



# Memorandum

**To:** ISO Board of Governors and Western Energy Imbalance Market Governing Body  
**From:** Anna McKenna, Vice President of Market Policy and Performance  
**Date:** January 26, 2023  
**Re:** **Decision on the extended day ahead market (EDAM)**

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***This memorandum requires ISO Board of Governors and WEIM Governing Body action.***

## EXECUTIVE SUMMARY

The diversity of resources and transmission connectivity in the West presents a unique opportunity to lead the nation and demonstrate that collaboration and innovative mechanisms can deliver substantial economic, reliability, and environmental benefits. An example of that is the Western Energy Imbalance market (WEIM), which since its inception in 2014 has grown to represent nearly 80% of the load in the West and has accrued over \$3 billion in benefits for its participants. The WEIM, although limited as only a real-time based market, clearly demonstrates that strong collaboration across a broad regional footprint is key to unlocking the value that exists across the West. The addition of a day-ahead market across a broad Western footprint builds on the WEIM to deliver sizable incremental benefits. Recent studies<sup>1</sup> estimate these benefits to range from \$543 million to \$1.2 billion per year when considering the operational benefits in addition to potential capacity benefits. The proposed extended day-ahead market (EDAM) provides a significant next step in unlocking these incremental benefits and achieving these shared objectives for all participating entities.

Management proposes to extend the ISO's day-ahead market to WEIM entities. The proposed EDAM design allows for the optimized commitment of resources and use of transmission capability across a larger footprint to effectively and efficiently position resources to meet next-day demand. The proposal provides the opportunity for existing WEIM entities to voluntarily extend their participation to the EDAM, building upon the established relationship with the ISO, while continuing to retain their resource planning,

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<sup>1</sup> <http://www.caiso.com/Documents/Presentation-CAISO-Extended-Day-Ahead-Market-Benefits-Study.pdf>

transmission service and planning, and reliability functions through their respective processes and Open Access Transmission Tariffs (OATTs).

A primary benefit of the EDAM is that it will provide access to a diverse pool of resources and increase visibility into the supply conditions across the market footprint in the day-ahead timeframe. The design further maximizes the optimal utilization of transmission capability within and between participating balancing areas to derive benefits of energy transfers across the footprint, while providing assurance that the transfer of energy may be relied on to serve load. This enables the market to optimize available supply and transmission through economic solutions to anticipated system conditions in the day ahead of the operating day, reducing the frequency of real-time emergency declarations under stressed system conditions. At the same time, the design supports greenhouse gas emissions accounting and reporting obligations associated with the transfer of energy across the region, thereby facilitating participants' compliance with regulations that may be implemented in different states across the region.

The proposed design is the result of extensive stakeholder engagement and diverse stakeholder input. Since the launch of the initiative, the ISO has held nearly 80 public meetings ranging from working groups, targeted workshops and meetings, to review the different iterations of the proposal. Moreover, the design is informed by over 1,500 pages of diverse stakeholder comments received across different proposal iterations, which are summarized in a separate document. The level of ISO engagement and stakeholder participation is an indication of the importance of this effort and the willingness of the West to build upon the collaboration and success of the WEIM, increase regional coordination, and support evolving state policy goals.

Management recommends the following motion:

***Moved, that the ISO Board of Governors and WEIM Governing Body approve the extended day-ahead market proposal as described in the memorandum dated January 26, 2023; and***

***Moved, that the ISO Board of Governors and the WEIM Governing Body authorize Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the change proposed in this memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.***

## **DISCUSSION AND ANALYSIS**

The EDAM design offers a regional day-ahead market by leveraging the existing features of the ISO's day-ahead market with additional modifications that recognize the unique challenges and needs of Western utilities, generators, and balancing authorities. The proposed design considers the enhancements to the day-ahead market being

considered in a parallel initiative and supports the optimal commitment of a geographically diverse set of resources across the EDAM footprint utilizing available transmission capability, building upon the WEIM and providing incremental economic, reliability and environmental benefits. The proposed EDAM design, although rooted in fundamental energy market principals and operations, is innovative and unique. Management expects that the design will evolve over time with experience. Further, Management will monitor its performance closely and will provide regular public reports on its performance.

Management proposes to establish the EDAM on the same participation model that balancing authorities have voluntarily elected to participate in the WEIM. This means each balancing authority may decide to extend its participation into the day-ahead market – the EDAM – or remain as a participant only in the real-time market – the WEIM. Management also proposes to extend parallel transitional measures to the EDAM that are present in the WEIM today to insulate participants from adverse reliability or market outcomes during the onboarding process and throughout their participation.

Interested entities will commit to a project timeline for implementation into the EDAM by executing an agreement with the ISO. The implementation process may take anywhere from six to 24 months depending on the circumstances, and will cover a variety of integration and project management activities. The ISO will recover its implementation costs through a deposit and incremental charge/refund true up mechanism based on its cost of similar services. Additional agreements will therefore be executed as part of the onboarding process, setting up participation and operation of EDAM in the balancing authority area. Participants thereafter will pay an administrative fee based upon the ISO's cost of service and the services necessary to support EDAM participation.

Load serving entities, as well as resources in participating balancing areas, will have the ability to participate in the day-ahead market, and their day-ahead market transactions will be settled through the ISO's settlements systems based on day-ahead market outcomes and differences between the day-ahead and real-time markets. This means that resources and load in a participating balancing authority area will be expected to submit an economic bid or a self-schedule in the market based on their availability and operational circumstances. This differs from the resource participation model in the WEIM, where resources may not participate and instead are represented by a base schedule that reflects their planned operation. In the WEIM, only deviations from base schedules and dispatch instructions are settled through the real-time market. Participating entities will be able to self-schedule or economically bid their load in the day-ahead market, and the market will optimize the transmission and resources offered into the market to identify efficient commitments and energy transfers to meet the forecasted load across the footprint. This foundational element of EDAM will allow for full optimization of load and resources through the day-ahead market and full settlement of imbalances between day-ahead positions and the real-time market.

Although all resources and load in participating EDAM balancing areas will be participating in the market through the submission of self-schedules or economic bids,

transmission providers in EDAM balancing areas will continue to operate their transmission service under their OATT to deliver generation to load or otherwise meet contractual obligations. Therefore, transmission customers will have to continue to comply with each provider's transmission reservation requirements and contribute to the costs of the transmission system. This design ensures that resources are not able to avoid transmission reservations and thereby shift the costs of the transmission system to other transmission customers and load.

Management proposes that resources located in an EDAM balancing area reserve transmission associated with their supply or otherwise be assessed a transmission charge by the transmission service provider. In particular, a generator located in an EDAM balancing area can meet the transmission service requirement by one of the following methods:

- Be a designated network resource under the terms of the EDAM entity OATT, which means that the load serving entity has arranged the transmission necessary to deliver that resource to load; or
- Reserve firm point-to-point transmission service under the OATT of any duration or otherwise hold a legacy transmission contract (pre-OATT).

To the extent the generator has not met the requirements noted above, the EDAM transmission service provider in an EDAM participating area will assess a transmission charge based upon the shortest duration of firm transmission service it offers under its OATT. Such assessments of transmission charges for transmission service will ensure generation continues to contribute to the costs of the transmission system and will continue to facilitate the administration of the OATT by EDAM entity transmission providers.

There are three primary dimensions of the EDAM proposal—prior to the day-ahead market, within the day-ahead market, and after the day-ahead market. Each dimension includes specific design elements that support the associated timeframe in which the ISO or the market participant take various actions.

### **Prior to the day-ahead market is the resource sufficiency evaluation**

Management proposes a day-ahead resource sufficiency evaluation (RSE) culminating at the start of the first run of the day-ahead market, i.e., the integrated forward market. The day-ahead RSE evaluates, across the next day 24-hour horizon, whether each balancing area's supply offered into the day-ahead market is sufficient to meet its next day forecasted load, imbalance reserve obligation, and self-provisioned ancillary service obligations. This includes functionality to allow each balancing authority to evaluate on an advisory basis its progress toward meeting the final RSE so they may take steps to cure any anticipated insufficiencies prior to the execution of the day-ahead market.

### *EDAM resource sufficiency evaluation structure*

The day-ahead RSE will consider resource bids – self schedules and economic bids – of different resource types and technologies, including demand response, across the footprint that entities may have contracted under respective resource adequacy or resource planning programs. This includes the planned delivery of firm energy products where the source or transmission path may not be known by the time of the day-ahead market run, but the entity relying on this energy product takes title to the energy at its intertie border.

Management proposes that balancing areas that pass the day-ahead RSE will be evaluated together, as a pool, in the WEIM hourly sufficiency evaluation. This pooling approach benefits those balancing areas by ensuring the diversity benefit of procured imbalance reserves through the day-ahead market is realized in the WEIM resource sufficiency evaluation. The day-ahead market will in all circumstances seek to cure the insufficiency of one or more balancing areas that may not have brought sufficient supply to the market to meet their next day obligations. To the extent there is sufficient supply in the market to cure an insufficiency without degrading reliability, the balancing area will have cured that insufficiency through the market and will be treated as if it had passed the RSE, and consequently will be considered as part of the pool of entities passing the RSE for purposes of being evaluated jointly for the WEIM RSE. Otherwise, the EDAM entity will be subject to the administrative surcharge outlined below and will be evaluated on its own for the WEIM RSE.

Management proposes that the day-ahead RSE design include financial consequences for RSE failure in order to provide a strong incentive for procuring sufficient supply ahead of the day-ahead market. The design provides a tiered consequence structure depending upon the magnitude of the failure to meet the EDAM entity's resource sufficiency. The first tier – Tier 1 – is a *de minimis* RSE failure within the maximum of 10 MW or the forecast error associated with the balancing area's upward imbalance reserve requirement. An RSE failure of a magnitude less than 50% of the balancing area's imbalance reserve requirement is considered a Tier 2 failure and is subject to an administrative surcharge with a 1.25 multiplier (i.e., a 25% adder above Tier 1). Finally, an RSE failure of a magnitude greater than 50% of the balancing area's upward imbalance reserve requirement is considered a Tier 3 failure – a larger magnitude failure – and is subject to an administrative surcharge with a 2.0 multiplier (100% adder above Tier 1). The tiered structure is intended to acknowledge small, *de minimis* failures, but apply a sufficiently robust financial consequence to incent forward procurement of supply to help ensure sufficiency in advance of the day-ahead market. The design also provides for additional escalating surcharge multipliers to the extent that an EDAM entity is persistently failing to meet the day ahead RSE. This additional component of the surcharge applies a prospective additional adder for each day over a rolling retrospective period an EDAM entity experienced a failure for the EDAM RSE.

### *Net EDAM export transfer constraint*

Management proposes to introduce a net EDAM transfer export constraint in the market that would allow balancing areas, including the ISO, to manage the amount of supply internal to their balancing area that can be exported to support transfers with other EDAM balancing areas. Without this protection, excess resource adequacy supply may be committed through the day-ahead market to support EDAM transfers, which in more stressed system conditions could pose a problem for the host balancing areas because the transfers would not be curtailable to manage the balancing area's system reliability conditions. In the ISO balancing area's case, this protects against exports from resource adequacy capacity similar to the ISO's ability to recall lower priority exports that are not contractually obligated to serve external load. Although other EDAM entities may not have a must offer obligation, this constraint will also give them the ability to manage their reliability or resource adequacy obligations while allowing their resources to be optimally managed through the market.

In sum, the day ahead RSE provides a common mechanism to evaluate how each balancing area is positioned and the ability of each balancing area to meet its next day obligations under the associated resource planning paradigms which may differ among entities. The RSE design, in conjunction with the net export constraint, instills confidence in the availability of supply to realize an optimized market solution and encourages entities to make available excess supply to the market beyond what is needed to meet the RSE.

### **Transmission availability to support the day-ahead market**

The availability of transmission, both internal to the system and across interfaces between balancing areas in EDAM, is foundational to optimizing unit commitment in the day-ahead market and to identifying robust energy transfers across the EDAM footprint.

Management proposes that transmission capability internal to each balancing area be made available to the EDAM to support optimized unit commitment in the day-ahead market that strengthens the re-optimization of flow capability across the internal network in real time, as in the WEIM today. Through the use of a full network model, the ISO would model the internal transmission system network of each EDAM entity as it does today through the WEIM. Known transmission outages will be visible to the day-ahead market and will be considered when identifying feasible resource commitments and energy transfers across the footprint.

Transmission customers and transmission providers will also be able to make transmission available across interfaces between EDAM balancing areas to support energy transfers between areas in the footprint. The transmission made available at the interfaces between EDAM balancing areas is also optimized by the day-ahead market to support EDAM transfers. The transmission that is made available to the EDAM is high quality transmission – firm and conditional firm – under the OATT, while the ISO will make its full transmission capability available to support optimized transfers.

Transmission providers will make rights across interfaces between EDAM balancing areas associated with delivery of generation to meet an EDAM entity's resource sufficiency available to the EDAM to optimize in the day-ahead market. To the extent transmission rights held by transmission customers across EDAM balancing area interfaces are not being utilized to support delivery of generation for purposes of the resource sufficiency evaluation, there are different options through which the transmission customer can make transmission available to the EDAM or otherwise exercise their rights. The transmission customer can exercise their specific OATT rights in the day-ahead market by submitting a self-schedule in the day-ahead market associated with those existing transmission rights. In such cases, the market will not optimize those transmission rights, but the self-schedule will nevertheless count for the RSE for the sink EDAM balancing area. To the extent transfer revenue accrues, it will be settled with the EDAM entity. Alternatively, the transmission customer can elect to voluntarily release those transmission rights<sup>2</sup> to the EDAM. In such cases, to the extent transfer revenue accrues across the interface, the ISO will settle those transfer revenues directly with the transmission customer that released their transmission rights to the EDAM.

Transmission rights held by transmission customers that are not exercised in the day ahead market or released to the market, will remain unscheduled and will be optimized in the day-ahead market to support EDAM transfers. Transmission customers whose transmission rights remained unscheduled and were optimized by the market, can later exercise their transmission rights through the real-time market. The market will seek to re-dispatch the system to accommodate those transmission rights. If re-dispatch is not feasible, the market will not disturb day-ahead market cleared schedules. Instead, the market will seek to accommodate these later scheduled transmission rights before accommodating new submitted self-schedules.

The transmission provider in an EDAM area must also make unsold firm transmission capability available to the market to optimize transfers between EDAM balancing areas. The ISO will produce a report for the transmission providers identifying the amount of unsold transmission capability that was optimized in the day-ahead market, such that the transmission provider can resume sales for the transmission that was not utilized by the market.

Transmission customers holding OATT transmission rights across interfaces with non-EDAM balancing areas can continue to exercise these rights to support reliability, resource adequacy or other contractual obligations. Transmission customers holding firm transmission rights that wheel through an EDAM balancing area or otherwise export from the EDAM footprint will be able to self-schedule their transactions associated with their OATT transmission rights through the day-ahead market. The ISO, along with EDAM entity transmission providers, will monitor the frequency and magnitude of the exercise of these transmission rights across different systems and interfaces to understand the market impacts. If such exercise is frequent across discrete transmission paths, or if frequent use is anticipated across discrete transmission paths as determined during the EDAM entity

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<sup>2</sup> The transmission rights eligible to be released to the EDAM at the onset are long-term firm or monthly firm, conditional firm, transmission rights.

onboarding process, Management would consider adjustments such as internal network transmission carve-outs, seams arrangements or other mechanisms to mitigate the potential impacts.

#### *Providing for historical transmission revenue recovery through EDAM*

Management proposes a design under which transmission providers in the EDAM footprint, including transmission owners in the ISO, can recover historical transmission revenues through the EDAM. The proposed process would allow for the following transmission through the EDAM as follows:

1. Historical transmission revenues from sales of short-term firm and non-firm transmission products under the OATT, and for historical Wheeling Access Charge revenues for the ISO;
2. A portion of new approved transmission builds that increase the transfer capability between EDAM balancing areas based on the proportional ratio of historical short term sales to the overall historical transmission revenues; and
3. Revenues for use of the transmission system when wheel through transfer volumes through an EDAM balancing area are greater than total import and export transfer volumes for the balancing area.

Participating EDAM entities, in their role as transmission providers, will continue to administer and sell transmission under their OATTs. As a result of EDAM participation, transmission service providers may experience reduced transmission sales particularly of shorter term transmission products – monthly, weekly, daily and hourly firm and non-firm transmission. In particular, current WEIM entity transmission providers considering participation in the EDAM expressed that it was important that the design ensure that they can recover their historical transmission revenues to avoid or mitigate transmission cost shifts between different customer classes to the extent there are reduced transmission sales once they join the EDAM. Management proposes three measures for ensuring transmission revenue recovery:

- Since EDAM entity transmission providers continue to make OATT sales, the EDAM recoverable transmission revenues are based on the difference between the historical transmission revenues from short-term firm and non-firm sales and the current OATT sales. As an entity continues to make OATT sales of short-term transmission it reduces the amount that may be recoverable through the EDAM. A portion or percentage of new transmission builds would also be recoverable through the EDAM to the extent a new approved transmission upgrade increases the transfer capability between two EDAM balancing areas, thus supporting increased transfers across the footprint. The portion of the new transmission build costs that would be recoverable through the EDAM is derived by determining the percentage that historical short-term firm and non-firm sales contribute to the overall transmission revenue requirement of the transmission provider.
- Revenues associated with the use of an EDAM entity's transmission system to support transfers wheeling through the system in excess of import and export transfers will also be eligible for cost recovery. In these instances, the EDAM entity



transmission system is supporting the derivation of benefits for the rest of the EDAM footprint in excess of the benefits the EDAM entity may be deriving for itself through transfers that may either source from or sink into its balancing area. When those net wheels through the EDAM entity system exceed the import and export transfers, the EDAM entity transmission provider would be compensated for this net wheel through use of its system at the approved non-firm hourly point-to-point transmission rate.

The EDAM recoverable revenues associated with the three components described above would be allocated to gross load across the EDAM footprint since load, ultimately, derives the primary benefits from the optimized transfers resulting from EDAM participation. Additionally, as part of the allocation of recoverable revenues, an individual EDAM entity will not be allocated its own recoverable revenue or shortfall that needs to be recovered.

### **Extension of the day-ahead market processes to other balancing areas**

Management proposes the retention of the integrated forward market and residual unit commitment as integral components of the EDAM that produce efficient unit commitments and energy transfers between EDAM balancing areas, deriving the expected economic and reliability benefits. Extension of the day-ahead market necessitates retention of significant elements of the day-ahead market as described below.

#### *Market power mitigation*

For the start of the EDAM, Management proposes to extend to the EDAM the same market power mitigation design used in the WEIM today. Entities are familiar with this approach and the design can also effectively address market power concerns in the EDAM. Management will be evaluating overall broader market power mitigation design changes within the existing *price formation enhancements* initiative and to the extent design changes emerge, these would be extended to the EDAM.

#### *Extension of convergence bidding*

Convergence bidding (also known as virtual bidding) is an important element of two-day energy markets as it drives convergence between day-ahead and real-time market prices through day-ahead virtual supply and demand bids for expected real-time supply and demand that was not bid into the day-ahead market. Convergence bidding improves market liquidity and increases competition by allowing more parties to take day-ahead market positions that are then liquidated in the real-time market. Convergence bidding entities are subject to rigorous creditworthiness requirements and can submit convergence bids, which are financial bids that do not represent physical supply or demand.

Management proposes a convergence bidding design that allows EDAM entities to elect whether or not to enable convergence bidding within their balancing area at the onset of their participation in the EDAM. As the EDAM launches and becomes operational, in the lead up to the two-year anniversary of EDAM operations, the ISO will conduct a stakeholder process to evaluate and derive a permanent EDAM convergence bidding policy informed by operational experience and stakeholder input. This aspect was important for prospective

EDAM entities to provide them the ability to gain operational experience with the EDAM prior to introducing convergence bidding within their balancing area, to the extent they elect not to implement convergence bidding at the onset of their EDAM participation. Management does not propose to change convergence bidding in the ISO BAA. The ISO, along with the Department of Market Monitoring (DMM), will continue to monitor and evaluate market performance with convergence bidding enabled in some balancing areas in the footprint but not others, which will inform evolution of future design.

#### *External resource participation*

External resource participation refers to the ability of resources located outside of the EDAM footprint to participate in the market. In the WEIM today, pseudo-tied and dynamically scheduled resources can self-schedule or economically bid at the WEIM entity interties since these resources are source-specific and have contractual and other obligations described in the individual tariffs with transmission providers. Other supply that is under contract and is located outside of the WEIM footprint can only self-schedule at the WEIM entity interties but cannot economically bid. This restriction is due, in part, to reliability concerns that non-source specific supply that may not be deliverable can economically bid at the interties and displace physical internal generation. If the economically bid intertie supply does not perform, it can cause or exacerbate reliability conditions within the WEIM balancing area. For the ISO balancing authority area, parties can continue to submit both economic bids and self-schedules at ISO interties.

Management proposes to extend the WEIM framework for external resource participation to the EDAM so as to enable contracted source-specific supply and designated under the terms of the EDAM entity OATT to bid economically at the EDAM entity intertie. Through the stakeholder process, WEIM entities continued to express similar reliability concerns of permitting economic bidding at their interties. However, supply outside of the EDAM footprint that is designated under the terms of the EDAM entity OATT to serve load in the EDAM balancing area can bid economically at the EDAM entity intertie where the load is located. The supply needs to have sufficient specificity to be modeled in the ISO master file. The terms of the OATT for designating a network resource impose specific transmission requirements that provide confidence the supply that is designated is deliverable, and the added requirement that the resource be specific and modeled in the ISO master file provides further confidence that the supply is real and not speculative. In the EDAM, the ISO will continue to support full intertie bidding at its interties with non-EDAM balancing areas. As the EDAM becomes operational and participating entities gain further operational experience, this element of the design can be re-evaluated to consider whether to expand external resource participation.

#### *Confidence in market transfers between balancing areas*

In the EDAM, participating balancing areas will rely on optimized market transfers identified through the day-ahead and real-time markets to serve their load. As a result, it is important to ensure that participating entities can rely upon these transfers in normal and stressed system conditions and have the confidence that these transfers will be effectuated mutually across the footprint to ensure reliable service to loads. There are several elements of the

design, described earlier, that contribute to instilling confidence in EDAM transfers, including the resource sufficiency evaluation and net export constraint, as well as the day-ahead optimization of energy and imbalance reserves.

In stressed system conditions, the market will re-dispatch in response to changes in conditions. The broad supply pool offered into the market will provide an effective tool for responding to changes in conditions. When the market has done all it can to respond to changes in system conditions, the EDAM entity may need to rely on its own operational tools to manage conditions on its grid. These tools may include seeking emergency assistance from neighboring balancing areas, triggering emergency supply programs such as demand response or other emergency generation, or deployment of operating reserves and arming firm load.

Management proposes that in stressed conditions where the EDAM entity has exhausted its operational tools and load shed in the balancing area is imminent, EDAM transfers out of the balancing area be afforded equal priority to an EDAM participating entity's load subject to operational discretion and good utility practice. In these instances, similar to practices in place today, the EDAM entity facing the reliability event would coordinate with neighboring balancing areas including other EDAM balancing areas that are depending on transfers sourcing from the EDAM entity facing the reliability event. The operators in those instances would continue to maintain discretion and the ability to coordinate such that if curtailing the EDAM transfer ahead of load would not cause reliability problems for the receiving EDAM balancing area, they can curtail these to avoid or limit load shed. The proposed design of equal priority between EDAM transfers and load instills mutual confidence between EDAM entities that these transfers can be relied upon even in stressed system conditions and that entities will support reliable and dependable service to each other under those conditions.

### **Greenhouse gas (GHG) accounting**

State carbon pricing policies increase the marginal cost of electricity to the extent generation subject to these policies produces greenhouse gas (GHG) emissions. Two states in the West, California and Washington, currently have carbon pricing policies covering electricity generation serving their demand.<sup>3</sup> An objective of the market design is to account equitably for GHG costs associated with EDAM transfers, consistent with current and emerging state policies within the EDAM footprint.

Under the WEIM GHG accounting design in place today, bid adders are used to identify which resources serve demand in the California balancing area using a resource-specific approach. When offering bids to serve demand in a state with carbon pricing policies, scheduling coordinators for resources located in balancing areas outside of California submit a two-part bid adder consisting of a GHG bid capacity (MW) quantity and a GHG price (\$/MWh). The bid adder reflects the willingness of the resource to make its output available to serve demand within California and reflects the cost of compliance with California's

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<sup>3</sup> The ISO is similarly committed to working with Oregon regulators to fulfill reporting and compliance with Oregon's Clean Energy Targets legislation. The program requires electricity suppliers to reduce greenhouse gas emissions associated with electricity sold in Oregon according to an emissions reduction schedule, for which the first reduction target is 2030.

carbon pricing policies. The market optimization considers the GHG bid cost adder in addition to the energy bid to determine efficient dispatch and identify which resources serve demand in California balancing areas. To the extent a resource does not submit a GHG bid adder, the market does not consider or attribute the resource to serve California demand.

Management proposes to extend the current WEIM GHG accounting framework and resource-specific approach to the EDAM with several enhancements.

While a number of different options were considered throughout the initiative,<sup>4</sup> the current resource-specific approach to GHG accounting in the WEIM provides a reasonable starting point for the EDAM since it provides a defined and tested approach that is familiar to prospective EDAM entities, requires the fewest implementation changes, and most closely aligns with current regulations. The bid adder design is also flexible enough to accommodate alternative approaches to GHG accounting should states want to evolve their programs.

The proposed resource-specific approach is an initial EDAM design and the ISO is committed to working collaboratively with stakeholders and regulatory agencies based on operational experience and regulatory policy changes to evolve the approach including consideration of alternate approaches.

#### *Geographic boundary for GHG accounting purposes*

Management proposes to update the geographic boundary used for GHG accounting purposes to reflect state boundaries rather balancing authority area boundaries. Today, in the WEIM, the market uses balancing area boundaries to represent GHG regulation areas. A state-level boundary more accurately represents the boundary of the GHG regulation area than balancing area boundaries, which generally do not align with state boundaries. This enhancement will allow the market to reflect the dispatch costs associated with GHG pricing program compliance for resources within a state or dispatched to serve demand within that state, but not reflect these costs in the dispatch of resources not subject to the GHG pricing program.

#### *Supporting bidding and attribution for multiple GHG regulation areas*

Management proposes a further enhancement to the GHG accounting framework to allow for submission of GHG bid adders associated with serving demand across multiple GHG regulation areas. As described earlier, under the resource specific approach to GHG accounting, resources located outside of the GHG regulation area can voluntarily elect to submit GHG bid adders that reflect the cost of compliance with state carbon emission pricing policies. The market will consider the bid adders in addition to energy bids in determining the most efficient dispatch for serving demand in a GHG regulation area. California is currently the only state with a carbon compliance cost, but the state of Washington is in the process

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<sup>4</sup> Throughout the initiative, and different iterations of the proposal, the ISO and stakeholders considered different approaches which were discussed in various working groups and workshops but ultimately may not be compatible with existing regulatory policy structures and would require significant changes to state regulations to implement.

of developing rules for its cap-and-invest program which will establish a carbon price and separate compliance structure through an initial auction on February 28, 2023. Other states across the West may consider similar policies in the future.

Recognizing the need to facilitate compliance with multiple carbon pricing policies, the EDAM will support bid adders for multiple GHG regulation areas. Resources can indicate willingness to serve demand in different GHG regulation areas and reflect state-specific compliance costs through separate GHG bid adders. This framework will allow for resource-specific attribution of resources in one GHG regulation area to serve load in another GHG regulation area. For example, a resource in Washington could submit a GHG bid adder to serve demand in California and vice versa. Should regulators pursue program linkage, a single carbon price can be used to reflect the common compliance cost.

#### *Establishing an attribution baseline through an updated GHG counterfactual*

Attribution of resources to a GHG regulation area can result in secondary dispatch wherein resources backfill to serve demand outside of a GHG regulation area. In the WEIM today, a GHG counterfactual approach is used to limit attribution that may result in secondary dispatch. The purpose of a GHG counterfactual is to establish a baseline to determine what dispatch would have occurred in non-GHG regulation areas without offers to serve demand in a GHG regulation area(s). In the WEIM today, the counterfactual is based on self-submitted base schedules representing the expected resource operation.

Management proposes an enhancement to the GHG counterfactual applied in the EDAM by introducing a special market run – the GHG reference pass – in the day-ahead market process. Since there are no base schedules in the EDAM, the GHG reference pass uses energy bids to optimize dispatch that would serve the demand in the non-GHG regulation area without GHG transfers. The enhanced GHG counterfactual is expected to more closely align with the integrated forward market run, resulting in fewer deviations and a larger reduction of secondary dispatch. Because energy bids are used for dispatch in the integrated forward market, using bids instead of self-submitted base schedules should reduce the opportunity for resources to withhold supply from the first market pass to secure a GHG attribution.

Management proposes that the counterfactual for use in real time will be the difference between the day-ahead market energy schedule and day-ahead market GHG award. Because GHG compliance is ultimately based on dispatch and the resulting emissions in the real-time market which performs its own optimization and determines final attribution, this approach more closely aligns with the concept of base schedules than the day ahead energy schedule. Further, this allows for resources with lower GHG bids that only participate in WEIM to displace more expensive resources participating in the EDAM. The GHG counterfactual for entities that participate in the WEIM and not in the EDAM will continue to use self-submitted base schedules.

### *Introduction of a GHG net export constraint limiting secondary dispatch*

Management also proposes the introduction of a GHG net export constraint to further limit attribution and reduce the potential for secondary dispatch. The GHG net export constraint is an hourly constraint, which limits attribution of resources to a GHG regulation area in periods when a balancing area is a net importer or limits attribution in excess of a net optimal transfer schedule. In the day-ahead market, the GHG net export constraint is an hourly constraint that applies to every EDAM balancing area that does not overlap with a GHG regulation area. When an EDAM balancing area that overlaps with a GHG regulation area fails the resource sufficiency evaluation, all net export constraints are deactivated for that hour so as to not restrict imports into that balancing area potentially creating a reliability risk. In the day-ahead market, the constraint is deactivated for the hour of the resource sufficiency failure, while in the real-time market (WEIM) the constraint is deactivated for every fifteen minute interval in which a WEIM balancing area that overlaps a GHG regulation area fails the resource sufficiency evaluation.

Furthermore, the proposed design accounts for supply to which load serving entities within a GHG regulation area have entitlements to serve their demand.<sup>5</sup> Contracted resources viewed as external to the GHG regulation area will have a zero value in the GHG reference pass so that the capacity can be fully attributed to serve demand in a GHG regulation area. In addition, attribution of this supply to serve demand in the GHG regulation area will not be constrained by the GHG net export constraint. Resources viewed as internal to the GHG regulation area, including pseudo-tie resources and dynamically scheduled resources from non-EDAM balancing areas shown as system resources at a scheduling point in the GHG regulation area, are not attributable.

### **Post-market settlement and transfer revenue and congestion revenue allocation**

Settlement will be managed in accordance with the ISO tariff-based timelines and procedures associated with settlement of all market participant transactions. All day-ahead charges will be assessed and settled similarly, unless there is a unique dimension to the EDAM settlement that necessitates additional provision. This primarily arises in the context of transmission availability and the associated transfer and congestion revenues.

In the WEIM, the ISO models internal transmission constraints, internal transmission limits, and transmission transfer limits between balancing areas and will continue to do so in the EDAM. As noted earlier, transmission capability internal to an EDAM balancing area is made available to support optimized day ahead unit commitment. Congestion revenue accrues when transmission constraints or limits internal to an EDAM balancing area are reached on particular paths, which in turn causes the marginal cost of congestion component of the locational marginal price (LMP) to reflect the difference between the

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<sup>5</sup> The ISO's final proposal identified that resource adequacy supply would receive this treatment, but the logic behind this proposed aspect of the GHG reference pass equally applies to non-resource adequacy resources under contract to serve load.

incremental costs to serve demand. These accrued incremental costs are accounted for as congestion revenues.

Management proposes that congestion revenues, accrued as a result of internal transmission limits or constraints being reached, be allocated fully to the EDAM entity where the internal limit is reached. This approach is consistent with the allocation of congestion revenues in the WEIM where these are fully allocated and settled with the EDAM entity where the internal transmission limit is reached creating the congestion revenue accrual. From a practical perspective, if an internal binding transmission limit is reached, the market will re-dispatch generation internal to that balancing area to continue serving load, and this is the case even outside of the EDAM where the balancing area where the internal limit is reached is ultimately responsible for resolving that constraint. As such, it is appropriate to fully allocate congestion revenues to the EDAM entity where the internal constraint originated and not share those congestion revenues with other EDAM entities.

Transmission capability is also made available at interfaces between EDAM balancing areas, which is then optimized to support energy transfers. Transfer revenue accrues when the transmission scheduling limit at the transfer points (interfaces) between EDAM balancing areas is reached, which is informed by the amount of transmission capacity that is made available across the interface. When this transfer limit is reached, it will result in price separation of the marginal energy component of the LMP, and this difference in the energy component of the LMP represents the accrual of transfer revenue.

Management proposes that transfer revenue accrued at an interface between two EDAM balancing areas be shared equally between the two EDAM entities that made the transmission available to facilitate energy transfers. This is an equitable approach, supported by stakeholder comments, that reflects entities coming together and releasing transmission to the day-ahead market to share in the benefits of optimized market transfers. Two EDAM balancing areas could mutually agree to a different allocation to reflect existing or future commercial arrangements. The exception to the equal sharing of transfer revenue is for the transmission made available at an interface when the transmission customer releases their transmission rights in advance in return for transfer revenue, where the transmission customer will receive the full allocation of transfer revenue associated with the transmission rights released to the market.

The Market Surveillance Committee published its opinion of the proposal on January 23, and formally adopted its draft Opinion on January 25. The final Opinion will be formally adopted on January 27, 2023.

## **CONCLUSION**

Management requests the ISO Board of Governors and WEIM Governing Body approve Management's extended day-ahead market proposal described in this memorandum. This proposal will extend the ISO's day-ahead market to WEIM entities thus enabling optimized commitment of resources and use of transmission capability across a larger footprint to efficiently position resources to reliably meet next-day demand.