LANDSCAPE REVIEW: OREGON'S ROLE IN WESTERN ENERGY MARKET AND REGIONAL TRANSMISSION ORGANIZATIONS

Oregon Clean Grid Campaign

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GRIDWORKS

EXECUTIVE SUMMARY

As utilities and states across the West consider changes to how the electric power grid is operated and how electricity is bought and sold across the West, Oregon's regional and community-level advocacy organizations are uniquely positioned to further their efforts to transform Oregon's electricity industry. The transition to an equitable, affordable, 100% clean electricity grid will largely hinge on the ability of utilities to reliably and cost-effectively deliver clean energy resources to their customers.

The need. Two of the most pressing regional challenges to achieving states' clean energy mandates, including in Oregon,[1] are:

- The development of regional electricity markets—spaces where utilities and independent power producers can buy and sell clean energy to serve customer needs across the West, and
- New transmission capacity—upgrading existing lines and building new lines to carry power from remote power generation resources like wind farms to customer demand in our neighborhoods.

Emerging solutions. Regional market conversations are rapidly progressing in the West, and transmission solutions are concurrently being considered both within the constructs of regional markets and among individual utilities. Two competing configurations for incremental steps to a full regional transmission organization are poised to reshape the Western grid and the way it is used:

- The California Independent System Operator (CAISO) is currently developing a day-ahead market (EDAM) to expand its existing Western Energy Imbalance Market (WEIM), which already operates across the West.
- In a competing offer, the Southwest Power Pool (SPP), based in the Great Plain states, is offering its version of a day-ahead market that will operate separately from the CAISO.

Both the CAISO and SPP markets are able to and are considering expanding into regional transmission organizations, and there is currently a clear sense of urgency and competition among these entities to win over the West at large.

The actors. Participants in conversations about the CAISO and SPP offerings, largely led by utilities, are negotiating the details around governance proposals and financial terms for participation as well as advocating to ensure their priorities are considered. Meanwhile, clean energy, environmental justice, and labor advocates in Oregon have the opportunity to steer conversations in ways that help ensure Oregon:

- Achieves its ambitious 100% clean energy mandate,
- Realizes the benefits of the clean energy transition, including jobs, for customers and communities, and
- Maintains reliability and resilience of the power grid for local communities.

Diving into a challenging conversation. Challenging conversations is the fact that delivering power is an increasingly complicated maneuver in the West, where vertically integrated utilities have historically approached transmission planning and electricity markets through siloed, utility-by-utility processes. Today, they are looking beyond their local service footprints to engage in regional conversations about the future of the energy grid.

This paper is intended to help advocacy organizations consider the changes afoot in the power industry, and how advocates might position themselves to step into discussions of new energy industry structures and processes to promote the needs of their communities. We'll discuss:

[1] Clean Energy Transition Institute. Oregon Clean Energy Pathways Analysis. Pages 2 & 3.

- A brief history of grid operations in the West,
- The emergence of centralized, regional energy markets,
- Current market proposals from CAISO and SPP and efforts to form regional transmission organizations (RTOs),
- How RTOs and centralized markets differ,
- The benefits and challenges of creating centralized markets and RTOs, including
    - cost savings for customers,
    - increased household spending power and new jobs, and
    - environmental and climate benefits
- The important role of governance in access, operations, and ensuring benefits flow to customers, and
- Questions advocates might ask themselves as they engage in markets and transmission conversations

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Landscape Review: Oregon's Role in Western Energy Markets and Regional Transmission Organizations

How will Oregon's climate, environmental, and social goals be supported by the emergence of new Western energy markets or a Western regional transmission organization?

INTRODUCTION

Thanks to environmental justice-led efforts and a broad coalition of labor, clean energy, and other public interest advocates, the Oregon Legislature adopted the "100% Clean Energy for All" (HB 2021) bill in 2021.[2] While this bill establishes ambitious targets for transitioning Oregon's electricity grid to 100% renewable energy, significant barriers remain to ensure this transition happens at the pace and scale necessary to reliably and affordably deliver clean energy.

As new renewable energy resource deployment and regional and federal clean energy priorities accelerate West-wide discussions of regional energy market governance and development, Oregon policymakers and advocates have an opportunity to shape market and transmission development in a way that maximizes the power of the grid, equitably and affordably distributes energy resources, and supports meaningful job creation in the region.

The technical issues of energy markets and regional market governance have not historically been areas of focused advocacy engagement by state-level advocacy organizations interested in climate resilience, climate justice, and climate change mitigation. But the impact of Oregon utilities joining any one of a number of proposed Western energy markets affects our energy system's responsiveness to Oregon's climate and environmental justice goals, land-use planning, economic opportunities, energy costs, and reliability of service.

Two competing configurations for power markets are poised to reshape the Western grid and the way it is used: Both The California Independent System Operator (CAISO) and the Southwest Power Pool (SPP), based in the Great Plain states, are working on offerings to develop a West-wide market. Utilities are currently aligning themselves with the market operator they prefer based on their own internal cost benefits analysis, but little of this information is shared with non-utility stakeholders.

The choice between these service providers and their proposed West-wide governance structures will impact Oregonians' access to low-cost renewables and their voices in West-wide transmission planning and cost allocation, energy reliability, and the methods by which power is bought and sold across the West.

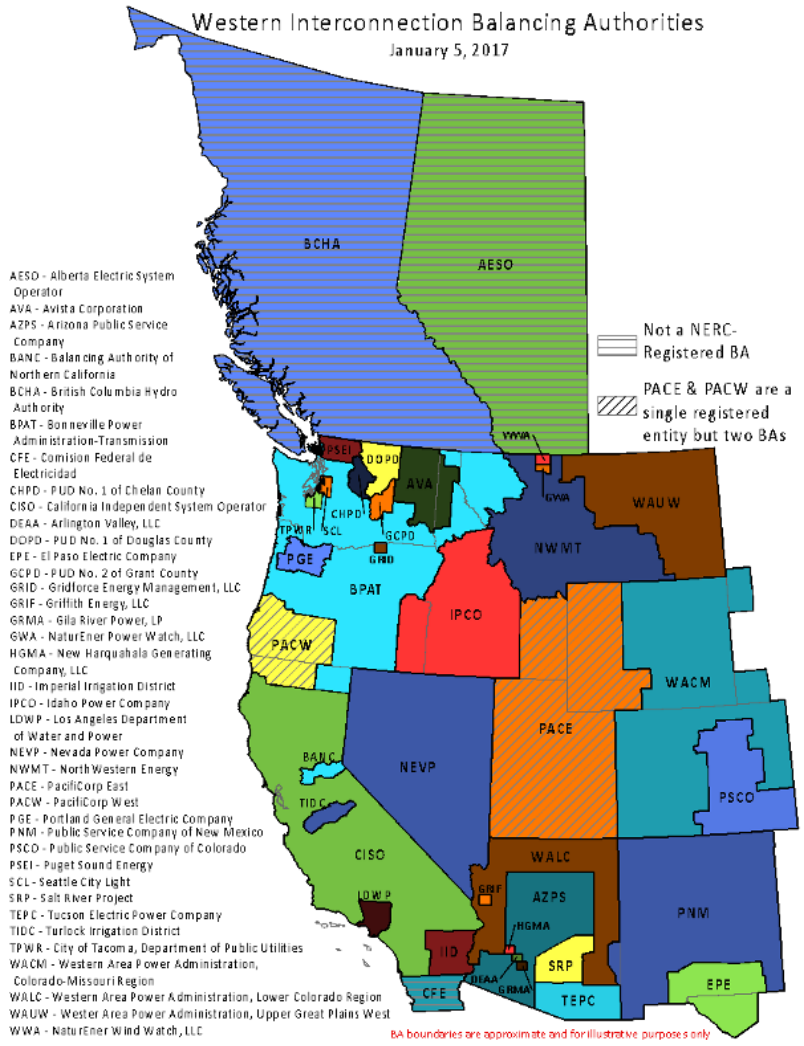
HISTORY OF GRID OPERATIONS AND ENERGY MARKETS IN THE WEST

Before launching full sail into a discussion of the potential changes to energy markets in the electric power industry in the West, it is helpful to understand the current configuration of markets and power grid operations in the industry.

[2] Oregon Public Utilities Commission. HB 2021 Implementation Activities. Accessed August 15, 2023.

Power grid operations

Historically, electric utilities have owned and operated portions of the interconnected transmission system, called balancing areas (BAs). Under this structure, each utility owns, maintains, and operates transmission assets in their BA. As "BA authorities," utilities are also responsible for ensuring that their BAs are "balanced"—that the amount of electricity in their BAs exactly matches the amount of power their customers use at every instantaneous moment.



The West, including the U.S., Canada, and Mexico, is currently served by 38 balancing areas, 3 of which serve Oregon, as illustrated in the figure to the left.[3]

For reliability reasons, historically BA authorities have been required to hold steady a pre-specified amount of energy coming in or out of their BA for an hour before they can change the flows between their BAs.[4] Under this requirement, a utility must balance its BA using only generation that is inside its BA.[5] If utilities don't ensure that their BAs are balanced, their BAs can collapse, causing blackouts and potentially threatening the entire Western grid.

However, limiting the utility to its own generation resources for balancing its BA for reliability needs can be economically inefficient because power generation outside of a utility's BA can provide less expensive energy needed to meet reliability and balancing needs.

Clean energy resources like wind and solar power are considered "variable resources" because they only produce power when the wind is blowing and the sun is shining. As utilities build more of these variable resource types, such as wind and solar plants, utilities increasingly need more

[3] Western Electricity Coordinating Council. Western Interconnection Balancing Authorities. This figure shows 37 BAs. For an updated map, see slide 46 here.
[4] The change of power flows between the BAs are made at the top of each hour.
[5] Some of a utility's generation is outside of its BA, and the power from those resources have historically been fixed at a set level at the beginning of each operating hour.

diverse generation resources as reserve generation to make up for any unanticipated gaps in power generation that would cause imbalances and reliability concerns in the power grid.

Without enough reserve generation, utilities have been forced to cut production at wind and solar generation plants to keep their systems balanced for reliability requirements.
BA authorities are more and more frequently shutting down production from wind or solar plants due to a lack of generation that can respond to and make up for any variation in expected output from wind and solar farms in their BA. The process of shutting down variable clean energy resources for reliability requirements, known as "curtailment," essentially wastes zero-cost clean energy production. Limits to transmission capacity in the region also limits the contributions renewable energy generation can provide to meeting load and is resulting in curtailments.

This arrangement of operating the grid with separate balancing areas is largely a relic of the early 1900s, and was historically necessary to ensure power reliability during times when the grid was less interconnected and communication and control systems were less sophisticated.

Increases in industrial customer demand, new state clean energy requirements, and increased electrification are expected to put even more demands on individual BAs.[6] Meeting these additional demands will create unnecessary costs for consumers and increase the wasteful shutting down of clean power resources unless industry practices change to more efficiently exchange surplus energy resources. For example, instead of shutting off clean energy resources for system balancing and reliability needs, utilities could use markets to balance their systems with other generation resources outside of their BAs resulting in a more efficient utilization of their clean energy resources.

In recent years, clean energy advocates in the West have increasingly argued for more streamlined and economically efficient methods for operating the power grid:

1. **Developing a West-wide RTO:** Some advocates today argue that merging all 38 Western BAs into a single BA—as is done under a regional transmission organization (RTO) or independent system operator (ISO)—would improve power grid reliability. They argue that a Western-grid operator could monitor the transmission system as well as generation and customer demand over a larger geographical footprint, allowing more insight into the collective needs of the transmission grid, allowing more responsiveness to those needs, and allowing more regionally diverse generation resources to maintain grid reliability. Merging BAs into a single RTO or ISO would also allow the wider use of power generation across the region to serve reliability requirements through the use of energy markets.
2. **Expansion of energy markets:** Short of merging BAs, energy markets can be used to share energy between BAs and gain economic efficiencies in the reliability balancing act utilities undertake every day.

Buying and selling electricity through markets

The operation of electricity markets arose separately from utilities' operations of their BAs. Markets first began as single transaction power markets that matched individual power sellers with individual power buyers in a two-party exchange called a "bi-lateral market." The bi-lateral power markets allowed utilities to sell excess power to each other and provided independent power producers, such as owners of independent solar generation projects, equal access to opportunities to sell power to utilities in service of utility customers.[7]

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[6] Pacific Northwest Utilities Conference Committee. Northwest Regional Forecast of Power Loads and Resources. August 2023 through July 2033.

[7] Historically, in the 20th century, utilities as grid operators could use access to transmission to thwart the sale of lower cost power by independent power producers, thus allowing the utility to make a sale for a higher profit. In orders 888 and 889 issued in 1996, the Federal Energy Regulatory Commission

In addition to providing opportunities for utilities to buy power a month or even a year ahead, the bi-lateral markets include a day-ahead market option that allows utilities to buy and sell power for the next day's demand as their forecasts of expected demand, also termed "load," and the availability of power generation assets become clearer. For example, a utility in an area experiencing a sudden and unexpected heat wave may need to purchase more power than it had initially planned for in order to serve the likely increase to customer loads caused by more residents turning on air conditioners.

Over time, power trading hubs arose. These hubs are designated as physical locations on the grid where power is "exchanged": The power seller promises to deliver the electricity to a certain physical point on the grid where it can be received by the buyer.

However, the contracted promise of power isn't enough to ensure that power is delivered to the customers who ultimately receive it. Electricity flows from resources to customer load along transmission lines and through the path of least resistance—this is the physics of electricity. Consequently, after a utility purchases electricity at a designated trading hub in a bi-lateral day-ahead market exchange, the utility must also acquire transmission service across each BA that is between the power seller's generator and the utility's load. The separate acts of purchasing power and transmission services also creates economic inefficiencies on both the power and transmission sides of the equation

Transmission service requests

In a grid like the West's with multiple BAs, moving power long distances can be a daunting chore of securing separate transmission rights from each BA along the electrical path between a generator and a customer load. For new renewable resources, often located far from load centers, securing long-term transmission service can significantly delay project development. If new transmission lines must be built to support a transmission service request, for example to connect a new wind farm in Montana with customers of a utility in Oregon, the transmission service requests would need to be submitted to multiple BA operators, and multiple other BAs would need to ensure that any new transmission line does not adversely affect their transmission operations. This multiple BA analysis often results in expensive study costs and transmission system upgrades across multiple utility transmission paths, which can make a project financially infeasible.

The Big Debate

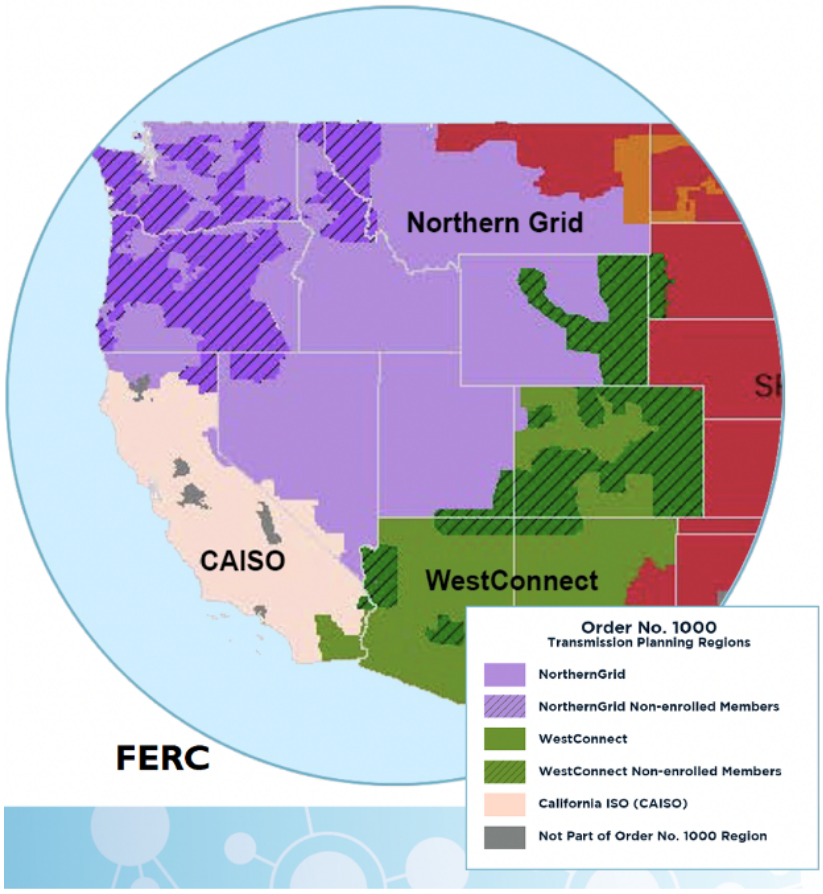
As we'll see later, a more modern day-ahead market referred to as a centralized day-ahead market eliminates the need for buyers or sellers of power to also find transmission service for each power purchase they make, as is required in the bi-lateral day-ahead markets. Instead, centralized day-ahead market operators consider all available generation and all available transmission simultaneously in order to squeeze out better value from the transmission system and choose the most affordable generation resources to meet customer's needs. A centralized day-ahead market can be operated over a footprint with multiple BAs or offered as part of the services of an RTO. Much of the current debate in the utility clean energy space centers on what configurations to use for creating a centralized day-ahead market.

established open and equal access to transmission service on the transmission systems of the transmission owners so that utilities that own both generation and transmission cannot use their transmission assets to affect power markets.

Long-term transmission planning

With new renewable generation often located far from utility load centers, transmission planning has become critical to getting lower cost renewable generation to Oregon.[8] Even for new renewable generation located in Oregon, such as the potential of Oregon offshore wind, region-wide planning is necessary to deliver power and to realize the scale of benefits associated with Oregon offshore wind.[9] Transmission planning is often managed on a utility-by-utility basis, and inputs are shared with a regional organization to inform planning on a regional scale. Regional planning in the Western U.S. is currently handled by NorthernGrid, CAISO, and WestConnect to differing degrees of success.

The footprints of these planning organizations are often too small to encompass the long multi-state transmission lines needed to deliver low-cost wind and solar generation to customer load centers.[10] The planning organizations are largely viewed as insular activities that, according to some, fail to uphold best practices in planning while also failing to spur the buildout of transmission needed to share generation across regions during extreme weather events.[11] To date, the regional planning organizations have not initiated a joint planning process for transmission projects across their footprints, despite a federal requirement to perform joint planning.[12]



As we'll discuss more later, clean energy developers and advocates have proposed the merging of BAs and the formation of a regional

[8] The Hemingway-to-Boardman transmission line is an example of a transmission line to bring renewables from Wyoming and Idaho to Oregon. It had been in the planning and development stage for more than 15 years. Construction is now underway and should be completed in the next several years.

[9] Oregon offshore wind sites have a potential of 10 GW of generation capacity in waters less than 30 meters in depth, creating an annual energy production equivalent to 5 large scale nuclear reactors. Oregon Dept. of Energy, Floating Offshore Wind: Benefits & Challenges for Oregon, September 15, 2022, Page 19. Oregon offshore wind potential from: NREL's Oregon Offshore Wind Site Feasibility and Cost Study, October 2019, Page 5.

[10] See TransWest Express for an example of such a line.

[11] Americans for a Clean Energy Grid, Transmission Planning and development Regional Report Card, Page 7 and 13.

[12] Federal Energy Regulatory Commission. "FERC Order 1000." 2015.

transmission organization (RTO) across the West so that utilities and clean energy developers would have one-stop shopping for transmission planning West-wide. This could facilitate, for example, efforts to connect surplus solar in California or new solar projects in Nevada to Oregon load.

THE EMERGENCE OF CENTRALIZED, REGIONAL ENERGY MARKETS

In recent years, the Western United States has seen steady growth in the use of centralized power markets driven by the customer savings they produce. Large portions of California have long participated in centralized markets operated by the California Independent System Operator (CAISO).[13]

Generally, centralized markets consist of two primary markets that hold auctions to buy power to serve customer demand in two different timeframes:

1. A real-time market or "Energy Imbalance Market" (EIM), which provides generation to balance the minute-to-minute difference between customer demand and generation output—the balancing act discussed earlier that BA operators must currently do on their own.
2. A centralized day-ahead market, which holds an auction that commits generators to produce power for the next day.

Real-time markets or "Energy Imbalance Markets"

Real-time markets, or "energy imbalance markets" (EIM), are used to balance load and generation from moment-to-moment. Every five minutes an EIM re-assesses utility load forecasts and analyzes the transmission system to dispatch the least cost sources of power available to meet customer needs. By monitoring the grid continuously and re-evaluating its condition, an EIM is able to assess and utilize the maximum available capacity on the grid. Combined with a list of continuously updated bid prices from generators, an EIM can maximize the use of the transmission grid and choose the most affordable sources of power to serve customers.

Today, multiple Western utilities participate in an EIM without having joined an RTO or having merged their BAs. Due to its insight into multiple utility systems across the West, the EIM allows utilities to choose from far more generation options than can be considered by individual utilities that do not participate in an EIM. The bigger footprint of an EIM lowers customer costs by giving utilities access to a larger array of generation resources for real-time energy needs than those found solely in a utility's individual BA.

[13] The term independent system operator and regional transmission operator are used interchangeably in this paper.

In 2013, CAISO offered utilities in the West the opportunity to participate in the Western Energy Imbalance Market (WEIM), a real-time energy market.[14] Today, nearly 80% of all load in the West participates in the WEIM.[15] Savings to date are estimated to be $4.2 billion, with annual benefits of approximately $1.4 billion in 2022.[16] Additional portions of Western load participate in the Western Energy Imbalance Services (WEIS) offered by the Southwest Power Pool (SPP), a regional transmission organization (RTO) based in the Great Plains region. The WEIS has seen a $61.2 million cumulative net benefit since inception in 2021, with estimated annual benefits of $31.7 million in 2022. The SPP estimates that the WEIS costs participants $4.7 million to operate, resulting in a benefit-to-cost ratio of 7-to-1. SPP also estimates that its WEIS provides a realized savings of $1.35 per 1,000 kilowatt hours in 2022.[17]

Centralized day-ahead markets

A centralized day-ahead market determines the most affordable combination of generation while co-optimizing the use of the transmission system. Due to the larger transmission footprint of a centralized day-ahead market, it can maximize the amount of least cost power that can flow across congested portions of the transmission system. Individual BAs in a bi-lateral market cannot maximize the use of the transmission system to move the least-cost power because individual BAs cannot see the entire transmission footprint or all the price bids of the generators. The same is true of the participants in the bi-lateral day-ahead market—they only see price offers and do not necessarily know the location of the generation source on the grid.

In addition to picking the generation that is least cost to provide energy, a centralized day-ahead market eliminates the purchasing of redundant power generation through "load diversity." As we learned before, in a bi-lateral market each BA needs some extra generation in case its actual daily load is higher than its day-ahead forecast. But each BA's actual daily load is not always higher than its day-ahead forecasts—some days it is higher, some days it is lower, and some days it is about the same as the forecast. Under a centralized market, the load of all participating BAs is aggregated under one centralized view, or "pooled." This pooling of the load and a centralized accounting of resource diversity reduces the amount of extra generation that is needed by participating utilities on a whole.

Centralized day-ahead markets also manage transmission congestion, which occurs when there is more low-cost power available than can flow over a transmission path.[18] By co-optimizing generation price bids and the available transmission capacity, the market can maximize the use of the lowest cost power.

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[14] The real-time market participation CAISO first offered was simply called the EIM. The name was recently changed to the Western Energy Imbalance Market. For the purposes of this document WEIM will be used to refer to EIM since its conception. The Western Interconnect is an electrically connected transmission system that stretches over the western U.S. and Canada and part of Mexico. It includes WA, MT, OR, ID, UT, Co, CA, NV, AZ, NM, British Columbia, Alberta and a portion of Baja, Mexico.

[15] CAISO, "New entities expand WEIM's reach to a total of 11 Western states." April 5, 2023

[16] For additional breakdown of benefits per utility, see the CAISO WEIM 2023 quarterly benefits study

[17] Southwest Power Pool. "2022 WEIS Benefit of Market Report." *Western Services Documents*, 27 March 2023.

[18] A transmission path is a collection of transmission lines that are in "parallel," causing electric power to flow through the lines in a collective manner.

CURRENT PROPOSALS: CENTRALIZED MARKETS AND REGIONAL TRANSMISSION ORGANIZATIONS

Centralized day-ahead market opportunities

In the last several years, two opportunities to participate in a centralized day-ahead market without joining a full RTO have emerged:

- CAISO is offering its Extended Day-Ahead Market services (EDAM) that are being actively considered by utilities across the West.[19] PacifiCorp announced it will participate in the CAISO EDAM and more announcements are expected in 2023.[20]
- The SPP is offering Markets+ and is in phase 1 of designing its market structure. Multiple utilities across the West are actively participating and funding phase 1.[21]

Bonneville Power Administration

BPA is a federal power market administration that owns approximately 75% of the transmission system in the Northwest and is dedicated by law to deliver federal power to public utilities.[22] BPA provides about 28% of the electric power generated in the Northwest.[23]

BPA has joined the Western EIM but including its transmission assets and power generation in a day ahead market or in an RTO would require addressing several of BPA's statutory obligations.[24] That said, the Western Area Power Administration, a federal power marketing administration, has decided to join the Southwest Power Pool RTO.[25]

Without BPA's participation, the formation of a centralized day-ahead market or RTO in the Northwest would significantly lower the potential benefits to customers of that RTO. That said, BPA is actively considering joining both the EDAM and Southwest Power Pool's Markets+, including the provision of up to $2.2 million in funding to support phase one development of SPP's Markets+. We expect BPA will determine the direction it wishes to take by March 2024.[26]

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[19] CAISO published its final proposal for their Extended Day-Ahead Market on December 7, 2022.
[20] PacifiCorp is joining the CAISO's Extended Day-Ahead market in 2025. Additional utilities may be joining soon, with announcements made here.
[21] Arizona Public Service, Bonneville Power Administration, Chelan County Public Utility District, NV Energy, Powerex Corp., Puget Sound Energy, Salt River Project and Tucson Electric Power.
[22] Oregon Department of Energy. "Regional Transmission Organization Study: Oregon perspectives," Page 6. December 2021.
[23] Bonneville Power Administration. "BPA Facts." 2022.
[24] For example, BPA is in discussions with its customers regarding their 5b public power rights. Under 5b public power rights BPA is statutorily obligated to offer contracts to sell firm power to meet regional public power utilities and IOU customers' power requirements in excess of their resources.
[25] On April 28, 2023, WAPA published a Federal Register notice (FRN) on its recommendation to pursue final negotiations regarding Southwest Power Pool RTO membership.
[26] Bonneville Power Administration. "BPA will contribute funds to SPP Market Development." February 2023.

RTO opportunities

Today, as groups of utilities are engaged in cooperative efforts to evaluate participation in a centralized day-ahead market, there are also whispers of joining or forming an RTO that would provide both market services and perform grid operations:

- In parallel to their offering of the individual market services of an RTO, CAISO is still offering utilities outside of California the opportunity to participate in its ISO (a structure similar to an RTO), and
- SPP is still offering to stand up an RTO for utilities in the West.

Recently, state regulators issued a joint letter to Megan Decker, chair of the Oregon Public Utilities Commission and co-chair of the Committee on Regional Electric Power Cooperation, proposing the creation of a new independent body to develop a single RTO across the West.[27] The new organization would consider a relationship with CAISO to provide services to support the RTO's offerings.[28]

The proposal has wide support among state regulators with all three of the commissioners of Washington Utilities and Transportation Commission and two commissioners of the Oregon Public Utilities Commission (presumably with the support of Chair Decker) signing the letter as well as state utility commissioners from California, Arizona, and New Mexico.

What is attracting utilities, regulators, and environmental advocates to form centralized day-ahead markets and RTOs? What are some of the economic benefits, and what are the barriers to participation in centralized markets or an RTO? How does governance play a role in adopting the use of centralized markets or participating in an RTO? Where can advocates play a role or have their voices heard in the decisions about an RTO?

These and other questions about centralized day-ahead markets and RTOs are explored and discussed in the remainder of this document to provide a first look inside the effort to share power across the West.

[27] Committee on Regional Electric power Cooperation, or CREPC, is a forum for representatives of state agencies to discuss Western energy issues. For example, at CREPC CAISO first announced its offer of WEIM services. The letter was also addressed to Co-chair Sarah Cottrell Propst.

[28] State regulators' call for viable path to electricity market inclusive of all western states with independent governance, July 14, 2023. See letter here.

Resource Adequacy and WRAP

"Resource adequacy" refers to the ability of a portfolio of generation resources to meet customers' peak demands for electricity—whether a utility has enough power resources available to serve customers' highest demand. Resource adequacy studies are also used to determine what combination of new resources are needed to meet peak customer demands. In part, they do this by scoring a resource's contribution to meeting peak demands, which significantly affects the economic value of resources relative to other resources. Resource adequacy is critical to understanding the value of wind and solar locations and energy storage technologies.

In California, resource adequacy is determined by the California Public Utility Commission. In the West, outside of California, each utility is responsible for determining its own generation resource adequacy methodology and standard of adequacy. This isolated approach has led to incongruous methods across the West and inhibits the efficient use of surplus generation capacity. With the addition of variable energy sources such as wind and solar, and the move away from fossil fuels, efficient use of all Western generation capacity would reduce the amount of new generation needed to be built and lower costs for consumers.

To address these issues, utilities outside of California have voluntarily formed the Western Resource Adequacy Program (WRAP), using a collaborative process with an organization known as the Western Power Pool and are developing governance design. The WRAP recently launched a test phase of its resource adequacy program that will eventually require participating utilities to meet one common resource adequacy standard. WRAP's methodology for calculating resource adequacy will have far ranging impacts and will determine the economic value of wind, solar, and energy storage resources to meet customer demand.

Resource adequacy is recognized in the West as a prerequisite for forming centralized markets. If some utilities are short on generation capacity to meet their peak loads, they will lean on the short-term market to purchase the capacity they need, driving prices up and threatening reliability. Just such an event occurred during the June 2021 heat dome that struck the West.

FUNCTIONS OF A FULL REGIONAL TRANSMISSION ORGANIZATION (RTO)

Regional transmission organizations and independent system operators (RTO/ISOs) perform eight key functions that can provide value to the West.[29] They operate as one, single region-wide balancing authority, as a single region-wide transmission operator, as single region wide interconnection and transmission service provider, as a one-stop regional shop for transmission planning, and they operate a common resource adequacy standard.

> ***Semantics: ISO or RTO?***
>
> Independent system operators (ISOs) and regional transmission organizations (RTOs) were historically envisioned as separate ideas, but over time the acronyms have become largely interchangeable. Now, both ISO and RTO usually mean the same thing: a nonprofit organization that manages the high-voltage U.S. transmission grid, without owning any part of the grid, and ensures non-discriminatory transmission service. In the West, there is one ISO—the California ISO (CAISO).

Under the current construct of 38 separate BAs in the West, grid reliability is examined piecemeal: Each utility only looks to ensure the reliability of the portion of the West's transmission system located in its individual BA. In an RTO construct, the reliability of an entire grid is studied as the single interconnected system that it is. Due to the economies of scale of transmission planning, the bigger footprints studied under RTOs tend to find lower cost solutions to transmission reliability issues.

In addition, RTOs operate real-time markets, day-ahead markets, and can perform greenhouse gas accounting and allowance bid pricing for states with climate and clean energy goals:

Greenhouse gas accounting

The Western Energy Imbalance Market (WEIM) and the potential footprint of an expanded day-ahead market include states, such as Washington and California, that have cap and trade programs that apply greenhouse gas pricing on greenhouse gas-emitting resources. It is anticipated that more states will adopt allowance-based programs for regulating greenhouse gas emissions.

CAISO's WEIM has incorporated California's Cap and Trade program into its market structure. CAISO's WEIM allows generators participating in the market that are outside of California to voluntarily offer to sell power to serve California. Those generators' bid prices consist of two components: the cost of the energy to make the electricity and a price adder related to the resource's greenhouse gas emissions and greenhouse gas allowance costs. Both components are considered together in the auction, and the resources with the overall least cost generation are designated for service to California.

After that optimization is complete, the remaining generation bids are evaluated without the greenhouse gas allowance adder, and the least cost generation to meet load outside California is selected. This design allows clean energy to compete in California's market but does not charge other states' customers for California's greenhouse gas allowances.

[29] For a more formal description of the functions of a full RTO as derived from the Federal Energy Regulatory Commission Order 1000, see the Clean Energy Buyers Association's Benefits of New Regional Transmission Planning Entities in the U.S. West and Southeast Region, page 13.

Washington state's Cap and Invest Program has a statutory directive to link to other greenhouse gas allowance programs such as California's Cap and Trade program. The WEIM and a centralized day-ahead market provide the means for linking the two programs. To date, the WEIM has incorporated greenhouse gas reporting for WEIM participants that are subject to the Washington Cap and Invest program.

BENEFITS AND CHALLENGES OF CENTRALIZED MARKETS AND RTOS

Since the 1990s, the benefits to the Western states of an RTO and the benefits of individual functions of an RTO, such as centralized markets, have been the subject of many studies.

With adoption of CAISO's Western EIM (WEIM), the West now has studies based on actual participation in one of the market services an RTO can provide. The widespread participation in the CAISO's WEIM has resulted in an estimated $4.2 billion in benefits since 2014 and an estimated $1.4 billion in annual benefits in 2022.[30] With its much smaller footprint, participation in the SPP's WEIS has resulted in $31.7 million in annual benefits in 2022 and a benefit-to-cost ratio of 7-to1.[31] SPP estimates WEIS provides a realized savings of $1.35 per 1,000 kilowatt hours in 2022.[32]

Benefits

Power savings. If the West were to adopt a single West-wide RTO, customers in the West could realize an estimated $1.3 billion benefits annually.[33] These savings come primarily from lower costs for both power generation and reduced transmission costs for moving power to customer load.[34] Potential benefits grow to $2 billion annually by 2030, primarily because the West would need to build fewer generation resources thanks to a more efficient use of available resources.[35]

A two-RTO scenario for the U.S. portion of West—such as what could happen if some utilities join CAISO and others join SPP—produce lower benefits of $501 million annually.[36] This is largely due to a reduction in sharing capacity across the West due to the boundaries between RTOs and the resulting need for each RTO region to build more generation capacity over time.[37]

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[30] See a breakdown of individual participating utilities' estimated benefits here
[31]Southwest Power Pool. "2022 WEIS Benefit of Market Report." *Western Services Documents*, 27 March 2023.
[32] ibid
[33] The benefits are based on 2018 dollars. See Utah Office of Energy Development. Western States' Market Study. 2021. Page 7.
[34] Production cost savings come from the market selecting lower cost generation, reduced wind and solar curtailment, reduced transmission costs, and reduced operating and flexibility reserves (generation held locally to use to maintain reliability and balance the system). See Utah Office of Energy Development. Western States' Market Study. 2021. Page 4.
[35] Utah Office of Energy Development. Western States' Market Study. 2021. Page 7.
[36] The two-RTO scenario involves CAISO being one of the RTOs, and the rest of the utilities in the West being in a second RTO. See Utah Office of Energy Development. Western States' Market Study. 2021. Page 6-7.
[37] See Utah Office of Energy Development. Western States' Market Study. 2021. Pages 35-37.

Short of creating a single RTO, the addition of a single West-wide day-ahead market to the existing real-time market (WEIM) results in a West-wide savings of $642 million in annual gross benefits.[38]

In 2030, Oregon could see a $80 million annual benefit from electricity production cost savings with a single RTO footprint, or Oregon could realize a $3 million benefit in production cost savings from joining a single West-wide day-ahead market.[39]

Increased household spending power and new jobs. Reduced electricity costs could, if benefits are required to flow to customers, have the added value of increasing household economic power and adding local jobs. The *Western RTO Economic Impact Study* estimates that new household spending power would support 17,807 jobs by 2030 and increase the Gross Regional Product by nearly $1.8 million with the creation of a single West-wide RTO.[40] New business activity would support 50,000 to 230,000 new jobs by the year 2030.[41] The *Western RTO Economic Impact Study* also predicts the creation of 140,000 new permanent jobs in the year 2030, a combination figure of new business activity and estimated increases in renewable development due to the RTO.[42]

Environmental and climate benefits. The CAISO estimates that in the first quarter of 2023 the Western EIM reduced emissions by 22,685 metric tons of CO_2 through fewer curtailments (the shutting off of power generation for reliability needs) of renewable energy resources.[43] Moving to a single West-wide RTO could prevent the curtailment of approximately 1.2 percent of the West's renewable resources that would otherwise be curtailed under the current status quo.[44] Other studies show that if the West pursues a clean energy economy *without* a day-ahead market, greenhouse gas emissions would be 13% higher.[45] Much of this reduction in emissions is the result of a single market's ability to tap into a diverse set of power generation resources that could not otherwise be reached through the current market structure, which could also help to prevent the overbuild of both transmission and generation infrastructure.[46]

Northwest public utilities are studying market participation in part due to the potential for market coordination to help them integrate expected increases in wind and solar projects into their operations and to help them meet changes to customer load.[47]

Challenges

Transmission cost allocation—who pays for major new infrastructure investments, and how are existing transmission costs aligned? Utility stakeholders have identified the allocation of

[38] See Utah Office of Energy Development. Western States' Market Study. 2021. Page 6.
[39] Production cost savings come from the market selecting lower cost generation, reduced wind and solar curtailment, reduced transmission wheeling costs, and reduced operating and flexibility reserves (generation held locally to use to maintain reliability and balance the system). See Utah Office of Energy Development. Western States' Market Study. 2021. Page 40.
[40] Gross regional product is the value of all final goods and services produced in a region- in this case as a result of more spending power due to reduced electricity bills. See also Advanced Energy Economy. Western RTO Economic Impact Study July. 2022. Page 25
[41] Advanced Energy Economy. Western RTO Economic Impact Study. 2022. Page 36
[42] Advanced Energy Economy. Western RTO Economic Impact Study. 2022. Page 46.
[43] CAISO WEIM 2023 Quarterly Benefits Study. Page 3.
[44] See Utah Office of Energy Development. Western States' Market Study. 2021. Page 43.
[45] Western Flexibility Assessment. 2019. Page 118.
[46] For additional reading: The Nature Conservancy's "Power of Place: Clean Energy Solutions that Protect People and Nature" report. 2022.
[47] Public Generating Pool, Organized Market Retrospective Full Report. Page 8.

transmission costs as an RTO structural issue that should be resolved before forming an RTO in the West.[48]

Load growth, or the increase in demand utilities are seeing from customers, will play a large role in this conversation. While some estimates demonstrate that the Northwest will see a 20 percent overall growth in customer demand over the next five years,[49] multiple utilities across the Northwest have little load growth and already meet their loads with clean hydroelectric generation.[50] Assigning them a portion of the costs of new transmission infrastructure that they might not need, through a regulatory procedure known as "cost allocation," is a point of risk in their decisions to join an RTO. In contrast, other utilities in the Northwest forecast substantial growth.[51] They could reach new clean energy resources through improved market and transmission planning.

The cost-to-benefit ratio of joining an RTO poses additional challenges to some Northwest public utilities who currently rely on BPA for their transmission service.[52]

Transmission rights. Retaining the value of existing transmission rights in a transition to a centralized day-ahead market or RTO is an economic and operational concern for utilities as well.[53] Today utilities have transmission rights that permit them to move power from a specific generator to their load. In moving to an RTO, these physical rights are converted to financial rights that entitle the utility to financial compensation. Under an RTO, utilities' demand needs will be met, but the economic value of the financial transmission rights may not be equal to the economic value of their former physical transmission rights.

BPA's statutory requirements. BPA's large presence in the Northwest and its statutory requirements require unique consideration in forming a RTO or joining a centralized day-ahead market.[54] For instance, BPA has established that if it participates in a centralized day-ahead market, it must maintain control over the delivery of power and transmission services to its

[48] Ibid.
[49] Pacific Northwest Utilities Conference Committee. Northwest Regional Forecast of Power Loads and Resources. August 2023 through July 2033. Page 5.
[50] "Anticipated load growth is based on utilities' unique circumstances such as service territory characteristics, local economic factors and energy policies. This results in varying load projections, with some utilities expecting flat or little load growth and other utilities anticipating marginal to substantial increases in load growth." See: Pacific Northwest Utilities Conference Committee. Northwest Regional Forecast of Power Loads and Resources. August 2023 through July 2033. Page 5.
[51] Pacific Northwest Utilities Conference Committee. Northwest Regional Forecast of Power Loads and Resources. August 2023 through July 2033. Page 5.
[52] Public Generating Pool. Organized Market Retrospective. Pages 7-8.
[53] To join a centralized day-ahead market or an RTO, utilities must exchange their transmission rights that allow them to move power from their generator to load for financial transmission rights (FTR). FTRs do not guarantee the right to move the power from the generator to load but are instead intended to make the utility financially whole with respect to its existing transmission rights.
[54] Public Generating Pool. Organized Market Retrospective. Page 7.

customers.[55] Northwest utilities that are statutorily entitled to BPA power and transmission service are concerned that the grid's existing transmission costs, which are generally higher than BPA's transmission costs, will be shifted onto BPA customers. They are also concerned that the way prices are set in the market will impact the value of the electricity that BPA sells. These Northwest utilities, which are currently not subject to federal regulation, are also concerned about federal regulation as a result of BPA participation in a centralized market or an RTO that is federally regulated.[56] The downside of BPA maintaining its own rates and charges for customers of its transmission system is that the benefits of one single transmission rate across the greater West-wide system is lost. Currently, the additional fees generators must pay to use the BPA transmission system is an impediment to bringing new clean energy resources to load.

Governance. The decisions of governing bodies of RTOs and centralized markets not only affect market participants, they also affect state environmental policy and matters of state jurisdictional authority. Early attempts by the utility PacifiCorp to fully join an RTO by merging its BA operations with CAISO was hindered by the CAISO governance structure that by law allowed the governor of California to appoint all three members of the CAISO's Board of Governors. Discussions of potential governance structures were conducted initially by PacifiCorp and CAISO in stakeholder meetings. However, state regulators soon banded together to discuss governance using a combination of public meetings and private discussion. The governance conversation in California continues to evolve, and recently the Governor of California has indicated a strong desire[57] to work with the rest of the West to make certain these issues are addressed.

THE IMPORTANCE OF GOVERNANCE IN ACCESS, OPERATIONS, AND ENSURING BENEFITS FLOW TO CUSTOMERS

Under the multi-BA construct, decisions about generation resource adequacy, resource dispatch, and transmission planning are made by individual utilities and overseen by utility governing boards or state commissions. Under an RTO, a single governing structure will make a collective decision for utilities and stakeholders in the West.

Under an RTO, governance will determine how market rules treat resources such as distributed energy resources, energy storage, demand response, and wind and solar as well as rules on the treatment of greenhouse gas costs and reporting. Decisions about transmission operations, resource sufficiency, and reliability that affect electric service to communities all across the West will be in the hands of the RTO governance structure.

Participation in and representation in well-designed governance structures, even if those structures are regional bodies, allows local interests to prompt new programs, affect change, and ensure local perspective is included at the beginning of the decision-making processes.[58]

Utilities have historically dominated the governance decisions within markets, and only on occasion have local stakeholder and state utility commissions weighed in directly. Typically, the heaviest involvement of public interest and state commissions takes place during the Federal Energy Regulatory Commission (FERC) review. However, challenging RTO policies after an RTO

[55] BPA. Day-Ahead Market Workshop Presentation. July 2023. Page 22.
[56] BPA. Day-Ahead Market Workshop Presentation. July 2023. Page 22.; The Federal Energy Regulatory Commission has federal authority over centralized markets and RTOs.
[57] Venteicher, Wes.. "California hits pause on power sharing." Politico. May 2023.
[58] An example of opportunities to participate include the CAISOs annual policy initiatives roadmap process.

governing board has made its decision and has filed its rules for approval at FERC has proven costly and time consuming for states and local interest groups.

The West is still grappling with how to create governance structures that meet the needs of stakeholders in the region. Regional stakeholders have been active in the design of governance since the beginning of efforts to form RTOs and centralized markets in the West. There is a long history of proposed governance structures dating back to the 1990s from previous attempts to establish RTOs and centralized markets in both the Northwest and greater West.[59]

Recent discussions of governance center on the governing board's power and authorities, who has representation on the governing board, and how representatives are appointed. Discussions also include the scope of the power and authority of formal committees that review policy prior to any policy moving to the full governing board for adoption.[60] It is on these formal review committees that local advocacy groups can gain seats as representatives.

Discussions of how to assure inclusion of state policy and local interests—such as issues of equity and vulnerable communities—have been at the center of governance discussions. One way to enhance state interests is to grant the state committees that are part of the RTO governance structure joint authority with the RTO governing board over certain policy matters.[61] For instance, SPP provides joint authority to its regional state committee over transmission cost allocation and resource adequacy issues.[62]

Western EIM Governance: How advocates and stakeholders affected positive change

Since the inception of the CAISO's Western EIM (WEIM) proposal in 2013, WEIM governance has evolved as a result of active stakeholder advocacy.[63] Early advocacy led to the creation of the WEIM Governing Body, whose mission is to represent the interests of those in the Western EIM footprint.

As the WEIM Governing Body began engaging in its work, it formalized two important groups that provide critical stakeholder input to WEIM processes and broadened the engagement with stakeholders across the West:

- The first group, the Body of State Regulators, made up of state commissioners, examines Western EIM policies and gives voice to state policy.[64]
- The second, the Regional Issues Forum, provides an opportunity for stakeholders to learn about Western EIM policies and provides a platform for developing common comments to the CAISO staff, the Western EIM Governing Body, and the CAISO Board of Governors.[65]

More recently, the Western EIM Governing Body has gained joint decision-making authority with the CAISO Board of Governors on issues affecting the WEIM.[66] This new authority provides

[59] Past efforts to create an RTO include Indigo, RTO West and Grid West, MC Initiative, and PacifiCorp joining the CAISO.
[60] For more on governance committee see the WEIM Governance Review Committee and SPP's Markets+ Governance Design team
[61] This joint authority includes what are called Section 205 rights that allow the governance committee(s) that hold those rights to file policy and rules on behalf of the RTO at FERC.
[62] Western Resource Advocates. "RTO Governance Models: The Role of States." April 2019.
[63] In 2015, the CAISO formed a transitional committee of stakeholders from across the West to develop a governance structure for the Western Energy Imbalance Market (WEIM).
[64] The Body of State Regulators was established in 2016, and its charter was enhanced in 2021.
[65] Western Energy Imbalance Market. "Regional Issues Forum."
[66] CAISO. Charter for Energy Imbalance Market Governance. Section 2.2.1. Page 4.

stakeholders in the West a governance board with strong authority over Western EIM issues affecting utility operations, power costs, and reliability.

The Body of State Regulators and the Regional Issues Forum meetings are open to local interest groups and accept comments with few formal requirements. Their representatives are intentionally selected to achieve geographic diversity.

Considering governance in new day-ahead market proposals.

CAISO and the Extended Day-Ahead Market. A centralized day-ahead market affects all generation and dispatch decisions as well as the use of transmission capacity for its participants. Consequently, the governance model of CAISO's proposed EDAM is critical to the interests of the West.

The CAISO conducts stakeholder processes on nearly all CAISO related issues. The stakeholder processes include public meetings and multiple written comment opportunities. The CAISO staff respond to comments and issue iterative draft proposals as they develop a final proposal for the CAISO Board of Governors or Western EIM Governing Board to consider.

On February 1, 2023, the CAISO Board of Governors and the Western EIM Governing Body approved a governance structure for the CAISO day-ahead market, EDAM.[67] Under the governance structure, the Western EIM Governing Body has joint authority with the CAISO Board of Governors on matters affecting the footprint of the EDAM. However, issues of the governance structure of an RTO and even centralized markets going forward is still being debated. This dynamic along with the fluid state of governance proposals offers an opportunity for local advocacy groups to shape their role in governance.

SPP Markets+. The Southwest Power Pool recently launched its governance proposal for its day-ahead market proposal, Markets+.[68] The governance proposal is still open to negotiation and potential change. Markets+ is in a conceptual market design phase and still seeks commitment from participating utilities.[69]

Under its currently proposed governance structure, SPP will have a Markets+ Participants Executive Committee (MPEC) that will develop the policy and rules for the market. The MPEC members are dominated by utilities, transmission owners, and other market participants. The Markets+ Independent Panel (MIP), which is designed to oversee the MPEC, will only have authority to reject or approve, but not modify, the policies and rules put forth by the MPEC.[70] Ultimately, decisions by the MPEC and MIP can be appealed to the SPP Board. This governance structure incorporates less shared state and local participation and authority than states and advocacy groups may want to see.

Western Regulators' Call for Independent Governance. The July 14, 2023 letter from state regulators from five Western states, including Oregon, calling for the creation of an independent governance structure for a new RTO that would have broad representation across the West provides another potential opportunity for advocacy groups to be involved in shaping the development of governance and markets.[71]

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[67] With input from stakeholders, the Governance Review Committee developed the proposed governance structure for the EDAM. The Governance Review Committee was jointly appointed by both the California ISO Board of Governors and the Western EIM Governing Body.
[68] Southwest Power Pool. "A Proposal for Southwest Power Pool's Western Day-Ahead Market and Related Services." November 2022.
[69] ibid
[70] ibid. A five-member panel that is independent from Markets+ participants and Markets+ stakeholders.
[71] State regulators' call for viable path to electricity market inclusive of all western states

CONCLUSION

Oregon advocates, including environmental justice advocates, clean energy advocates, and labor advocates, have led successful legislative campaigns to reduce energy bills, support energy saving home upgrades, and create good jobs in clean energy projects across Oregon. Even still, significant questions about whether and how Oregon will achieve its legislative targets remain. The extent to which a transition to clean energy will maximize customer benefits is unclear.

The Western power grid is in flux as the need for decarbonizing the economy presses the electricity sector to develop new, more efficient grid operations and markets. Advocates participating in the formative stages of market development and transmission conversations in the West can help set the direction of the industry to assure it is responsive to local communities, equity issues, and vulnerable communities.

After decades of discussion and many studies, efforts to form centralized markets and RTOs in the West have rarely discussed or engaged local interests and community-based environmental, labor, and equity advocates. Influencing the structures of governance and the geographical footprints of these opportunities will be critical to making local voices heard. Exploration of the following topics could help advocates position themselves to affect the direction of the electricity markets and their role in the clean energy economy.

- How will state and local interests, including economic, climate, and equity considerations, be incorporated in long-term transmission planning?
- How will reliability and resiliency for underserved communities be considered?
- What structures and support will be included in governance proposals to enable and enhance state and local participation?
- How will market size and design be shaped to serve communities across the West?
- What state and local policies should be incorporated in the design and purpose of the market or RTO?
- What is the best design for ensuring access to participation in decision-making processes and having input heard?

with independent governance, July 14, 2023. See letter here.