:

- For example, in the [MISO 2021 State of the Market Report](#), the IMM notes that CTS between MISO and PJM: “has produced very little of the sizable savings it could generate” and that “more than 40 percent of the current CTS transactions are ultimately unprofitable” (at xx and 90, emphasis added).

To address these continued inefficiencies the IMM recommends to modify CTS so it can better approximate intertie optimization:

- “we recommend the RTOs consider modifying the CTS to clear transactions every five minutes through [the Unit Dispatch System, UDS] based on the most recent five-minute prices in the neighboring RTO area.”
- Doing so was estimated to offer cost savings of \$23m for transactions with PJM and \$44m for transactions with SPP

Table 14: CTS with Five-Minute Clearing Versus Current CTS
2021

	Percent of Intervals Adjusted	Production Cost Savings	Profits	Percent Unprofitable
PJM				
Current CTS	9.7%	\$7,203,734	\$199,456	39.4%
5-Minute CTS	77.5%	\$23,207,329	\$11,765,360	13.8%
SPP				
5-Minute CTS*	89.6%	\$44,089,866	\$25,984,814	22.1%

* Results omit Feb. 13-19 when SPP experienced very high prices from the Arctic Event.

Source: MISO [2021 STATE OF THE MARKET REPORT](#)
(potomaceconomics.com)

PJM's Market Monitor Recommended Intertie Optimization

The PJM Market Monitor has recommended to reconsider intertie optimization since 2014:

- In the [2022 PJM State of the Market Report](#) (at 105), the PJM Market Monitoring Unit (MMU) repeats the recommendation it has made since 2014: “The MMU recommends that PJM explore an interchange optimization solution with its neighboring balancing authorities that would remove the need for market participants to schedule physical transactions across seams. Such a solution would include an optimized, but limited, joint dispatch approach that uses supply curves and treats seams between balancing authorities as constraints, similar to other constraints within an LMP market.”

The recommendation is supported by a finding of inefficient intertie schedules that are inconsistent with seams-related price differences during almost half of all trading periods:

Table 9-27 Distribution of hourly flows that are consistent and inconsistent with price differences between PJM and MISO: 2022

Price Difference Range (Greater Than or Equal To)	Percent of Inconsistent		Percent of Consistent	
	Inconsistent Hours	Hours	Consistent Hours	Hours
\$0.00	4,176	100.0%	4,584	100.0%
\$1.00	3,773	90.3%	4,190	91.4%
\$5.00	2,517	60.3%	2,737	59.7%
\$10.00	1,570	37.6%	1,612	35.2%
\$15.00	989	23.7%	1,056	23.0%
\$20.00	673	16.1%	700	15.3%
\$25.00	490	11.7%	531	11.6%
\$50.00	150	3.6%	243	5.3%
\$75.00	65	1.6%	137	3.0%
\$100.00	38	0.9%	94	2.1%
\$200.00	26	0.6%	34	0.7%
\$300.00	19	0.5%	15	0.3%
\$400.00	17	0.4%	8	0.2%
\$500.00	15	0.4%	6	0.1%

Table 9-29 Distribution of hourly flows that are consistent and inconsistent with price differences between PJM and NYISO: 2022

Price Difference Range (Greater Than or Equal To)	Percent of Inconsistent		Percent of Consistent	
	Inconsistent Hours	Hours	Consistent Hours	Hours
\$0.00	3,463	100.0%	5,297	100.0%
\$1.00	3,193	92.2%	5,021	94.8%
\$5.00	2,327	67.2%	3,834	72.4%
\$10.00	1,667	48.1%	2,511	47.4%
\$15.00	1,206	34.8%	1,664	31.4%
\$20.00	912	26.3%	1,173	22.1%
\$25.00	709	20.5%	881	16.6%
\$50.00	360	10.4%	360	6.8%
\$75.00	220	6.4%	209	3.9%
\$100.00	143	4.1%	133	2.5%
\$200.00	49	1.4%	54	1.0%
\$300.00	22	0.6%	28	0.5%
\$400.00	14	0.4%	24	0.5%
\$500.00	9	0.3%	20	0.4%

Source: [2022 State of the Market Report for PJM \(monitoringanalytics.com\)](#)

Coordinated Transaction Scheduling vs. Intertie Optimization

Coordinated Transaction Scheduling (CTS)

- 75+min prescheduled 15-min transactions, based on forecasts, which often results in uneconomic trades
- Based on CTS bids by traders, who need to reserve transmission (at a cost)
- Transmission charges reduce CTS efficiency
- If transmission charges are eliminated, traders capture value of transactions (free rides)
- Experience:
 - Low transaction volume due to costs and risk of inefficient trades;
 - Has not been able to improve inefficient use of interregional transmission

Intertie Optimization

- Optimized in real time every 5 min, greatly reducing the frequency of uneconomic trades
- Optimized by RTOs using transmission that remains available after bilateral markets have closed
- Hurdle-free optimization increases market efficiency
- Value of transactions shared by RTOs (i.e., their transmission owners and, ultimately, customers)
- Experience:
 - High transaction volume with substantial benefits to participating BAAs (e.g., Western EIM)
 - Can greatly reduce inefficient use of interregional transmission (e.g., European “market coupling”)

Bottom Line: CTS is not working – not for Traders, not for RTOs, not for TOs, and not for Customers

See: Intertie Optimization, [Frequently Asked Questions](#)

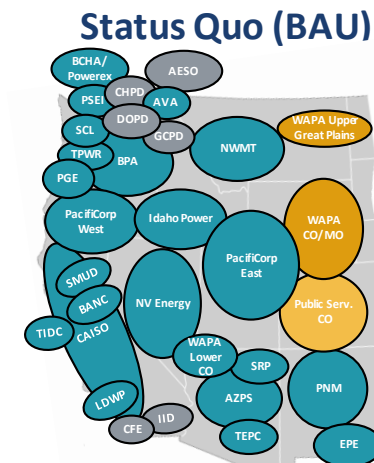
Potential Value of Inertia Optimization in the WECC

Brattle EDAM/Markets+ Benefits Analyses (for NVE)

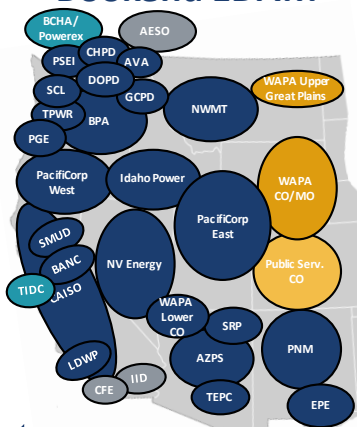
Scenarios to capture range of potential footprints:

- Status Quo (BAU) vs. WEIM+EDAM vs. Markets+
- M+ assumed to have day-ahead and real-time markets
- RTO West co-optimized with M+ where applicable

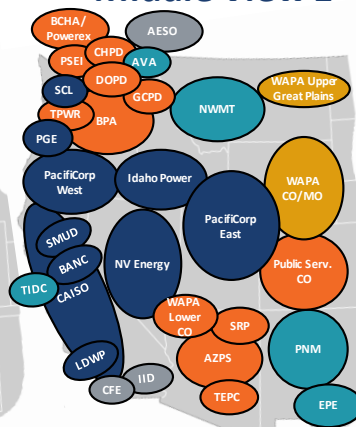
SPP RTO West
WEIS only
Markets+
EDAM & WEIM
WEIM only
Non-Market BA



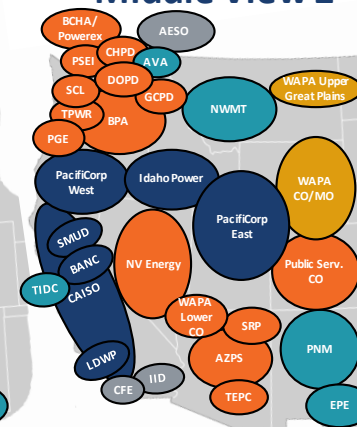
Bookend EDAM



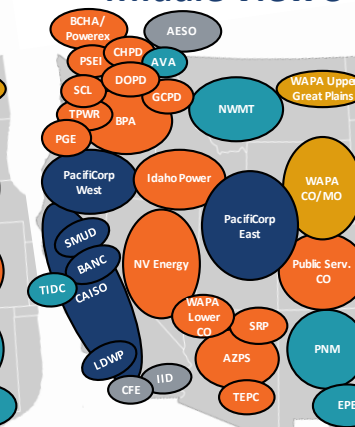
Middle View 1



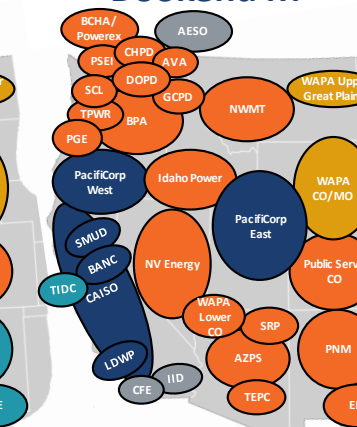
Middle View 2



Middle View 3



Bookend M+



NVE in EDAM

NVE in EDAM

NVE in M+

NVE in M+

NVE in M+

Bigger EDAM Footprint

Source: [NV Energy Day-Ahead Market Benefits Studies](#)

Bigger M+ Footprint

Markets offer Significant WECC-Wide Benefits

The implementation of M+ and/or EDAM produces significant WECC-wide customer benefits, with **estimated benefits ranging from \$825-\$985 million per year** across the footprint scenarios

- A single market covering most of the WECC (bookend EDAM in this case) produces the highest benefits
- A two-market EDAM/M+ scenario produces modestly lower benefits
- The difference across the different footprints illustrates the potential benefit of intertie optimization

WECC-Wide Benefits (\$ Millions)

	BAU	Bookend EDAM	Middle View 1	Middle View 2	Middle View 3	Bookend Markets+
WECC-Wide						
Adjusted Production Cost	\$10,273	\$9,007	\$9,880	\$9,894	\$9,919	\$9,891
Wheeling Revenue	\$446	\$128	\$378	\$439	\$434	\$396
Trading Revenues:						
Bilateral	\$1,327	\$487	\$506	\$496	\$477	\$343
WEIM	\$339	\$263	\$236	\$192	\$182	\$99
WEIS/Mk+ RT Market	\$28	\$31	\$89	\$124	\$125	\$134
EDAM	-	\$950	\$946	\$734	\$676	\$670
Markets+	-	-	\$454	\$606	\$717	\$945
Total System Cost	\$8,134	\$7,149	\$7,269	\$7,303	\$7,308	\$7,304
Benefit Compared to BAU		\$985	\$865	\$831	\$826	\$830

Potential benefit of intertie optimization could be as large as ~\$150 million/year in the WECC

All market participation scenarios show benefits relative to BAU

Source: [NV Energy Day-Ahead Market Benefits Studies](#)

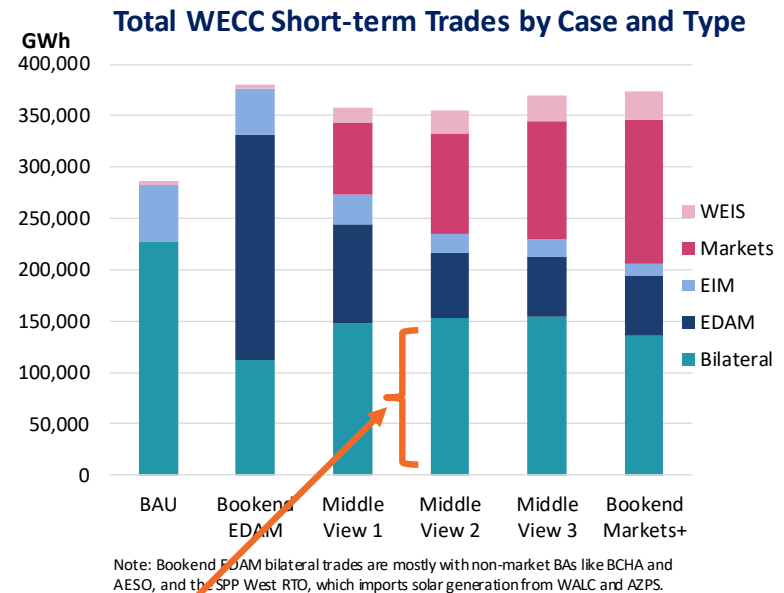
WECC-Wide Trading is Enhanced with One or Two Markets

Creating one or two optimized markets with depancaked transactions reduces trading inefficiencies relative to the status quo

- Bilateral trades face “hurdles” due to low of transparency and liquidity
- Bilateral trades between markets generally are more efficient than bilateral trades at hubs or between utilities, due to higher transparency and market-based liquidity (e.g., hourly CAISO intertie trades)

Adding organized DA markets increases WECC-wide trading by 20-30% (60-90 TWh) relative to the “bilateral” status quo

- Still ~125-150 TWh of bilateral trading in all the market cases simulated



~150 TWh of bilateral trading in the WECC after the DAMs, which would be more efficient with intertie optimization

Thank You!

Comments and Questions?

(Additional Slides)

See also Brattle Reports on:

[Intertie Optimization \(incl. FAQs\)](#)

[Optimal Expansion and Use of Interregional Transfer Capability](#)

[NV Energy Day-Ahead Market Benefits Studies](#)

[Extended Day-Ahead Market Benefit Study](#)

[EDAM Simulations: PacifiCorp Results](#)

Intertie Optimization: Implementation Options

How would RTOs/ISOs determine and schedule optimal intertie transactions?

The RTOs would use their existing market optimization SCED engines to optimize intertie schedules subject to available intertie capabilities after all bilateral transactions are closed

- As the PJM IMM explains, this would: “include an optimized, but limited, joint dispatch approach that uses supply curves and treats seams between balancing authorities as constraints, similar to other constraints within an LMP market”

1. Contract-path option: treat the contract path across the interface like a single line with a generator (representing the neighboring region) dispatched through SCED.

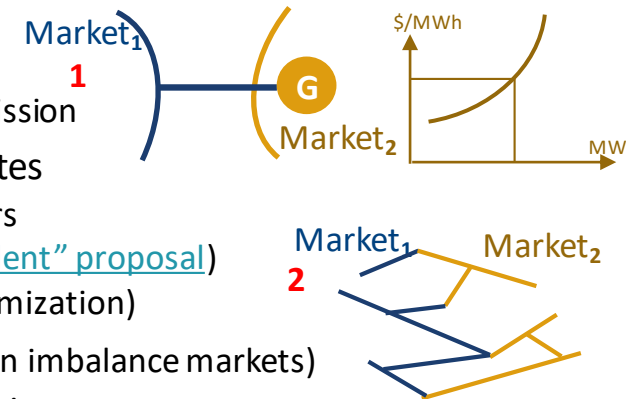
- The neighboring region would provide generation supply curve (incremental/decremental cost of importing more or less) for RT intervals
- Simplest, will increase efficiency, but not optimally use full physical transmission

2. Flow-based option: represent interface physically with limiting flow gates

- The neighboring region provides binding flow gates and marginal generators with shift factors on these flow gates (ISO-NE’s [2014 IEEE “Marginal Equivalent” proposal](#))
- Will use full physical capability (ISO-NE simulations achieve 99% of full optimization)

3. Combined SCED option: used full, multi-regional SCED (similar to Western imbalance markets)

- Assures full optimization but likely impractical for existing market-based regions



FERC Has the Authority to Implement Intertie Optimization



Norman Bay and Vivien Chum (Willkie Farr & Gallagher LLP):

- FERC has long recognized the inefficiencies of market seams. *See* Order No. 888 & Order No. 2000
- FERC's authority to address seams issues is clear given its duty to ensure just and reasonable rates
- There is well established precedent for FERC to address market seams:
 - Coordinated Transaction Scheduling (ISO-NE-NYISO; NYISO-PJM; and PJM-MISO)
 - Western EIM and EIS
 - FERC precedent with respect to CTS: recognizing the value of “Tie Optimization” and leaving the door open. *See NYISO*, 139 FERC ¶ 61,048 (2012) (recognizing the possibility of replacing CTS with a “different methodology for scheduling external transactions (i.e., Tie Optimization or a superior alternative), if it is determined that such changes could result in greater cost savings”)
- If the RTOs/ISOs propose intertie optimization, FERC has the clear authority to accept the filing under section 205. FERC would also be able to require intertie optimization under FPA section 206

Estimated EDAM & M+ Benefits are Conservatively Low

The estimated benefits are likely understated due to several factors:

- **Overstated base-case efficiency:** our simulation of the BAU is more efficient than reality
 - The Base Case assumes that balancing authorities have optimal security-constrained unit-commitment and dispatch (SCUC and SCED) in both DA and RT, making the simulated dispatch more optimal than reality.
 - Inefficient utilization of transmission by bilateral trades is not fully modeled, understating the extent M+ and EDAM will be able to make better use of all physically and contractually available transmission.
 - Transmission outages are not modeled, which would magnify the benefit of SCED-based congestion management in EDAM and M+ compared to the BAU
- **Normalized loads and fuel prices:** the model uses weather-normalized loads and averaged monthly natural gas prices without daily volatility
 - Challenging market conditions (beyond the included heat wave and cold snap), such as during the 2022 gas price spikes, will magnify EDAM/M+ benefits. Illustrated by the WEIM experience of much higher benefits in 3Q of 2021 and 3Q-4Q of 2022
 - The Base Case does not reflect the limited liquidity of bilateral market during challenging market conditions
- **No capacity benefits quantified:** we have not quantified the extent to which EDAM and M+ may reduce investment costs associated with lower operating reserve requirements

Speaker Bio



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John has broad experience helping clients address a range of issues related to wholesale power markets. He is an expert in electric market modeling, analyzing regional market participation, transmission benefit-cost analysis, transmission rate design, market design, detection of market manipulation and damages analyses, and strategic planning.

John has worked with electric utilities, cooperatives, public power authorities, transmission developers, generation owners, power traders, and ISO/RTO staff. He has assisted clients in developing whole market rules, ancillary service product, designing market power mitigation regimes and auction clearing mechanics, leading strategic planning initiatives, and modeling the power system to assess the benefits of new transmission, the benefits of participating in wholesale power markets, and the value generation assets.

John has provided expert testimony to FERC, provincial regulators in Canada, and in U.S. Federal Court related to transmission rate cases, alternative transmission rate designs, cost allocation, and contracts for wholesale power.

Brattle Group Practices and Industries

ENERGY & UTILITIES

Competition & Market Manipulation
Distributed Energy Resources
Electric Transmission
Electricity Market Modeling & Resource Planning
Electrification & Growth Opportunities
Energy Litigation
Energy Storage
Environmental Policy, Planning and Compliance
Finance and Ratemaking
Gas/Electric Coordination
Market Design
Natural Gas & Petroleum
Nuclear
Renewable & Alternative Energy

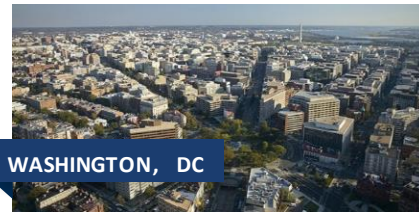
LITIGATION

Accounting
Analysis of Market Manipulation
Antitrust/Competition
Bankruptcy & Restructuring
Big Data & Document Analytics
Commercial Damages
Environmental Litigation & Regulation
Intellectual Property
International Arbitration
International Trade
Labor & Employment
Mergers & Acquisitions Litigation
Product Liability
Securities & Finance
Tax Controversy & Transfer Pricing
Valuation
White Collar Investigations & Litigation

INDUSTRIES

Electric Power
Financial Institutions
Infrastructure
Natural Gas & Petroleum
Pharmaceuticals & Medical Devices
Telecommunications, Internet, and Media
Transportation
Water

Our Offices



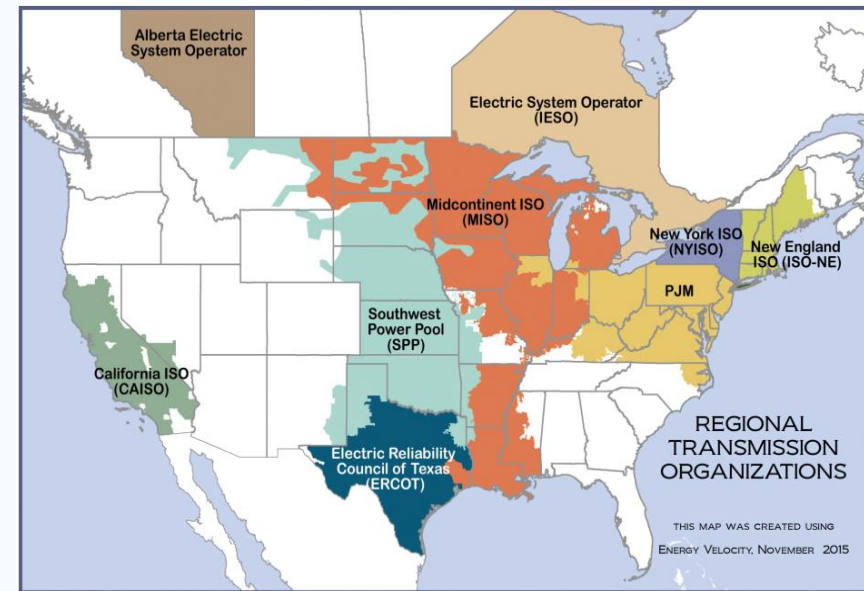
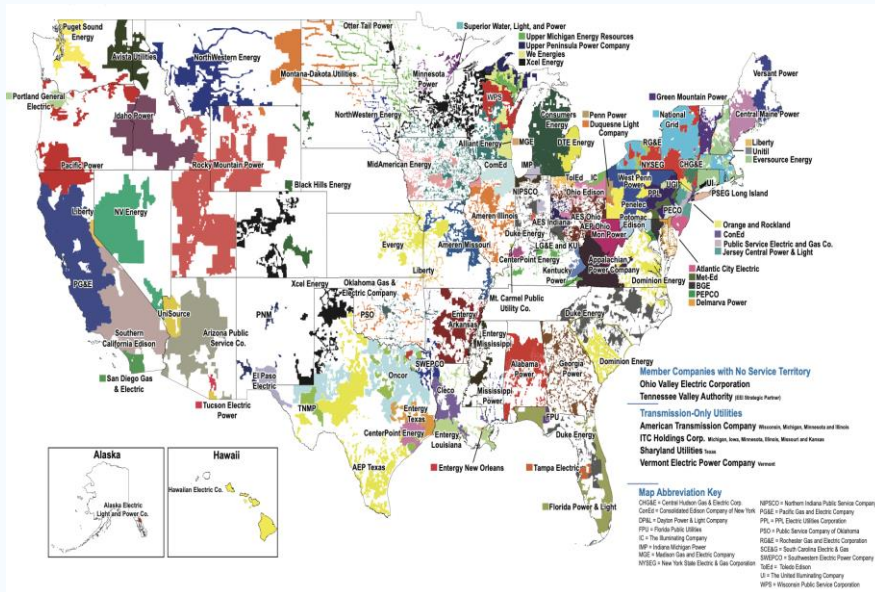


Market Seams Management

Western Energy Markets
Regional Issues Forum

April 9, 2025

Seams Management Step 1: Consolidate Operations into Well Configured Markets



Day Ahead Markets Will Change Transmission Flows and Require New Congestion Management Tools at Market Seams

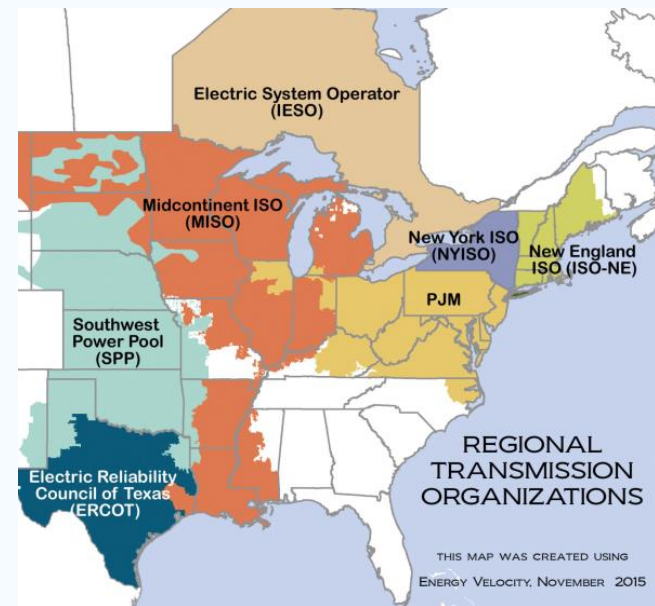
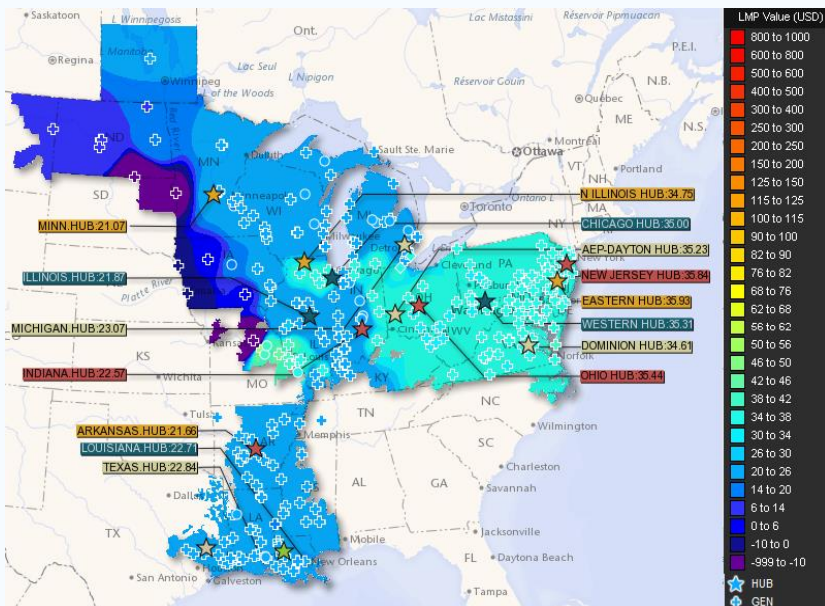
Current congestion management tools are inadequate to track and equitably assign responsibility for management of loop flow.

- Resource optimization in the day-ahead market will change historical generation and energy flow patterns, and result in higher levels of loop flow on external systems.
- Use of market dispatch rather than rather than PtP transmission scheduling will decrease visibility into sources of loop flow.
- Current congestion management process will be less effective and may unfairly shift the burden and cost of congestion management to load outside of the market.

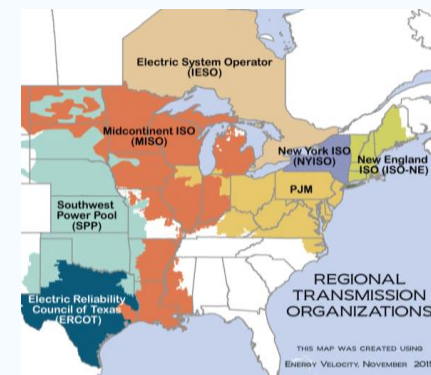
Joint Operating Agreements will be needed to define and implement a uniform regional Congestion Management Protocol ("CMP").

- The proposal developed by the Enhanced Curtailment Calculator Expansion Task Force offers a proven model.
- A uniform CMP will allow calculation of market and tagged transmission flows, and allocation of redispatch responsibility, when needed.
- Adoption of a revised CMP will be complex in the West due to need to involve multiple TOPs, TSPs, BAAs, RCs, Market Operators.

Trading Patterns and Market Prices Follow Market Boundaries

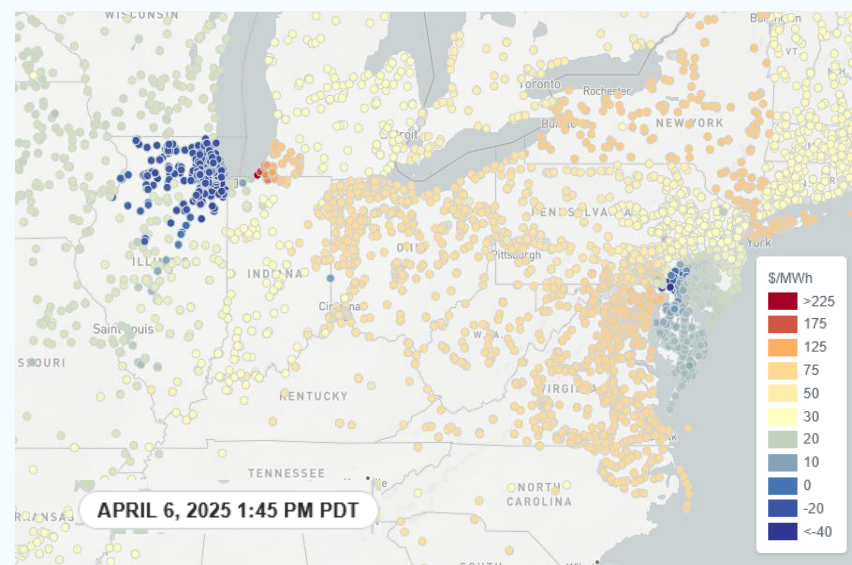


Market Seams Inhibit Economic Transfers and Create Substantial Consumers Losses



Prices on this typical spring day evidence the impact of barriers to efficient trade.

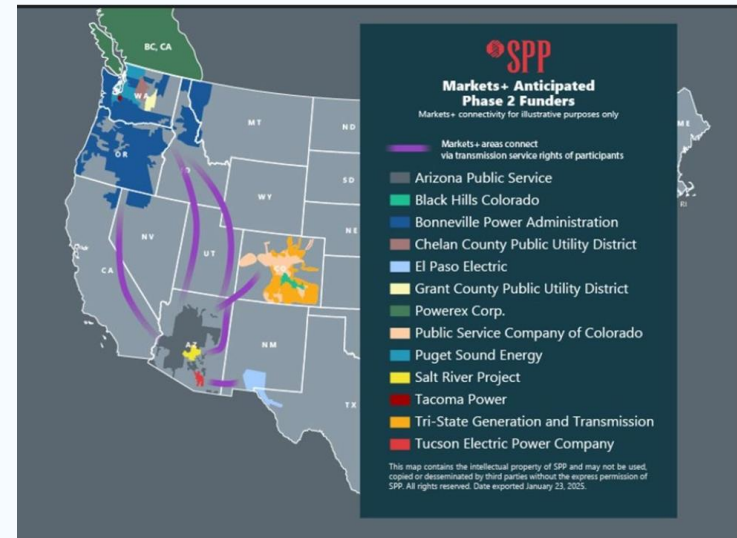
- New York would benefit through greater imports from both New England and PJM. Trading hurdles, not physical transmission constraints result in prices in NYISO roughly 2X that of its neighbors.
- Prices in Chicago were $-\$20/\text{MWh}$, reflecting excess supply.
 - Physical transmission constraints limited the ability of PJM to transfer low-cost energy from Chicago to eastern portions of the PJM market.
 - Trading hurdles prevented exports of low-cost power from Chicago to neighboring MISO loads in Illinois and Wisconsin.



Non-Contiguous Market Footprints Complicate the Situation

In existing markets, seams management has focused on cross boarder transactions.

- Where markets include non-contiguous zones, transfers between zones will require drive-out, drive-through and drive-in transmission service and schedules.
- Absent mitigation, this undermines the value of coordinated market resource commitment and dispatch.
- Reducing barriers to such transactions would require new types of transmission service, and coordination between multiple parties (Market Operators, TOPS, TSPs, BAAs, RCs).



Opportunities to Reduce Efficiency Losses

Experience in current markets, based on more than 20 years of operating history, shows that efficiency losses at market seams are substantial and that market mechanisms to mitigate the negative impact are only marginally effective.

- The largest opportunity to improve seams efficiency is through the introduction of Market-to-Market congestion management.
- Opportunities to improve efficiency through participant trading are limited. Current markets operate effectively as “islands” and efficiency losses due to trading barriers have not been successfully addressed.
- Barriers to efficient trading should be minimized where possible:
 - Reducing financial barriers by eliminating Transmission Rate Pancaking.
 - Reducing scheduling hurdles by aligning market scheduling requirements and timelines.
 - Increasing trading incentives through well coordinated interface pricing.

THANK YOU



Market Seams

Western Energy Markets
Regional Issues Forum

April 9, 2025

Todd Kochheiser

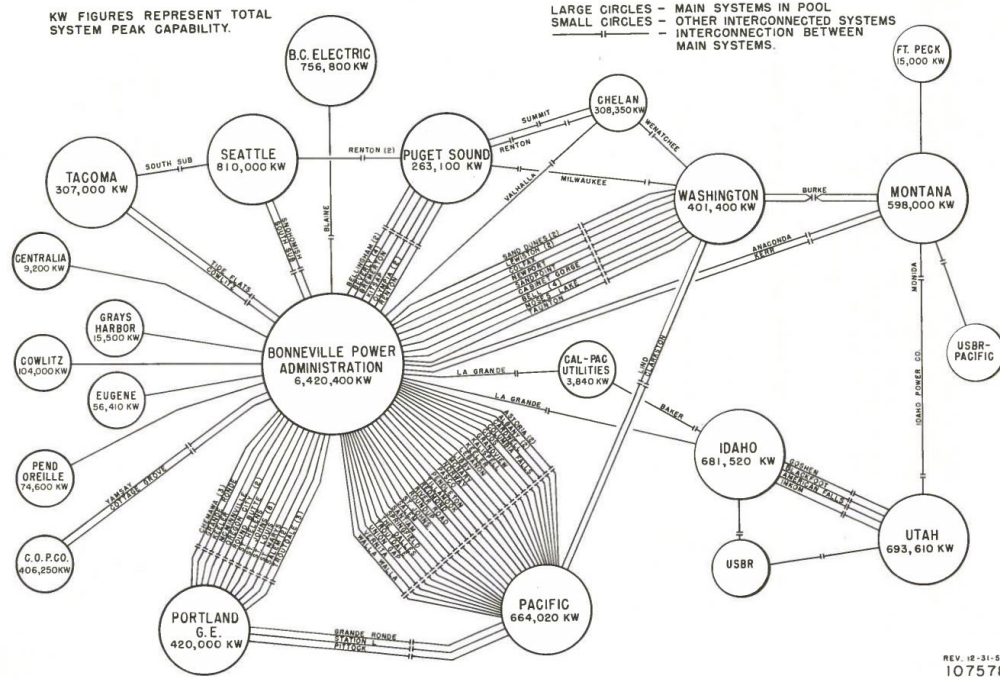


COMPLEXITY

(past, present, future)

The Past (~1958)

NORTHWEST POWER POOL
SCHEMATIC DIAGRAM OF INTERCONNECTIONS



Source: Paper written by Bonneville's Branch of System Operations and Power Resources (July 29, 1958)

- The early days of seams!
- Systems that were previously independent and standalone (*infinite seams*) had been interconnected across the PNW
- Pooled operations provided each member with significant value that outweighed the added complexity
- Complexity was traded for efficiency and reliability benefits that could not be achieved independently

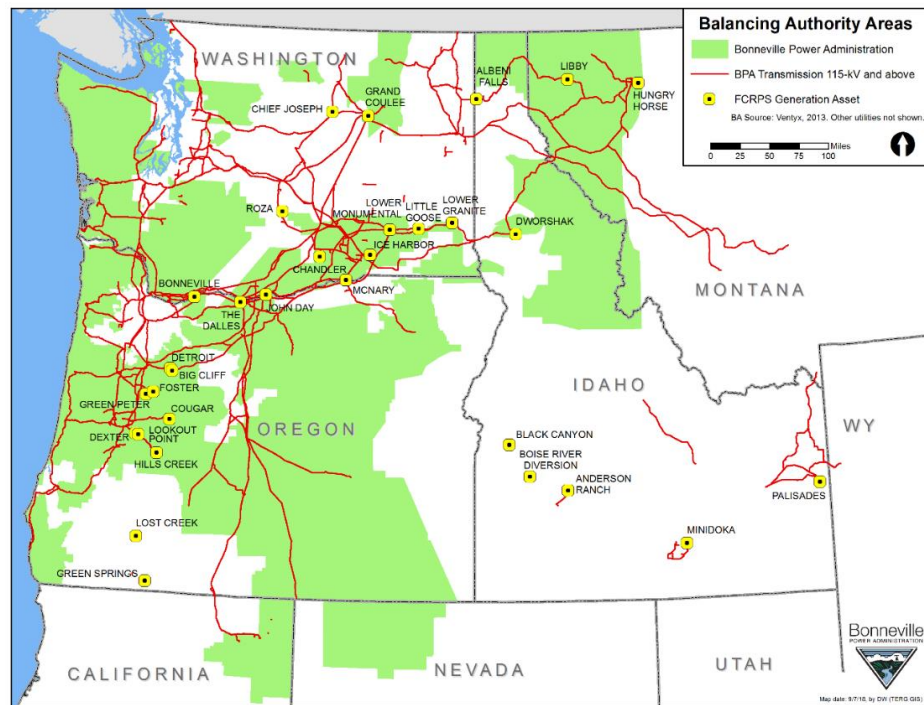
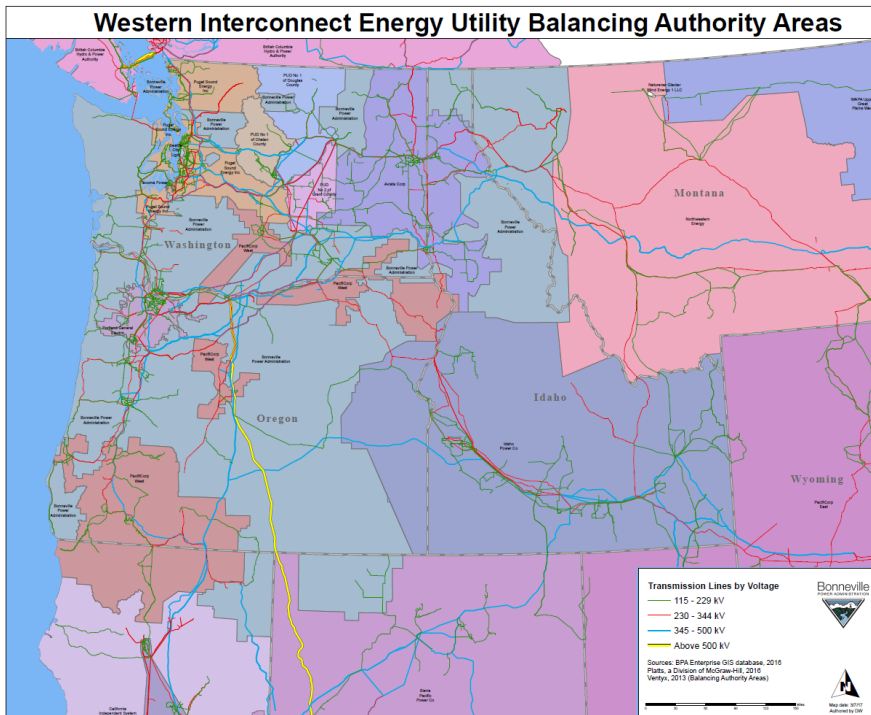
The Present

The 1958 grid and interconnected operations was so simple!

Complexity has increased in the WECC and the PNW!

- The WECC is now fully interconnected and consists of 38 BAAs and over 30 TSPs
- Dramatic build out of transmission assets and interconnections between utilities
- Deregulation occurred resulting in Open Access
- New organized energy markets have been created
- The integration of large amounts of variable energy resources
- In the PNW, many BAAs are non-contiguous with loads and resources pseudo-tied across multiple TSPs and geographic zones, often relying on BPA Transmission.
- BPA's BAA is non-contiguous, located in six states, and adjacent to 18 BAAs (~360 ties) and 15 TSPs

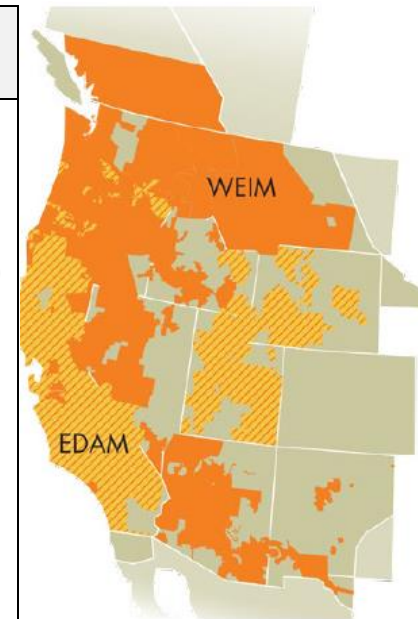
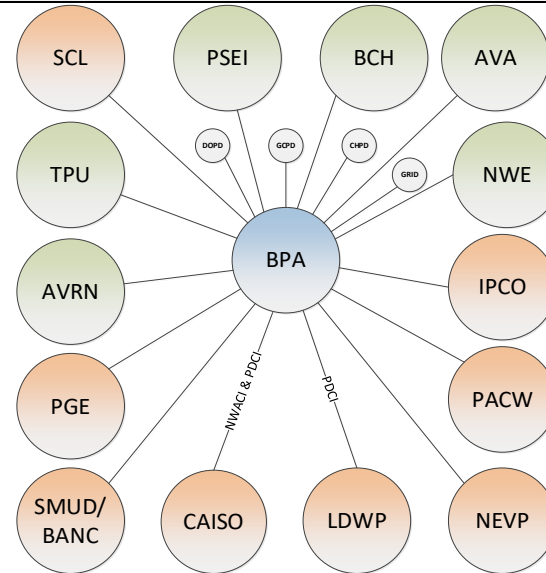
The Present - Non-contiguous BAAs



The Future?

BAA Adjacencies (WEIM / EDAM or EDAM Leaning)

- | | |
|---|---|
| <ul style="list-style-type: none"> • Avista (AVA) • Avangrid (AVRN – Gen Only) • Balancing Area of Northern California (BANC) • BC Hydro (BCHA) • Chelan County PUD (CHPD) • California ISO (CISO) • Douglas County PUD (DOPD) • Grant County PUD (GCPD) • GRID (Gen Only) | <ul style="list-style-type: none"> • Idaho Power (IPCO) • LA Department of Water and Power (LDWP) • Nevada Energy (NVE) • Northwestern (NWE) • PacifiCorp West (PACW) • Portland General Electric (PGE) • Puget Sound Energy (PSE) • Seattle City Light (SCL) • Tacoma Power (TPU) |
|---|---|



Only BPA adjacencies shown

What Seams?

Seams and Markets

- Operating in WECC has become more complex over time
- Seams are not a new concern for utilities, load serving entities, merchants, or marketers operating in the Western Interconnection
- Similar to how BAA and TSP footprints produce seams, the addition of multiple new non-contiguous Day Ahead markets will increase complexity and impact existing operational and commercial seams

Operational Seams Examples

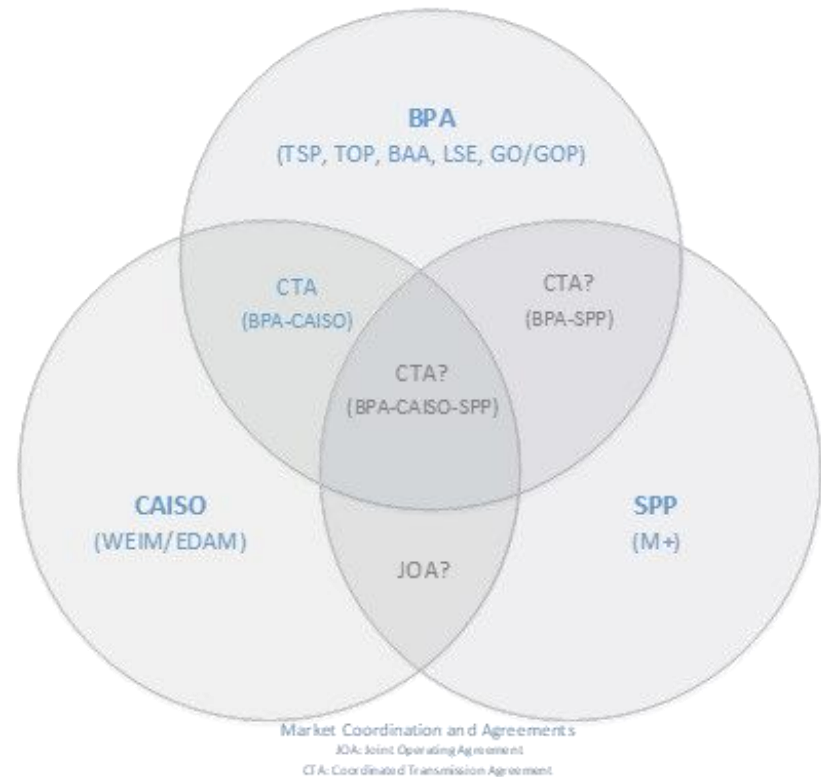
- Reliability Coordination (RC)
- Balancing Authority Area (BAA)
- Transmission Operations (TOP)
- Transmission Constraints and Market Congestion
- Congestion Management
- Dynamic Transfer Capability (DTC)
- Interconnection Reliability Operating Limits (IROL)
- Outage Coordination
- Operational Studies

Commercial Seams Examples

- Market timing and process requirements (Bi-Lateral, DA, and RT)
- Interplay between Resource Adequacy Programs
- Jointly Owned Transmission (network and Interties)
- Remote Load (i.e., load service in another BAA)
- ATC ID, OATT, and Business Practice (BP) Discrepancies between adjacent TSPs or joint asset owners
- Price Formation (between markets)
- Transmission Rights

Seams Agreements

- Given the complexity of WECC, the potential for non-contiguous market and RC footprints, and the number of parties involved, multiple types of agreement will likely be necessary.
- These types of agreements can be complex and lengthy requiring years to negotiate and implement
- Agreements amongst RTOs can range from 200-400 pages.



Conclusion

- Operating in WECC has generally become more complex over time
- Seams introduce complexity
- Complexity creates operational and commercial challenges
- Market and RC footprints will impact the number and type of seams and associated operational challenges
- BPA and other entities in the region will need to work collaboratively to address operational challenges & complexity from seams, regardless of market decisions
- Seams between centrally cleared markets and between markets and non-market areas will likely necessitate agreements between parties
- The impacted parties and scope of the issues that will need to be addressed are not yet fully known
- Addressing these complexities is possible with time and effort
- Stay positive!



Questions

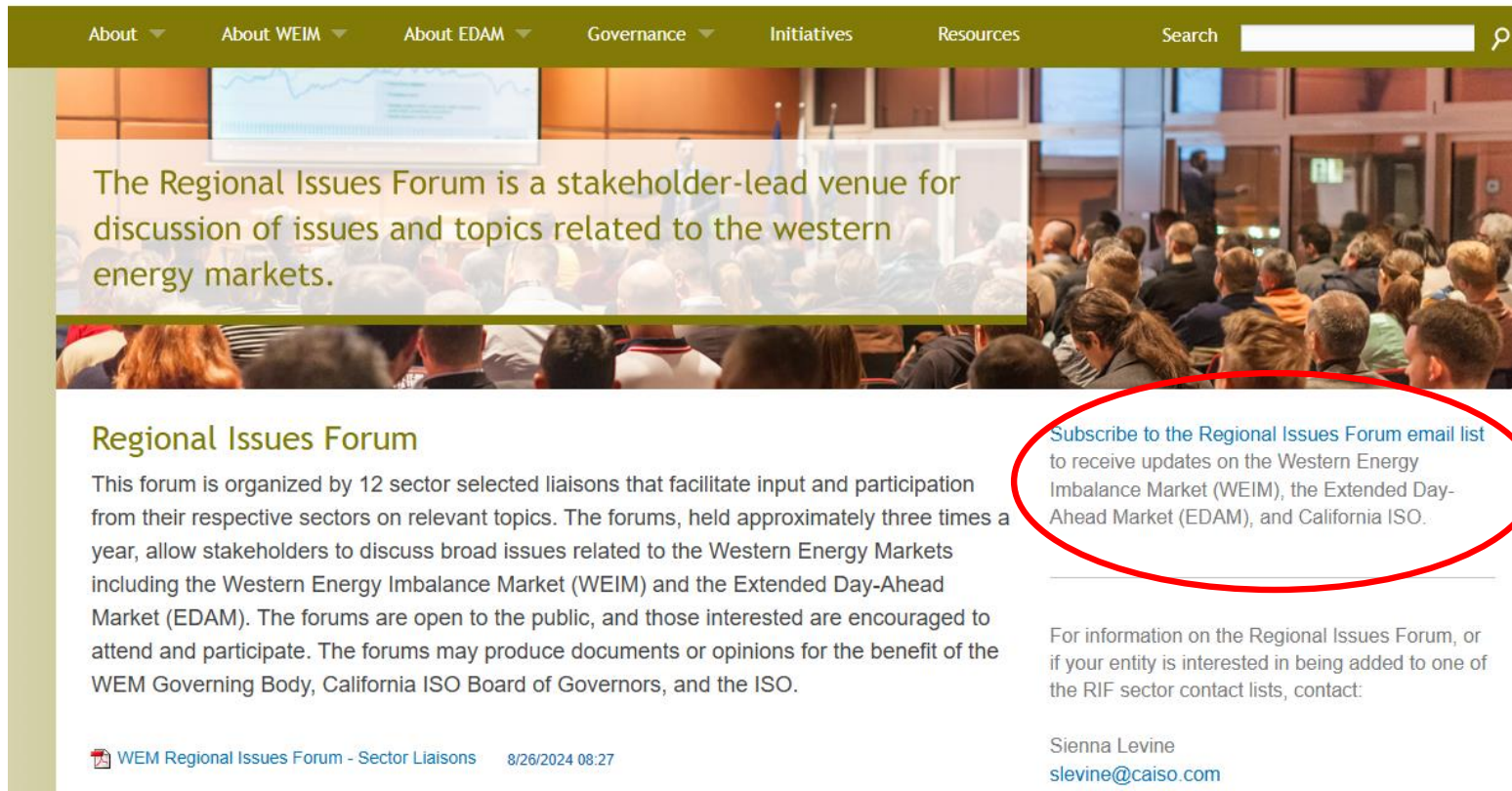
Supplemental Material:

- Bonneville Workshop Meeting #10 [Presentation](#) (see slides 29-44)
- Bonneville Day Ahead Market [Draft Policy](#) (see appendix D, page 84-89)



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WESTERN ENERGY MARKETS



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The Regional Issues Forum is a stakeholder-lead venue for discussion of issues and topics related to the western energy markets.

Regional Issues Forum

This forum is organized by 12 sector selected liaisons that facilitate input and participation from their respective sectors on relevant topics. The forums, held approximately three times a year, allow stakeholders to discuss broad issues related to the Western Energy Markets including the Western Energy Imbalance Market (WEIM) and the Extended Day-Ahead Market (EDAM). The forums are open to the public, and those interested are encouraged to attend and participate. The forums may produce documents or opinions for the benefit of the WEM Governing Body, California ISO Board of Governors, and the ISO.

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Sienna Levine
slevine@caiso.com

 WEM Regional Issues Forum - Sector Liaisons 8/26/2024 08:27

Register for the June 17, 2025 RIF Meeting

The Renaissance Hotel, Reno, NV

Regional Issues Forum

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 WEM Regional Issues Forum - Sector Liaisons 8/26/2024 08:27

Public session participation information

Date & time	Location	In-person registration	Web and audio participation information
Apr 09, 2025 9 a.m. - 12:30 p.m.	PacifiCorp, Portland, OR	https://caiso.regfox.com/wem-regional-issues-forum	https://caiso.webex.com/caiso/onstage/g.php?MTD=279be17944123eb3ee9633e2e715993 Phone only: 1-844-621-3956 access code: 25049372888
Jun 17, 2025 1 p.m. - 5 p.m.	Renaissance Hotel, Reno, NV	https://caiso.regfox.com/wem-regional-issues-forum-june-17-2025	https://caiso.webex.com/caiso/onstage/g.php?MTD=e651252baf5c9781bc91d26160524d8c3 Phone only: 1-844-621-3956 access code: 24845428518

For connectivity issues, call Intellor at 1-301-250-7202

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WESTERN ENERGY MARKETS

Regional Issues Forum

Adjourned

April 9, 2025

9:00 a.m. – 12:30 p.m. (Pacific Time)

