



EDAM

EXTENDED DAY-AHEAD MARKET

EDAM Straw Proposal – Stakeholder Meeting (Day 1)

May 25th, 2022



California ISO

Reminders

- This call is being recorded for informational and convenience purposes only. Any related transcriptions should not be reprinted without ISO permission.
- Calls are structured to stimulate open dialogue and engage different perspectives with the understanding that stakeholders have read the proposal.
- In the interest of time, please refrain from repeating or reiterating what has already been said.
- If you need technical assistance during the meeting, please send a chat to the event producer.

Thank you for joining us, and we look forward to an engaging discussion.

AGENDA – Day 1

Time	Topic
9:00 - 9:15	Welcome & opening remarks
9:15 - 9:30	EDAM stakeholder process & timeline
9:30 - 12:00	EDAM straw proposal walkthrough <i>Note: Break around 10:30 a.m.</i>
12:00 - 1:00	Lunch
1:00 - 2:00	Focused discussion: Day-ahead resource sufficiency evaluation (RSE) <ul style="list-style-type: none">• <i>Non-resource specific supply</i>• <i>Pooled WEIM RSE and EDAM diversity benefit</i>• <i>Failure Consequences</i>
2:00 - 3:00	Stakeholder panel discussion – Day-ahead RSE
3:00 - 3:15	Break
3:15 - 4:15	Focused discussion: Transmission commitment <ul style="list-style-type: none">• <i>Bucket 3 transmission and revenue recovery approaches</i>
4:15 - 5:15	Stakeholder panel discussion – Transmission commitment

AGENDA – Day 2

Time	Topic
8:00 - 9:15	Panel discussion - Governance Review Committee delegation of authority and stakeholder engagement
9:15 - 10:00	Focused design discussion: Greenhouse gas (GHG) accounting <ul style="list-style-type: none">• <i>Overview and examples of resource specific and zonal approaches</i>
10:00 - 10:15	Break
10:15 - 11:15	Stakeholder panel discussion – GHG accounting
11:15 - 12:00	Stakeholder general session – open discussion
12:00 - 12:30	Next steps & wrap up <ul style="list-style-type: none">• <i>Initiative interdependencies</i>

The logo for EDAM, consisting of the letters 'E', 'D', 'A', and 'M' in a bold, sans-serif font. The letters are white with a slight gradient and are set against a dark blue background. The background of the entire slide features a faint, light blue grid with various data points and numbers, suggesting a financial or technical context.

Welcome & Opening Remarks

Elliot Mainzer, *President and Chief Executive Officer*

Mark Rothleder, *Senior Vice President and Chief Operating Officer*

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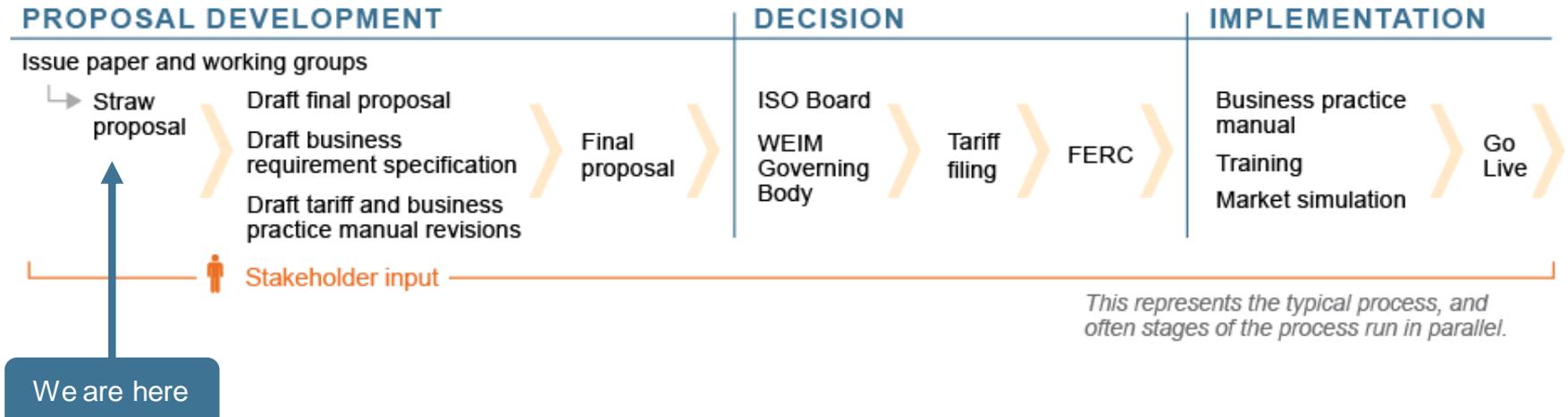
EDAM Stakeholder Process and Timeline

Milos Bosanac, *Regional Markets Sector Manager, Market and Infrastructure Policy*



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Policy Initiative Stakeholder Process



EDAM milestones

Q2

- April 28 EDAM straw proposal published
- May 25-26 EDAM stakeholder meeting (in-person and virtual)
- June 16 Straw proposal comments due
- June 23 - July 6 EDAM technical workshops

Q3

- August 11 Publication of revised straw proposal
- August 25 Stakeholder meeting (revised straw)
- September 9 Stakeholder comments (revised straw)
- Week of Sept. 12 Publish draft tariff framework

Q4

- October 19 Publication of draft final proposal
- November 2-3 Stakeholder meeting (draft final)
- November 3 Publish draft tariff language
- November 18 Stakeholder comments (draft final and draft tariff)
- December 7 Publish final proposal (and separately draft BRS)
- December 14 Briefing to ISO Board and WEIM GB

2023

FERC filing (Q2), Implementation Activities (Fall 2023)

2024

EDAM Go-Live

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EDAM Straw Proposal Walkthrough – Processes and Activities

Milos Bosanac, *Regional Markets Sector Manager, Market
and Infrastructure Policy*



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Speakers

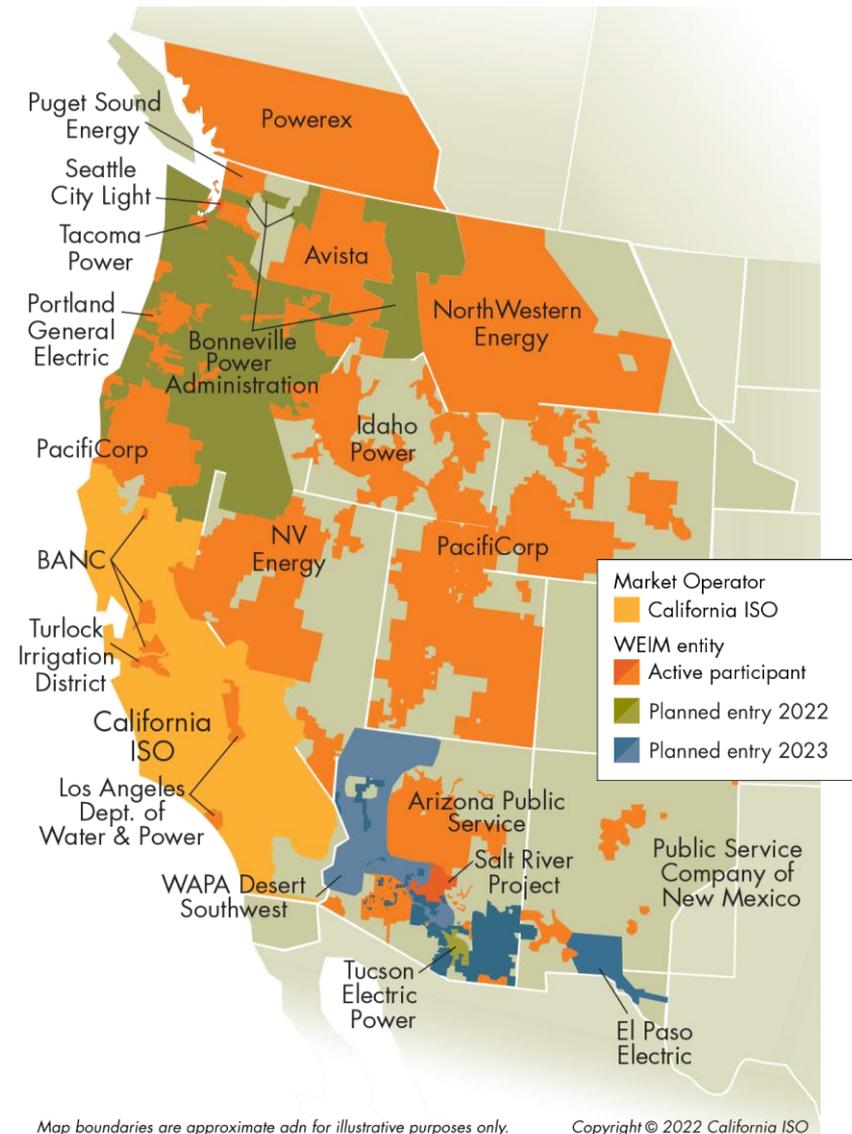
- Milos Bosanac, *Regional Markets Sector Manager, Market and Infrastructure Policy*
- Mark Rothleder, *Senior Vice President and Chief Operating Officer*
- Partha Malvadkar, *Principal, RA, Infrastructure, and Grid Enhancements, Market Policy and Performance*
- James Friedrich, *Lead Policy Developer, Policy Development*
- Anja Gilbert, *Lead Policy Developer, Policy Development*
- Danny Johnson, *Lead Policy Developer, Policy Development*
- George Angelidis, *Executive Principal, Power Systems, Power Systems and Market Technology*
- James Lynn, *Senior Advisor - Market Settlement Design, Market Services Support*
- John Anders, *Assistant General Counsel - Legal*

EDAM Participation

- Similar to the WEIM, an EDAM entity retains the following key responsibilities:
 - BAA reliability function
 - Transmission planning function
 - Resource planning function
- Participation in the EDAM provides the opportunity to co-optimize load and resources across a larger footprint to derive operational, planning, reliability, and environmental benefits.

EDAM voluntary participation model

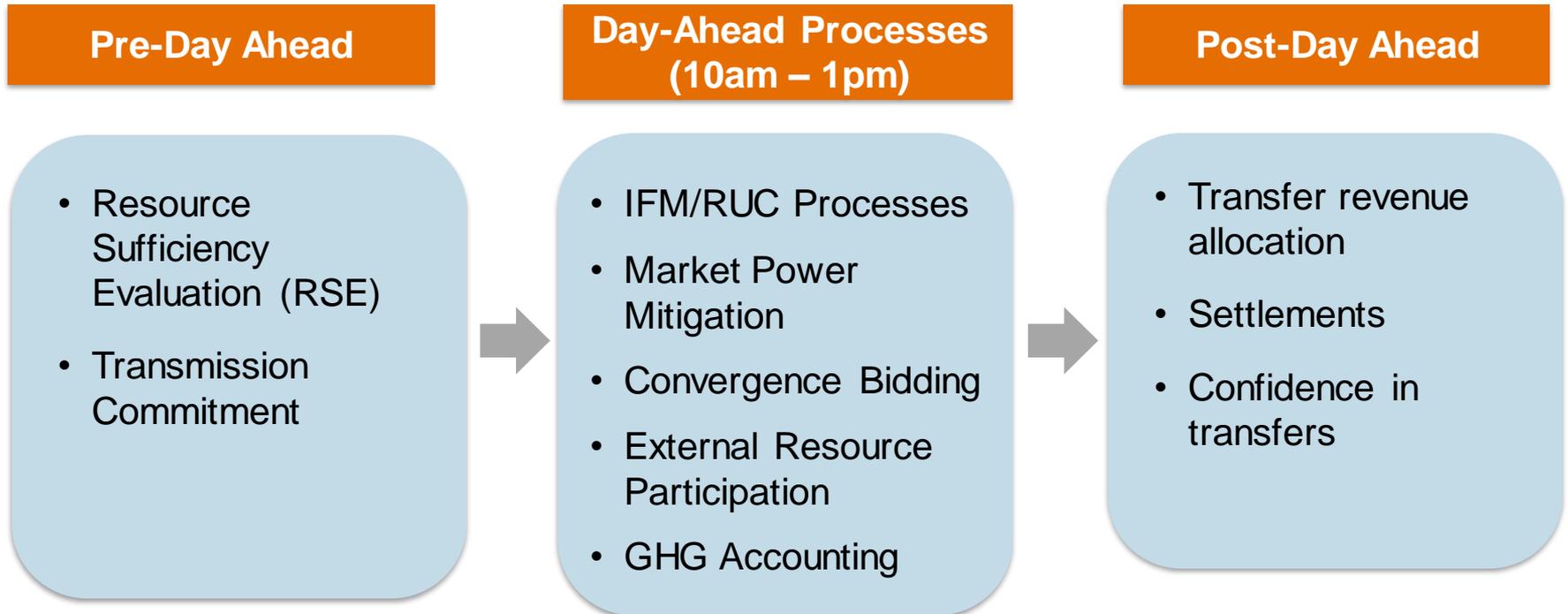
- Ease of entry and ease of exit from EDAM
- Voluntary entry into EDAM
 - Participation in WEIM a prerequisite
- Voluntary exit from EDAM
 - No exit fees
 - 6-month notice period
- Safeguards and protection measures if there are adverse reliability or market impacts.



Resource Participation in EDAM versus WEIM

- In the WEIM, resources are identified as “participating” and “non-participating.”
 - WEIM BAA submits base schedules representing resources not in the market, and these are not settled through the RT market.
 - Participating resources can offer into the market and be dispatched through WEIM.
- In EDAM, all transactions are settled through the DA market.
 - Generation can “self-schedule” in the market to run and meet obligations without being displaced by the market.
 - Generation can economically offer to derive the benefit of optimized commitment to meet obligations of the footprint.
- Base scheduling in the DA market can create market inefficiencies and unsettled flows contributing to congestion that could cause uplifts borne by other market participants.

EDAM design components – an overview



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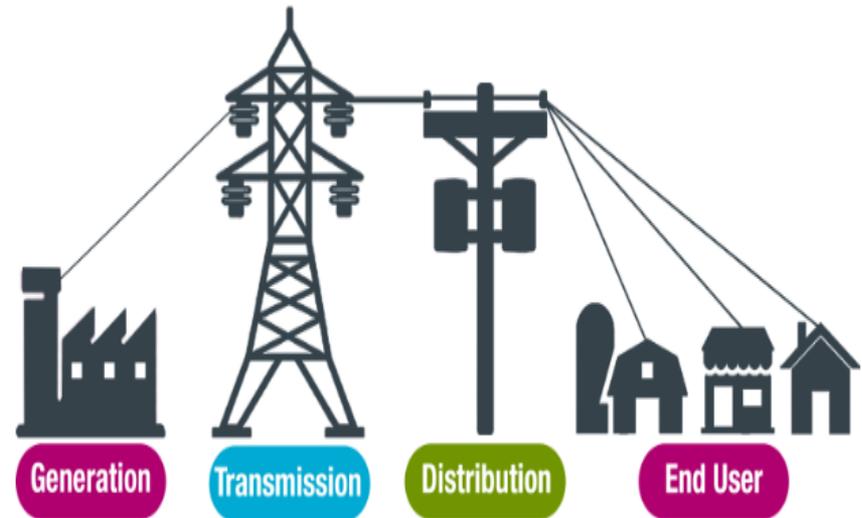
Pre-Day Ahead Market Activities



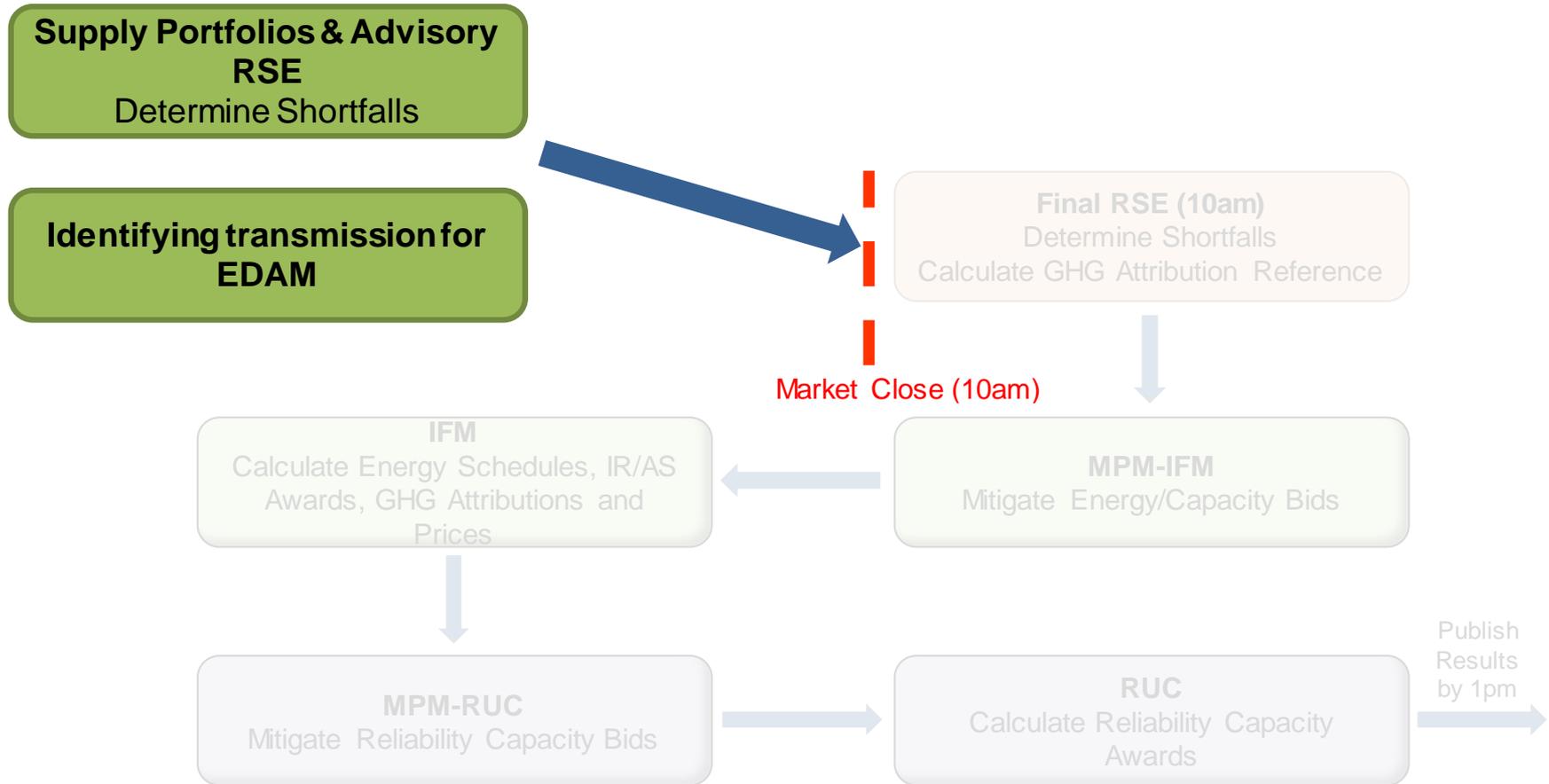
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Preparing for Participation in the Day Ahead Market

- Participating EDAM BAAs position their systems as they do today.
- Securing supply to meet expected grid needs.
- Secure transmission to meet expected needs.



Pre-Day Ahead Market Close Processes



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Pre-Day Ahead Market Activities:

Positioning Supply for Day Ahead
Resource Sufficiency Evaluation



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Purpose of EDAM RSE is to test that every participating BAA brings sufficient supply and flexibility to meet obligations over upcoming 24-hours

- Ensures that each participating BAA is fully forward resourced so that that all EDAM transfers are mutually beneficial economic displacement.
- Considers all supply made available to the market or load modification programs planned for use in the upcoming day.
- Test to ensure each BAA is able to meet uncertainty that can arise between the day-ahead and real-time.
 - Accomplished through proposed imbalance reserve product
 - Accounting for uncertainty increases the confidence in transfers

To implement this test the ISO is proposing to create a new application

- Single test for both capacity and flexibility
 - Subject to all resource constraints; including intertemporal constraints
- Executed separately for each BAA, on demand as well as at preset times
- Each BAA can submit their expected demand forecast that they will be tested against, the ISO will calculate imbalance reserve requirements
 - Ancillary Services (AS) will be self-provided by each EDAM BAA, and the ISO will still co-optimize AS and energy in the CAISO BAA
- Hourly shortfalls are identified
- Solution can be used as reference for resource GHG attribution

Integration with the existing day-ahead market

- Binding test conducted at BAA level at 10am prior to running the DA market.
 - Test is not evaluating individual LSE sufficiency
- Ability to evaluate resource sufficiency prior to 10am on an advisory basis to inform day ahead supply plans.
 - Advisory evaluations between 6am and 9am
- The application's cost-minimizing optimization and resource bids will optimally use energy limited resources (storage, hydro, others) across the day in determining if an entity has a feasible operating plan.

EDAM RSE and WEIM RSE both test for resource sufficiency but do so in fundamentally different ways

- Differences are attributed to existing market or base schedules that can be used as a reference for the WEIM RSE test. EDAM RSE has no similar reference, only bids.

EDAM RSE	WEIM RSE
Single test to determine if feasible schedule is possible across 24-hours	Separate hourly tests for capacity and flexibility
Test supply offers against forecast obligations	Tests base/market schedules as well as supply offers against forecast demand
-	Additional tests to screen for feasibility and balance of base schedules

The EDAM aims to be inclusive of all resources planned for use during the upcoming day

- Will not impose requirements on local regulatory integrated resource plans or the RA process
- Firm energy contracts (WSPP Schedule C)
 - Historically deemed reliable, used across West
 - Supply can be used to offset the RSE obligation
- Intertie bids at ISO Interties
 - Propose to count in the EDAM RSE and utilize in the EDAM market-clearing process
- Demand response programs
 - Can participate through PDR or RDRR models
 - Non-market participating programs can be represented through an EDAM RSE obligation offset with caveats

Accounting for different resource types in RSE

- Gas resources
 - Recognition that energy market timeline does not align with gas nomination timelines
 - Offers into the market can reflect fuel limitations, and potential reliance on intra-day gas procurement
- Hydro resources
 - Recognition of different limitations impacting hydro availability and production
 - Can identify daily energy limits with upper and lower bounds on total energy scheduled
 - Can model multiple individual hydro resources as one resource
- Variable energy resources
 - Dependence on forecasted output, associated uncertainty
 - Submission of RUC availability bids up to forecast

The ISO proposes the consequences of failing the EDAM RSE would only be applied during agreed-upon stressed system conditions

- Recognizes participating BAAs have access to surplus supply through the day-ahead bilateral markets.
 - No reason for surplus supply in the EDAM to be transacted at prices substantially higher than prevailing bilateral prices
- Concerns about insufficient forward procurement during stressed system conditions.
- During stressed system conditions, an optional hurdle rate at the bid cap would be used to cure additional supply
 - Constraint in market to prevent any BAA from exporting into a shortage conditions

Linking EDAM and the WEIM

- The financial schedules produced by the EDAM provide incentive for participants offer into the real-time market.
 - RT market schedules will be used for WEIM RSE
- The ISO proposes that entities that pass the EDAM RSE be tested as a pooled footprint in the WEIM.
 - Allows EDAM participants to work together to pass the WEIM RSE
 - Allocating a diversity benefit can result in lower imbalance reserve procurement at a BAA level

EDAM RSE example (4-hour sample)

■ Gas resource supply

- ◆ Capacity: 2000MW
- ◆ Energy bid: \$40/MWh
- ◆ IRU bid: \$4/MWh

■ VER supply

- ◆ Capacity: 1000MW

■ Import from non-EDAM BAA

- ◆ Capacity: 1000MW
- ◆ Energy bid: \$20/MWh

■ Hydro resource supply

- ◆ Capacity: 1000MW
- ◆ Energy bid: \$10/MWh
- ◆ IRU bid: \$2/MWh
- ◆ Daily energy limit: 2000MWh

■ Energy storage supply

- ◆ Capacity: 500MW/2000MWh
- ◆ Energy charge bid: \$10/MWh
- ◆ Energy discharge bid: \$30/MWh

EDAM RSE example results (4-hour sample)

Hour	1		2		3		4	
	Energy	IRU/IRD	Energy	IRU/IRD	Energy	IRU/IRD	Energy	IRU/IRD
Obligation	1000	180	3500	350	5000	450	2000	100
Gas supply			700	350	1600	400	500	
VER forecast	700		800		900		500	
Import	800		1000		1000		1000	
Hydro		180	1000		1000			100
ESR	-500				500			
Total supply	1000	180	3500		5000	400	2000	100
Pass/Fail	✓	✓	✓	✓	✓	-50	✓	✓
Marginal Price	\$20	\$2	\$40	\$4	\$40	\$247	\$40	\$2

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Pre-Day Ahead Market Activities:

Making Transmission Available to
EDAM to Support Transfers

Transmission Supporting EDAM

- Design intended to maximize hurdle free transmission availability in EDAM, while respecting the ability to exercise transmission rights.
- Transmission internal to the BAA, the internal system flow capability, is made available to support EDAM transactions similar to the WEIM today.
- Transmission at the interfaces between EDAM BAAs is made available to the EDAM under the “transmission buckets” concept supporting robust transfers between EDAM BAAs to derive benefits.
 - Transmission made available by transmission customer and transmission provider.

Bucket 1 Transmission – Required to Support Resource Sufficiency Obligation

- High quality transmission: Firm and Conditional Firm transmission to support reliable transfers.
- Made available by transmission customer, whether hold transmission rights under OATT or legacy contracts.
- Supports RSE deliveries sourcing in adjacent EDAM BAA.
- Eligible to receive transfer revenue.

Bucket 2 Transmission – Incremental Transmission

- High quality transmission: Firm and Conditional Firm transmission to support reliable transfers.
- Voluntarily made available by transmission customer in return for congestion rents.
 - If made available voluntarily, cannot be utilized later in real-time.
- The ISO seeks stakeholder comment on whether the scope of bucket 2 transmission should be expanded to include unscheduled transmission rights.

Bucket 2 Transmission – Unscheduled Transmission

- ISO seeks feedback on expanding the scope of Bucket 2 transmission to include unscheduled firm (or conditional firm) transmission rights by 10am of day prior to flow.
- The unscheduled transmission is made available to EDAM to optimize transfers and derive further benefits.
 - Made available at 10am to the market.
- Unscheduled transmission rights can be exercised by rights holder between DA and RT to support transactions if necessary.
 - May drive re-optimization in the RT market.

Bucket 3 Transmission – Unsold ATC

- Consists of unsold firm available transfer capability (ATC) to support transfers at interfaces between EDAM BAAs.
- Bucket 3 transmission not utilized by the market would revert back to the EDAM entity for continued sales under the OATT.
- The Transmission Commitment working group, the ISO and stakeholders focused primarily on two approaches:
 - Approach 1: EDAM entities would make bucket 3 transmission available to the market for optimization at a hurdle rate (i.e., the published tariff rate).
 - Approach 2: EDAM entities would make bucket 3 transmission available to the market hurdle-free through a reciprocity framework

Bucket 3 - Additional Hurdle Free Options with transmission cost recovery enhancements

- Introduction of approach that removes transmission hurdle rate from the market optimization.
- Allows for cost recovery of Bucket 3 transmission costs and overall transmission revenue recovery as a result of participation in EDAM.
 - For example, recovery of short-term firm and foregone non-firm transmission revenues.
- Approaches put forward:
 - 3A – Volumetric uplift charge on a per transaction basis
 - 3B – Make-whole uplift assigned based on total transaction volumes.
 - 3C – Make-whole uplift assigned based on historical pre-EDAM volumes of transactions between specific EDAM entities.

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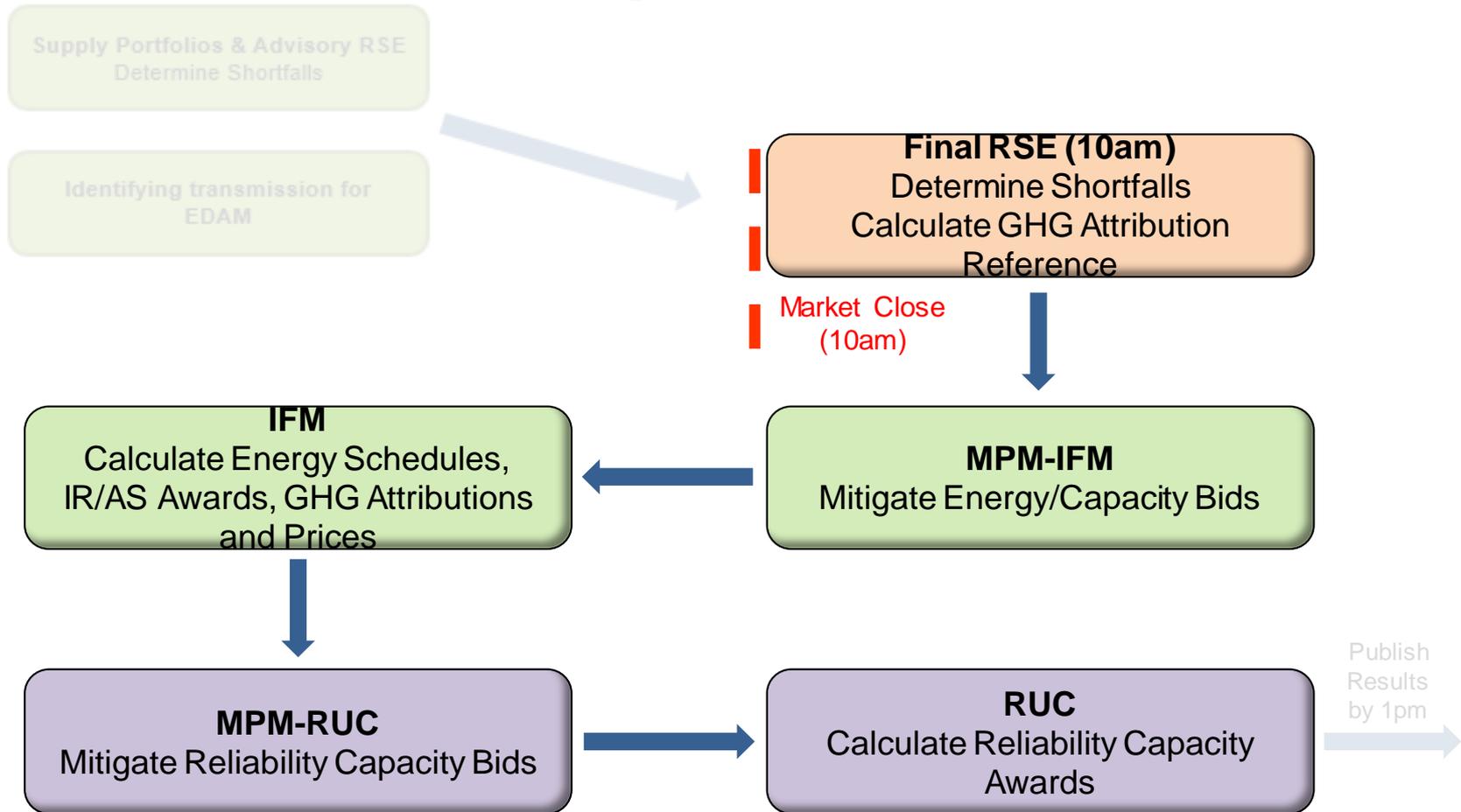
Day Ahead Market Processes

Milos Bosanac, Regional Markets Sector Manager, Market and Infrastructure Policy



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DA Market Activities (10am -1pm)



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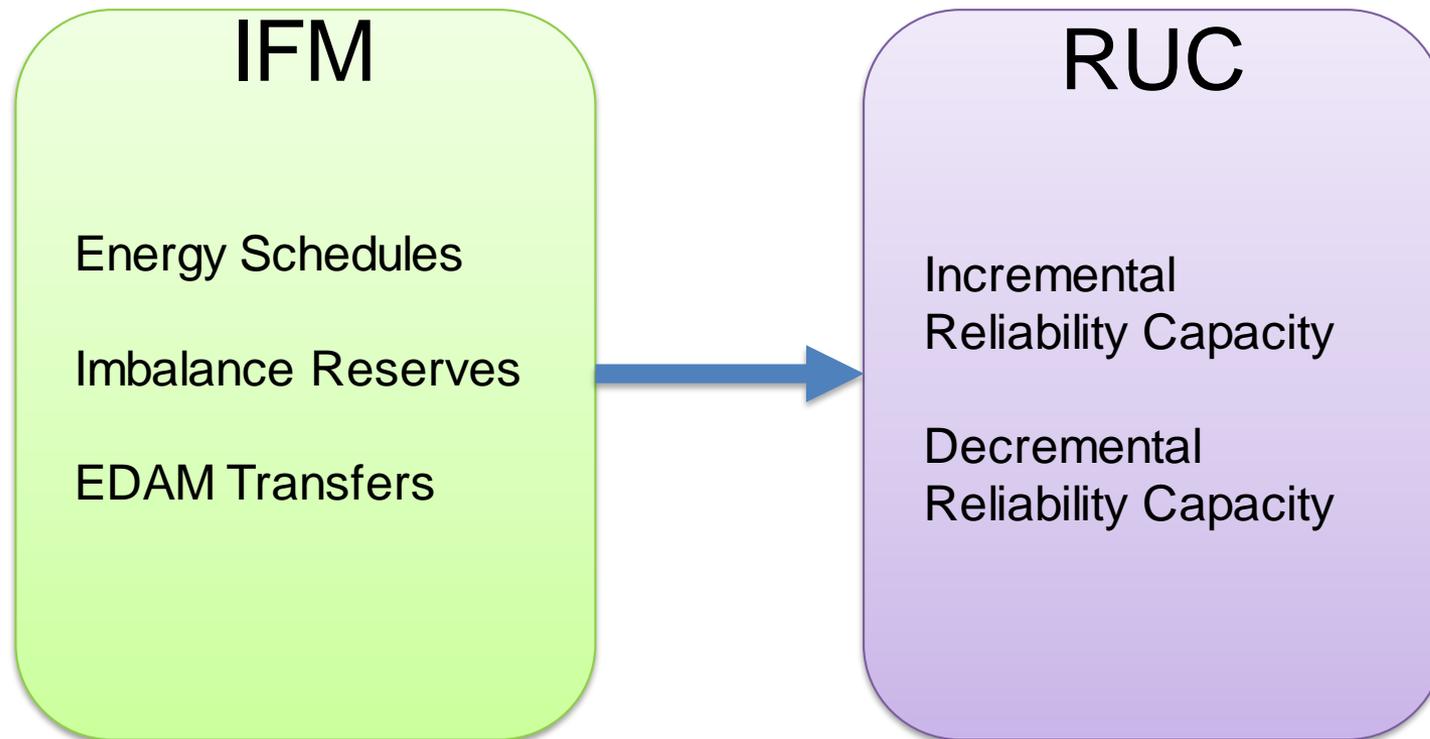
Day Ahead Market Processes:

**Integrated Forward Market (IFM) and
Residual Unit Commitment (RUC)**



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IFM and RUC are essential EDAM components



IFM Role and Function

- IFM balances supply and demand and produces hourly schedules (across 24-hr horizon), EDAM transfers, GHG attributions, and procures ancillary service and imbalance reserves.
 - Note: ancillary services will not be co-optimized with energy across the footprint. Ancillary services procurement remains the obligation of the individual EDMA entity.
- WEIM has no demand bids; in EDAM, entities can self-schedule or economically bid demand into IFM
 - If bid-in demand clears less than the BAAs load forecast, RUC will secure additional reliability capacity up to the forecast.
 - Entities can decrease dependence on RUC by bidding full load forecast.

Imbalance Reserves

- An imbalance reserve product will procure 15-minute ramping capability to cover forecast uncertainty and provide intra-hour ramp capability.
- Imbalance reserves enhance benefits of EDAM:
 - Diversity benefit can reduce each BAAs uncertainty requirements.
 - Builds confidence that solution provides for coordinated capacity to address unrealized uncertainty.
 - Allows more optimal scheduling of energy and transfers by accounting for uncertainty/ramping needs.
 - Allows BAAs to meet uncertainty needs from resources across the EDAM footprint.
 - Establishes a consistent metric and treatment of uncertainty for the EDAM RSE.
 - Provides revenue opportunities for EDAM BAAs with flexible resources.

RUC Role and Function

- RUC process procures incremental and decremental capacity (reliability capacity up/down) based on the amount of physical energy that clears the IFM in relation to the BAA load forecast.
- Based on how load is offered into the IFM, absent RUC awards there may be a shortfall in meeting the forecasted demand.
- Supply participates in RUC by submitting reliability capacity bids and the RUC produces hourly reliability capacity awards, transfers of reliability capacity and prices.

RUC Proposals

- IFM and RUC are integral and complementary components and functions of the DA market.
- ISO proposes that the RUC function remain a critical component of the EDAM.
- All supply offered into the IFM must make the same quantity available for reliability capacity.
 - Ensures all resources shown in the EDAM RSE, and any offered excess above the RSE amount, are available for use in RUC.

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Day Ahead Market Processes:

Market Power Mitigation (MPM)

Organized electricity markets include measures to prevent the exercise of market power

- Suppliers could potentially exercise market power if they are critically needed to mitigate congestion or serve load.
 - Most prevalent scenarios are in transmission constrained load pockets where supply can provide counter-flow to mitigate congestion
- The market performs a 3-pivotal supplier test to assess if their supply is needed to mitigate congestion or serve load.
- If pivotal supply is needed to mitigate congestion, resources providing supply counter-flow are mitigated.
- If pivotal supply is needed to serve load in an EDAM BAA all supply resources in the BAA are mitigated.
- Bid mitigation:
 - Energy bids are replaced with default cost-based bids, if higher
 - Imbalance reserve bids are capped at the competitive locational imbalance reserve marginal price

Proposal to extend WEIM BAA Market Power Mitigation Framework to EDAM

- The test is triggered when the power balance constraint shadow price for an EDAM BAA is higher than the one for the ISO BAA.
 - This indicates that transfers along an interface between the ISO BAA and the EDAM BAA are limited in the import direction to the EDAM BAA
- Each EDAM BAA, excluding the ISO BAA, is tested independently.

Price Formation Enhancements initiative will consider changes to the MPM framework for BAA mitigation

- An enhanced framework could test for market power in serving load by grouping EDAM BAAs, including the ISO BAA, instead of testing each BAA individually.
 - BAAs without price separation (no binding transfer limits between them) can be grouped
 - BAAs can be grouped hierarchically and in decreasing merit order of their power balance constraint shadow price
- Further deliberated along with other enhancements in the *Price Formation Enhancements* initiative.

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Day Ahead Market Processes:

Convergence Bidding



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Convergence bidding in EDAM

- Convergence bids are purely financial bids that do not represent physical supply and demand.
- Convergence bids can only be submitted in the day ahead market.
 - Virtual supply (demand) is paid (charged) the day-ahead locational energy price and charged (paid) the 15-minute locational energy price.
- Convergence bidding is intended to minimize systemic differences between day-ahead and real-time prices.
 - Has several market benefits, notably market power protection.

Convergence bidding in EDAM

- Recommend to continue convergence bidding in the ISO BAA but propose a transition period to convergence bidding in the EDAM footprint.
 - Modeling and other implementation issues could create arbitrage opportunities.
 - Lack of familiarity with convergence bidding could lead to unintended financial impacts.
 - May require interim bidding requirements to maintain appropriate market incentives.
- Specific transition period not proposed, but commitment to re-evaluate and discuss introduction of convergence bidding after 1-year of EDAM operations.

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External Resource Participation



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External Resource Participation

- External resource participation refers to the ability of supply located outside of the EDAM footprint to participate in the day ahead market.
- In the WEIM today, external resources can be economically offered into the market if they are source specific – pseudo tied or dynamically scheduled.
 - Supply under contract to EDAM entity can be self scheduled
- Intertie bidding – economic bids at the intertie of the WEIM entity not associated with a source – are not permitted today in WEIM.

External resource participation in EDAM

	ISO	Non-ISO EDAM Entity
Pseudo tied	X	X
Dynamically Scheduled	X	X
Contracted Supply (self-schedule)	X	X
Intertie Bidding (economic bidding)	X	

- Intertie bidding concerns expressed by WEIM entities:
 - Operational: reliability impacts of displacing internal generation.
 - Transmission: potential free-riding.
- ISO is leaning toward retaining the WEIM framework to external resource participation.

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GHG Accounting



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GHG Objective and Approach in the Straw Proposal

- The ISO's key objective is to reflect the cost of carbon compliance as well as existing and developing state compliance requirements in the market.
- The ISO included two proposals that emerged through the working groups: (1) the resource-specific approach and (2) the zonal approach.
- The ISO indicated an initial leaning toward the resource-specific approach for implementation at the onset of EDAM as it is the more defined option and aligns with the WEIM.
- The ISO seeks stakeholder feedback on both options, including whether these are aligned with existing or emerging regulatory structures.

Resource-Specific Approach Overview

Market optimizes based on the GHG costs bid in by specific generators, includes GHG attribution.

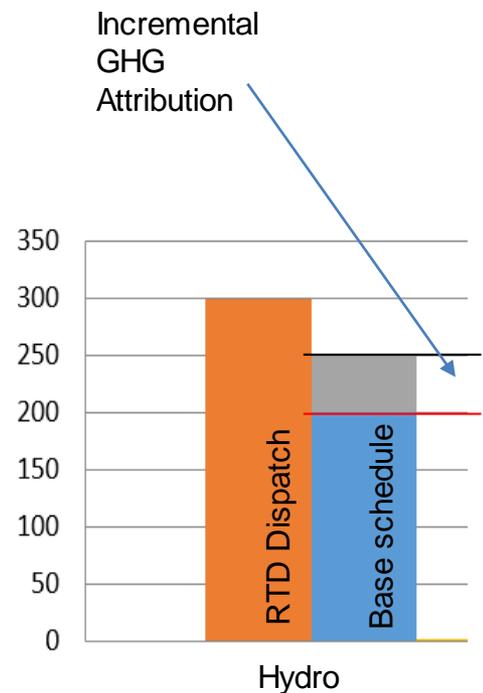
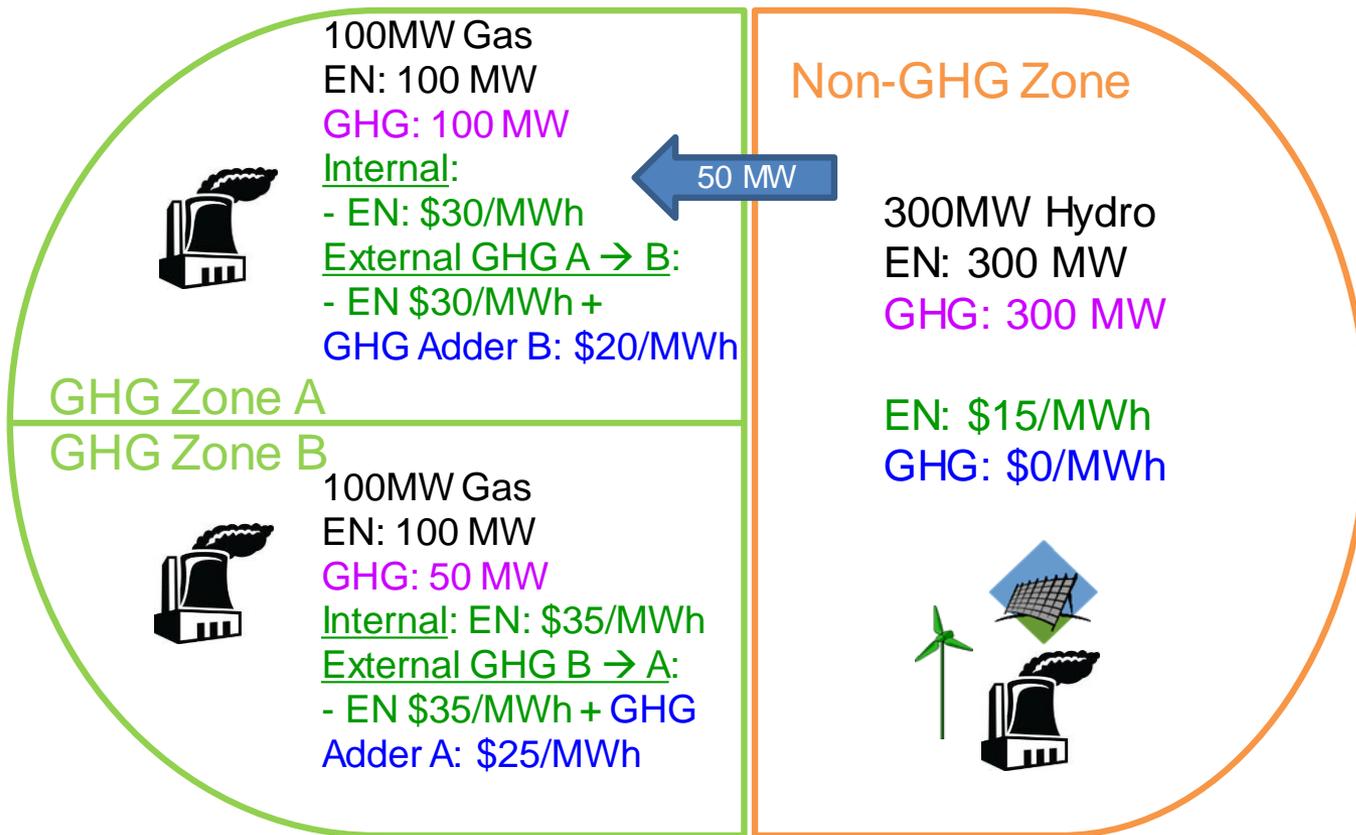
Resource Specific Bidding and Attribution Mechanics

- Voluntary GHG bid adder
 - Non-GHG regulation area to GHG regulation area
 - Unlinked: Additional costs of GHG regulation area to GHG regulation area
- Energy bid includes the cost of GHG compliance
 - Internal treatment within a GHG regulation area
 - Linked: GHG regulation area to GHG regulation area

Enhancements to Limit Secondary Dispatch

- Improved Baseline: Uses the RSE solution as the counterfactual
- Constraints to limit attribution based on transfer schedules: Limiting GHG attribution to hourly net export transfers or to zero if the BAA is a net importer

Resource Specific Approach Bidding and Attribution



Gen in EIM Area	Base Schedule (MW)	RTD Dispatch (MW)	Deemed Delivered to Non- GHG Regulation Area (MW)	Contribution to Potential Secondary Dispatch
Hydro	200	300	50	0

Zonal Approach Overview

Combination of a resource-specific pathway and hurdle rate, without GHG attribution

Hurdle Rate

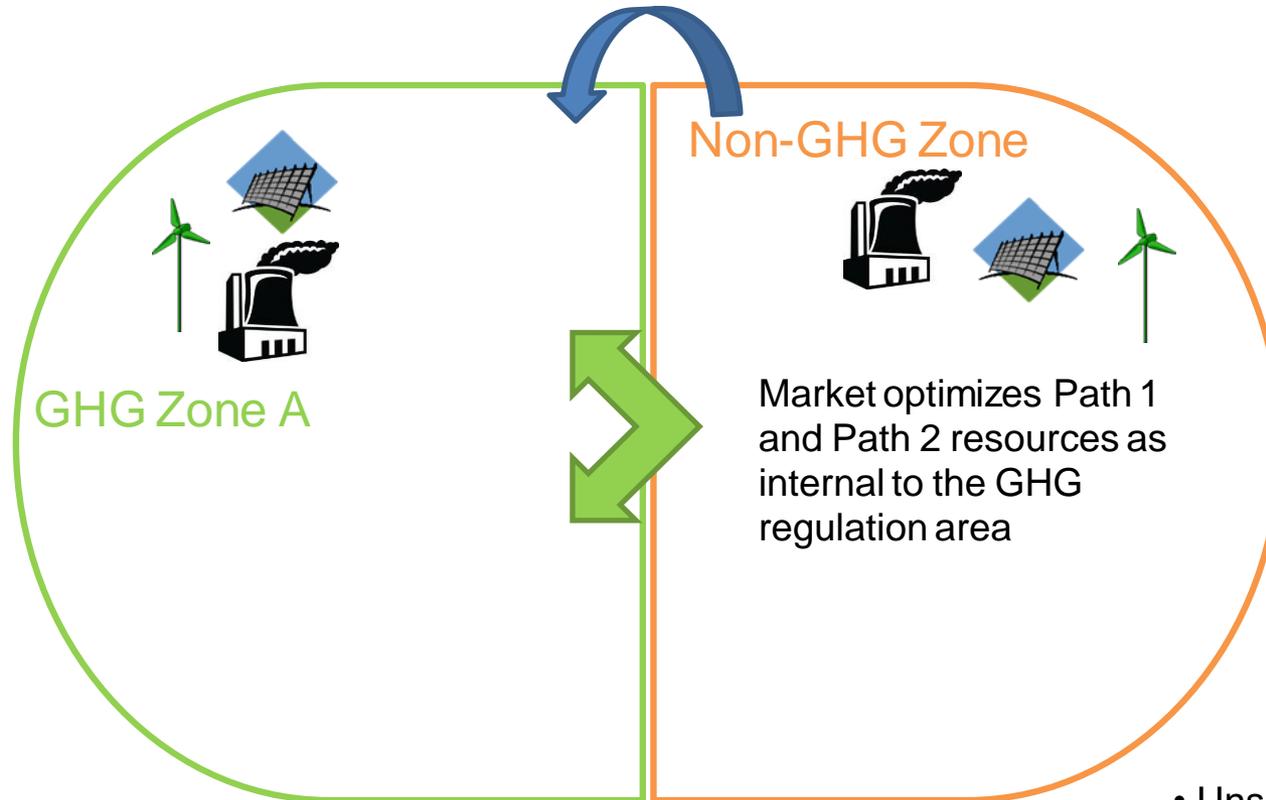
- The hurdle rate is the price (\$/MWh) a transfer from a non-GHG regulation area to a GHG regulation area must overcome
- Hurdle rate = allowance price x emissions rate

Participation Options

- Path 1: Long-term commitments are recognized as internal to the GHG regulation area
- Path 2: Short-term commitments are recognized as internal to the GHG regulation area
- Hurdle Rate: All other resources are subject to a hurdle rate, allowing transfers if the price differential is sufficiently high

Zonal: Single GHG Regulation Area

Hurdle \$8.74



Transfer

Internal Price: \$30

≥

External: \$20 + \$8.74 = \$28.74

No Transfer

Internal Price: \$30

<

External: \$25 + \$8.74 = \$33.74

- Unspecified Rate = **0.437** mTCO₂/MWh
- Allowance Cost = **\$20**
- Hurdle Rate: (0.437 mTCO₂/MWh) * (\$20) = **\$8.74/MWh**

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Day Ahead Market Outputs



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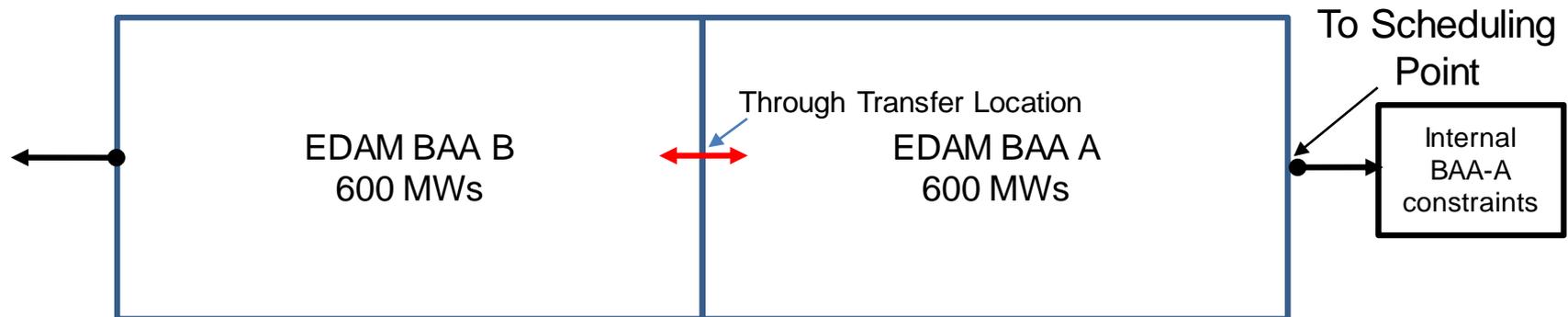
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Day Ahead Market Outputs: Transfer Revenue Allocation

Transfer Revenue Allocation

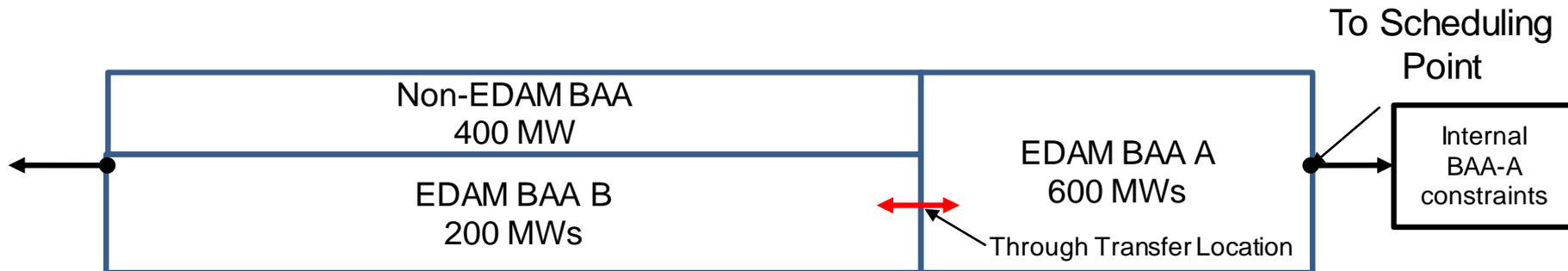
- Transmission made available to the EDAM is eligible for transfer revenue allocation.
- Transfer revenue is collected when a transfer constraint binds (congestion) and creates energy, imbalance reserve, or reliability capacity price differences between two BAAs.
- The ISO proposes allocation of transfer revenue 50:50 at a transfer point between EDAM BAAs, or all the transfer revenue going to an EDAM BAA at a transfer point depending upon where the transfer constraint binds.
- The ISO proposes that transfer revenue be allocated to, and settled with, the EDAM BAA entity or transmission providers which will determine how it is further allocated to its customers.

Transmission “Through” Transfer Location



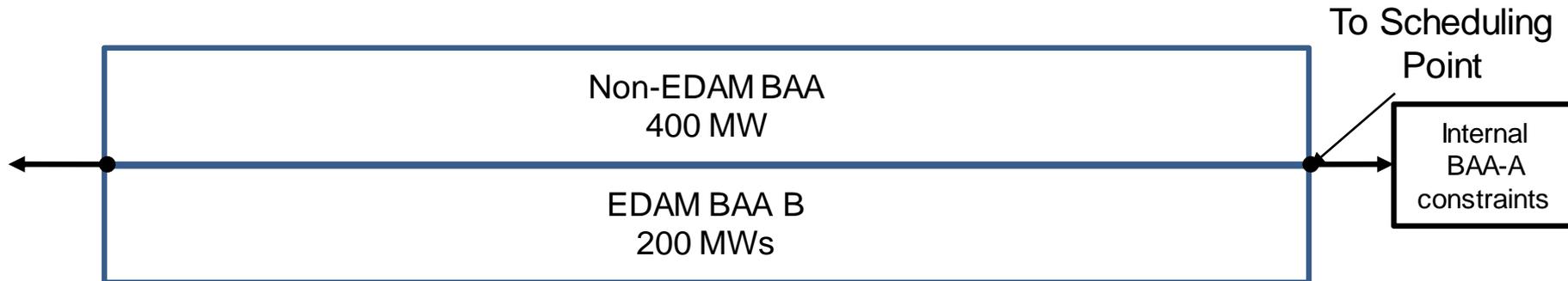
- EDAM Entities provide transmission to an agreed upon transfer location between two scheduling points creating an internal intertie (200 MW, 400 MW).
- EDAM Transfer does not compete with Non-EDAM intertie schedules from an external intertie.
- Transfer Revenue from binding transfer constraint associated with the internal intertie is distributed between EDAM BAA A and EDAM BAA B entity of transmission providers at default proration value of 50:50, respectively.

Transmission “Mixed” Transfer Location



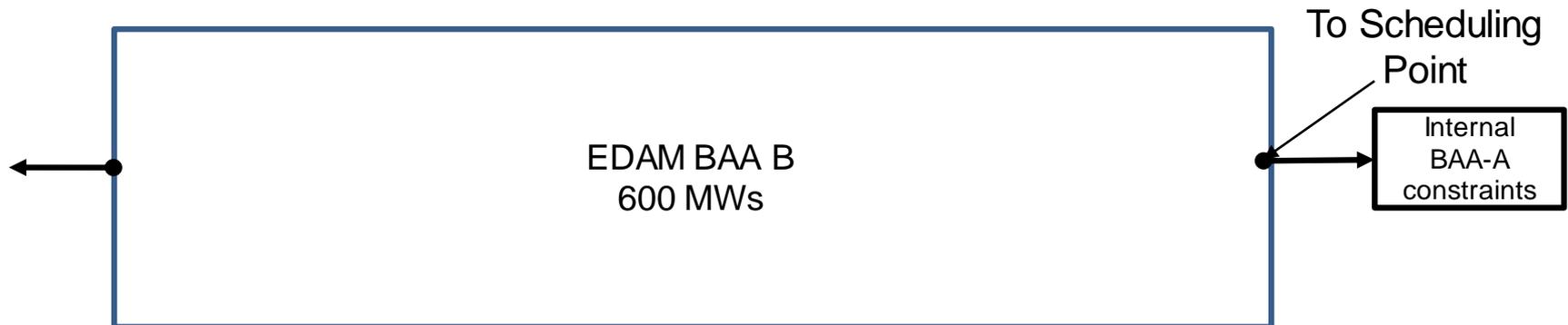
- EDAM Entities provide transmission to an transfer location creating an internal intertie (200 MW, 400 MW) and requires additional BAA A transmission to BAA A scheduling point.
- EDAM Transfer competes with Non-EDAM intertie schedules from an external intertie.
- Transfer Revenue from binding transfer constraint associated with the internal intertie is distributed between EDAM BAA A and EDAM BAA B entity or transmission providers at default proration value of 50:50, respectively.

Transmission “To” Transfer Location



- EDAM Entities provide transmission to an transfer location at BAA A scheduling point creating an internal intertie (200 MW, 400 MW).
- EDAM Transfer competes with Non-EDAM intertie schedules at that BAA A scheduling point from an external intertie.
- Transfer Revenue from binding transfer constraint associated with the internal intertie is distributed between EDAM BAA B receives 100% transfer revenue EDAM BAA A 100% internal constraint revenue.

Transmission “To” Transfer Location



- EDAM Entities provide transmission to an transfer location at EDAM BAA A scheduling point creating an internal intertie (600 MW).
- EDAM Transfer does not compete with Non-EDAM intertie schedules from an external intertie.
- Transfer Revenue from binding transfer constraint associated with the internal intertie is distributed between EDAM BAA B 100% of EDAM transfer revenue and EDAM BAA A receives 100% of internal EDAM BAA A constraint revenue.

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Day Ahead Market Outputs:

Settlements



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Settlements Review

- In the following two slides we are going review the Day ahead, Reliability Capacity, and Real Time Settlement.
 - Day Ahead and Real Time Energy settlement
 - Convergence bidding
 - Transfer Revenue
 - Imbalance Reserve
 - Reliability Capacity
 - Flexible Ramp Settlement
- In future technical groups, and as the design evolves, we will refine the settlement details.

Day Ahead Settlement

Product	Settlement
Day Ahead Energy/Convergence Bid	Energy and Convergence Bids will settle at the relevant nodal Locational Marginal Price (LMP) * Supply resource eligible for bid cost recovery ** Including Transfer Resources
	Transfer Energy Revenue will be allocated to EDAM Entity or Transmission Provider
	Congestion Rents from energy and convergence Bid settlement allocated to EDAM Entity or CRRs/measured demand
Imbalance Reserve Award	Marginal Energy and Marginal Loss Neutrality allocated to EDAM Entity or measured demand
	Imbalance Reserve Award (IRU or IRD) settle at relevant Imbalance Reserve Marginal Price (IRUMP or IRDMP) * Supply resource eligible for bid cost recovery
	Non-Compliance Charge applies to IRU/IRD not bid into real time market
	Transfer IRU/IRD Revenue will be allocated to EDAM Entity or Transmission Provider Imbalance Reserve Costs allocation: Tier 1: Supply where the upper/lower economic limit does not support day ahead energy schedule or Real Time demand deviation Tier2: Metered Demand

Day Ahead Settlement

Product	Settlement
Reliability Capacity Awards	Reliability Capacity Award (RCU or RCD) settle at relevant reliability capacity marginal price (RCUMP or RCDMP) * Supply resource eligible for bid cost recovery
	Non-Compliance Charge applies to RCU/RCD not bid into real time market
	Transfer RCU/RCD Revenue will be allocated to EDAM Entity or Transmission Provider
	Imbalance Reserve Costs allocation: Tier 1: allocation is to net virtual supply/net virtual Demand, under-scheduled/over-schedule load or over-scheduled/under-scheduled variable energy resource Tier2: Metered Demand

Real Time Market Settlement

Product	Settlement
Real Time Market Energy/ Convergence Bid	<p>Instructed imbalance deviation from day ahead position at the relevant FMM or RTD nodal Locational Marginal Price (LMP) Convergence bid reversal will settle at relevant FMM LMP * Including Transfer Resources ** Includes HASP Reversal settlement for intertie schedules *** Supply resource energy is eligible for bid cost recovery</p>
	<p>Uninstructed deviations from day ahead position or final real time dispatch will settle at the relevant RTD nodal Locational Marginal Price (LMP)</p>
	<p>RTM Transfer Energy Revenue will be allocated to EDAM Entity or Transmission Provider</p>
	<p>Congestion Rents from energy and convergence Bid settlement allocated to EDAM Entity or measured demand</p>
	<p>Marginal Energy and Marginal Loss Neutrality allocated to EDAM Entity or measured demand</p>

Real Time Market Settlement

Product	Settlement
Flexible Ramp Product	<p>Forecasted Movement** will settle as a deviation settlement from day ahead forecasted movement at the difference between FRUMP and FRDMP</p> <p>Flexible Ramp Uncertainty (FRU or FRD) will settle as deviation settlement from five minute IRU/IRD awards at relevant nodal FRUMP or FRDMP</p> <p>* Supply resource eligible for bid cost recovery</p> <p>** Includes Convergence bid forecasted movement settlement</p>
	<p>Non-Compliance Charge applies to FRU/FRD</p>
	<p>Flexible Ramp Costs allocation: Tier 1: resource deviations within Flexible Ramp Uncertainty category buckets Tier2: Metered Demand</p>

EDAM

Day Ahead Market Outputs: Confidence in Market Transfers

Role of Market Operator & EDAM BAAs

- Each EDAM BAA continues to retain the reliability function for its BAA.
 - EDAM does not represent a footprint-wide BAA.
- The ISO is responsible for EDAM operations and the reliability of its own BAA.
 - The ISO is not the BAA operator for EDAM BAAs.
- In stressed and emergency conditions, each EDAM BAA has the discretion to take steps to maintain system reliability.
 - Access to individual BAA operational tools, exercise of operational coordination and good utility practice.

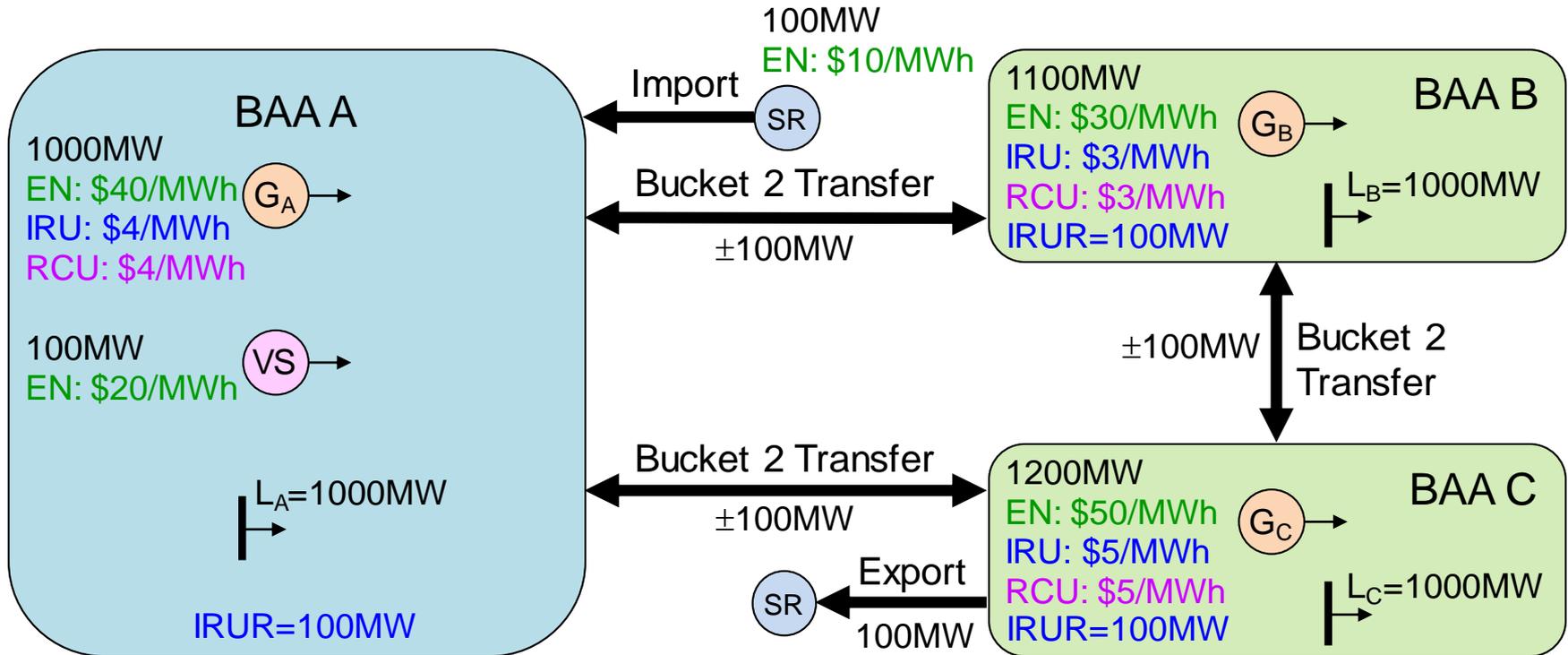
EDAM Design Features Enhancing Reliability

- *Day Ahead Resource Sufficiency Evaluation (RSE)*
 - Each EDAM entity brings supply to meet forecasted demand + uncertainty.
- *Market ensures feasible commitment and dispatch*
 - Market optimization will ensure demand can be met feasibly along with transfers out of the BAA.
- *Imbalance reserves product*
 - Procured efficiently across footprint, can be called upon in stressed conditions.
- These features help limit the risk of stressed system conditions becoming emergency conditions.

Emergency Conditions & Operational Coordination

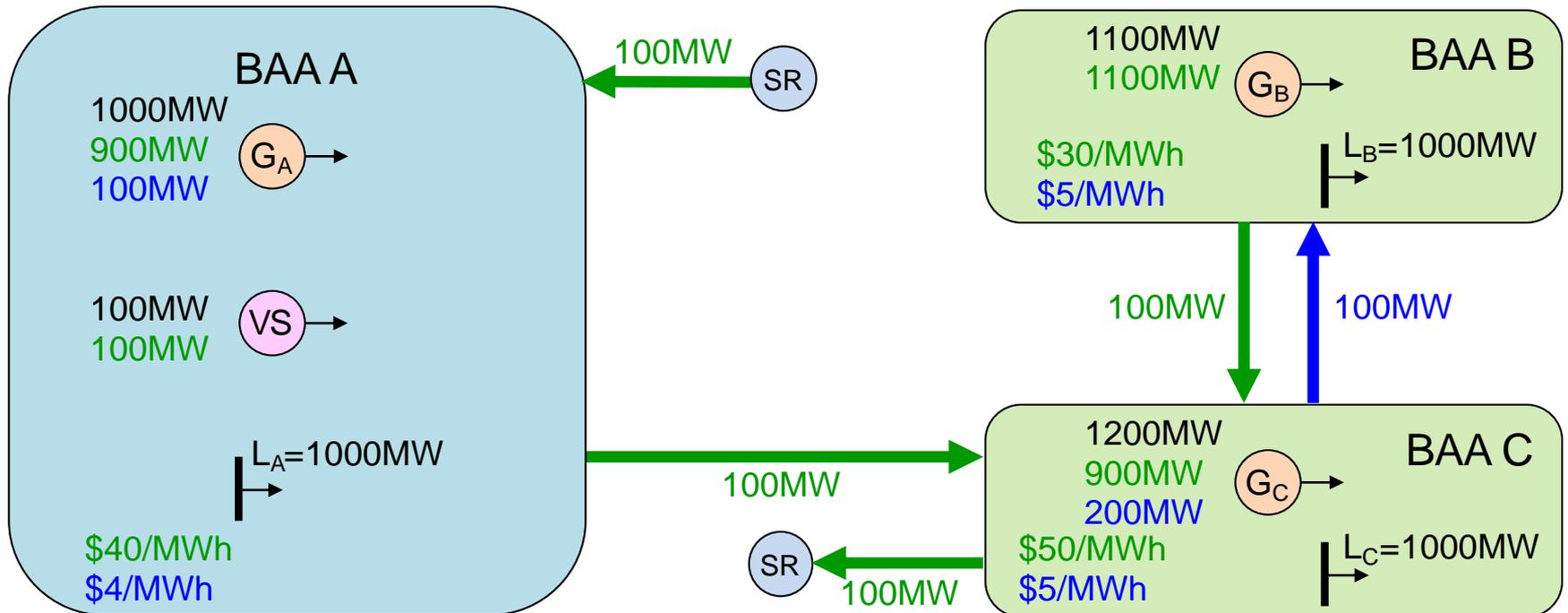
- The ISO proposes that in severe system conditions, if an EDAM BAA faces the potential risk of load shed, market transfers sourcing from the EDAM BAA be afforded equal priority to load.
- Each EDAM BAA determines its own ability, necessity, and procedures for managing reliability, including load shedding.
 - Ability to access operational tools such as out of market supply, emergency assistance, backup generation, etc...
- If load is at risk of being shed, market transfers sourcing from the EDAM BAA could be curtailed proportional to load.
 - Subject to EDAM BAA operational discretion, good utility practice, and coordination with adjoining BAAs aiming to minimize impact to all as is common practice today.

EDAM Transfer Example Setup

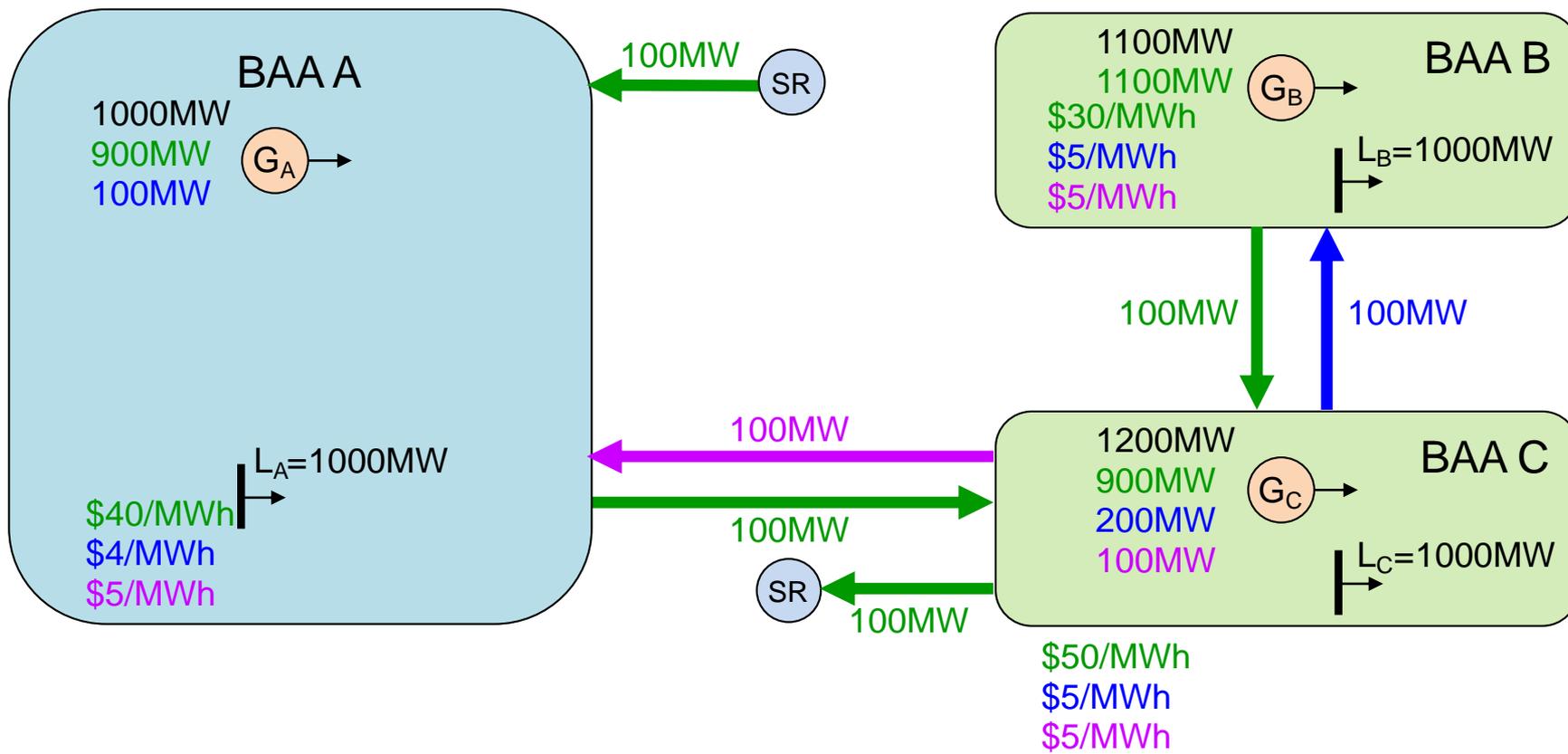


G: non-VER generator; VS: virtual supply; L: load; SR: system resource; EN: energy; IRU: imbalance reserve up; RCU: reliability capacity up; IRUR: imbalance reserve requirement.

IFM Solution

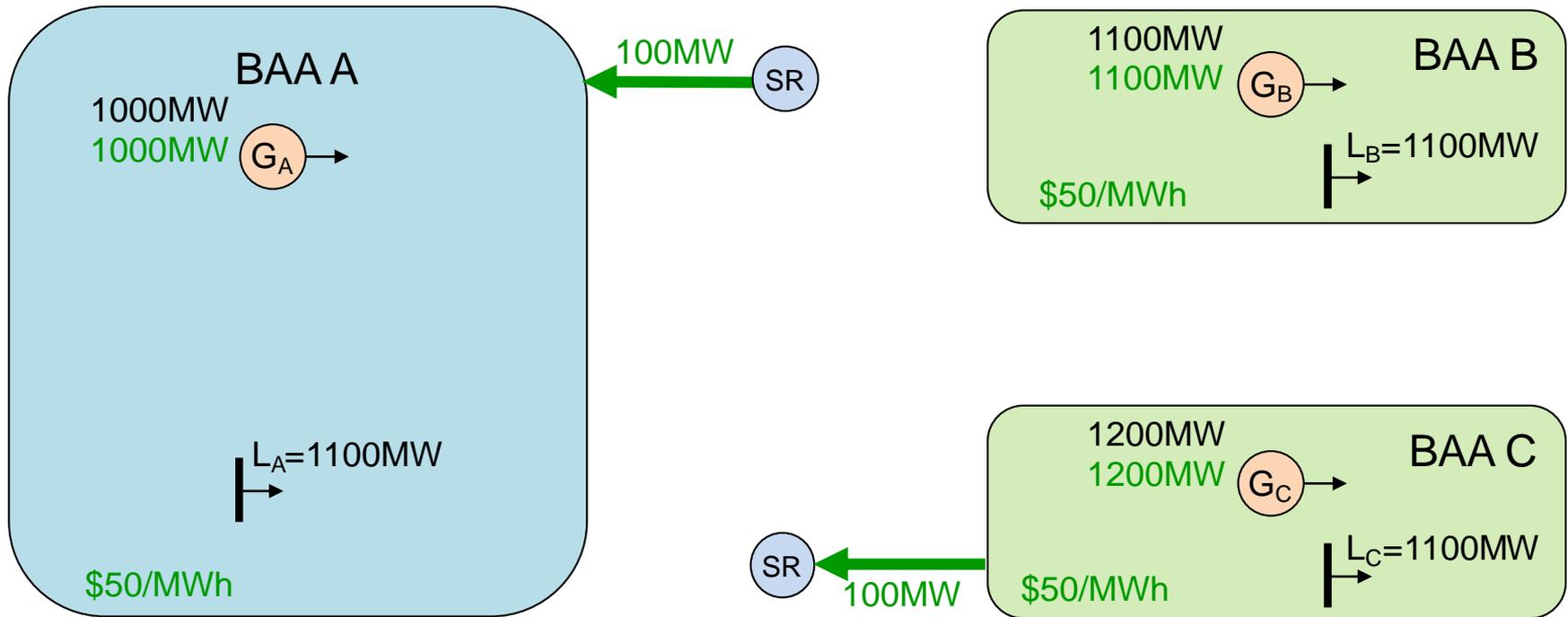


RUC Solution



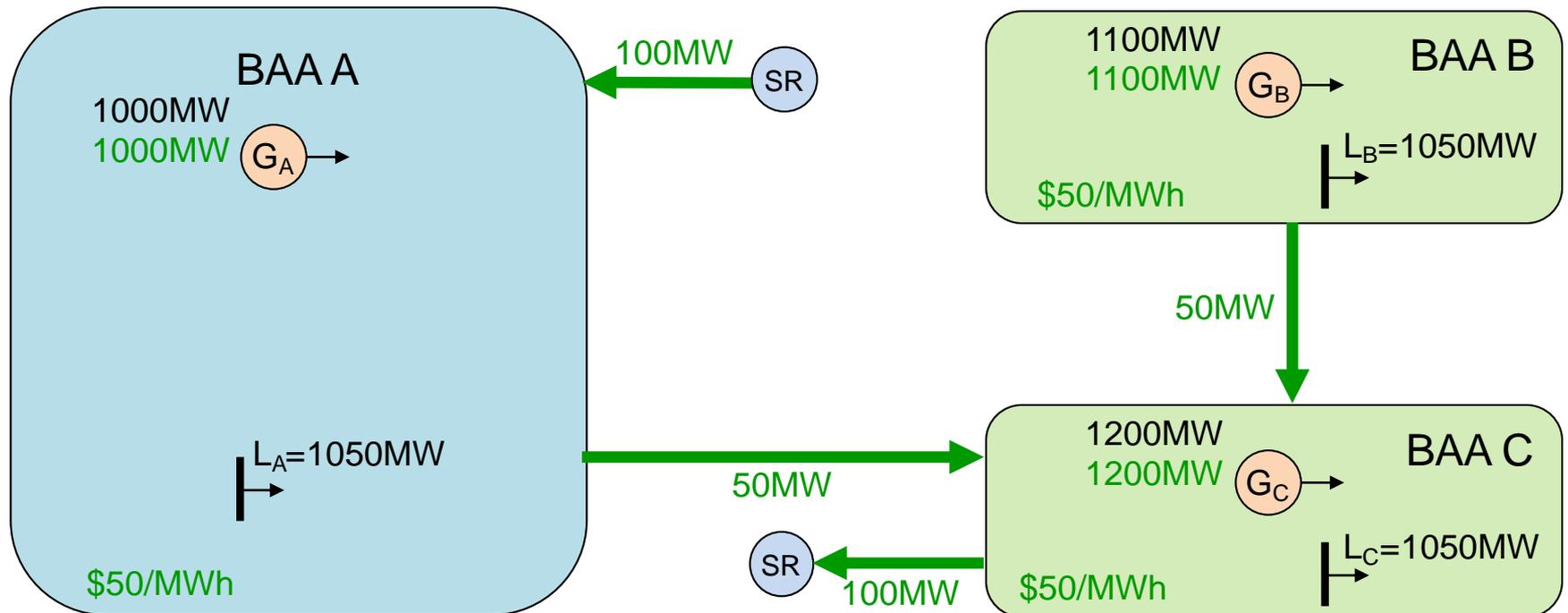
WEIM Solution

100MW Uncertainty Materialized



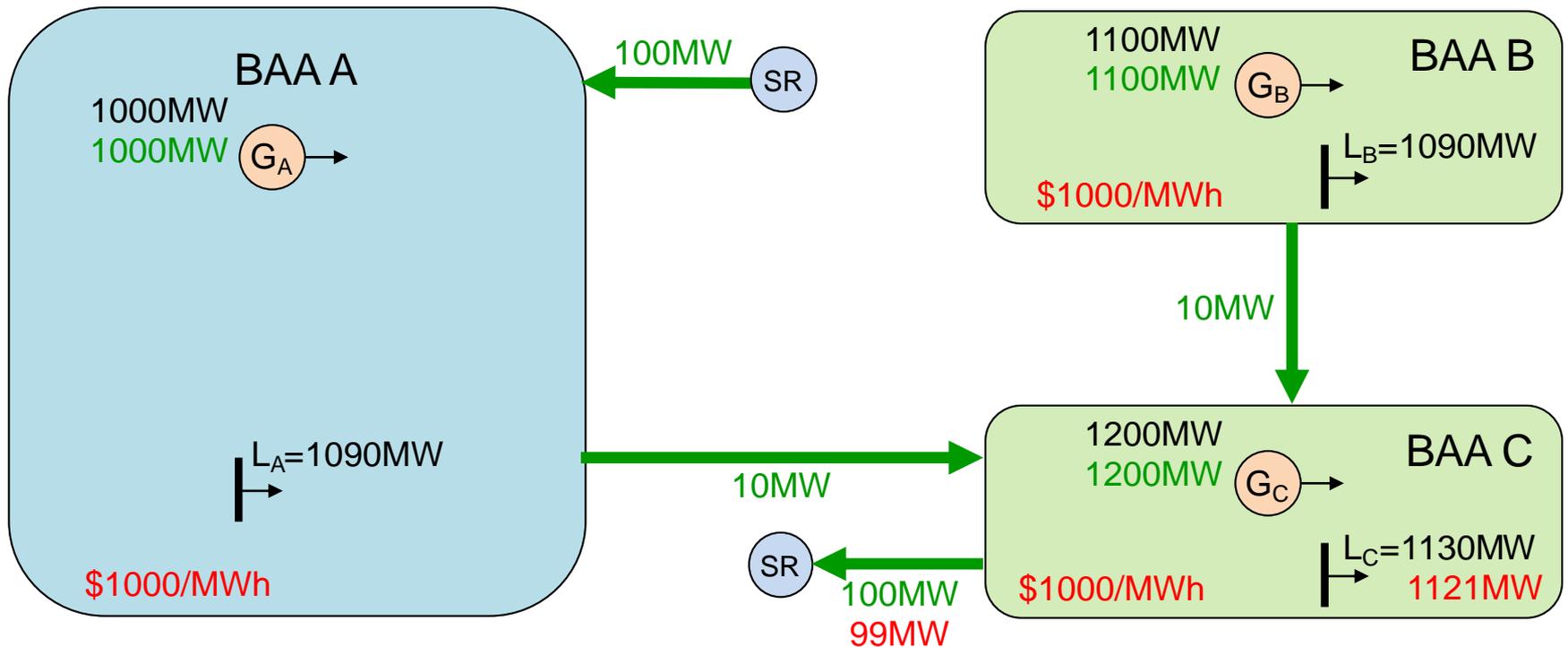
WEIM Solution

50MW Uncertainty Materialized



WEIM Solution

90/90/130MW Uncertainty Materialized



Reliability Benefits

- The market optimization positions the footprint collectively, and each BAA individually, in a position to effectively respond to uncertainty than without a market.
- The optimized supply and imbalance reserve commitment through the market decreases the risk that stressed system conditions become emergency conditions.
- In the corner cases, where there is insufficient supply in the footprint, affording market transfers equal priority to load provides an equitable approach for individual EDAM BAAs to provide collective confidence in transfers.

EDAM

Focused Discussion: Day Ahead Resource Sufficiency Evaluation

- (1) Non-resource specific supply*
- (2) Pooled WEIM RSE and the diversity benefit*
- (3) EDAM failure consequences*



Speakers

- Danny Johnson, *Lead Policy Developer, Policy Development*
- George Angelidis, *Executive Principal, Power Systems, Power Systems and Market Technology*
- Mark Rothleder, *Sr Vice President and Chief Operating Officer*
- Milos Bosanac, *Regional Markets Sector Manager, Market and Infrastructure Policy*
- John Anders, *Assistant General Counsel - Legal*

Non-resource specific firm energy contracts (WSPP-C)

- General recognition that these arrangements are prevalent across the west, highly reliable, and entities depend upon these to supplement resource portfolios today.
 - These can support RA imports into the ISO and imports of energy to other Western BAAs
- General quality of these arrangements:
 - Firm energy, cannot be interrupted for economic reasons
 - Delivered energy to a specified point, BAA intertie
 - Source is not known ahead of DA market close (10am)
 - Transmission path or quality not known

The ISO proposes non-source specific firm energy contracts be treated as follows:

- In the EDAM RSE, the non-resource specific firm energy imports would count towards the test obligations.
- Supply would be represented as a self-scheduled injection into the sink BAA at scheduling point
 - Sink BAA assumes a financial position for that schedule
 - Implement rules to prevent gaming opportunities from moving delivery point in real-time.
- As the full transmission path is not known, bucket 1 transmission is not being required as part of showing even if injection point is EDAM neighboring BAA.
- ISO will seek to monitor performance of these arrangements.

Accounting for non-resource specific supply in the EDAM optimization has pricing and reliability impacts

- The injection would be modeled as sourced from the neighboring BAA. Injection quantity would be distributed to generation aggregation point.
 - Potential to impact day-ahead flows and prices in the source BAA
- The ISO requests feedback on whether these injections should be included in congestion management.
 - Ensures that the injection is not “double using” the transmission in the day-ahead market
 - Gives non-resource specific schedules equal priority to buckets 1,2,3 transmission in the optimal solution; potentially devaluing those products

Intertie bids at the ISO BAA border

- The ISO is leaning toward intertie bids at the ISO border with non-EDAM BAAs counting toward the RSE as they are similar to WSPP-C supply.
- Consideration on intertie bids in RSE:
 - Should these count?
 - Should these be derated based on observed performance?
 - Should these count with some additional criteria that ensures delivery such as an attestation?

Non- resource specific demand response can be used in the RSE, regardless of whether it can be modeled and bid into the market

- Demand response that does not meet PDR or RDRR criteria can be reflected as a offset of RSE obligation.
 - This would require a commitment that demand response would be used the following day
 - Offset would be reflected in RUC target
- Proposing load bidding rules to not allow economic displacement through the EDAM of this type of demand response.

Demand	Supply	Planned Demand Response	Load bidding maximum	RUC Target
6000	5500	500	5500	5500

Questions to consider on non-resource specific supply

- To what extent is there a stakeholder desire to allow non-resource specific supply (no source, no transmission path) in their current form to qualify for the RSE?
- Can these WSPP-C arrangements evolve to specify source, and BAA-to-BAA transmission, if located in EDAM footprint?
- Are there additional mechanisms to incent performance of non-resource specific supply necessary?

The EDAM proposes to offer a diversity benefit

- Pro-rata diversity benefit
 - Imbalance reserve requirement current set to met 97.5% upwards uncertainty requirement
 - Can consider a higher value if necessary and supported collectively
- Transmission will be reserved as part of optimal solution to ensure deliverability.
- Potential to increase reliability by allocating partial diversity benefit.
 - Allocation of full diversity benefit maintains same reliability as a single BAA procuring imbalance reserves to 97.5% upwards uncertainty requirement
 - Could be implemented through a higher EDAM footprint imbalance reserve requirement or a MW quantity procured beyond 97.5 upward requirement

The ISO is proposing to pool all EDAM participant schedules in the WEIM RSE

- Entities passing the EDAM RSE would be evaluated in the WEIM RSE as a group rather than as individual BAAs.
 - Awarding a diversity benefit may result in substantially less imbalance procurement in each BAA; the diversity benefit offsets imbalance reserve requirements
 - Pooled test ensures each BAA has imbalance reserves procured to the 95% confidence in real-time (97.5% upwards uncertainty)
- Using a pooled approach can significantly increase reliability to the extent the full diversity benefit is not allocated.
 - High levels of uncertainty are unlikely to occur concurrently across a broad geographic footprint

Example of Diversity Benefit Allocation

	Imbalance Requirement	Diversity Benefit	New Requirement
BAA 1	200	16.66	183.33
BAA 2	300	25	275
BAA 3	100	8.33	91.67
Footprint	550	50	550

* Requirement of 550 MW corresponds to 95% confidence (97.5 upwards uncertainty)

	Imbalance Requirement	Diversity Benefit	New Requirement
BAA 1	200	8.34	191.66
BAA 2	300	12.5	287.5
BAA 3	100	4.17	95.83
Footprint	550	25	575

*Requirement of 550 MW corresponds to 95% confidence (97.5 upwards uncertainty); withhold an additional 25MW to increase footprint reliability
****Still more cost effective than meeting requirement as stand alone BAA**

Simple example for how a pooled approach would work

	EDAM Schedules*	EDAM Imbalance Reserve Schedules*	WEIM Forecast	Existing WEIM RSE	Pooled WEIM RSE Forecast	Pooled WEIM RSE
BAA1	1000	50	1020	Passed	2860	Passed
BAA2	800	70	900	Failed	2860	Passed
BAA3	900	60	940	Passed	2860	Passed
*Pooled EDAM energy and imbalance reserve procurement of 2880 MW						

Pooled WEIM RSE – if there is insufficient supply

- EDAM entities would have their incremental transfers limited from the broader footprint.
 - EDAM entities would have available supply optimally used to meet demand
 - To extent PBC relaxation is expected to occur, entity would have forewarning from advisory market runs
 - Outside of the market emergency actions are expected in deficient BAA; should similar actions be expected in the remainder of the footprint?
- Emergency energy procurement through the WEIM during periods of insufficiency is being considered in the WEIM RSE Phase 2 initiative.

EDAM RSE – Failure Consequences

- Normal Conditions
 - Would not propose any penalty
 - Expectation would be supply offers into EDAM are comparable with bilateral prices; potential differences arising from hourly granularity vs on/off peak blocks
- Stressed Conditions
 - Propose optionality for a BAA to cure resource insufficiency through a hurdle rate at the bid cap; else BAA net transfers are limited to bucket 1 transmission
 - Request stakeholder feedback on defining signifiers of stressed system conditions
 - Request stakeholder feedback on if additional consequences are needed for entities who routinely utilize this functionality

EDAM

Stakeholder panel discussion: Day-Ahead RSE

Moderator: Jim Baggs, *Regulation & Market Development
Officer, Seattle City Light*

Stakeholder panel discussion: Day-Ahead RSE

Moderator:

Jim Baggs, *Regulation & Market Development Officer, Seattle City Light*

Panelists:

Jeff Spires, *Director, Power, Powerex Corp.*

Scott Ranzal, *Director Portfolio Management, Pacific Gas and Electric Corporation*

Carrie Bentley, *CAISO Committee Consultant, Western Power Trading Forum*

Mike Wilding, *VP, Energy Supply Management, PacifiCorp*

Jon Olson, *Director of Energy Trading and Contracts, Sacramento Municipal Utility District*

EDAM

Focused discussion: Transmission commitment in EDAM

Bucket 3 transmission and revenue recovery approaches

Speakers

- Partha Malvadkar, *Principal, RA, Infrastructure, and Grid Enhancements, Market Policy and Performance*
- James Lynn, *Sr Advisor - Market Settlement Design, Market Services Support*
- Mark Rothleder, *Sr Vice President and Chief Operating Officer*
- Milos Bosanac, *Regional Markets Sector Manager, Market and Infrastructure Policy*
- George Angelidis, *Executive Principal, Power Systems, Power Systems and Market Technology*
- John Anders, *Assistant General Counsel - Legal*

Bucket 3 Unsold ATC and Revenue Recovery

- Stakeholder working groups focused on two main approaches for recovery Bucket 3 (unsold firm ATC) transmission costs:
 1. *Transmission hurdle rate* – as part of the market optimization, include hurdle rate representative of the tariff rate.
 - However, pancaking of transmission hurdle rates limits efficient transfers.
 2. *Reciprocity framework* – variations on the reciprocity framework where transmission is made available to the market hurdle free in order to derive greater benefits of resource optimization.
 - However, this approach does not allow for revenue recovery for the unsold ATC made available that will need to be balanced against benefits.

Removing transmission hurdles from optimization

- The ISO introduced 3 new alternatives for consideration that are variations of each other which remove transmission hurdles from the market optimization.
- Removing transmission hurdles from the optimization could allow the market to optimize generation commitment and dispatch more efficiently.
- The alternatives consider after-the-fact recovery of bucket 3 transmission revenues and more broadly allow the EDAM entity to have transmission revenue recovery resulting from EDAM participation.
 - For example, there may be foregone non-firm transmission revenues and short term firm revenues resulting from participation.

3A – Volumetric uplift charge on a per transaction basis

- Each EDAM BAA would calculate or forecast their expected lost transmission revenues as the basis of an after-the-fact uplift.
- The ISO forecasts the expected volume of wheel through transactions, or use another determinant, to calculate a volumetric charge.
- The ISO would allocate the revenues associated with wheel through volumes to each EDAM entity to make whole lost transmission revenues.
- Over/Under Collection could be addressed through a true up mechanism.

Approach 3B – Make-whole uplift assigned based on total transaction volumes

- Each EDAM BAA's transmission service provider would calculate its transmission revenue requirement with the intent of keeping it financially neutral by recovering its costs across a pre-determined timeframe.
- The revenue requirement would deduct sales made via the OATT.
- The expected gap in recovered revenues would be pooled and allocated based on total exports/imports or across all load in the EDAM footprint.
- A year-end true up keeps the EDAM entity whole financially from a transmission revenue perspective.

Approach 3C – Make-whole uplift assigned based on historical pre-EDAM volumes

- EDAM entity in coordination with the ISO and other participants will identify the revenues it has historically derived from transmission transactions across its system that sourced from or sank in a current EDAM BAA.
- Lost Revenues assigned to users/beneficiaries to remain revenue neutral.
- Need to update beneficiaries of hurdle free transmission over time for readjustments (ideally not based on historical volumes solely to alter participant incentives).

Question to consider in further design

- Are there additional variations to the three approaches ensuring transmission revenue recovery that should be considered?
- What types of lost transmission revenues should be eligible to be recovered through an uplift charge (wheeling, import, export, non-firm, short-term firm)?
- Should the lost transmission revenues be allocated across the EDAM footprint – allocated to load or all market participants (load, gen, imports/exports)?
- Should the lost transmission revenues be allocated to individual EDAM entities, leaving it to each entity's discretion on how to recover those costs from their customers?
- How might different uplift cost designs affect bidding incentives in the EDAM market, and how do we minimize any associated inefficiencies?

EDAM

Stakeholder panel discussion: Transmission commitment

Moderator: Doug Boccignone, *Principal Flynn Resource Consultants Inc.*

Stakeholder panel discussion: Transmission Commitment

Moderator:

Doug Boccignone, *Principal, Flynn Resource Consultants Inc.*

Panelists:

Kevin Smith, *Attorney, Braun Blaising Smith Wynne, Balancing Authority of Northern California*

Russ Mantifel, *Bonneville Power Administration*

Meg McNaul, *Attorney, Thompson Coburn LLP, Counsel to the CA Six Cities*

Jeff Spires, *Director, Power, Powerex Corp.*

Kathy Anderson, *Senior Manager, Real Time Operations & Markets, Idaho Power Company*

Day 1 Wrap-up

- Thank you for attending day 1 of the EDAM straw proposal stakeholder meeting.
- Day 2 of the meeting begins tomorrow at 8 a.m. Pacific Time. Meeting and participation details are available on the [ISO calendar](#).



EDAM

EXTENDED DAY-AHEAD MARKET

EDAM Straw Proposal – Stakeholder Meeting (Day 2)

May 26, 2022



California ISO

Reminders

- This call is being recorded for informational and convenience purposes only. Any related transcriptions should not be reprinted without ISO permission.
- Calls are structured to stimulate open dialogue and engage different perspectives with the understanding that stakeholders have read the proposal.
- In the interest of time, please refrain from repeating or reiterating what has already been said.
- If you need technical assistance during the meeting, please send a chat to the event producer.

Thank you for joining us, and we look forward to an engaging discussion.

AGENDA – Day 2

Time	Topic
8:00 - 9:15	Panel discussion - Governance Review Committee delegation of authority and stakeholder engagement
9:15 - 10:00	Focused design discussion: Greenhouse gas (GHG) accounting <ul style="list-style-type: none">• <i>Overview and examples of resource specific and zonal approaches</i>
10:00 - 10:15	Break
10:15 - 11:15	Stakeholder panel discussion – GHG accounting
11:15 - 12:00	Stakeholder general session – open discussion
12:00 - 12:30	Next steps & wrap up <ul style="list-style-type: none">• <i>Initiative interdependencies</i>

EDAM

Panel discussion: Governance Review Committee delegation of authority and stakeholder engagement

Moderator: Andrew Campbell, *Executive Director, Energy
Institute at Haas, University of California, Berkeley*

Panel discussion: Governance Review Committee delegation of authority and stakeholder engagement

Moderator:

Andrew Campbell, *Executive Director, Energy Institute at Haas, University of California, Berkeley*

Panelists:

Aly Koslow, *Director, Federal Regulatory Affairs and Compliance, Arizona Public Service*

Ann Rendahl, *Commissioner, Washington Utilities and Transportation Commission*

Lauren Tenney Denison, *Director, Market Policy & Grid Strategy, Public Power Council*

Manuel Sanchez, *Director of Power Operations, Public Service Company of New Mexico*

Jeff Nelson, *Director, FERC Rates & Markets Integration, Southern California Edison*

EDAM

Focused design discussion: Greenhouse Gas (GHG) Accounting

Overview and Examples of Resource Specific and Zonal Approaches



California ISO

Speakers

- Anja Gilbert, *Lead Policy Developer, Policy Development*
- George Angelidis, *Executive Principal, Power Systems, Power Systems and Market Technology*
- James Lynn, *Sr Advisor - Market Settlement Design, Market Services Support*
- Mark Rothleder, *Sr Vice President and Chief Operating Officer*
- Milos Bosanac, *Regional Markets Sector Manager, Market and Infrastructure Policy*
- John Anders, *Assistant General Counsel - Legal*

GHG Approaches

The ISO included two options in the straw proposal, and each has different approach while still reflecting the cost of carbon in the market:

1. The Resource-Specific approach seeks, to the extent possible, to identify the source of GHG emissions and use a least-cost optimized dispatch to deem generation to serve load.
2. The Zonal approach moves away from deeming, and allows resources to be viewed as internal to a GHG regulation area on a resource specific basis or allows transfers if the price differential between areas exceeds a to-be-determined hurdle rate.

Enhancements for Both the Resource-Specific and Zonal Proposals

- Reflecting the GHG regulation area
 - Today the CAISO only looks at the BAA level, which does not reflect state geography
 - The ISO proposes to update its model to reflect GHG regulation area boundaries
- Creating a “GHG pseudo tie”
 - Allows resources outside of a GHG regulation area to be viewed as internal for GHG accounting purposes

Resource-Specific Approach Overview

Market optimizes based on the GHG costs bid in by specific generators, includes GHG attribution.

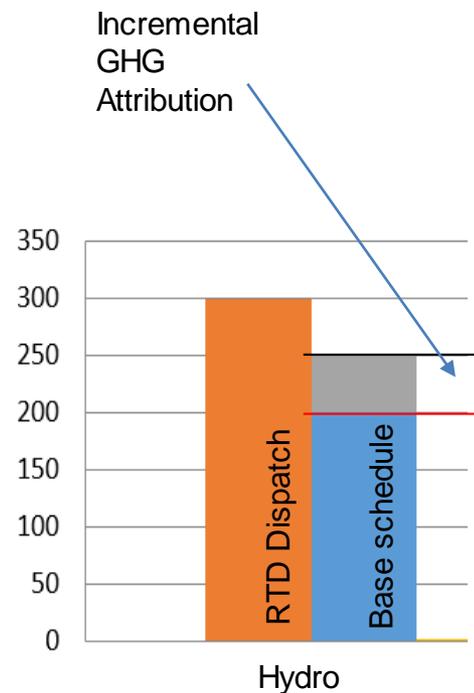
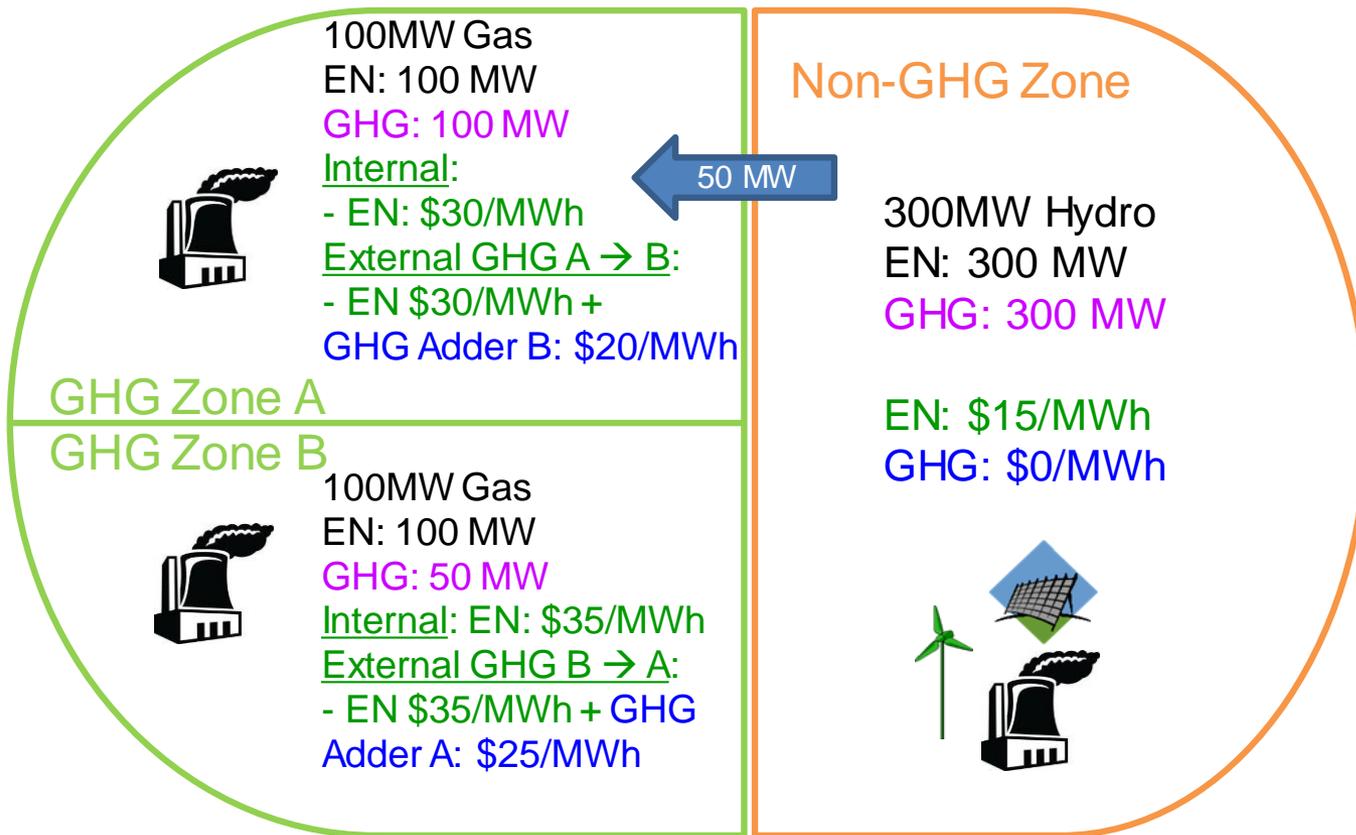
Resource Specific Bidding and Attribution Mechanics

- Voluntary GHG bid adder
 - Non-GHG regulation area to GHG regulation area
 - Unlinked: Additional costs of GHG regulation area to GHG regulation area
- Energy bid includes the cost of GHG compliance
 - Internal treatment within a GHG regulation area
 - Linked: GHG regulation area to GHG regulation area

Enhancements to Limit Secondary Dispatch

- Improved Baseline: Uses the RSE solution as the counterfactual
- Constraints to limit attribution based on transfer schedules: Limiting GHG attribution to hourly net export transfers or to zero if the BAA is a net importer

Resource Specific Approach Bidding and Attribution



Gen in EDAM Area	Base Schedule (MW)	RTD Dispatch (MW)	Deemed Delivered to GHG Regulation Area A (MW)	Contribution to Potential Secondary Dispatch
Hydro	200	300	50	0

The RSE Solution is a more accurate baseline, as compared to the WEIM self-submitted base schedules

- Secondary dispatch arises from higher-emitting resources backfilling to serve load outside of a GHG regulation area.
- Secondary dispatch can be reduced through a more accurate baseline. Using the RSE solution is a more accurate reflection of commitment, and thus a more accurate baseline.

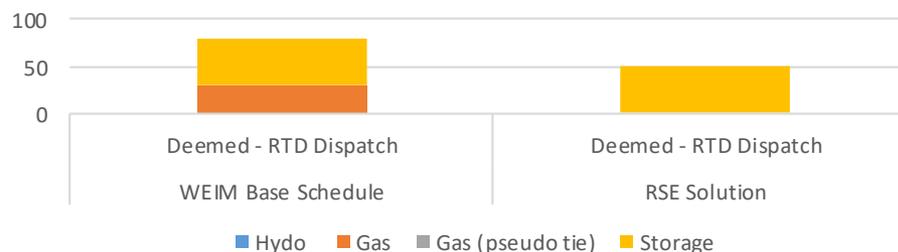
Table 1: BAA Portfolio in WEIM

Gen in EIM Area	Self-Submitted Base Schedule (MW)	RTD Dispatch (MW)	Deemed Delivered to Regulation Area (MW)	Contribution to Potential Secondary Dispatch
Hydro	200	300	50	0
Gas	200	250	80	30
Gas (pseudo-tie)	200	250	N/A	0
Storage	200	180	50	50

Table 2: BAA Portfolio in EDAM

Gen in EIM Area	RSE Solution (MW)	RTD Dispatch (MW)	Deemed Delivered to Regulation Area (MW)	Contribution to Potential Secondary Dispatch
Hydro	200	300	50	0
Gas	250	250	0	0
Gas (pseudo-tie)	200	250	N/A	0
Storage	200	180	50	50

Illustrative Example: Secondary Dispatch

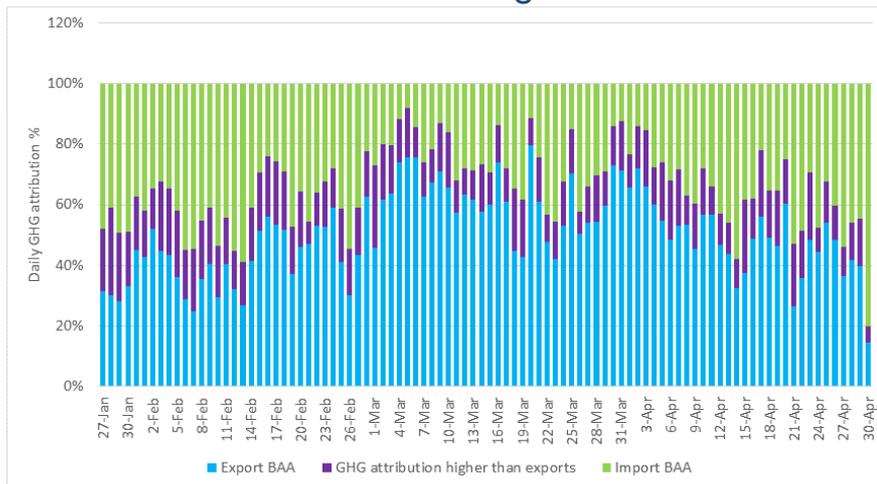


*All resources have an Upper Economic Limit of 300 MW

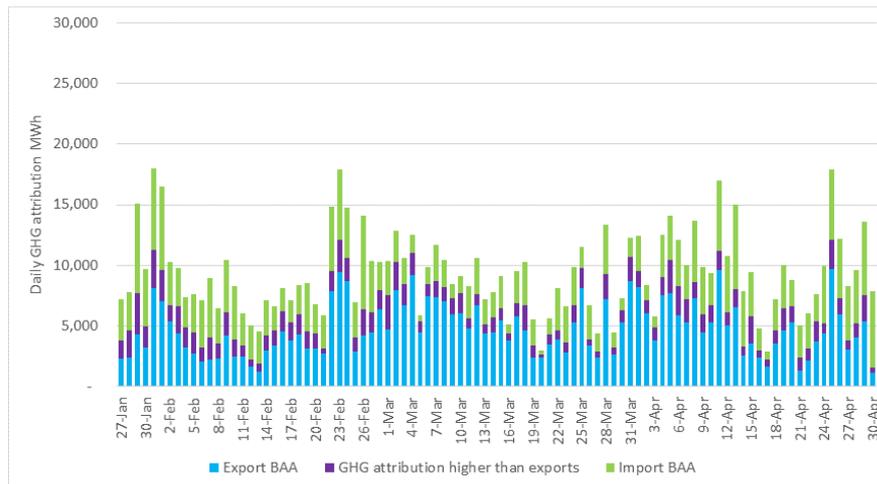
Impact of Applying the EDAM Net Export Constraints to WEIM data from 1/27/22-4/30/22

Sources of GHG Attribution from a BAA	WEIM Today	EDAM
Exporting below transfer limits	Included	Included
Exporting above transfer limits	Included	Excluded
Importing	Included	Excluded

EDAM Net Export Constraints Applied to WEIM Percentage



EDAM Net Export Constraints Applied to WEIM Volume



Zonal Approach Overview

Combination of a resource-specific pathway and hurdle rate, without GHG attribution

Hurdle Rate

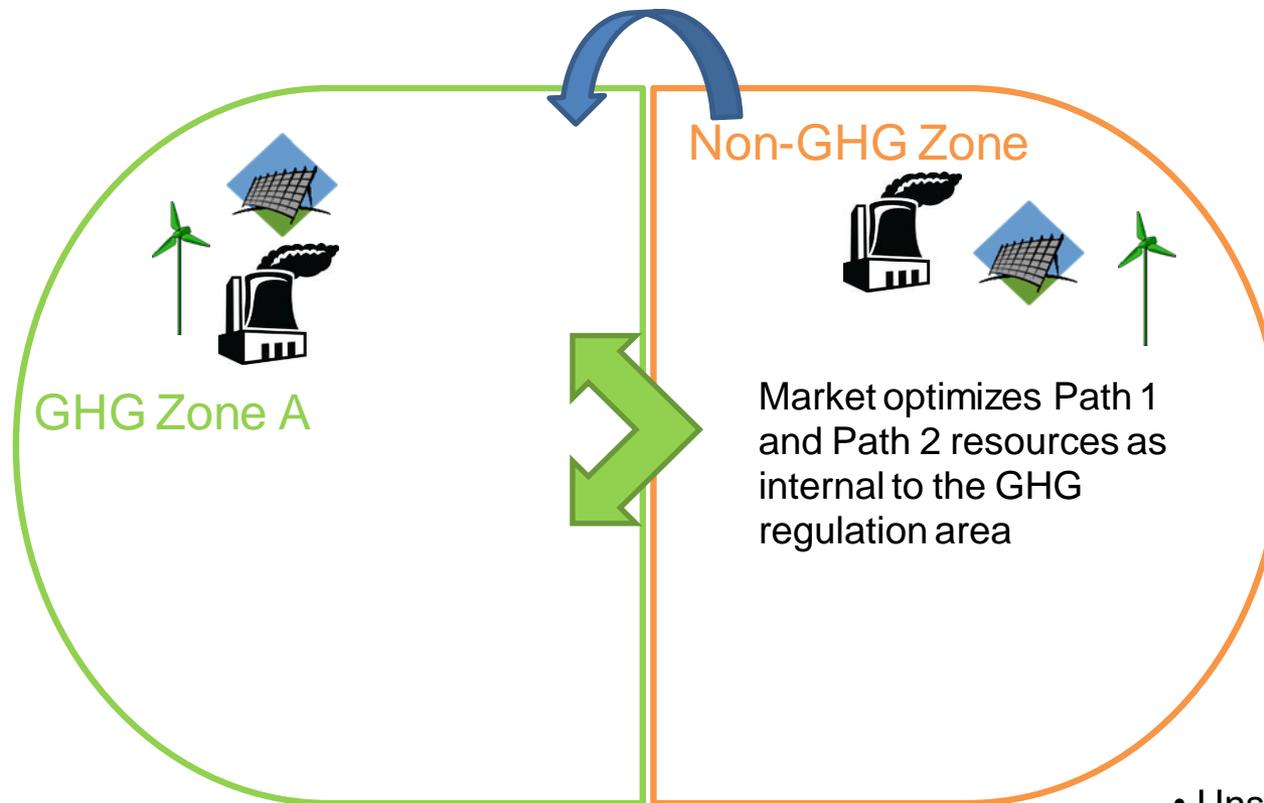
- The hurdle rate is the price (\$/MWh) a transfer from a non-GHG regulation area to a GHG regulation area must overcome
- Hurdle rate = allowance price x emissions rate

Participation Options

- Path 1: Long-term commitments are recognized as internal to the GHG regulation area
- Path 2: Short-term commitments are recognized as internal to the GHG regulation area
- Hurdle Rate: All other resources are subject to a hurdle rate, allowing transfers if the price differential is sufficiently high

Zonal: Single GHG Regulation Area

Hurdle \$8.74



Transfer

Internal Price: \$30

≥

External: \$20 + \$8.74 = \$28.74

No Transfer

Internal Price: \$30

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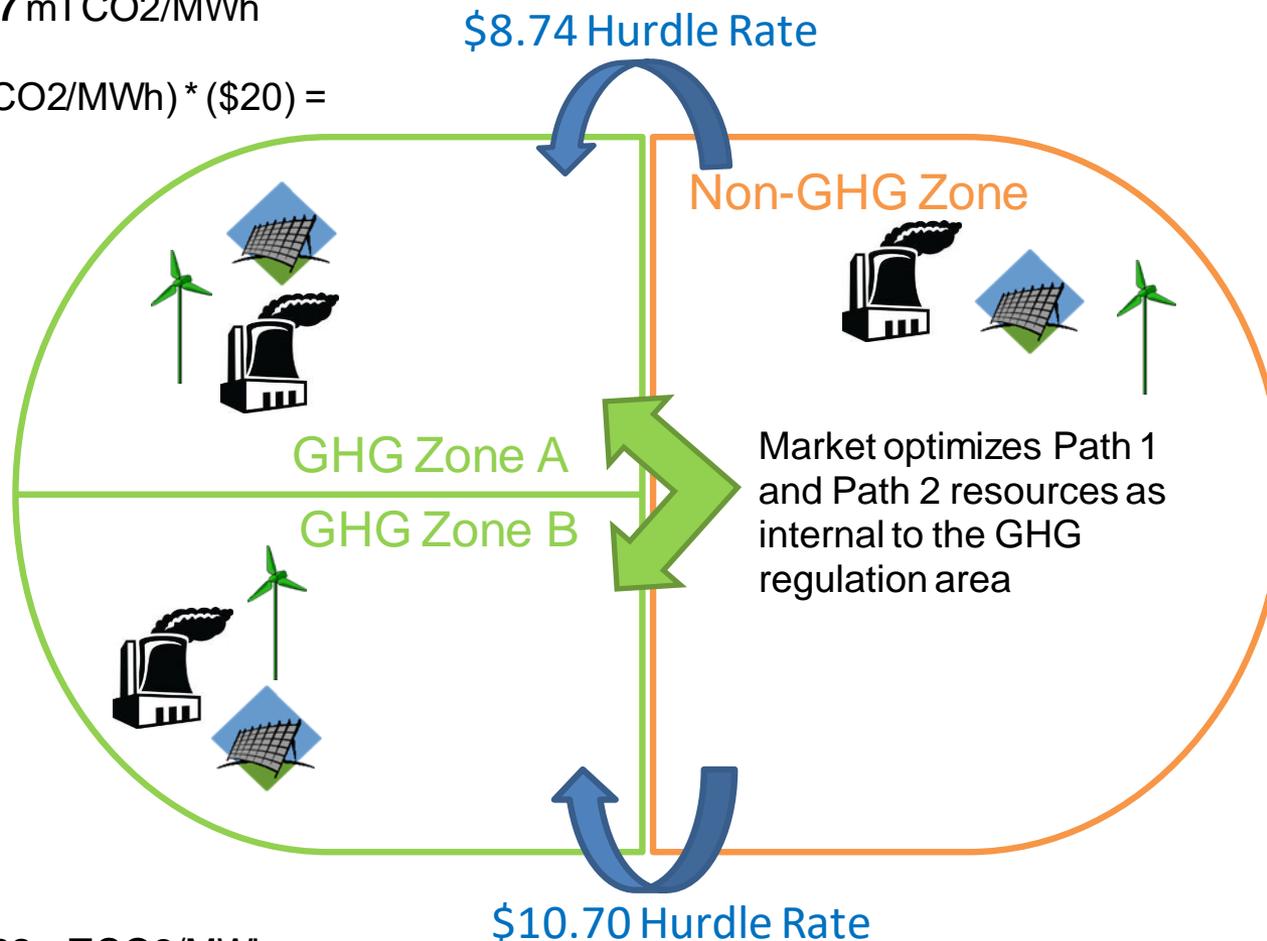
External: \$25 + \$8.74 = \$33.74

- Unspecified Rate = **0.437** mTCO₂/MWh
- Allowance Cost = **\$20**
- Hurdle Rate: (0.437 mTCO₂/MWh) * (\$20) = **\$8.74/MWh**

Zonal: Unlinked GHG Regulation Areas

GHG Zone A:

- Unspecified Rate= **0.437** mTCO₂/MWh
- Allowance Cost = **\$20**
- Hurdle Rate: $(0.437\text{mTCO}_2/\text{MWh}) * (\$20) =$
\$8.74/MWh



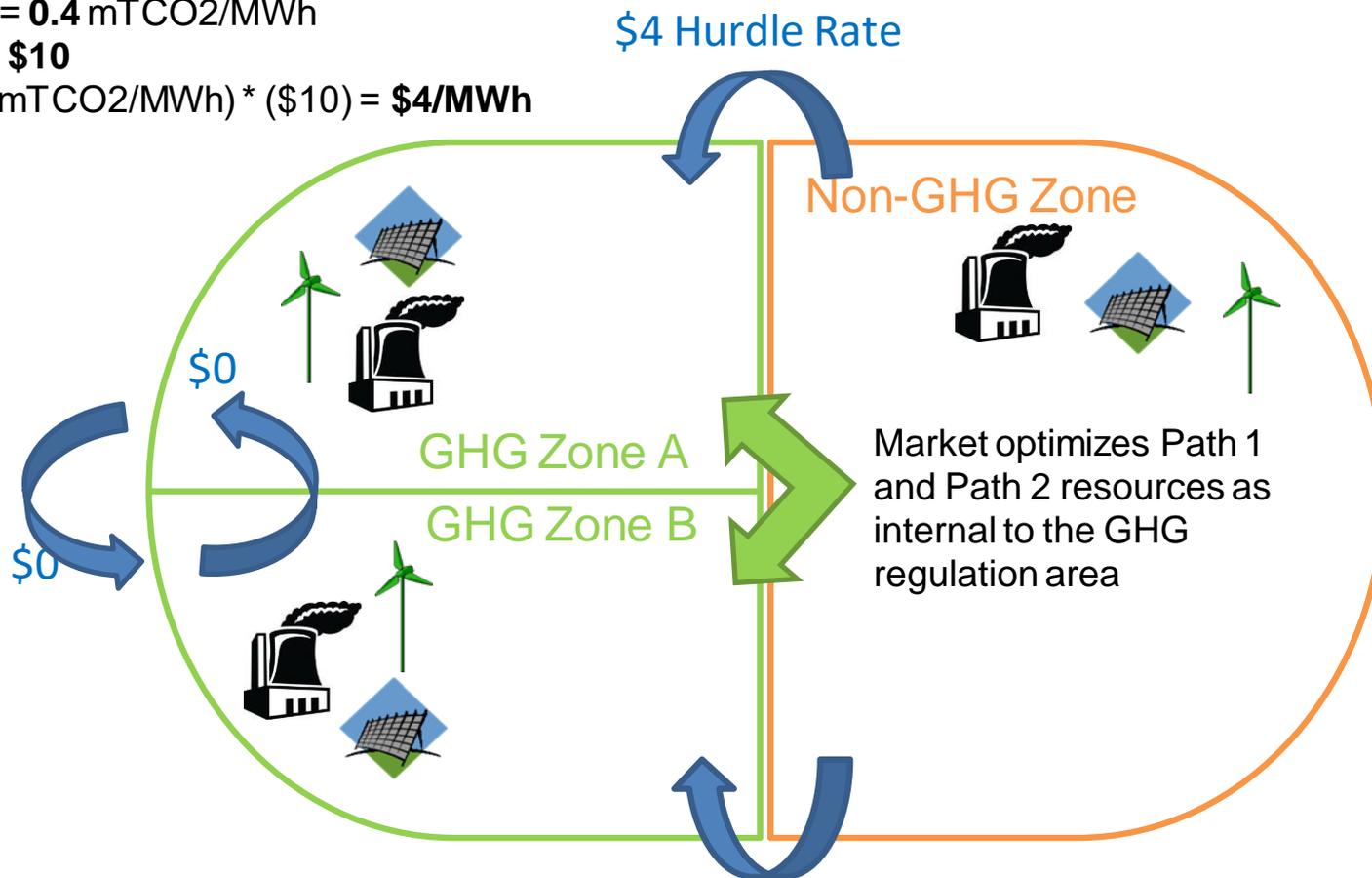
GHG Zone B:

- Unspecified Rate= **0.428** mTCO₂/MWh
- Allowance Cost = **\$25**
- Hurdle Rate: $(0.428\text{mTCO}_2/\text{MWh}) * (\$25) =$
\$10.70/MWh

Zonal: Linked GHG Regulation Areas

GHG Zone A:

- Unspecified Rate= **0.4 mTCO₂/MWh**
- Allowance Cost = **\$10**
- Hurdle Rate: $(0.4\text{mTCO}_2/\text{MWh}) * (\$10) = \mathbf{\$4/\text{MWh}}$



GHG Zone B:

- Unspecified Rate= **0.4 mTCO₂/MWh**
- Allowance Cost = **\$10**
- Hurdle Rate: $(0.4\text{mTCO}_2/\text{MWh}) * (\$10) = \mathbf{\$4/\text{MWh}}$

Possible Open Issues for State Air Regulators

Resource-Specific Approach	Zonal Approach
<ul style="list-style-type: none">- How to determine compliance costs for resources in a GHG zone that serve another unlinked GHG zone- How to account for emissions leakage that remain after measures to address secondary dispatch are implemented	<ul style="list-style-type: none">- How the hurdle rate emissions factors will be determined- What point of regulation is needed to support air regulators statutory requirements- Will there be sufficient data to support specified source reporting requirements under path 1 and path 2- How to account for emissions leakage that is not eliminated by the approach

Greenhouse Gas Settlement

Resource-Specific Approach	Zonal Approach
Resource with a day ahead GHG obligation will settle at relevant marginal cost of GHG price	Day ahead GHG transfer obligation will settle at relevant GHG hurdle rate and allocated based upon state regulator requirements (e.g., GHG zonal metered demand)
EDAM Area marginal GHG neutrality allocated to EDAM Entity or measured demand	
Resource with a real time GHG obligation will settle as a deviation settlement for day ahead position at relevant marginal cost of GHG price	RTM GHG transfer obligation will settle as a deviation settlement from day ahead GHG transfer position at relevant GHG RTM hurdle price and allocated upon state regulator requirements (e.g., GHG zonal metered demand)
EIM Area RTM marginal GHG neutrality allocated to EDAM Entity or measured demand	

EDAM

Stakeholder panel discussion: GHG accounting

Moderator: Clare Breidenich, *Carbon and Clean Energy
Committee Director, Western Power Trading Forum*



California ISO

Panel discussion: GHG Accounting

Moderator:

Clare Breidenich, *Carbon and Clean Energy Committee Director, Western Power Trading Forum*

Panelists:

Bobby Olsen, *Salt River Project*

Josh Walter, *Strategic Advisor, Seattle City Light*

Ian White, *General Manager, Regulatory & Market Affairs, Shell Energy North America (US), L.P.*

Anurag Sahni, *Forward Marketing Manager, Los Angeles Department of Water and Power*

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Stakeholder general session: Open discussion Q&A

Speakers

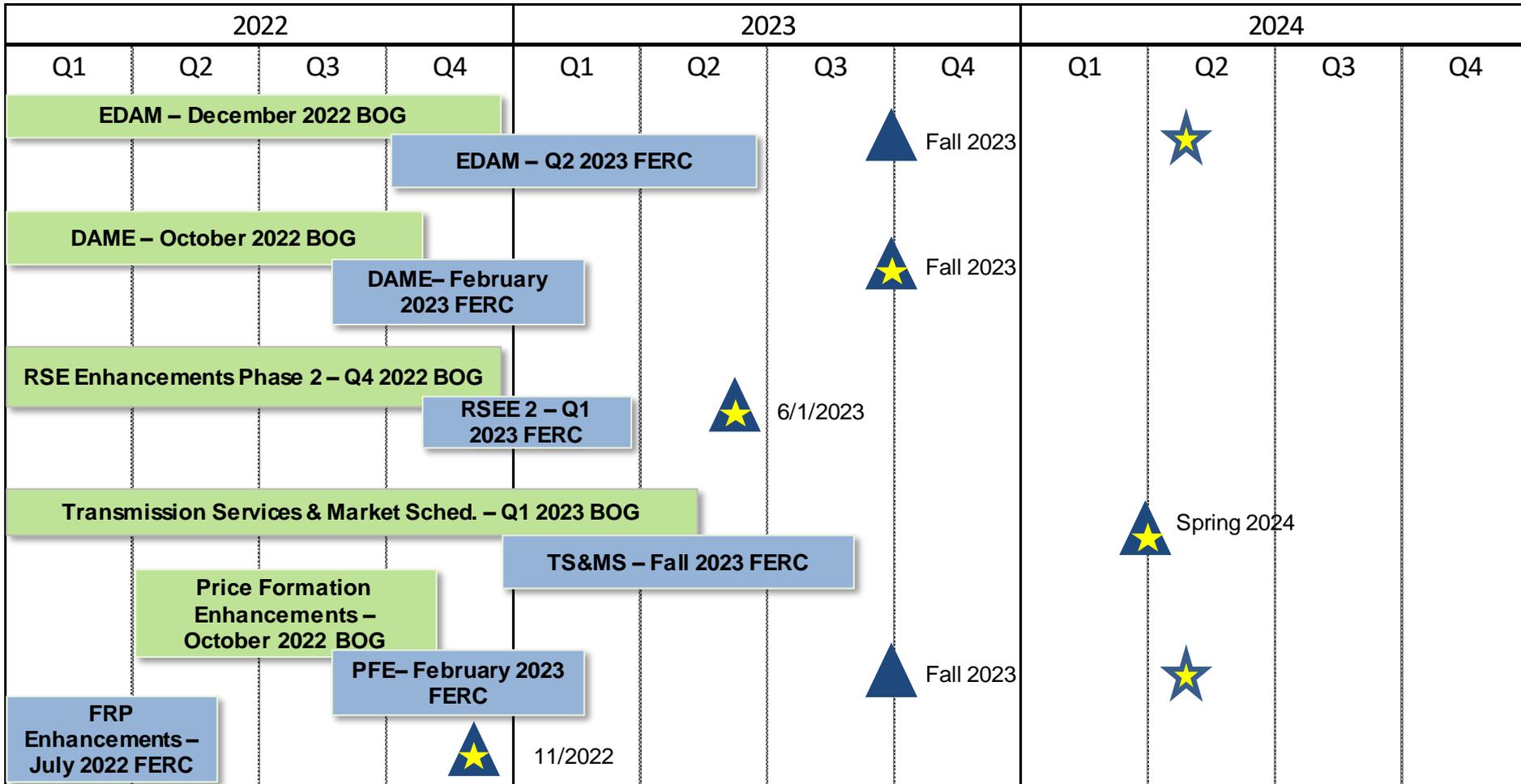
- Milos Bosanac, *Regional Markets Sector Manager, Market and Infrastructure Policy*
- Mark Rothleder, *Sr Vice President and Chief Operating Officer*
- Partha Malvadkar, *Principal, RA, Infrastructure, and Grid Enhancements, Market Policy and Performance*
- James Friedrich, *Lead Policy Developer, Policy Development*
- Anja Gilbert, *Lead Policy Developer, Policy Development*
- Danny Johnson, *Lead Policy Developer, Policy Development*
- George Angelidis, *Executive Principal, Power Systems, Power Systems and Market Technology*
- James Lynn, *Sr Advisor - Market Settlement Design, Market Services Support*
- John Anders, *Assistant General Counsel - Legal*

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Initiative Interdependencies and next steps

Greg Cook, *Executive Director, Market and Infrastructure Policy*

Major Initiatives Timelines, 2022-2024



 Policy development; ISO Board of Governors & WEIM Governing Body decision

 Tariff development; FERC filing and ruling
ISO Public

 IT Release

 Go live

Next steps

- Please submit comments on the straw proposal using the commenting tool linked on the initiative webpage.
 - Comments are due by end of day June 16, 2022.
- Visit the initiative webpage for more information:
[California ISO - Extended day-ahead market \(caiso.com\)](https://www.caiso.com/California-ISO-Extended-day-ahead-market)
- If you have any questions, please contact
isostakeholderaffairs@caiso.com



- The ISO is pleased to be hosting the Stakeholder Symposium in-person at the Safe Credit Union Convention Center in downtown Sacramento on Nov. 9 – 10, 2022
- Registration will be open in May
 - Public notice will be issued once the site is available
- Additional information is available on the Stakeholder Symposium page on ISO's website at:
<http://www.caiso.com/informed/Pages/MeetingsEvents/StakeholderSymposium/Default.aspx>
- Please direct questions to symposiumreg@caiso.com

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Closing remarks

Mark Rothleder, *Sr Vice President and Chief Operating Officer*

Thank you for your participation.

That concludes the Extended Day-Ahead Market
stakeholder meeting.