

MARKETS



SEAMS INFORMATIONAL WEBINAR



*Working together to responsibly and economically
keep the lights on today and in the future.*



SouthwestPowerPool



SPPorg



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Southwest Power Pool
**WESTERN
ENERGY
SERVICES**

AGENDA

- Defining Seams
- Seams Coordination for Markets
- Equity Within A Single Market
- Seams Coordination for Reliability
- Path Forward on Seams

DEFINING SEAMS

SEAMS VS INTEROPERABILITY

Seams

(neighbors performing same function)

- Balancing Authority (BA) to BA
- Transmission Service Provider (TSP) to TSP
- Market to Market (neighboring markets)
- Greenhouse Gas (GHG) area to GHG area
- Reliability Coordinator (RC) to RC
- Transmission Operations Planner (TOP) to TOP

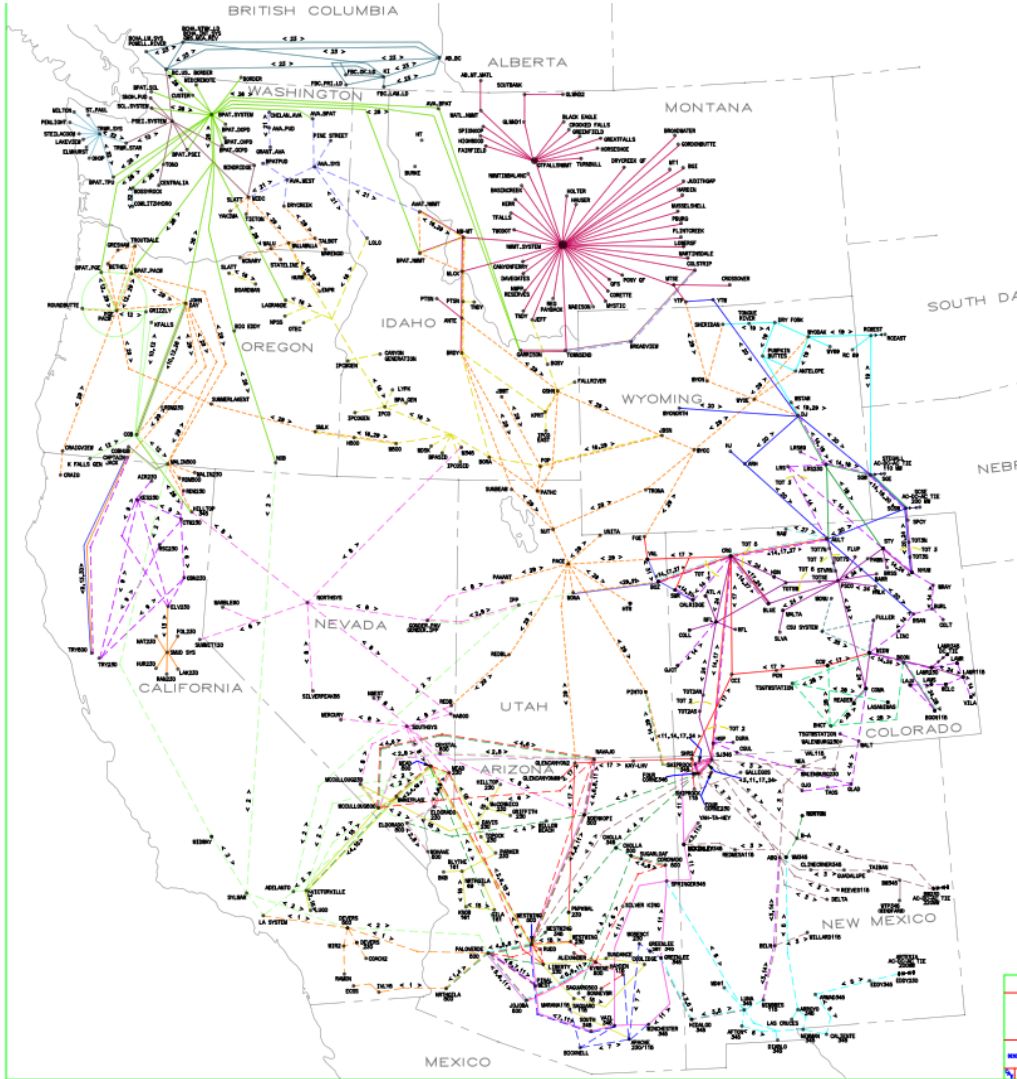
Interoperability

(Coordination/interaction with other programs or entities)

- BA to TSP OATTs
- Western Resource Adequacy Program
- Unscheduled Flow Mitigation Plan

EXISTING SEAMS IN THE WEST: TSPs AND BAs

TSPs

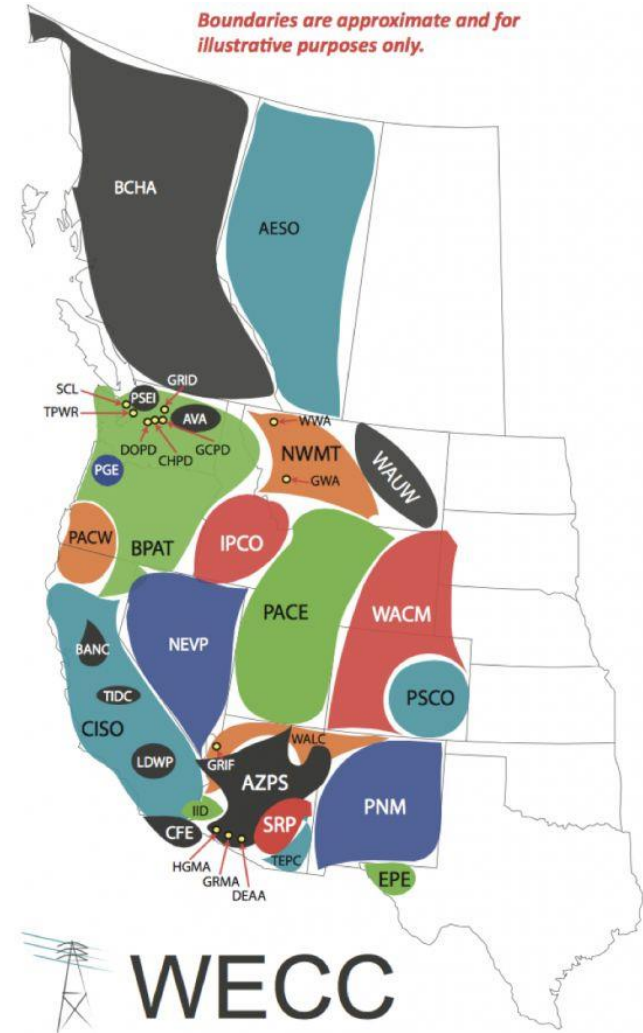


LEGEND

- | | |
|-----------------|-----|
| 1. IID | --- |
| 2. LDWP | --- |
| 3. PNM | --- |
| 4. AZPS | --- |
| 5. EPE | --- |
| 6. SRP | --- |
| 7. SWTC | --- |
| 8. NEVP | --- |
| 9. WASN | --- |
| 10. PSEI | --- |
| 11. TEPCC | --- |
| 12. PGE | --- |
| 13. SMD1 | --- |
| 14. TSGT | --- |
| 15. WALC | --- |
| 16. IPCO | --- |
| 17. CRCM (WACM) | --- |
| 18. BEPW (WACM) | --- |
| 19. BHBE | --- |
| 20. LAPT (WACM) | --- |
| 21. AVAT | --- |
| 22. NWMT | --- |
| 23. BCHA | --- |
| 24. PSCO | --- |
| 25. CSU | --- |
| 26. BPAT | --- |
| 27. PRPA | --- |
| 28. BHCT | --- |
| 29. PPW | --- |
| 30. TANC | --- |
| 31. DGT | --- |
| 32. TPWR | --- |
| 33. WITP | --- |

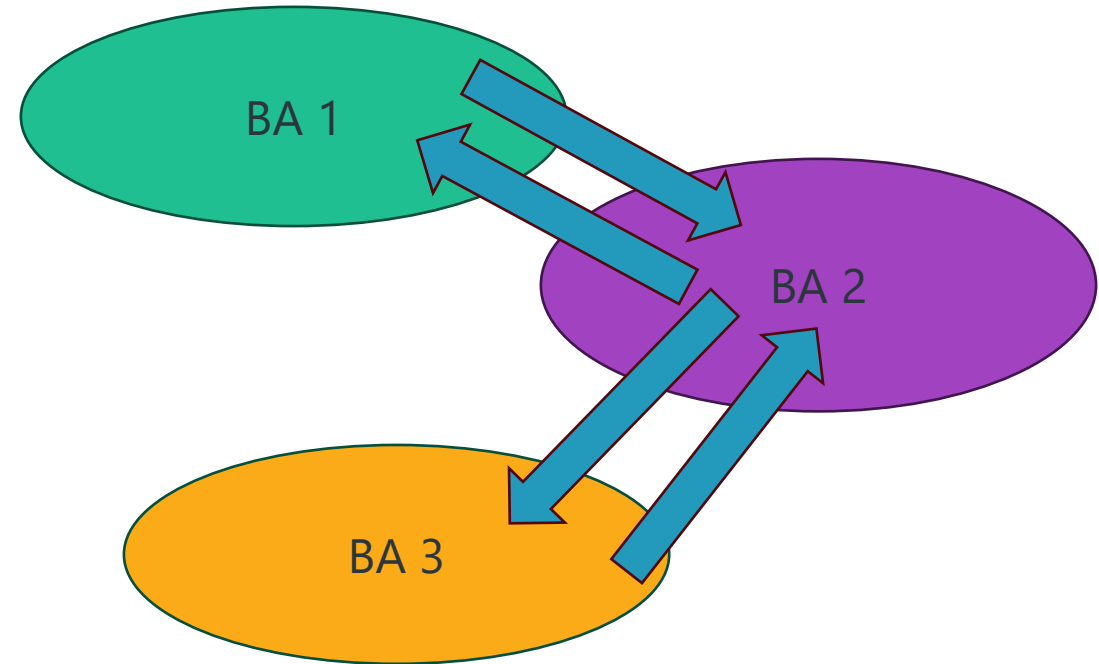
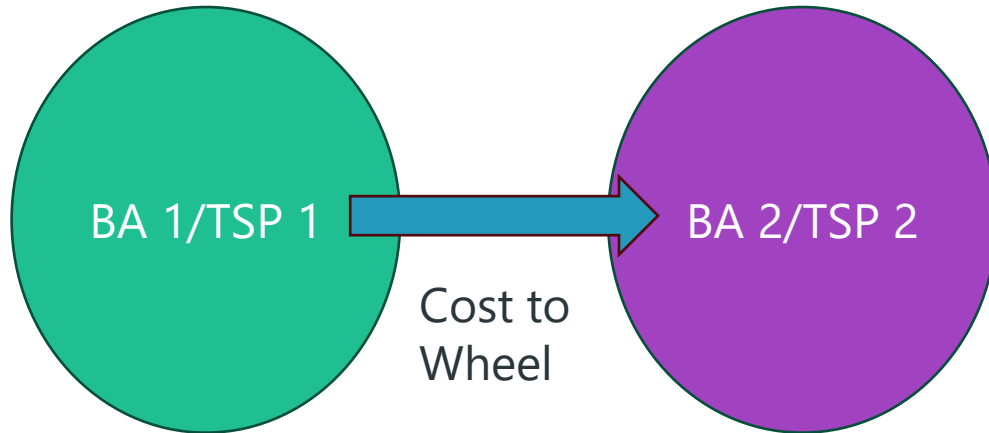
BAs

Boundaries are approximate and for illustrative purposes only.



Source: Western Electricity Coordinating Council

WHAT ARE BA AND TSP SEAMS?

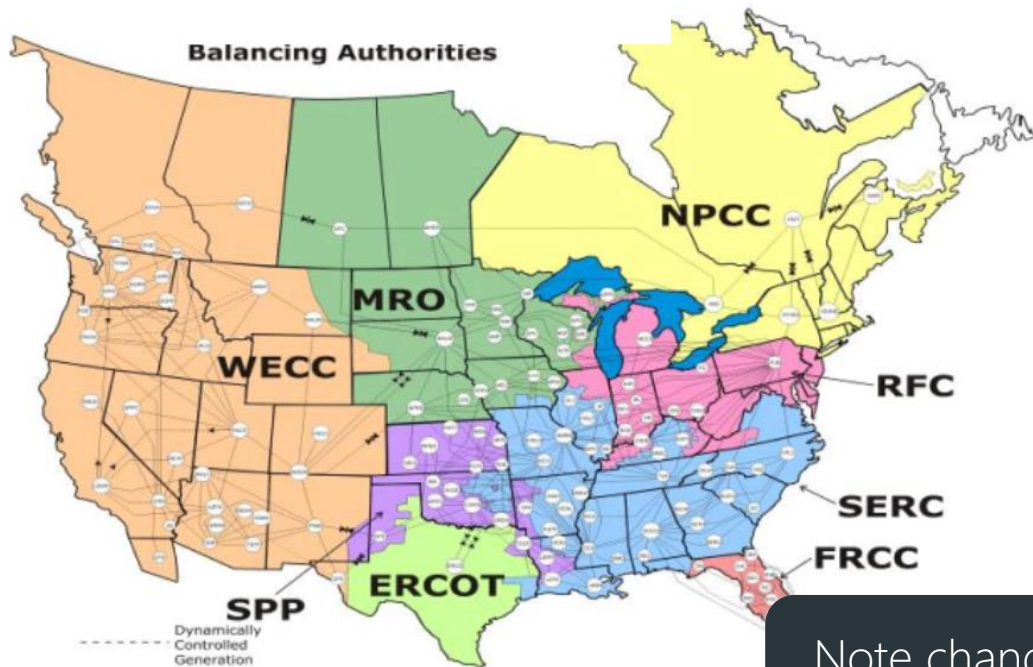


- BAs manage the imports, exports, and wheel transactions impacting the BA boundary, including the generation and load within the BA boundary, pursuant to the BA OATTs
- TSPs manage the transmission service sold to support the imports, exports, and wheeling transactions, including the service used to serve the load within the TSP network, pursuant to TSP OATTs.

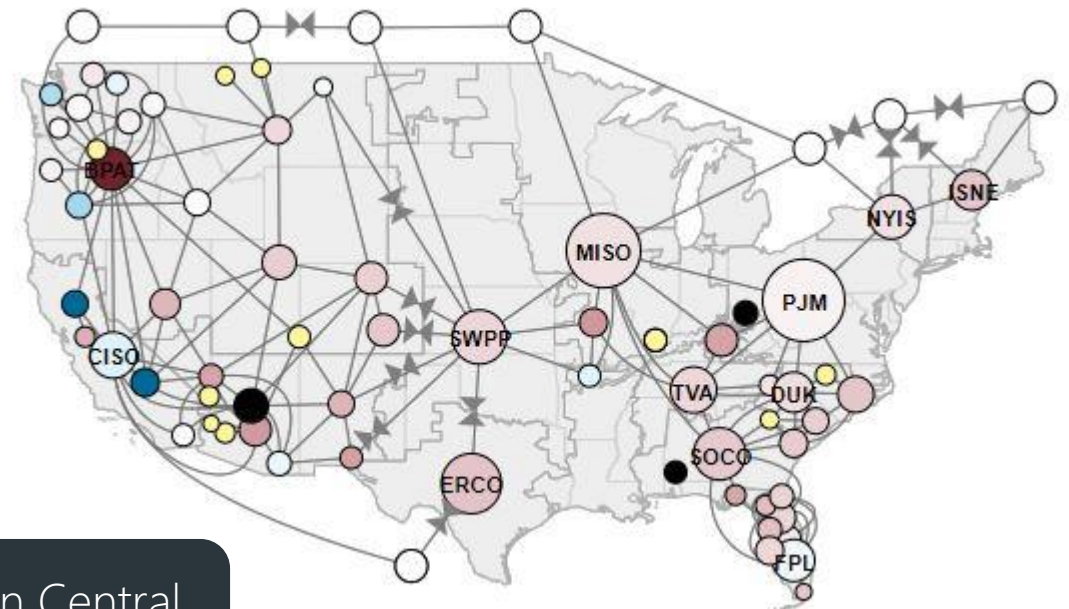
CAN SEAMS BE ELIMINATED?

- As long as more than 1 BA or TSP exists, seams will continue to exist – regardless of number of markets.
- Seams are reduced when BAs consolidate and/or TSPs consolidate facilities into joint tariffs (for example: RTO Tariff) or when neighboring BAs and TSPs enter into agreements to coordinate on a particular process.
- ***If neighbors join the same market, the rules for how the market is dispatched impacts the level of seams reduction.***

NERC BAs in 2006



NERC BAs in 2020s

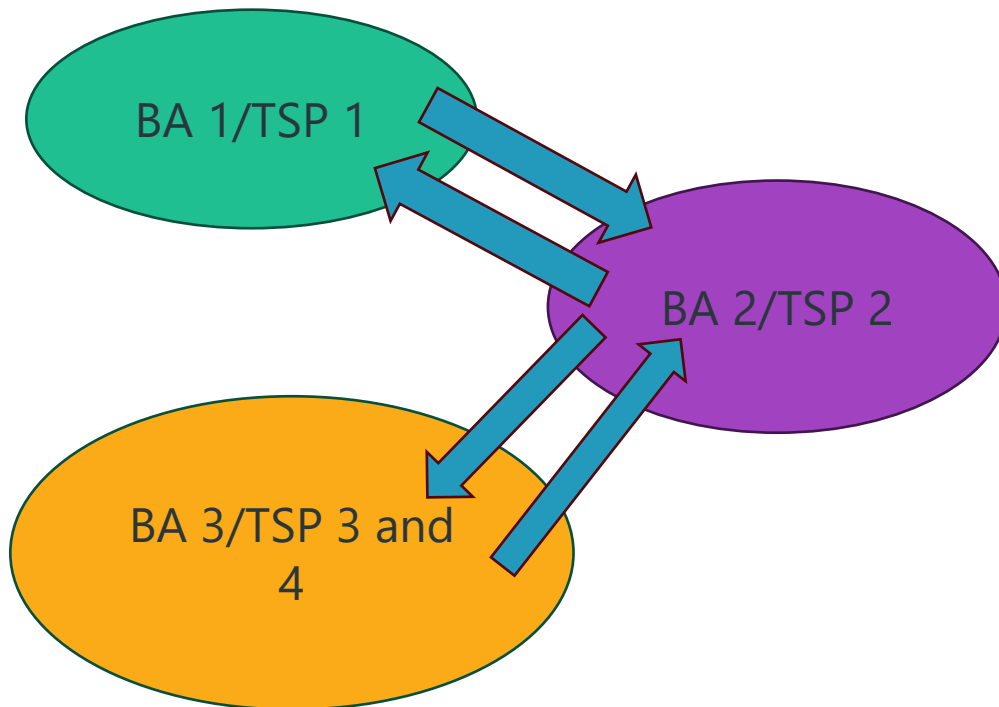


Note change in BAs in Central and Midwest US

MULTIPLE BA/TSP SEAMS VS. CONSOLIDATED FOOTPRINT

Seams In Place

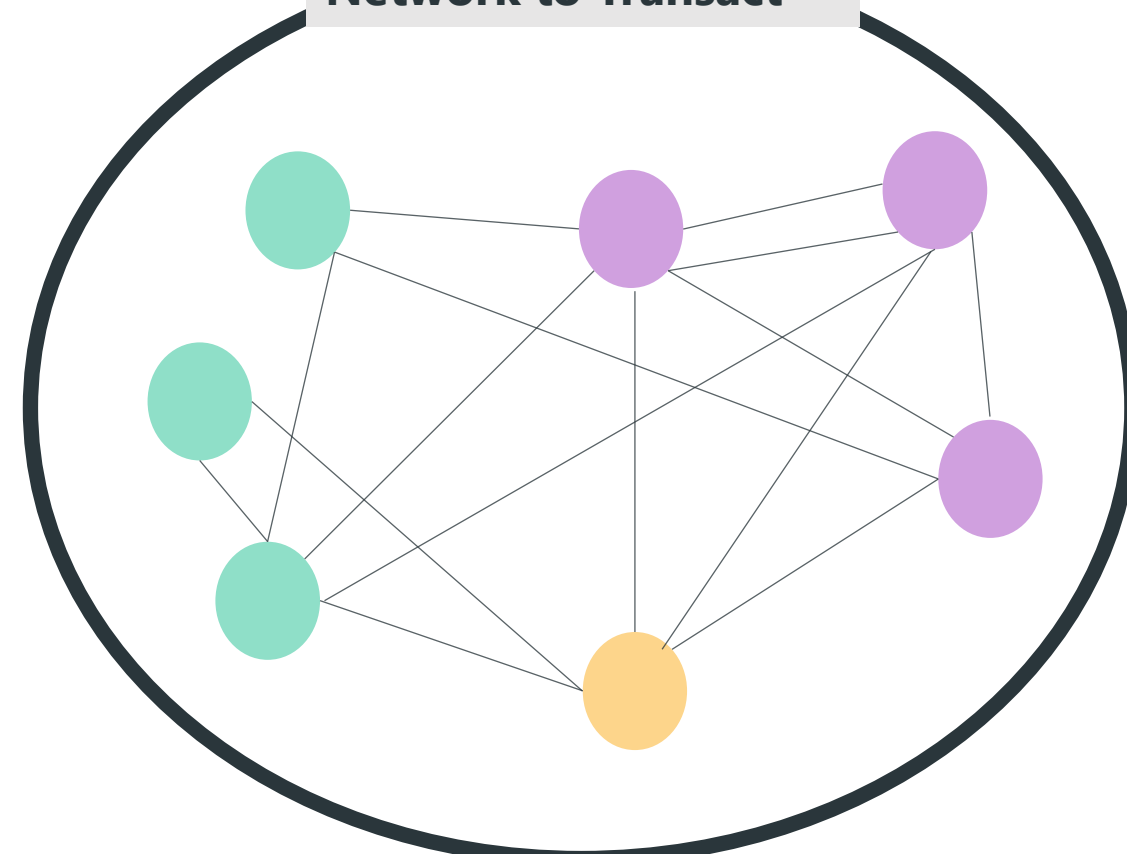
More than 1 BA, More Than 1 TSP, Multiple Terms to Transact



Examples: Western Interconnection outside of California ISO Footprint, Southeast US

Seams Removed

One BA, One TSP, One Network to Transact



Examples: SPP RTO Footprint, California ISO

WEST VS. EAST SEAMS:

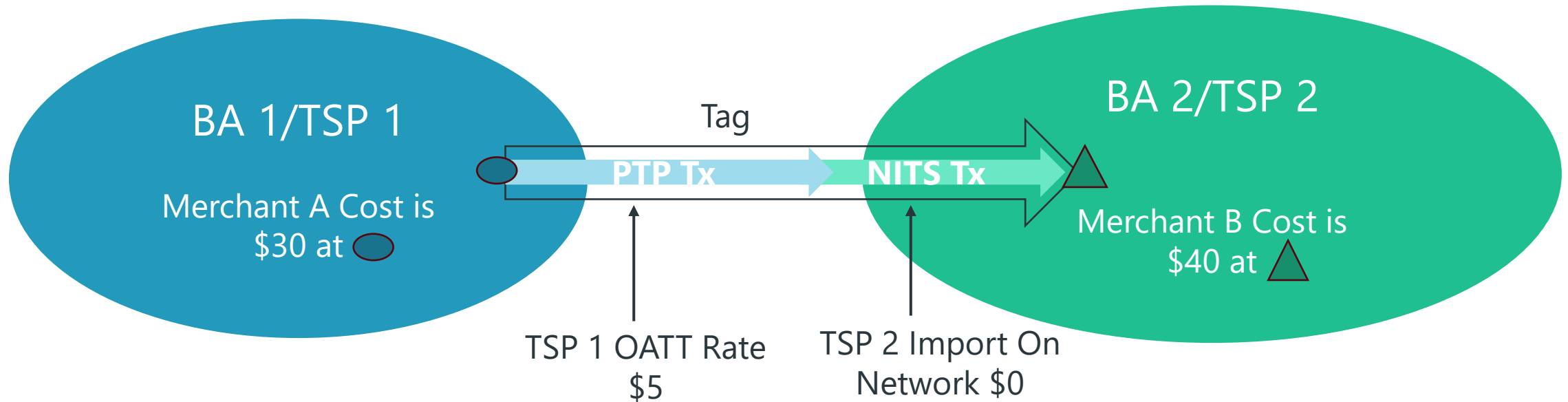
DIFFERENT ORDER OF MARKET IMPLEMENTATION, DIFFERENT CHALLENGES

Western Interconnection Markets	Eastern Interconnection Markets
Retained individual tariffs, TSPs and BAs, while adding markets on top of existing structure	Consolidated tariffs and TSPs, and then consolidated BAs, while adding markets on top of the consolidated footprints
<p>Impact to Markets:</p> <ul style="list-style-type: none">• Internal Seams Remain: Requires intentional policies between BAs/TSPs and market design decisions to reduce impact of the <u>internal</u> seams in the market dispatch.• Boundary Seams: Market footprints' boundary seams are market operators negotiating on peer-to-peer basis on behalf of their customers.• Internal Market Equity Challenges: Equity in revenue and cost allocation within the individual market footprint can be undermined by <u>internal</u> seams, particularly if policies are not intentional about reducing impacts of the internal seams.	<p>Impact to Markets:</p> <ul style="list-style-type: none">• Internal Seams Gone• Boundary Seams: Market footprints' boundary seams are RTOs negotiating on peer-to-peer basis on behalf of their customers.• Internal Market Equity Challenges: Equity in revenue and cost allocation <u>internal</u> to respective market footprints is managed by the governance of the applicable RTO process.

SEAMS COORDINATION IN MARKETS

WHAT ARE BILATERAL ECONOMIC TRANSFERS?

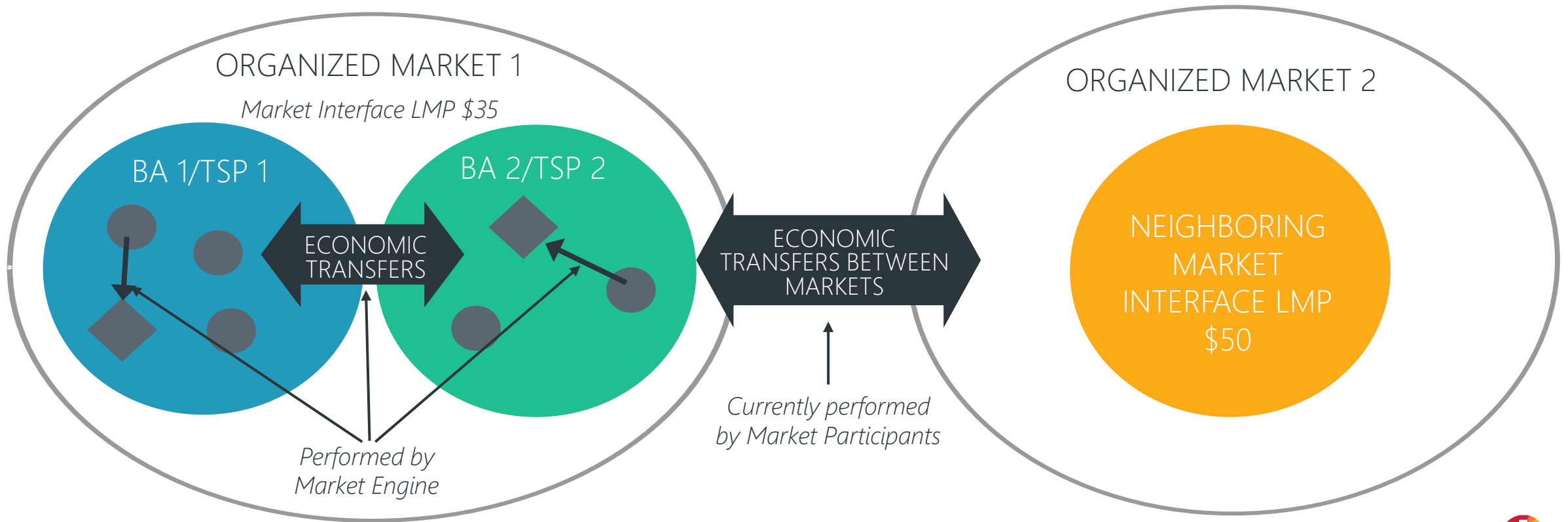
Bilaterally: opportunities to buy and sell physical energy between two locations. Organized markets do not prevent this type of transaction.



Parties negotiate for an agreed upon price to support mutually beneficial economic transfers. Merchant A sells energy to Merchant B at \$37. Merchant A receives value for energy above its cost to transact (and deliver) and Merchant B receives value by buying energy below its own cost to produce.

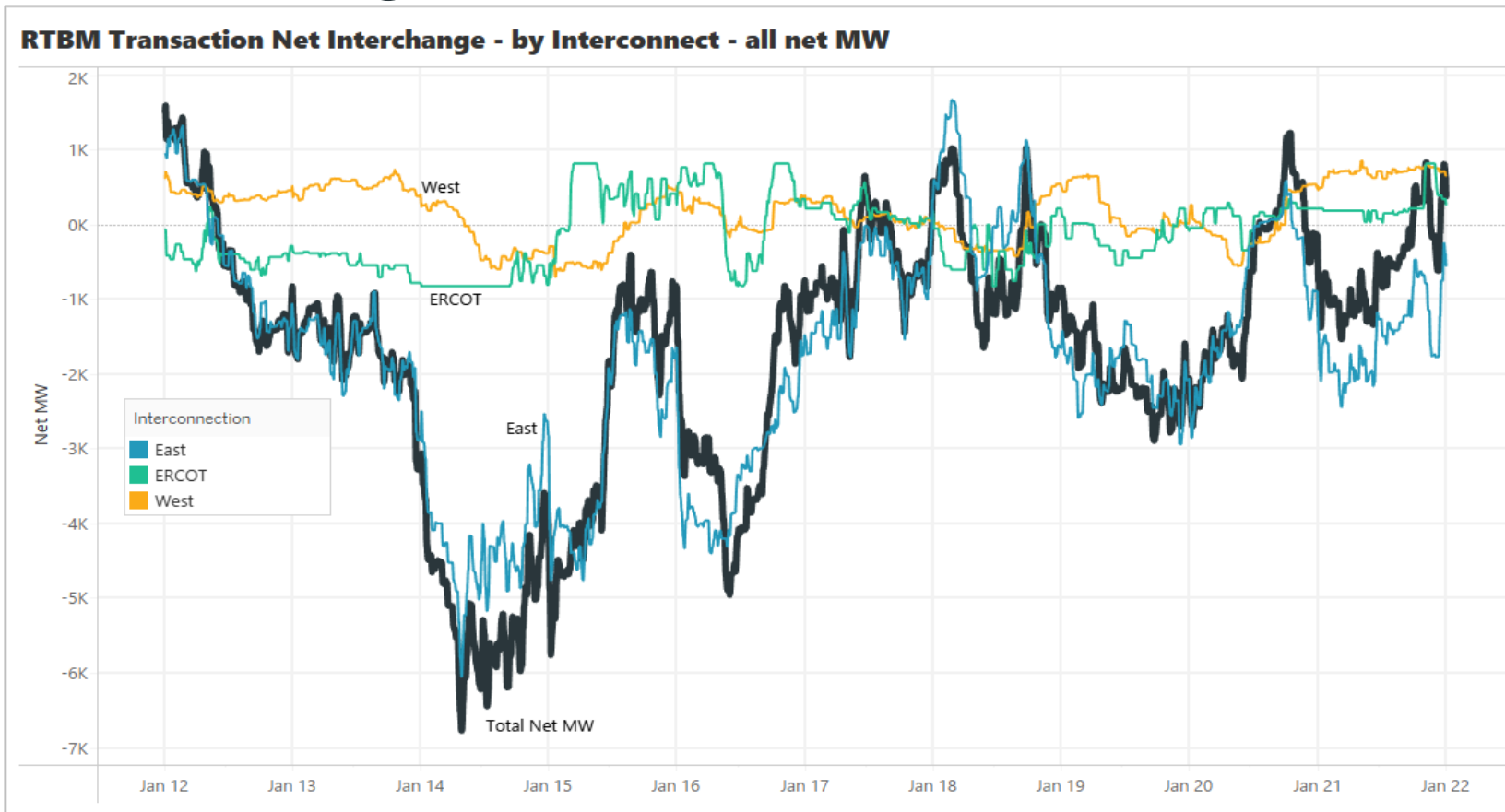
WHAT ARE MARKET ECONOMIC TRANSFERS?

Organized markets stack bids/offers and clear to the lowest production cost for the entire market while respecting transmission constraints and BA and TSP procedures.



WILL MORE THAN ONE MARKET END TRANSFERS?

- **No.** Transfers occur bilaterally and will be implemented by market engines and will continue.



SPP's BA NSI from East, ERCOT and West during Winter Storm Gerri

HOW DOES ONE MARKET IN THE WEST ELIMINATE SEAMS?

- It doesn't. Neither EDAM nor Markets+ eliminates seams.
- As long as more than 1 BA and TSP exist, seams will exist.
- EDAM and Markets+ propose to add markets on top of existing seams.
 - The Pathways' proposal to change CAISO's governance retains the largest seam in the West: the CAISO Balancing Authority Area within California.
- Markets+ is intentional about reducing the impact of **existing** seams in its approach to market commitment and dispatch.

SPP APPROACH TO MARKETS+

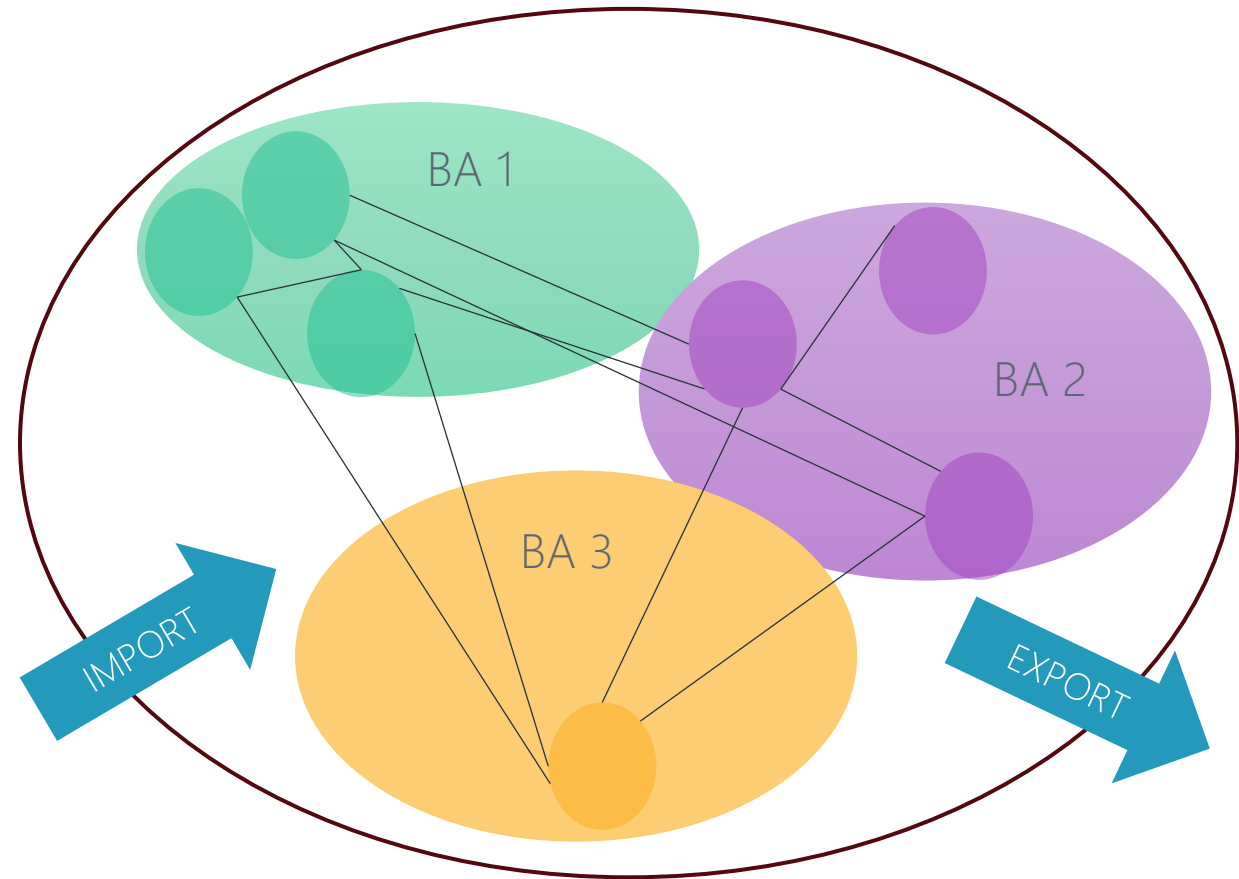
Market design developed by balanced, participant governance

SPP optimizes the dispatch across all participating BAs and TSPs using the full capability of the transmission system: centralized dispatch.

Reduces BA seams by optimizing the system more like an RTO/single BA area. Transfers can be full capability of the system less what is carved out for opt-outs or non-participating TSPs.

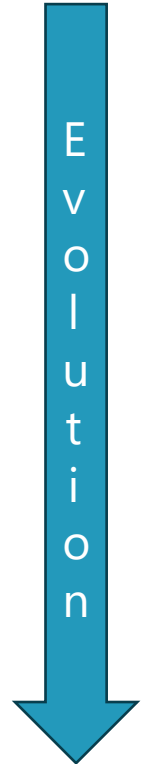
Congestion pricing is determined based on actual limitations of the system. RC and interconnection-wide congestion management methodologies apply

Import and exports to the market are priced on footprint need as a whole and not individual BA areas



TYPES OF SEAMS COORDINATION FOR ECONOMIC MARKET TRANSFERS

Economic Transfers	West Markets	East Markets
Bilateral trading between parties	Yes	Yes
Fixed transaction trading between organized markets	No*	Yes
Price Sensitive trading in one market, with fixed in other market	No*	Yes
Market Participant initiative spread bidding between markets	No	Yes, in some
Market Engine Initiated Transfers Between Markets: “Market to Market Optimization” ^	No	No



* SPP’s Markets+ will include this functionality on the seam with the California ISO footprint and EDAM

^ SPP is exploring this concept as a future enhancement.

EQUITY WITHIN A SINGLE MARKET

DESIGN FOR REVENUES AND COST ALLOCATION
WITHIN A SINGLE MARKET CAN BE MORE IMPACTFUL
THAN A SEAM

MARKETS: EXISTING EQUITY ISSUES WITHIN ANY GIVEN SINGLE MARKET

- A single market reduces operational seams but does not eliminate revenue or cost allocation policy issues between market participants or types of customers.

What should the market engine include for price formation?

Who receives congestion revenue?

When should costs be shared by generation and load? Or only generation or only load?

When should the entire market share a cost or revenue versus a specific region or zone?

Who contributes to make-whole-payments to generators and when?

HOW ARE EQUITY ISSUES FOR COST ALLOCATION POLICY ADDRESSED IN ORGANIZED **MARKETS**?

- Governance and stakeholder process
 - Proposals are evaluated to establish, modify or improve allocation approaches based on lessons learned from existing market outcomes or challenges
 - Independent oversight ensures protection of equity between customer classes and types of market participants
- **Cost allocation between market participants matters:** SPP settled \$30 billion in market transactions* in 2023.

HOW IS MARKETS+ ADDRESSING COST ALLOCATION POLICY WITHIN MARKETS+ DESIGN?

- Markets+ ported over many of the cost allocation design elements from SPP's existing Marketplace rules
 - Marketplace was developed through an independently governed and robust stakeholder process from 2008-2014 and rules have continued to evolve over the past decade to refine equity in cost-allocation principles.
- Markets+ enhanced some of the features from SPP's Marketplace to address specific regional differences in the West
- Going forward, the Markets+ independent governance process will continue to improve and refine the Markets+ design as the market evolves.

SEAMS COORDINATION FOR RELIABILITY

HOW ARE SEAMS IMPLICATED IN RELIABILITY?

The numerous BAs/TSPs tariffs can resolve congestion differently

Lack of uniform congestion management creates inequity between customers impacting the same constraint on the grid.

RESULT:

Some customers may experience re-dispatch requirements while others experience none – for the same constraint – simply because of the policy approach by that local BA/TSP.

TYPES OF SEAMS COORDINATION: RELIABILITY IMPACTS EQUITY TO CUSTOMERS ON THE GRID

Equity in Reliability Treatment	West Markets	East Markets
Bilateral agreements on shared paths or paths	Yes, some.	Yes
Common, production cost indifferent curtailments on any defined constraint (all parties contributing fair share/obligation) *	Very Limited. UFMP but only 4 paths	Yes, IDC on 2500+ flowgates
Coordinated market redispatch on shared (M2M) constraints: "Market to Market Coordination"	No	Yes
Coordinated market commitment on shared M2M constraints	No	Indirectly



* SPP West RC implemented a congestion management methodology agreement is in place for SPP West RC customers.

RELIABILITY: EXISTING EQUITY ISSUES IN WEST

	Congestion Management	Key Points	Current Frictions
WEST	<p>No uniform approach</p> <ul style="list-style-type: none"> ➤ Unscheduled Flow Mitigation Plan (4 qualified paths) ➤ Individual BA/TOP business practices implement curtailments 	<p>Congestion management decisions outside of UFMP are dependent on the local NERC entity processes, which creates inconsistency in treatment across West</p>	<ul style="list-style-type: none"> • Different practices create inequity in treatment between similarly situated entities. • Cost-shifts to customers without transparency. • No option for economic congestion management
EAST	<p>Uniform Approach</p> <ul style="list-style-type: none"> ➤ Interchange Distribution Calculator with Transmission Loading Relief (~2500 flowgates) ➤ Market to Market (M2M) between markets ➤ Congestion Management Process (CMP) 	<p>Uniform methodology and tools adopted by all in Eastern Interconnection – regardless of market or non-market area – creating consistency in equitability and transparency. Used as basis for M2M rules and allocations between markets and non-market areas</p>	<ul style="list-style-type: none"> • Debate continues over how to refine, improve and ensure cost-allocation methods are appropriate between markets • Debate occurs over flowgates to activate and when compensation should occur between parties.

WHAT IS “MARKET TO MARKET COORDINATION”?

- Systematic congestion management through re-dispatch of neighboring markets’ generation for shared constraints of neighboring markets

Greater Redispatch Efficiency

- Enables economic solution for constraints shared by more than one market

Consistent Pricing

- Facilitates greater price convergence between neighboring markets

Enhances Reliability

- Pools resources from both markets to jointly manage transmission congestion occurring near the market borders

Equitable Compensation

- Provides a payment mechanism between markets to facilitate economic sharing of neighboring transmission systems

M2M: CONGESTION MANAGEMENT RESOLVED ECONOMICALLY BETWEEN NEIGHBORING MARKETS

- Payments between markets are determined by comparing actual market flow to the firm rights (firm flow entitlements) of the market.
- Firm flow entitlements are intended to represent the portion of market flows that are considered firm.
- Market flows above firm rights when the flowgate is binding results in charges.
- M2M coordination enables the market operator to determine whether it is more economic to pay the charges or redispatch its own market generation to relieve the constraint.
- Each market shares shadow price information

M2M Settlements SPP and MISO in 2023

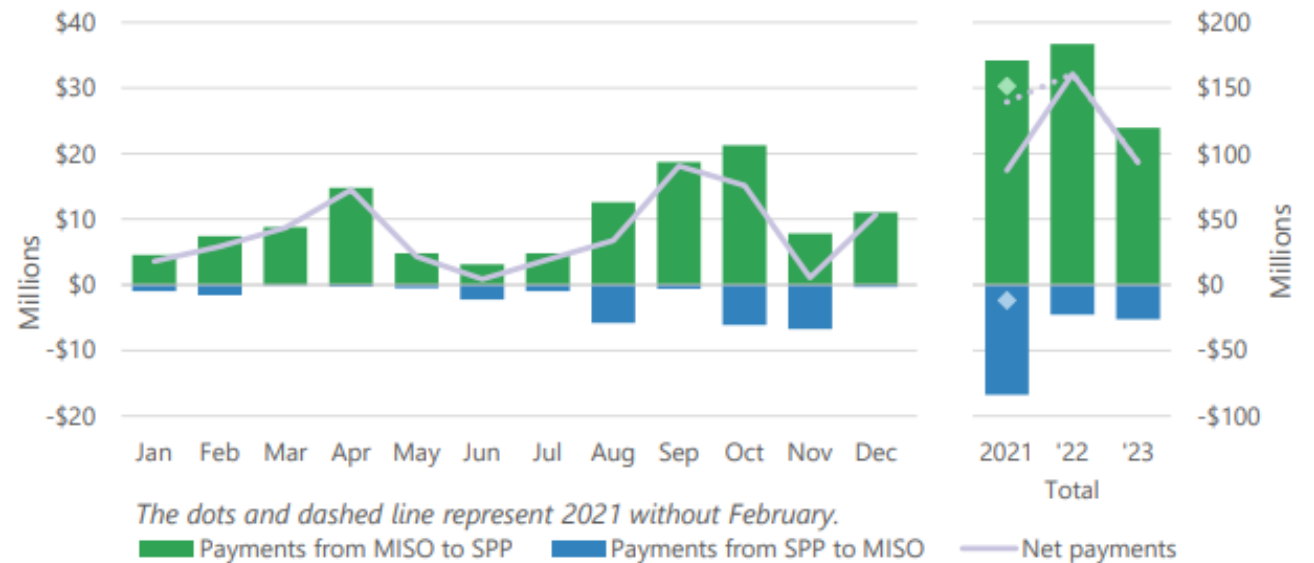


Chart from SPP MMU 2023 Annual State of the Market Report

PATH FORWARD ON SEAMS

WHEN CAN WE START REDUCING EXISTING SEAMS?

- Markets+ and EDAM/EIM preserve existing BAs and TSPs. Therefore, seams will continue to exist regardless of market footprints.
- We must focus on how to reduce frictions between those BAs/TSPs as well as market operator to market operator
- For **Reliability Seams**: We can start now – SPP presented to WECC on ECCWG proposal earlier this and is planning to advance the initiative to NAESBE.
- For **Market Seams**: We can start now on identification of friction points. Negotiation for addressing the friction points will likely need to wait until market footprints are more defined.

HOW DO WE EVALUATE EQUITY WITHIN AN INDIVIDUAL MARKET?

- Equity decisions within a market footprint are required to continuously balance interests and needs of all parties and is a reason market designs are forever evolving.
- Governance and independence by the market operator is critical
 - Value impacting decisions are made based on respective governance processes
- Markets+ design is based on a structure adopted by well-established equitable design with improvements to address regional differences in the West.

QUESTIONS