

Extended Day-Ahead Market (EDAM)

The Western Energy Imbalance Market (WEIM) launched in 2014 as the first multi-state real-time market in the West and has delivered more than \$6 billion in cumulative benefits to customers across its now 20+ participating Balancing Authorities. This incremental approach to organized market participation has enabled participants to realize the efficiency and reliability benefits of a combined, least-cost dispatch market that builds upon a proven platform originally developed for California.

The Extended Day-Ahead Market (EDAM) continues this evolutionary approach by allowing for coordinated day-ahead resource optimization while respecting the autonomy of utilities in the West to expand their market participation and take additional market services only when it works for them. As of the end of 2024, entities that have either committed to EDAM or otherwise indicated EDAM as their preferred day-ahead market represent nearly 50% of load in the West. The growing EDAM footprint represents a significant, contiguous transmission footprint that will allow the market to benefit from tremendous load and resource diversity.

Key features of EDAM include:

- **No need to reinvent the wheel:** EDAM offers a cost-effective, incremental option for utilities to build upon the successes and proven economic benefits of WEIM, while maximizing the value of prior investments in market software and communication systems to join the only operating day-ahead market in the West.
- **Respect for the autonomy of our partners:** Given the diversity here in the West, we respect the autonomy of our partners to participate in programs and markets in ways that work for them and that align with their needs. And EDAM has been designed that way—that's why participation does not require utilities or their third-party transmission customers to join particular resource adequacy or planning programs, and why there is no deadline by which utilities must commit to joining EDAM. They can remain in WEIM or elect to join EDAM when they are ready.
- **Improving reliability by minimizing seams:** Because EDAM is the only operating day-ahead market in the West approved by the Federal Energy Regulatory Commission (FERC), expanding its footprint provides an avenue to minimizing – or even eliminating – day-ahead market seams across the western grid, reducing significant inefficiencies. Given the increasing frequency of extreme weather that is uniquely impacting communities in the West, and the rapidly evolving resource fleet and grid, this offers significant reliability benefits that can help keep the lights on.
- **Opportunity for future evolution:** As the regional markets evolve, the governance of those markets also continues to evolve, creating new opportunities to meet the needs of the West.

The California ISO (CAISO) created this FAQ to provide responses to common questions about EDAM.

What is the deadline to join EDAM?

Any eligible balancing authority can join EDAM pursuant to CAISO's FERC-approved tariff, and there is no deadline to join. For example, entities that are currently participating in WEIM can pursue joining EDAM, or they can remain in WEIM. If an entity later decides it would like to join EDAM, we will be ready to integrate them into the market. Western stakeholders have developed WEIM and EDAM to respect the autonomy of utilities in the West to choose the services that work best for them and their customers. If an existing WEIM entity wants to extend participation to the EDAM, it generally requires at least 18 months to allow for coordinated onboarding and implementation activities between the entity and CAISO.

How is EDAM governed?

EDAM has been designed by Western stakeholders to efficiently and cost-effectively build upon the successes of the WEIM that launched in 2014. Prior to 2014, CAISO only provided services—including day-ahead and real-time markets—to utilities operating within the CAISO Balancing Area, almost entirely within the state of California.

As CAISO has expanded its regional offerings, its governance structure has evolved accordingly. And that continues to this day. Currently, the Western Energy Markets Governing Body—a five-member body nominated by Western stakeholders—holds joint authority with the CAISO Board of Governors over the market rules for WEIM and EDAM. Both bodies meet the Federal Energy Regulatory Commission’s requirement for financial independence from the market and its participants.

The Pathways Initiative is a stakeholder-driven effort, convened by stakeholders throughout the West, to develop governance enhancements to facilitate the success of the EDAM and future regional market offerings. The Pathways Step 1 proposal seeks to accomplish this objective by enhancing the authority of the WEM Governing Body in certain respects and thereby increasing regional confidence in EDAM. That proposal was approved unanimously by the Governing Body and the CAISO Board in August 2024. When Step 1 is implemented (expected in 2025), the Governing Body will hold primary authority over the market rules applicable to WEIM and EDAM. And the Pathways Initiative’s Step 2 proposal would continue to evolve governance even further, by creating a new corporation wholly independent of CAISO that could assume sole authority over the market rules for WEIM and EDAM following enabling legislation in California.

The bottom-line: as the regional markets offered by CAISO have evolved, so too has the governance of those markets.

How does the CAISO manage its dual roles of operating the regional markets and its responsibilities as a Balancing Authority?

CAISO operates the regional energy markets, providing non-discriminatory access to all market participants in accordance with market tariff rules as approved by FERC. As an independent system operator, CAISO does not own any of the transmission assets that are part of the grid it manages as a balancing authority. All transmission assets that are part of the CAISO balancing area are owned by Participating Transmission Owners (PTOs). In addition, CAISO neither owns generation assets, nor is it a load serving entity or a marketing entity that transacts with suppliers or load.

CAISO is not a market participant in the regional markets that it operates and has no financial interest in the outcome of those markets. As the market operator, CAISO facilitates trades in the day-ahead and real-time markets; it does not take title to, nor is it obligated to deliver, any energy bought and sold in its markets. CAISO does not submit bids to buy or sell energy in any market. Asset-owners and load-serving entities in California, such as Pacific Gas & Electric and Southern California Edison, participate directly in the market, and are financially and physically responsible for associated trades that are cleared in the markets.

As a balancing authority, CAISO also has the responsibility of dispatching generation within its footprint to meet load reliably consistent with NERC criteria. As a transmission operator, it operates the bulk energy system consistent with NERC and FERC requirements, while maintaining open access to the transmission system, managing the generation interconnection queue, performing transmission planning, and maintaining reliable operation of the transmission grid within its footprint. These responsibilities are similar to other balancing authorities around the West, such as PacifiCorp, Arizona Public Service, or the Bonneville Power Administration.

Why doesn't EDAM require its participants to participate in an organized Resource Adequacy program to maintain long-term reliability?

Given the diversity of our region, stakeholders have designed WEIM and EDAM to respect the autonomy of utilities in the West, in coordination with their respective regulators, to maintain resource adequacy for themselves. For this reason, market participants are not mandated to join a particular resource adequacy or resource planning program as a condition to deriving market benefits. This has worked well for over a decade now, where market participants have secured capacity through a diversity of resource adequacy and planning programs while optimizing those resources through a common real-time market platform: the Western Energy Imbalance Market. EDAM is built upon this same premise.

Without a common Resource Adequacy program, how does EDAM design ensure that there is sufficient supply to meet the short-term needs of the Western market?

As noted previously, EDAM does not require participants to utilize a single resource adequacy program to maintain long-term reliability. The main function of FERC-regulated markets, such as WEIM and EDAM, is to identify and clear the least cost solution to meeting customer demand across the market. The larger the WEIM and EDAM footprint, the greater the opportunity to share in the diversity of supply and demand across a wider area of the West. But like all energy markets in the country, obtaining reliability and economic benefits requires sufficient supply be made available in the day-ahead and real-time operational timeframe in order for the market to solve and efficiently position supply to meet the needs of the market footprint.

EDAM has been designed to accommodate any capacity procurement program that a utility participates in to maintain long-term reliability. The resource sufficiency evaluation (RSE) is a feature of EDAM that acts as a universal adapter for market participants regardless of how they secured that long-term capacity. The RSE operates as a final check on market participants to ensure that they have sufficient resources available going into the day-ahead and operational real-time timeframe to meet their needs without leaning on their neighbors. And importantly, EDAM imposes a must offer obligation through real-time on capacity that market participants use to meet the day-ahead RSE and which is scheduled by the day-ahead market.

The RSE enables EDAM to reconcile differences across resource adequacy programs focused on long-term reliability with the day-ahead needs of the market. **While securing capacity over multi-year, annual, and seasonal time horizons is crucial, the RSE ensures that enough capacity is available in the day-ahead and real-time to meet operational demands**—which can exceed earlier projections, especially during the increasingly frequent extreme weather that we have been seeing here in the West.

Does EDAM impose the policies of California or any other state on other market participants?

No, the EDAM design seeks to respect the diversity of policies impacting utilities that participate in the market. WEIM and EDAM optimize the resources that are bid into the market. States and other local regulatory authorities retain procurement oversight of their jurisdictional utilities that participate in WEIM or EDAM.

All states retain autonomy over their own policies that meet the needs of their residents, and EDAM accommodates these policy differences. For example, EDAM evaluates costs associated with greenhouse gas (GHG) emissions only for market deliveries into states that have GHG emission pricing policies.

How does EDAM manage and allocate the costs of physical congestion on the transmission system across its footprint?

Grid operators manage congestion in various ways. Outside of organized markets, they often rely on manual curtailment procedures based on the type of transmission service acquired, which may be less effective and less transparent than market-based solutions.

In organized markets, operators use tools like the re-dispatch of supply across a wider footprint to efficiently manage congestion and minimize curtailments. For example, CAISO manages congestion through security constrained economic dispatch to produce transparent locational Marginal Prices (LMPs), reflecting the cost differences in delivering energy to each LMP node on the system, incentivizing electricity to flow toward areas that are not congested.

Within CAISO's balancing area, congestion revenue rights (CRRs) allow entities to hedge against congestion costs. Congestion can also affect exports out of CAISO's market. For example, when prices inside CAISO's market are low and external prices are high, congestion may arise if generators inside of the market footprint attempt to export more energy than the transmission interties with surrounding regions can accommodate.

Today, in the day-ahead timeframe, CAISO manages congestion only within its balancing area footprint, but this is coordinated with neighboring balancing areas. Expanding EDAM participation will enable the market to manage congestion in the future for entities outside of the CAISO balancing area, allowing for 50-50 sharing of congestion revenues that accrue on the transfer path between any two balancing areas participating in the market. When congestion occurs on transmission facilities internal to one balancing area (rather than between two BAs) participating in EDAM, then those congestion revenues will be fully allocated to that EDAM entity in which the congestion occurs.

Western stakeholders designed EDAM to give participants the flexibility to allocate congestion revenues according to their unique system and customer needs. They can distribute these revenues to holders of physical transmission rights, or they can allocate these revenues based on measured demand or through some other mechanism.

A real-world example: January 2024 Winter Storm

During Martin Luther King Jr. Day weekend in 2024, prices in the Pacific Northwest spiked in both day-ahead bilateral markets and in the day-ahead CAISO prices as a result of high demand in the Pacific Northwest. Consistent with the supply and demand conditions, the CAISO's day-ahead market saw congestion on the California-Oregon transmission intertie resulting from the need to avoid scheduling exports to the Pacific Northwest in excess of the coordinated operating limits of the intertie.

These market conditions within the CAISO footprint generated significant congestion revenues from resources participating in the CAISO market that were allocated to holders of congestion revenue rights (CRRs)—which load-serving entities internal or external to the CAISO footprint, in addition to other entities, can acquire to hedge the cost of such congestion. Following this event, transmission owners on both sides of the California-Oregon intertie reviewed what occurred during this storm. They concluded that no changes to how the California-Oregon intertie limits are coordinated are needed at this time to manage the existing day-ahead seam that exists between CAISO's balancing areas and its neighboring balancing areas to the north.

EDAM presents an opportunity to eliminate—rather than to deepen and make permanent—this day-ahead seam between CAISO and the Pacific Northwest. For example, if balancing areas in the Pacific Northwest were in the same day-ahead market with CAISO through EDAM, it would no longer be necessary to coordinate in this way to avoid overscheduling exports from CAISO. Instead, the common day-ahead market could manage congestion on both sides of the intertie, with congestion revenues flowing to whichever side of the intertie causes the internal binding constraint or splitting those revenues 50-50 if the intertie transfer itself between two of the balancing areas binds.

Why doesn't EDAM include fast-start pricing?

Proper price formation is a critical function of organized energy markets. Market design must balance the need to properly incentivize generators to bid supply into the market with the objective of minimizing energy costs for end-use consumers.

Fast-start pricing refers to mechanisms in organized energy markets that compensate supply resources, like peaking gas units, in the Locational Marginal Price (LMP) for their start-up and operational costs. And while some day-ahead markets include fast-start pricing, it is important to note that fast-start resources are primarily dispatched in the real-time. **FERC acknowledges the need to account for these costs in wholesale market prices, but it has not prescribed a particular method for doing so.**

While WEIM and EDAM market design does not currently include fast-start pricing, the CAISO continues to work with stakeholders on exploring changes to price formation in EDAM. This includes consideration of fast-start pricing mechanisms and adjustments to how EDAM addresses scarcity pricing, while mitigating market power concerns.

However, **WEIM and EDAM design already includes market products specifically designed to compensate resources with fast and flexible response capabilities:** the Flexible Ramping Product (FRP) and Imbalance Reserves products. These unique market products were designed to address intra-day reliability needs by ensuring adequate supply of quick-start ramping capabilities in the real-time market, and are sources of revenue available to resources capable of adjusting their output on an interval of 15-minutes or less. Furthermore, one of the objectives expressed by advocates of fast-start pricing is the value it could provide to other flexible resources such as hydropower. In that regard, in addition to compensating explicitly for flexible and imbalance reserves which hydro is uniquely capable of providing, CAISO has also enhanced the ability of hydro resources to bid and recover their opportunity costs.

While fast-start pricing designs will tend to increase prices when a fast-start resource is economically dispatched to operate at its minimum operating level, studies vary significantly with respect to the frequency and magnitude of the impacts on the ultimate cost of energy. Such impacts will further be affected by the integration of increasing amounts of flexible storage resources across the West that do not have minimum operating level constraints. **The guiding principle should be that any cost increase resulting from market design should provide operational or consumer value.**

Can CAISO cut deliveries being wheeled through its footprint during scarcity events in order to keep the lights on in California?

The transmission grid crosses state and utility boundaries, and balancing authority areas. As energy moves across these boundaries, transmission operators have FERC-approved rules that dictate when and how those flows can be curtailed under certain conditions. These curtailment procedures are based on the priority of scheduled transmission use, particularly for serving native load within a balancing area. For example, while securing a more firm transmission priority might be more costly, it will be less likely to be subject to curtailment. Importantly, firm transmission can only be curtailed in the event such as a wildfire that causes the loss or de-rate of a transmission line. Firm transmission schedules cannot be interrupted simply because of a supply insufficiency.

In this regard, CAISO modeled its rules for wheel-throughs on the existing tariff procedures of neighboring transmission providers, recognizing the relative priority of transactions that wheel energy across the CAISO system compared to those serving native load. Given the high priority assigned to wheel-throughs, CAISO may only cut those exports after economic or low-priority wheel-throughs have already been reduced and concurrent with demand reductions within the CAISO balancing authority area. Since these provisions have been implemented, the CAISO's markets were able to clear all high-priority wheel-through transactions.

This design allows for the reservation of Available Transfer Capability (ATC) at transmission interties with CAISO, ensuring that wheeling transactions that secure ATC from external entities receive equal priority to CAISO's native load transactions when a transmission interface becomes constrained such as an outage induced de-rate. This design was approved by FERC and aligns with the practices of neighboring transmission providers under their tariffs.

Will EDAM create new seams in the West?

Seams result from the overlay of different policies or operational schemes over top of the contiguous physical transmission grid. For example, this can occur when adjacent balancing areas have different reliability coordinators, resource adequacy programs, greenhouse gas policies, or different market constructs. Grid operators and utilities have a long history of managing these seams, but they are inefficient and can be exploited at the expense of consumers.

The expansion of WEIM over the last decade has marked a major advancement in the minimization of an important seam that previously existed across the West. Until the WEIM, each balancing authority in the West managed the real-time dispatch of resources within its own footprint. Seams in real-time dispatch existed between balancing authorities. But WEIM has now extended a single, unified real-time market to utilities representing 80% of the Western grid. This has resulted not only in significant economic benefits (more than \$6.25 billion as of the end of 2024), but also in important reliability benefits.

The expansion of EDAM holds the promise of minimizing yet another important seam in the West with regard to the scheduling of large volumes of energy in the day-ahead timeframe. Elimination of these existing day-ahead seams between balancing authorities will provide for significantly improved situational awareness and visibility across the Western grid. While this will not eliminate all seams (e.g., there are likely to remain multiple resource adequacy and planning paradigms), it would represent a significant improvement over the status quo.