Joint Authors to Publish "Issue Alerts" to Inform Public Dialogue on Day-Ahead Market Choices

In recent months, there has been considerable industry dialogue focused on the market seams that will exist between EDAM/EIM and Markets+, as well as the EDAM/EIM governance enhancements being pursued through the Pathways Initiative. While both topics are important, a number of the Markets+ Phase 1 Funding Parties[1] ("Joint Authors") believe this dialogue is incomplete without also considering the numerous governance and market design differences between Markets+ and EDAM/EIM that are driving continued support for Markets+. To address this gap, the Joint Authors have worked together expeditiously to prepare timely information in this sixth "Issue Alert." The Joint Authors will continue this collaboration to issue a series of Issue Alerts identifying and explaining the key governance and market design elements that differ between Markets+ and EDAM/EIM and why these differences have important consequences for customers in terms of reliability, economic value, and environmental objectives.

The Joint Authors will share a new Issue Alert every few weeks covering the following topics:

1. Governance
2. Reliability
3. Fair and Accurate Market Pricing
4. Seams Issues
5. Support for Clean Resources
6. Market Operator Actions & Modeling
7. Durable Customer Benefits

[1] Arizona Public Service Co, Chelan County PUD, Grant County PUD, Powerex Corp., Public Service Company of Colorado, Salt River Project, Snohomish PUD, Tacoma Power, Tri-State Generation and Transmission Association Inc. and Tucson Electric Power Company prepared this Issue Alert 6.

Issue Alert 6:
Market Operator Actions & Modeling

This Issue Alert is part of an ongoing series highlighting the key governance and market design elements that differ between Markets+ and EDAM/WEIM and why these differences have important consequences for customers in terms of reliability, economic value, and environmental objectives.

Key Take-Aways

- A market operator has a tremendous ability to impact market outcomes through its role in running the market and authority to make adjustments to how the market is run.
- Even small changes in market parameters have the potential to cause large shifts in the distribution of the benefits associated with the over $25 billion in annual electricity trade that occurs between Balancing Authority Areas in the West.
- The California ISO's interventions in or operation of its markets have significantly affected outcomes for all market participants, including those outside of California.
- The impact of market operator actions has not been analyzed in any of the studies evaluating the benefits of organized market options in the West.
- Markets+ is the only organized day-ahead market proposal for the West that will have a fully impartial and independent market operator, providing critical confidence that all market operator actions will be for the benefit of all participants and stakeholders.
- Even if the Pathways Initiative succeeds in creating a Regional Organization with independent governance, the current draft proposal retains the California ISO as the market operator while also being a participating Balancing Authority, preserving the inherent potential conflict between its roles and fiduciary obligations.

The ability of an organized market to unlock maximum aggregate benefits—***and for each participating entity to receive an equitable share of those benefits*** —depends on three critical elements:

1. A stakeholder-driven governance framework with an independent board;
2. An efficient, reliable and equitable market design; and
3. A fully impartial market operator held accountable to all market participants through transparency.

Previous Issue Alerts focused on the first two points, highlighting important differences between the governance frameworks for Markets+ and for the California ISO's Extended Day-Ahead Market (EDAM) and Western Energy Imbalance Market (WEIM) as well as key market design differences that drive the economic, reliability, and environmental customer benefits realized in each market, and how those benefits are distributed among participating entities and their ratepayers. This Issue Alert focuses specifically on how the market operator runs the market day-to-day.

Over $25 billion of electricity trade occurs each year between Balancing Authority Areas (BAAs) in the West. A large portion of this trade activity can be expected to either be transacted in an organized day-ahead and real-time organized market, or to be significantly affected by prices in that organized market. Even seemingly small changes in market outcomes can therefore create major shifts in which entities and which sub-regions receive the benefits of that trade. The market operator, as the entity charged with running that market and with access to full visibility of all market information, has tremendous

ability to influence these market outcomes. This makes it vital that the market operator is fully impartial and that it does not have a conflicting duty to any particular state, market participant or subset of participants. An organized market that lacks a fully impartial market operator exposes its participants to shifts in hundreds of millions of dollars of economic value, shifts in reliability risk, and shifts in environmental benefits because of the actions that the market operator takes or does not take. And because production cost models—such as those used in the market benefits studies that have been published to date—assume the market is always run in strict accordance with standard rules, they cannot capture the impacts of manual interventions in the operation of the market.

Markets+ meets this critical need for a market operator that is fully independent and fully impartial. It will answer to the Markets+ Independent Panel, which is selected through a robust, sector-based nominating process and confirmed by SPP's independent board. As market operator for Markets+, SPP will be accountable for the performance of the entire market as a whole; the reliability, economic, and environmental outcomes of one state or region will be no more or less important than the outcomes of a different state or region. In contrast, the market operator for EDAM will be the California ISO, which will continue to have both conflicting fiduciary obligations to and Balancing Authority responsibility for a subset of the market participants. The California ISO board is appointed by California elected officials to govern the ISO by California and for the interest of California – not for equitable interest across the broader footprint. Even if the Pathways Initiative "Step 2" proposal were to be fully implemented as currently drafted, the market operator for EDAM will be the California ISO, which is not a fully independent and impartial entity.

The remainder of this Issue Alert details past instances where such interventions unfairly impacted market participants outside of the California ISO Balancing Authority.

Experience in the California ISO Demonstrates the Tremendous Ability of the Market Operator to Impact Market Outcomes for All Entities

Over the past decade, in its ***commingled roles as a Balancing Authority, transmission service provider and market operator***, the California ISO has taken a range of actions and operational decisions *for the benefit of the California ISO's Balancing Authority Area and/or transmission service territory* that significantly impact market outcomes for all participants:

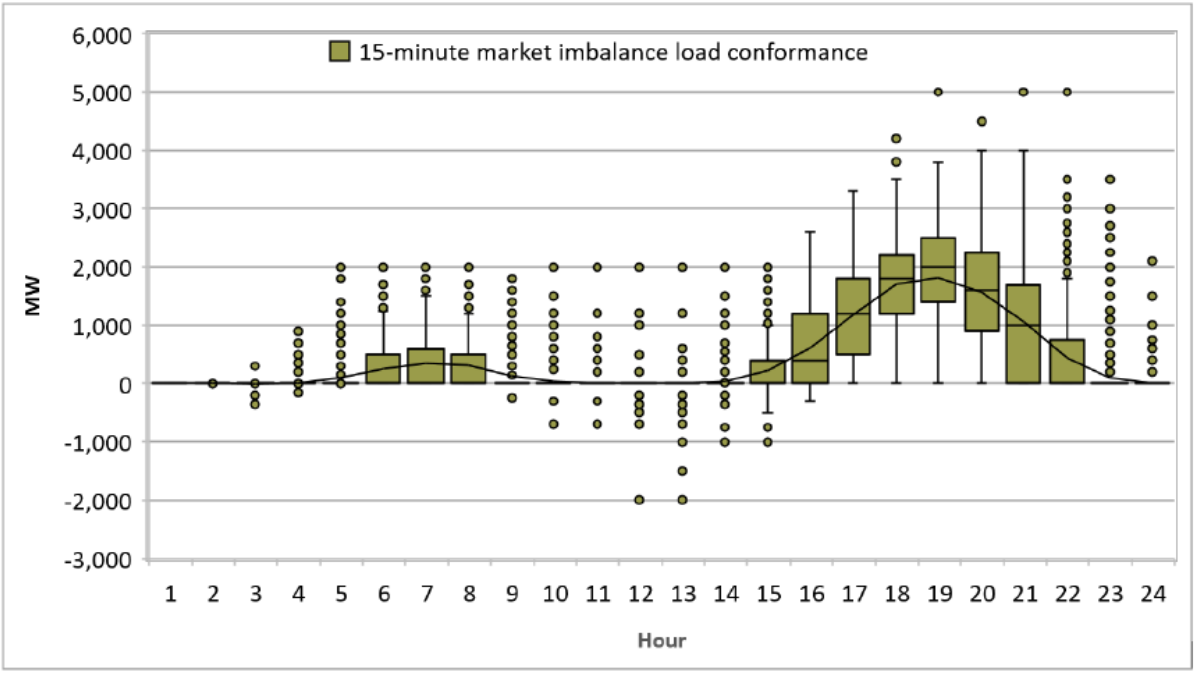
Upward "Biasing" of the California ISO Service Area's Demand Forecast to Increase Supply

California ISO operators routinely make very large upward adjustments to the demand forecast of the California ISO service area that is used in the real-time market ("load bias" or "load conformance"), particularly during the morning and evening peak hours. As explained by California ISO staff, "load conformance is significantly used in the hour ahead scheduling process (HASP) and the fifteen-minute (FMM) markets, mainly to position resources and secure additional intertie capacity."[2]

[2] California ISO Department of Market Analysis and Forecasting *WEIM Transfers, Hourly Interties and Load Conformance* ("CAISO Report"), at p. 4.

In 2023, the average load bias for the California ISO service area during the evening peak was approximately 1,800 MW but was as high as 5,000 MW in certain hours during a July heat event.[3] This is a continuation of an ongoing pattern of load biasing for the California ISO service area that first began in 2017.[4]

Figure 7.16 15-minute market hourly distribution of operator load adjustments (2023)



While modifying the demand forecast from time to time in response to outages or other unique circumstances that may not be captured in the forecast can allow the market operator to align market dispatches more closely with actual system conditions, the California ISO's very large and systemic upward load biasing for the California ISO service territory appears to be unique. While other WEIM Entities also have the authority to manually adjust the demand for their BAAs in the real-time market, none have engaged in the scale of systematic load biasing in one direction that the California ISO applies to its own service area:

[3] *See* California ISO Department of Market Monitoring *2023 Annual Report on Market Issues and Performance*, ("DMM 2023 Annual Report") at pp. 256-258; see also Fig. 3.9 at p. 146 regarding load bias during a July heat event.

[4] DMM 2023 Annual Report, at p. 242.

Frequency and Size of Load Bias, 2023 by Quarter

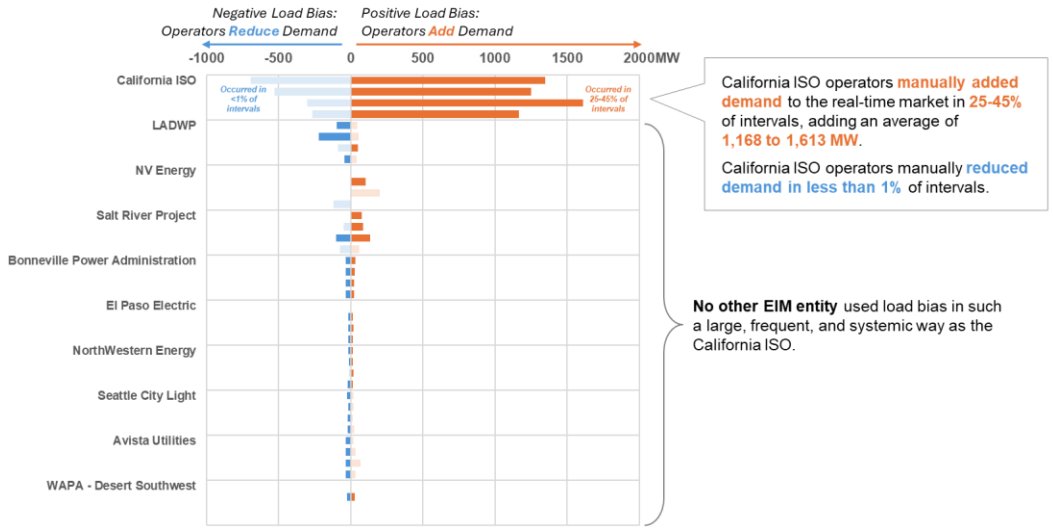


Chart shows data for Fifteen-Minute Market for all EIM entities that had positive or negative load bias in at least 1% of intervals in at least one quarter.

Faded color indicates adjustment made in less than 1% of intervals in the quarter.

Source: California ISO DMM Quarterly Reports on Market Issues and Performance for 2023.

Importantly, the impacts on market outcomes of CAISO operator actions are substantial and not limited to the California ISO service area. California ISO staff has explained that "[p]ositive conformance effectively increases the load requirements and will alter the overall market solution, not only for the CAISO area but for the overall system-wide Western Energy Imbalance Market (WEIM) area"[5] and "changes to market inputs can influence market clearing prices."[6]

In summary, California ISO operators consistently add very large quantities to the forecast demand for the California ISO service area that far exceeds the actual demand expected to materialize in real-time. This enables the California ISO area to acquire flexible capacity through additional energy imports rather than explicitly purchasing flexible capacity itself. Consistently intervening in the WEIM through manual operator adjustments that do not reflect actual system conditions[7] can produce inefficient market results, highlights fundamental issues in the application of market design[8], increases overall production costs and uplifts, and likely results in market prices that do not accurately reflect the marginal cost of

[5] CAISO Report, p11

[6] CAISO Report, p52

[7] If the load adjustments were needed in response to anticipated load forecast errors, one would expect to see a roughly equal frequency and magnitude of upward and downward adjustments and that the adjustments would be carried to the 5-minute solution. However, the adjustments are largely in the upward direction, and are not carried in similar volumes to the 5-minute market, so it appears that anticipated load forecast error is not the reason for the market action.

[8] Systemic adjustments to create additional resource commitments for reliability imply the market design, including the Resource Sufficiency Evaluation and flexible ramping product are not adequately designed to meet reliability.

meeting load in real-time. These impacts extend to the entire market footprint, with price impacts affecting purchases and sales across all WEIM participants and sub-regions.

Blocking WEIM Transfers to Support California's Reliability

Beginning in late July of 2023 and continuing until November, the California ISO blocked import transfers from the Western EIM during the peak net load hours in some of its market processes (the hour-ahead and 15-minute market) but not others (the 5-minute market). In the affected market processes, WEIM transfers compete with other supply offered at the California ISO's interties or from internal generation. According to the California ISO's Department of Market Monitoring (DMM), "The transfer limitation had the intended effect of increasing hourly block imports into the CAISO area and decreasing hourly block exports out of the CAISO area to protect reliability during peak net load hours in late July through mid-August."

In a May 2024 memo to the California ISO Board of Governors, DMM explained:

> *this practice has created a significant, systematic modeling difference between the 15-minute and 5-minute markets, which impacted market results in several ways.*
>
> - *Increased congestion into the ISO area from other WEIM areas in the 15-minute market compared to the 5-minute market.*
> - *Lowering of 15-minute WEIM prices relative to 5-minute prices in the Desert Southwest areas.*
> - *Potentially less efficient resource commitment in the 15-minute market in the Desert Southwest areas.*
> - *Reducing the amount of energy that could be scheduled out of the Desert Southwest through the WEIM in the hour-ahead and 15-minute markets.*[9]

DMM further stated that "DMM can conclude that ***the practice has a significant impact*** in terms of lowering 15-minute prices relative to 5-minute market prices in the Desert Southwest areas."[10]

While causing adverse consequences across the market footprint, these California ISO operator actions may not have been effective at enhancing reliability in the California ISO's service area, as DMM found that "[u]nder most conditions, it seems that limiting transfers would ***not provide significant reliability benefits, but would have negative market impacts***."[11] But these operator actions continued even after the initial reliability concerns appeared to no longer apply. As noted by DMM, "[t]he ISO explained the transfer limitations were needed in July and August for reliability reasons, but ***it is not clear why these transfer limitations continued during the fourth quarter*** through November 15."[12]

Concerns over the California ISO operator actions were compounded by a lack of transparency that these actions were even occurring. The first mention by the California ISO of these actions appears to

[9] California ISO DMM, memorandum to ISO Borad of Governors and WEIM Governing Body, May 15, 2024, ("DMM Memo") at 3.

[10] DMM Memo, at 3 (emphasis added).

[11] DMM Memo, at 5 (emphasis added).

[12] DMM Memo, at 3-4 (emphasis added).

have been in a report issued in mid-September, almost two months after they began. Some market participants became aware of the impact of these actions after several weeks of observing unusual market results for their areas, but a full explanation and evaluation of this practice and its impacts was not provided until the following April, when the California ISO's DMM published its quarterly report for Q4 2023.

At a minimum, the California ISO should have immediately communicated to all market participants the reliability concerns for its service area and its intended actions to address those concerns. Timely and transparent communication would have allowed all EIM participants to evaluate how their areas may be affected and enabled stakeholder evaluation of other solutions that may have avoided the negative consequences to broader WEIM market outcomes.

Implementation of Resource Sufficiency Evaluation and Consequences

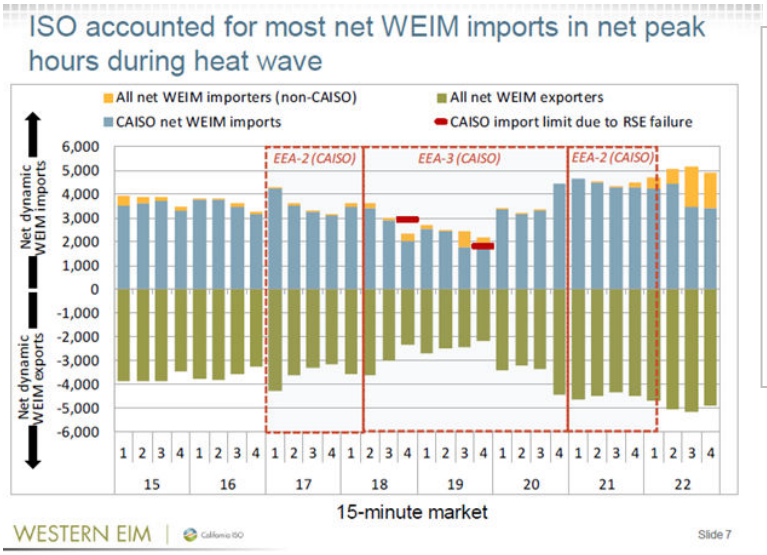
Because WEIM entities are not subject to a common resource adequacy requirement, the WEIM includes a Resource Sufficiency Evaluation ("RSE") to ensure that WEIM entities make enough capacity available to the market to meet their own needs without "leaning" on capacity or flexibility from other WEIM entities[13]. Under the WEIM design, one of the consequences of a WEIM Entity failing the RSE is a limit on WEIM transfers into or out of that Entity's BAA.[14] As the market operator, the California ISO developed the specific design and implementation of the RSE, and is responsible for its day-to-day application of the test to all WEIM BAAs. **This places the California ISO in the conflicting roles of being both:**

1) the market operator responsible for designing and applying the test; and
2) a Balancing Authority for an area that is subject to that same test.

For several years, the California ISO service area has experienced well-known reliability challenges due to insufficient resources in critical hours. While WEIM participants have limited transparency into the specific inputs and calculations performed by California ISO when applying the RSE, it became clear that the RSE was routinely failing to identify instances in which the California ISO's own area was not resource sufficient. Even in hours that the California ISO declared an energy emergency, such as during the August 2020 and September 2022 heat events, the RSE still frequently allowed the California ISO area to "pass" the RSE:

[13] EDAM also does not have a common Resource Adequacy requirement, so the EDAM design also includes a similar Resource Sufficiency Evaluation.

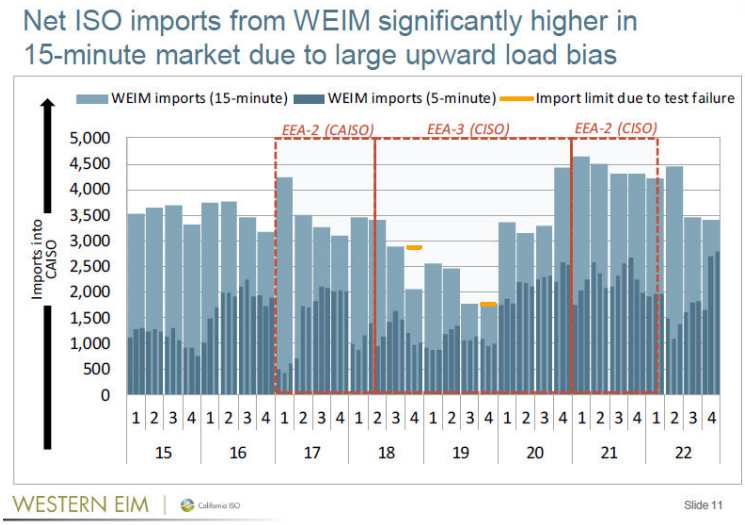
[14] Under the "Emergency Assistance" program, each BAA can elect whether they are willing to allow transfers to exceed the limit during RSE failures, subject to a financial penalty.



On Sept 6, 2022, the California ISO passed the RSE in all but two fifteen-minute periods across a multi-hour emergency event.

Furthermore, the RSE did not prevent leaning on the WEIM as the California ISO was able to continue to import as much as 3000 MW even when it did fail the test.

The chart above[15] also highlights that the consequences for failing the RSE are inadequate to prevent the California ISO's own area from leaning, because a deficient EIM entity is permitted to continue importing up to the same quantity as it was importing in the last interval in which it passed the RSE, without additional financial penalty. This rule is uniquely beneficial for the California ISO area because—unlike other WEIM entities—it typically begins importing large quantities from the rest of the WEIM in the hours leading up to the afternoon peak, driven in part by the large quantity of upward load bias applied by CAISO operators as described in a prior section. By the time of the evening ramp—when the California ISO needs to rapidly increase electricity production to make up for declining solar generation around sunset—the California ISO is able to receive 3,000 MW or more of supply from WEIM entities, and it can continue this high level of imports even when it fails the RSE[16].

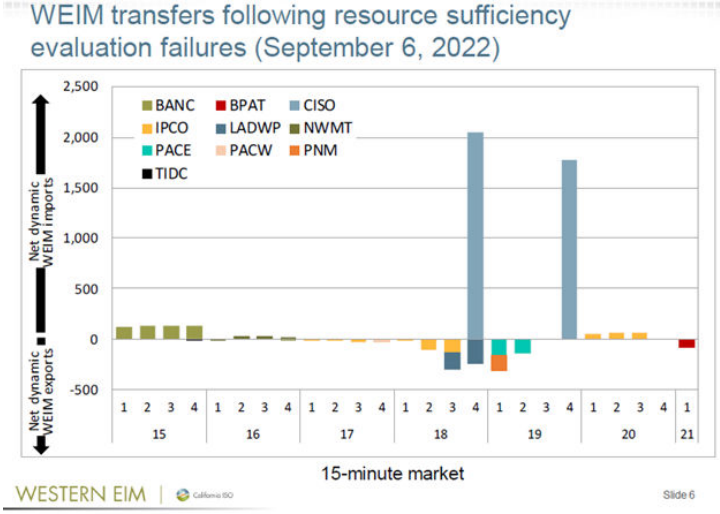


The California ISO typically begins importing large quantities from the rest of the WEIM in advance of critical hours, driven in part by load biasing.

[15] California ISO DMM, Market Monitoring Update: Resource Sufficiency Tests in the Energy Imbalance Market, Oct 25, 2022 ("DMM Presentation") at 11.

[16] DMM Presentation at 7.

This is very different from other WEIM entities that are often importing very little (or even exporting) immediately prior to an RSE failure. Those entities face much more significant limitations on their ability to access WEIM imports without financial penalty[17]:



CAISO uniquely benefits from failure consequences that enable imports to continue at their previous level, while other WEIM entities face much more significant limitations.

The problematic outcomes from the application of the RSE to the California ISO's area have been repeatedly raised by stakeholders in the WEIM since at least 2018, with concerns growing[18] after the test results showed frequent "passes" and large imports into the California ISO area during the emergency conditions of August 2020 (and again during September 2022). Despite extensive discussion and a lengthy stakeholder process that has led to some limited enhancements to the RSE and some additional reporting by DMM, there has been limited progress by the California ISO to ensure that the RSE is accurate and effective at preventing leaning for the California ISO service area during periods of insufficiency. Perhaps even more concerning, there has been no meaningful progress in addressing the CAISO's clearly conflicting roles or the need for full transparency and fully independent ongoing oversight.

Allocating $110 Million in Congestion Revenue on Jointly-Funded Pacific AC Intertie

The importance of the market operator's role in determining market outcomes also applies to the specific details of how the market footprint is modeled in the market software. Specific modeling choices—including how and where constraints are modeled— can greatly influence where congestion is calculated to be occurring in market systems, and which customer groups will receive the value of that congestion.

For example, the Northwest experienced a severe winter weather event in January of 2024, with multiple balancing authority areas declaring energy emergencies over several days. During nearly all hours of this event, large quantities of energy were imported from outside the Northwest region, primarily from surplus supply in the Southwest region. Approximately half of this supply was delivered through transmission facilities operated by the California ISO, and subject to congestion charges under its market design. During the five days of this winter event, the California ISO collected over $110

[17] DMM Presentation at 6.

[18] letterfromeimentitiesreedam-nov17_2020.pdf

million in congestion charges for south to north deliveries over the Pacific AC Intertie (*i.e.,* across the California-Oregon Border).[19]

The Pacific AC Intertie is a multi-state transmission line comprising a southern segment built and funded by ratepayers in California and a northern segment built and funded by ratepayers outside California. The congestion charges collected by the California ISO represent the economic value of the entire coordinated path, and yet the $110 million was distributed to customers of the California ISO.[20] This reflects two choices made by the California ISO regarding how it operates its market. First, the California ISO has declined to equitably allocate the congestion revenues from the use of multi-state transmission facilities with the entities that fund the non-California portion of those facilities. In the EDAM stakeholder process, the California ISO rejected proposals to ensure that congestion on these multi-state transmission lines would be allocated between entities 50/50, as it does on other multi-state paths that do not involve the California ISO's service territory. Second, the coordinated physical capability of the multi-state transfer path is modeled by the California ISO using a "scheduling constraint" that is applied as a limitation on the quantity of energy that can be imported into or exported out of California. California ISO's choice to model the coordinated limit of the overall multi-state transfer path as a limitation "inside" the California ISO ensures that the congestion revenue associated with the overall multi-state path is collected and allocated back to exclusively to customers of the California ISO.

Notably, similar dynamics have occurred during other periods on both the Pacific AC and Pacific DC interties, including during August 2020 when the entire West experienced a severe heatwave. During the six days of this summer event, the California ISO received significant imports from the Pacific Northwest and collected over $50 million in congestion charges for north to south deliveries over the Pacific AC and DC Interties, representing approximately 85%[21] of the overall economic value of these multi-state transmission paths.

Conclusion

Given the significant impact of a market operator's decisions and actions on market outcomes, it is vital that market participants have full confidence that the market operator's decisions are intended to promote reliability and efficient outcomes for the market footprint as a whole. This confidence requires the market operator to be fully independent of any market participant or group of participants, and of

[19] The January winter event and the California ISO congestion charges were discussed at the March 8, 2024 meeting of the Board of Directors of the Pacific Northwest Utilities Conference Committee (PNUCC). Slides are available here.

[20] Under the California ISO tariff, congestion revenues are allocated to measured demand and to entities that obtain financial rights that entitle them to the congestion revenue. For entities that are not California ISO load-serving entities, these rights must be purchased in an auction, with the proceeds also allocated to California ISO measured demand.

[21] During this period, the value of delivering lower cost energy on the multi-state Pacific AC from the Northwest (as measured by DA Mid-C prices) to Northern California (as measured by CAISO NP-15 prices) was approximately $69/MWh, of which CAISO congestion charges reflected roughly $62/MWh (89%). Similarly, the approximate value of delivering lower cost energy on the Pacific DC from the Northwest (as measured by DA Mid-C prices) to Southern California (as measured by CAISO SP-15 prices) was approximately $182/MWh, of which CAISO congestion charges reflected roughly $151/MWh (83%).

any sub-region within the market footprint. The market operator must also be able to fulfill its duties as the market operator for the entire footprint free of any conflicting duties to only a portion of that footprint.

Markets+ is the only proposed organized day-ahead and real-time market that provides for a fully independent and fully impartial market operator. This offers participants the confidence that all actions and decisions will be for the purpose of maximizing the economic, reliability and environmental customer benefits of the entire footprint.