Markets 101

The importance of regional electricity markets

February 15, 2023

About the NW Energy Coalition & Renewable Northwest

The NW Energy Coalition advances clean, equitable, and affordable energy policies by leveraging our analytic expertise and convening a broad alliance of people and organizations.

nwenergy.org | facebook.com/nwenergy | twitter.com/nwenergy

NW Energy Coalition
for a clean and affordable energy future

Renewable Northwest's mission is to decarbonize the region by accelerating the transition to renewable electricity.

renewablenw.org | facebook.com/renewablenorthwestproject | twitter.com/renewablenw

RENEWABLE NORTHWEST

Panelists

Robin Arnold
Markets & Transmission Director
Renewable Northwest

Kathleen Staks
Executive Director
Western Freedom

Caitlin Liotiris
Principal
Energy Strategies

Michael Milligan
Consultant
Milligan Grid Solutions, Inc.

NW Energy Coalition
for a clean and affordable energy future

RENEWABLE NORTHWEST

Western Markets 101

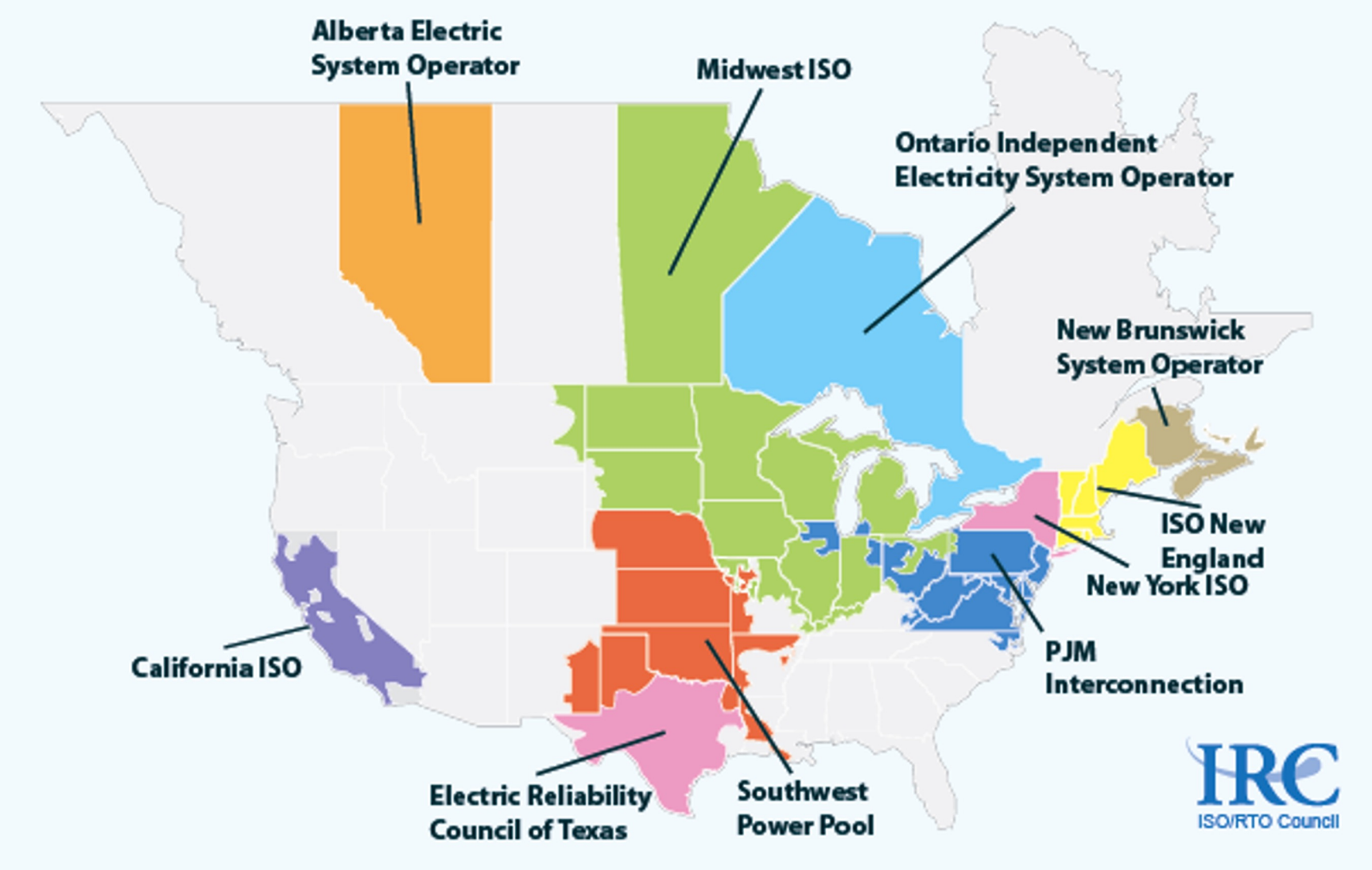
Robin Arnold

Markets & Transmission Director

Renewable Northwest

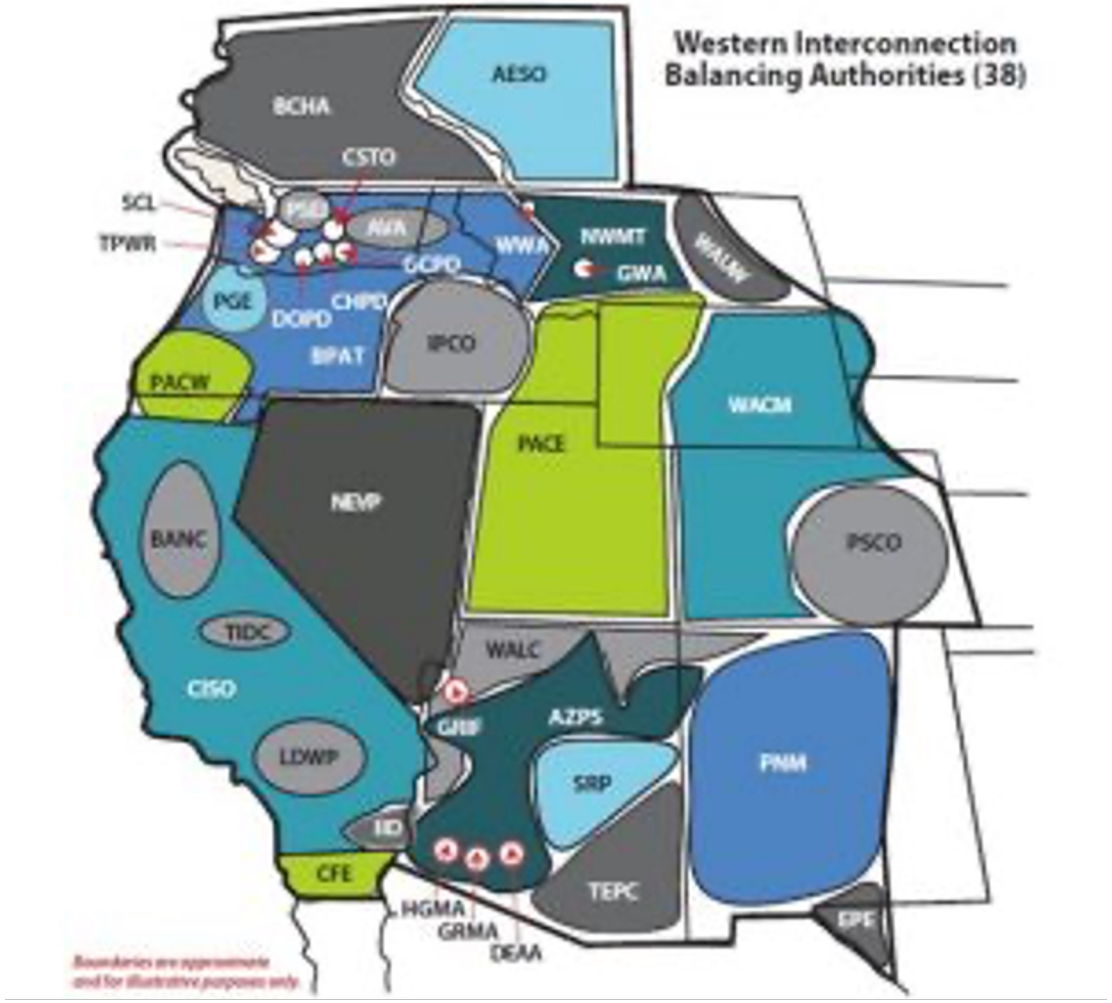
February 15, 2023

Regional Transmission Organizations



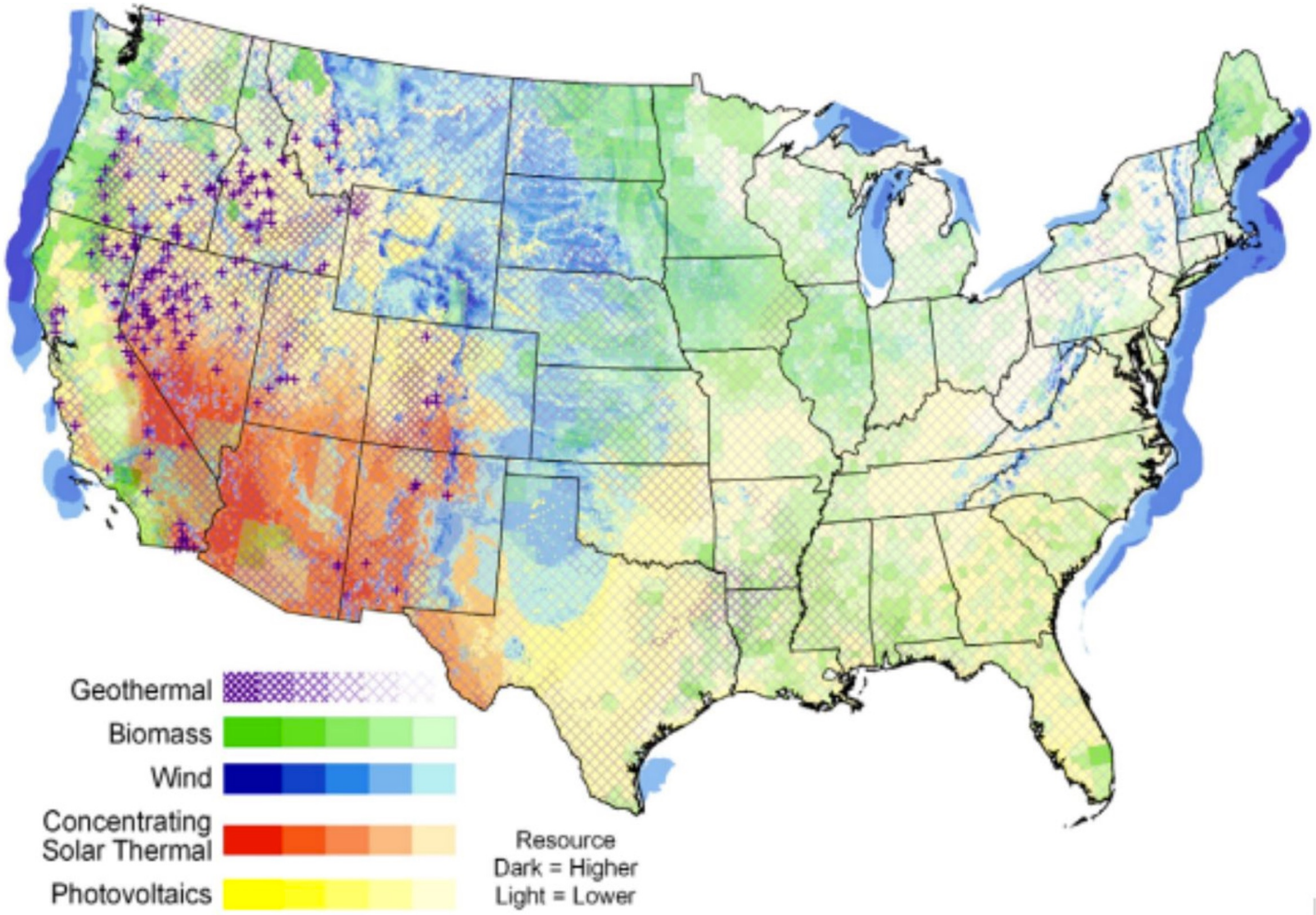
RENEWABLE NORTHWEST

Current Balancing Authorities in West



RENEWABLE NORTHWEST

What is problematic with 38 BAs in the West?



NREL
Transforming ENERGY

RENEWABLE NORTHWEST

Example of Transmission Rates Across BAs

2020 Tariff Rates		
	Transmission Rate ($/kw-mo)	Losses (%)
BPA Network Transmission	1.771	1.9
PSE	2.0151	2.7
Avista	1.37	3
NWE PTP & Network Transmission	4.831	2.8
MT Int	0.506	5

RENEWABLE NORTHWEST

Example of Transmission Rates Across BAs

Total Tx Cost to Reach PNW Markets			
	Transmission Rate ($/kw-mo)	Losses (%)	Total Cost ($/MWh)*
BPA	1.771	1.9	$5.96
PSE CTS + MT Int + BPA	4.2921	4.6	$14.45
NWE + BPA	6.602	4.7	$21.48
NWE + AVA	6.201	5.8	$20.62
NWE + AVA + BPA	7.972	7.7	$26.58

**45% capacity factor and losses valued at $30/MWh*

RENEWABLE NORTHWEST

Example of Rates in RTO vs. Northwest

PJM Versus PNW New Wind Math

	PJM	PNW	Comment
Approximate Cap. Factor	35%	35%	
Levelized Cost of Energy	**$40.00**	**$40.00**	Total amount needed for 15-years.
Capacity Revenue	-$5.21	$0.00	$ paid by PJM per EGPS capacity market wind modeling.
Basis	$0.50	$0.00	Typical price difference from node to hub in PJM. NA in PNW.
Transmission and Integration	$1.00	$12.00	Various PJM costs. BPA transmission and integration charges.
Other Costs/Revenue	**-$3.71**	**$12.00**	
Required PPA Price	**$36.29**	**$52.00**	Price required for intermittent power at market hub.
		-$15.71	Cost premium required for PNW deal.

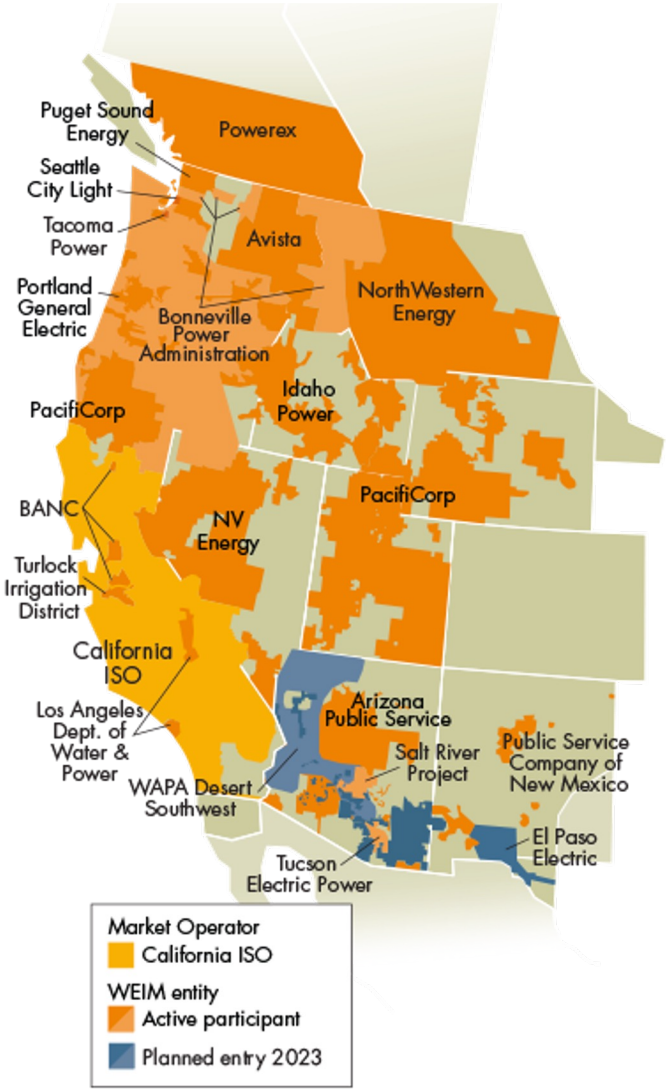
ENERGYGPS LLC

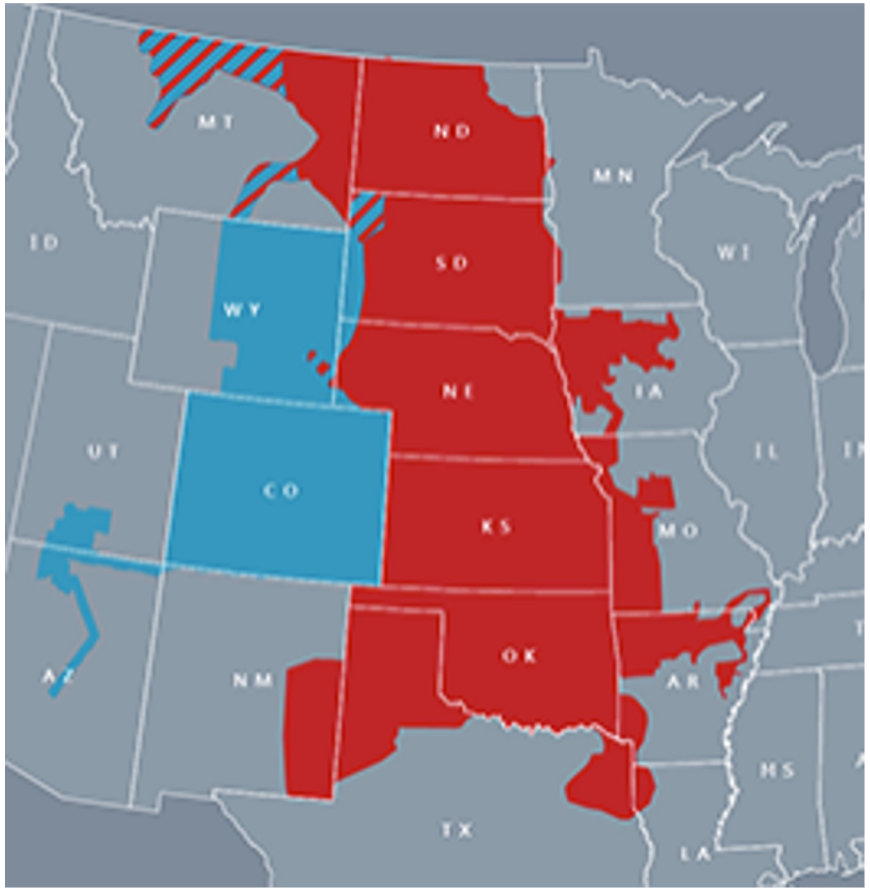
RENEWABLE NORTHWEST

Existing Markets in the Region

RENEWABLE NORTHWEST

CAISO vs. SPP Energy Imbalance Markets





RENEWABLE NORTHWEST

EIM/EIS

- Imbalance Markets only trade excess generation available in real time for five-minute intervals
- Available transmission capacity is voluntarily "donated" for use in the Imbalance Market

Both EIM/EIS and RA:

- Transmission owners retain individual operational control of systems, including authority over balancing authorities
  - Transmission needs to be arranged separately for each BA to move power from distant points, leads to "rate pancaking"
- Easier to enter & exit, less binding than RTO

RTO Services

- RTOs responsible for transmission grid reliability, planning, and operation
- Schedule generation resources that are least-cost a day in advance, and dispatch over five-minute intervals
- RTO has functional control of transmission system and engages in coordinated regional planning for transmission within footprint
- Typically, high entry/exit fees

RENEWABLE NORTHWEST

State Activities Related to Regional Market Expansion

RENEWABLE NORTHWEST

STATE COMMISSION-INITIATED DOCKETS

ARIZONA & NEW MEXICO

ARIZONA

- On July 23, 2021, the AZ Corporation Commission opened docket E-00000A-21-0271 to investigate regional planning in the West.
  - No schedule has been set yet for the docket.

NEW MEXICO

- In December 2021, the NM Public Regulation Commission rejected a merger between AVANGRID and PNM Resources in docket 20-00222-UT. The rejected stipulation would have required PNM to convene an RTO initiative group to explore RTO development.
- PNM and AVANGRID extended the merger agreement through April 2023 while they appeal the NM PRC decision at the NM Supreme Court.

RENEWABLE NORTHWEST

STATE LEGISLATIVE RTO REQUIREMENTS

COLORADO & NEVADA

COLORADO

- SB 72 (2021) requires utilities to join an organized wholesale market by January 1, 2030, absent a waiver from the PUC
- Creates the CO Electric Transmission Authority and creates new rules for CO PUC certification for new transmission lines.

NEVADA

- SB 448 (2021) also requires utilities to join an organized wholesale market by January 1, 2030, absent the granting of waivers.
- Creates a Regional Transmission Coordination Task Force to study opportunities to promote regional transmission development.
- Requires NV Energy to file a transmission infrastructure plan with the Nevada PUC.

RENEWABLE NORTHWEST

STATE LEGISLATIVE CLEAN ENERGY STANDARDS

OREGON

OREGON

- SB 589 (2021) requires the Oregon Department of Energy to identify the benefits, costs, and barriers to Oregon entities participating in an RTO.
  - The final study was released in December 2021.
- HB 2021 (2021) requires retail electricity providers to reduce electricity greenhouse gas emissions to 80% below baseline emission levels by 2030 and 100% by 2040.
  - The bill acknowledges that regional markets play a critical role in achieving 100% zero carbon emissions.

RENEWABLE NORTHWEST

STATE LEGISLATIVE CLEAN ENERGY STANDARDS

WASHINGTON

WASHINGTON

- SB 5116 (2019-2020), the "Clean Energy Transformation Act" ("CETA") requires utilities to be 100% greenhouse neutral by 2030 (allowing for natural gas offsets) and 100% renewable or non-emitting by 2045.
  - WUTC established a Carbon and Electricity Markets working group to examine CETA's integration with electricity markets outside the state and its compatibility with cap-and-trade programs (such as in California).

RENEWABLE NORTHWEST

Federal Activities Related to Regional Market Expansion

RENEWABLE NORTHWEST

FERC

- FERC opened docket RM21-17-000, an advanced notice of proposed rulemaking on transmission planning and cost allocation and generation interconnection processes.

- FERC and NARUC established a Joint Federal-State Task Force on Electric Transmission.

RENEWABLE NORTHWEST

DEPARTMENT OF ENERGY

- The DOE funded a study led by the Utah Office of Energy Development, the "State-led Markets Options Study," which looks at the costs and benefits of different market expansion options in the West.
- Two reports came out of the study on Sept. 20, 2021, a Technical Report and a Market and Regulatory Review Report.

RENEWABLE NORTHWEST

CONGRESS

- HR 3684, "INVEST in America Act," includes a $10 billion increase in spending authority for BPA; federal backstop provisions for transmission siting, and authority for the federal government to be an "anchor tenant" for up to 50% capacity on new transmission lines or line upgrades. The bill includes up to $65 billion total to upgrade the electric transmission grid.
  - The bill became law on November 15, 2021.
  - DOE launched its "Building a Better Grid" initiative in January 2022 to identify national transmission needs.

RENEWABLE NORTHWEST

ADDITIONAL RESOURCES

- WIEB's "Western Flexibility Assessment," https://westernenergyboard.org/wp-content/uploads/2019/12/12-10-19-ES-WIEB-Western-Flexibility-Assessment-Final-Report.pdf
- FERC RTOs and ISOs: https://www.ferc.gov/electric/power-sales-and-markets/rtos-and-isos
- Western Resource Advocate's "Overview of Regional Market Development in the Western Interconnection," https://westernresourceadvocates.org/wp-content/uploads/dlm_uploads/2019/04/Final-Western-Markets-Backgrounder-2-4-191.pdf
- SPP's "Western Energy Imbalance Service and SPP Western RTO Participant Benefits," https://www.brattle.com/wp-content/uploads/2021/05/20622_western_energy_imbalance_service_and_spp_western_rto_participation_benefits.pdf
- California Legislature ACR 188 draft study report: http://www.caiso.com/Documents/ACR188DraftSummaryReport-Jan13-2023.pdf
- AEE RTO Study: https://www.aee.net/western-rto
- NESCOE's "Governance Structure and Practices in the FERC Jurisdictional RTOs/ISOs," https://nescoe.com/resource-center/isorto-governance-feb2021/

RENEWABLE NORTHWEST

Markets 101

Benefits Markets Can Provide for the West

February 15, 2023

Prepared for:

RENEWABLE NORTHWEST

NW Energy Coalition
for a clean and affordable energy future

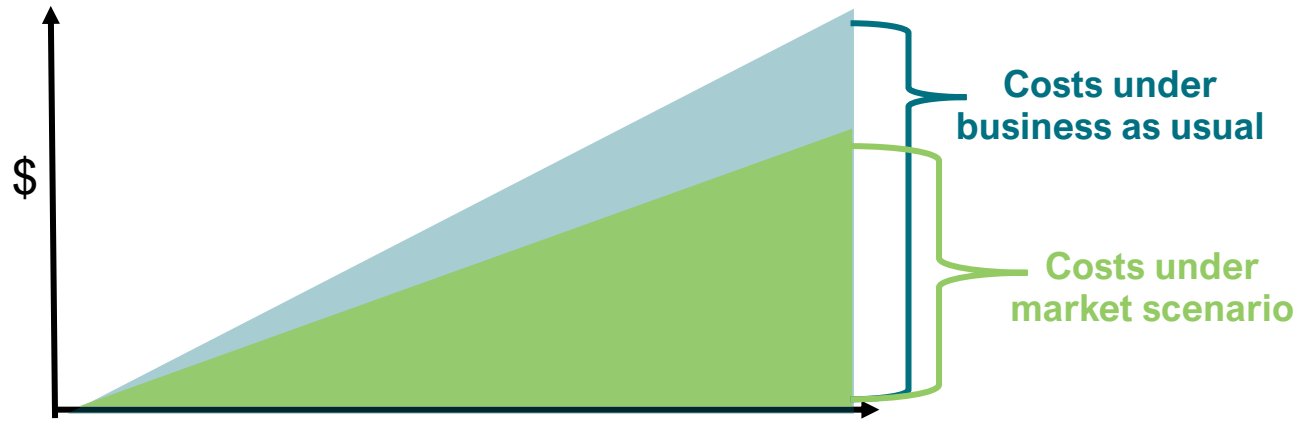
Caitlin Liotiris
Principal
ccollins@energystrat.com

ENERGY STRATEGIES

Contents

Context for Benefits Quantified in Market Studies

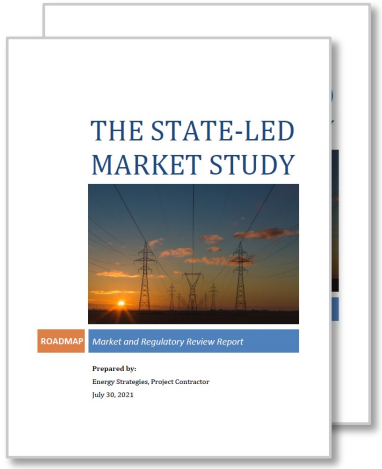
- **The potential benefits of organized electricity markets have long been recognized and many studies have been conducted that seek to quantify one or more types of benefits that may be achieved**
- **It is critical to understand what is generally meant by "benefits" or "savings" results produced by these studies**
  - *Note – benefits or savings are not intended to imply that electricity prices will go down, but rather compare a future "business as usual" case to a future with a market case*



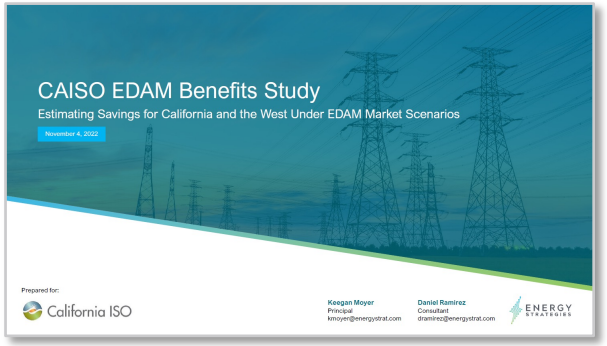
Costs under business as usual − **Costs under market scenario** = $ **Market savings/benefits**

Savings/benefits do not imply overall costs of electricity will *decrease* but that there will be savings relative to a future scenario in which new markets are **not** created

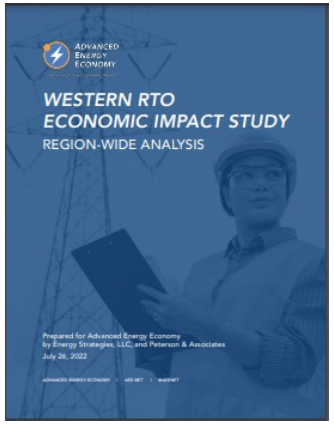
Energy Market Benefits: Related Studies by Energy Strategies



[State-Led Market Study Technical Report](#) & [Regulatory Review](#)



[EDAM Benefits Study](#)

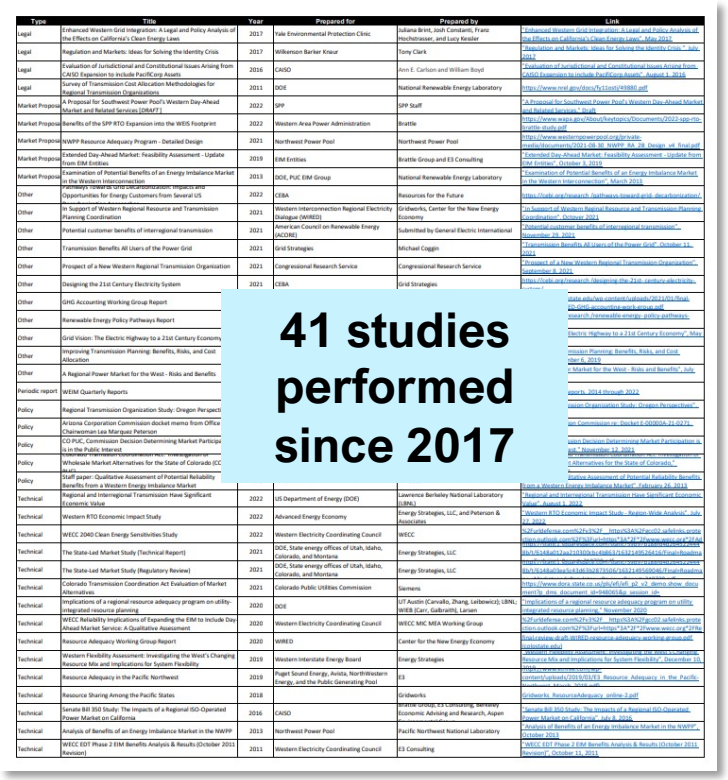


[Western RTO Economic Impact Study](#)

- Materials from these studies were used to inform today's comments and discussion on market services, benefits, and implications

Other important and relevant regional work covered in ACR 188

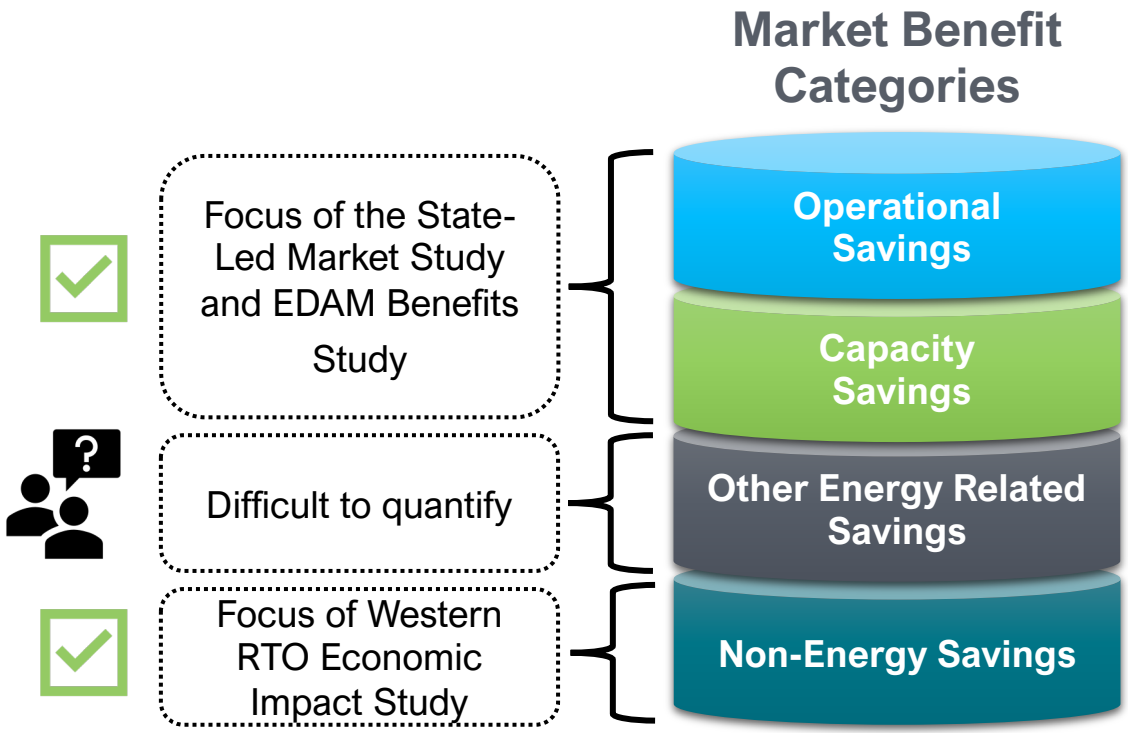
[Draft ACR 188 Report](#)



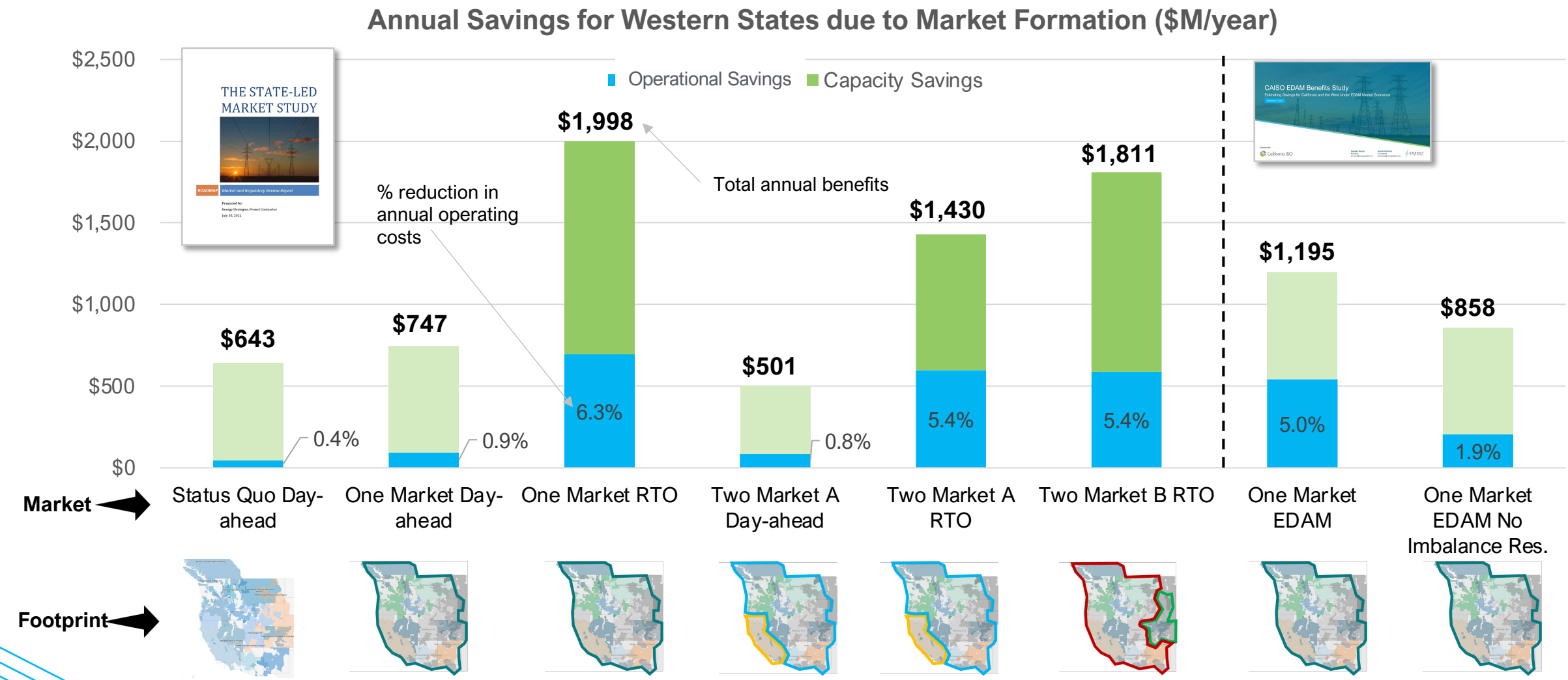
CAISO ACR 188 Study List

Types of Energy Market Benefits

- **Energy markets produce efficiencies (and savings) by changing the way we operate and plan electricity resources and transmission systems**
  - Not all such savings are quantifiable and some of the largest are commonly overlooked
  - Some of the easiest to quantify, such as operational savings, may actually be a relatively small portion of total benefits that markets can achieve



Forecasted Electricity System Benefits for Western States

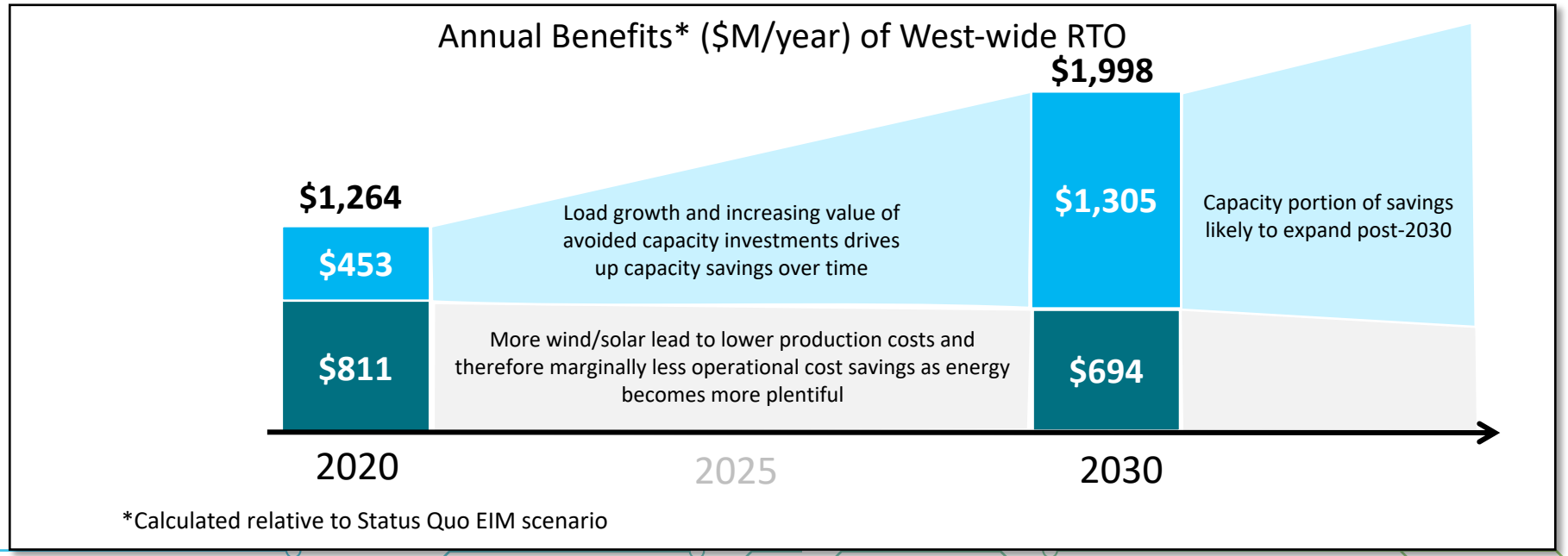


Benefits from a Comprehensive West-Wide Market

- **State-Led Market Study found that the quantified operational and capacity savings were maximized in a West-wide Regional Transmission Organization (RTO), the most comprehensive of the market structures**
  - This doesn't capture other, more expansive, categories of non-quantified benefits that could be furthered by an RTO
  - The Pacific Northwest (Oregon and Washington), were found to have significant benefits under a West-Wide RTO as compared to Business as Usual
- **Other benefits of a West-wide RTO the study captured, but didn't monetize, include:**
  - Reduction in renewable curtailments of 2.9 million MWh (system-wide curtailments dropped from 2.9% to 1.6%)
  - Reduction in CO_2 emissions in the West of 3.2 million tons/year (a 2% reduction) without changing any policies

2030 One Market RTO Annual Benefits

State	APC Benefit ($M)	Capacity Benefit ($M)	Total Benefit ($M)	
AZ	$59	$117	$176	
CA	$288	$190	$478	
CO	$62	$98	$160	
ID	($8)	$88	$80	
MT	$10	$36	$46	
NM	$43	$70	$113	
NV	($5)	$50	$45	
OR	$80	$127	$207	
UT	$43	$56	$99	
WA	$102	$449	$552	Estimated Ongoing Cost
WY	$19	$23	$43	
TOTAL	$694	$1,305	**$1,998**	$187-513



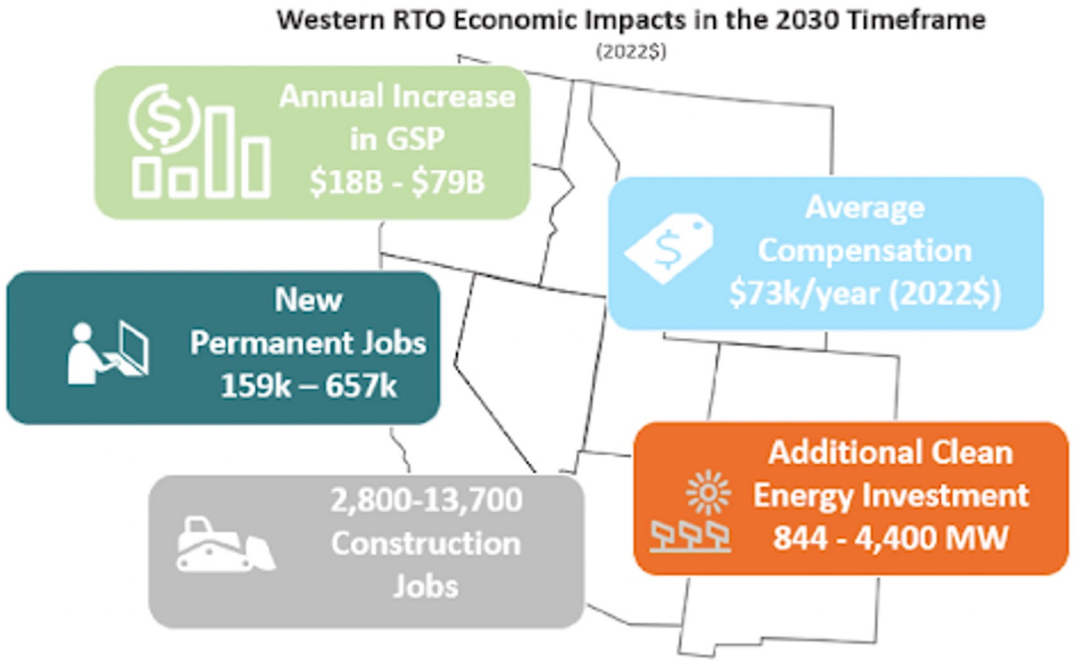
Economic Impact Study Evaluated Economic Implications from Electricity Savings due to Market Formation

- **Study aimed to look at how the electricity system benefits offered by formation of a comprehensive, West-Wide market might trickle into the Western economy and provide broader economic benefits, such as jobs and increased gross state product**
- **Included three pieces of economic impact analysis, reflecting a range where the greatest uncertainty in economic response exists**

1. Energy cost savings impacts on households
2. Increased business activity
3. Increased investment in clean energy (to meet corporate demand)

Economic Impacts from Market Formation are Expected to be Positive & Significant

- **Electricity-system benefits offered by a West-Wide RTO will create a positive impact for the Western states**
- **Between $18 billion and $79 billion in creased Gross Regional Product/year**
  - Equivalent to 0.4% to 1.6% of the region total
- **Create between 159,000 and 657,000 permanent jobs**
  - Paying $73,000 per job in average compensation
- **Result in between $619 million and $2.4 billion in increased tax contributions per year**
  - Stemming from increase state sales, excise and property taxes
- **Could spur additional clean energy investments (to meet corporate sustainability goals)**
  - Up to 4,400 MW in 2030 (as shown on the graphic) and up to 9,400 MW over a ten-year period considered in the study



ENERGY STRATEGIES

Thank You!

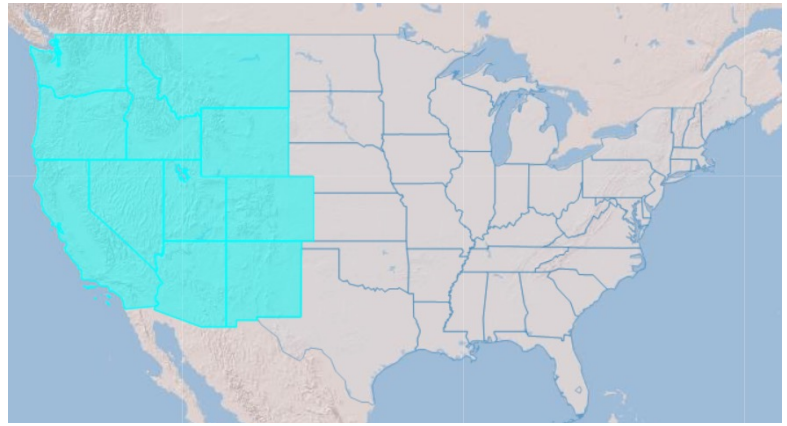
www.energystrat.com

Appendices

State-Led Market Study made possible through DOE grant

- The last several years have featured numerous discussions and initiatives related to the formation of coordinated wholesale trading markets in the West
- The Utah Governor's Office of Energy Development, in partnership with State Energy Offices of Idaho, Colorado, and Montana, applied for and received a grant from the US DOE to facilitate a 2+year state-led assessment of organized market options
- The project is called *Exploring Western Organized Market Configurations: A Western States' Study of Coordinated Market Options to Advance State Energy Policies*
  - Or "State-Led Market Study"
- The project provides Western States with a neutral forum, and neutral analysis, to independently and jointly evaluate the options and impacts associated with new or more centralized wholesale energy markets and potential footprints
- Stakeholder meetings held throughout multi-year study process, with issuance of final reports on July 30, 2021

State representatives from 11 Western States are participating in project



35

Rough History of Western Market Development Efforts

Active markets:

Pre-1998
Bilateral market structure

- Still responsible for bulk of DA trading in West today

1998
California Independent System Operator (CAISO)

- Controlled by CAISO BOD

2014
Western Energy Imbalance Market (WEIM)

- >75% of Western load will join (22 BAAs total)

2021
Western Energy Imbalance Service (WEIS)

- Contains entities within two WAPA BAAs
- Considering Markets+ (day-ahead)

2025
Western Resource Adequacy Program (WRAP)*

- Contains entities within two WAPA BAAs
- Non-binding showings in 2021-2022

Prior or ongoing market proposals:

1995-1998
INDEGO

2000-2006
RTO West/Grid West

2012-2016
NWPP MC Initiative

2013-2018
Mountain West Transmission Group

2015-2018
CAISO Regionalization

2017-2018
Peak/PJM RTO

2018-present
CAISO EDAM

2020-present
SPP/RTO West

2021-present
SPP Markets+

Energy Market Services: A *Generic* Reference Sheet

Market Service	Bilateral Market	Real-Time Market	Day-Ahead Market	RTO
Centrally optimized dispatch	No central optimization	Centrally optimized real-time dispatch; day-ahead unit commitment not optimized	Centrally optimized real-time dispatch and day-ahead unit commitment/dispatch	
Transmission wheeling	Fee applies to all transactions	No fee for in-market real-time transactions	No or nominal fee for in-market real-time and day-ahead transactions	No wheeling fees (except for exports)
Transmission available to market	Transmission rights required for all transfers	Can vary widely depending on market design – some or all capacity could be available		Transmission capacity available up to reliability limit
Transmission planning	Local planning by individual transmission providers; regional planning and interregional coordination under Order 1000 remain as they are today			Joint transmission planning by RTO; some lower voltage transmission planning remains at the local level
Tariffs and Operational Control of Transmission	Individual transmission providers retain control and have tariffs			RTO controls system, joint tariff
Reliability Obligations and Balancing Authority Boundaries	BAs are retained, have primary reliability obligations			RTO has primary reliability obligations; BAs consolidated
Ancillary Services and Co-Optimization	No optimization, reserve sharing groups	Can have optimization and ancillary service products		Ancillary service co-optimization and provision in the market
Resource Adequacy Function	Addressed by individual regulators; no market requirement	Market addresses intra-hour resource sufficiency, but does not impact long-term resource adequacy planning and processes	Market addresses day-ahead resource sufficiency. Depending on design, could impact long-term resource adequacy planning	Market can include its own longer-term resource adequacy requirements that must be achieved
Transparent Access to Market & Operational Information	Very little access to information, what is available is generally aggregated	Transparent access to pricing information for real-time transactions and transmission in the market	Transparent access to pricing information for day-ahead and real-time transactions and transmission in the market	Transparent access to pricing information for day-ahead and real-time transactions and transmission in the market

ENERGY STRATEGIES

Energy Market Services: Where things stand today (roughly)

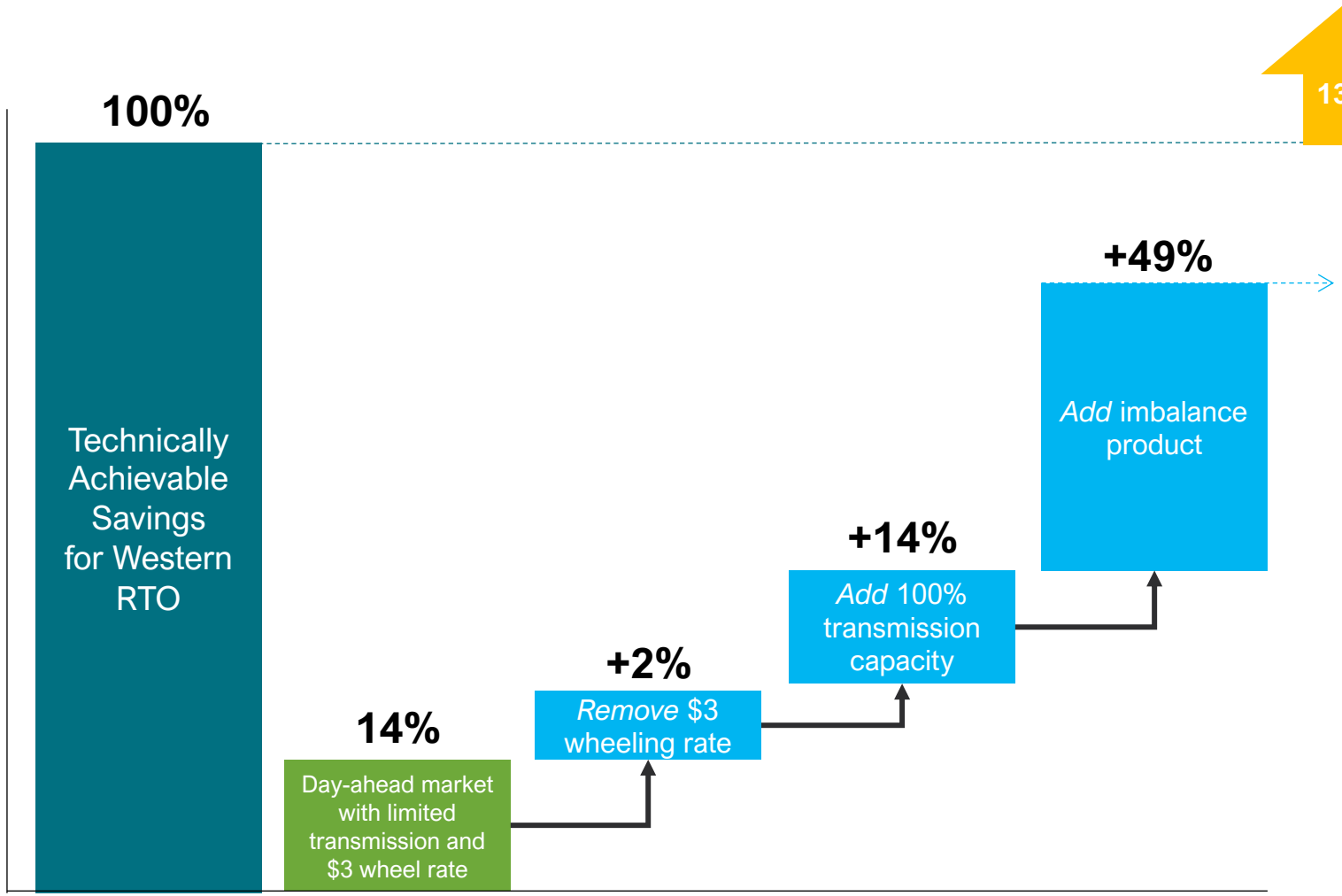
Market Service	Bilateral Market	Real-Time Market	Day-Ahead Market	RTO
Centrally optimized dispatch	No central optimization	Centrally optimized real-time dispatch; day-ahead unit commitment not optimized	Centrally optimized real-time dispatch and day-ahead unit commitment/dispatch	
Transmission wheeling	Fee applies to all transactions	No fee for in-market real-time transactions	No or nominal fee for in-market real-time and day-ahead transactions	No wheeling fees (except for exports)
Transmission available to market	Transmission rights required for all transfers	Can vary widely depending on market design – some or all capacity could be available		Transmission capacity available up to reliability limit
Transmission planning	Local planning by individual transmission providers; regional planning and interregional coordination under Order 1000 remain as they are today			Joint transmission planning by RTO; some lower voltage transmission planning remains at the local level
Tariffs and Operational Control of Transmission	Individual transmission providers retain control and have tariffs			RTO controls system, joint tariff
Reliability Obligations and Balancing Authority Boundaries	BAs are retained, have primary reliability obligations			RTO has primary reliability obligations; BAs consolidated
Ancillary Services and Co-Optimization	No optimization, reserve sharing groups	Can have optimization and ancillary service products		Ancillary service co-optimization and provision in the market
Resource Adequacy Function	Addressed by individual regulators; no market requirement	Market addresses intra-hour resource sufficiency, but does not impact long-term resource adequacy planning and processes	Market addresses day-ahead resource sufficiency. Depending on design, could impact long-term resource adequacy planning	Market can include its own longer-term resource adequacy requirements that must be achieved
Transparent Access to Market & Operational Information	Very little access to information, what is available is generally aggregated	Transparent access to pricing information for real-time transactions and transmission in the market	Transparent access to pricing information for day-ahead and real-time transactions and transmission in the market	Transparent access to pricing information for day-ahead and real-time transactions and transmission in the market

Energy Market Services: Where things stand today (roughly)

Market Service	Bilateral Market	Real-Time Market	Day-Ahead Market	RTO
Centrally optimized dispatch	No central optimization	Centrally optimized real-time dispatch; day-ahead unit commitment not optimized	Centrally optimized real-time dispatch and day-ahead unit commitment/dispatch	
Transmission wheeling	Fee applies to all transactions	No fee for in-market real-time transactions	No or nominal fee for in-market real-time and day-ahead transactions	No wheeling fees (except for exports)
Transmission available to market	Transmission rights required for all transfers	Can vary widely depending on market design – some or all capacity could be available		Transmission capacity available up to reliability limit
Transmission planning	Local planning by individual transmission providers, regional planning and interregional coordination under Order 1000 remain as they are today			Joint transmission planning by RTO; some lower voltage transmission planning remains at the local level
Tariffs and Operational Control of Transmission	Individual transmission providers retain control and have tariffs			RTO controls system, joint tariff
Reliability Obligations and Balancing Authority Boundaries	BAs are retained, have primary reliability obligations			RTO has primary reliability obligations; BAs consolidated
Ancillary Services and Co-Optimization	No optimization, reserve sharing groups	Can have optimization and ancillary service products		Ancillary service co-optimization and provision in the market
Resource Adequacy Function	Addressed by individual regulators; no market requirement	Market addresses intra-hour resource sufficiency, but does not impact long-term resource adequacy planning and processes	Market addresses day-ahead resource sufficiency. Depending on design, could impact long-term resource adequacy planning	Market can include its own longer-term resource adequacy requirements that must be achieved
Transparent Access to Market & Operational Information	Very little access to information, what is available is generally aggregated	Transparent access to pricing information for real-time transactions and transmission in the market	Transparent access to pricing information for day-ahead and real-time transactions and transmission in the market	Transparent access to pricing information for day-ahead and real-time transactions and transmission in the market

What incremental benefits can we expect from adding market services?

Drivers of Operational Benefits By Market Feature



Building more transmission further increases savings

WECC-wide EDAM scenario from recent CAISO study achieved 78% of operational efficiencies of RTO

Important Notes:

- Results will vary by state – data presented is for combined Western States
- Data based on results from various WECC studies over the last two years
- "Planning efficiencies" not included, such as capacity benefits, access to public policy resources, etc.
- All comparisons are relative to status quo (real-time markets only)

Markets 101: How can markets promote reliability and resilience?

Michael Milligan, Ph.D.

Consultant

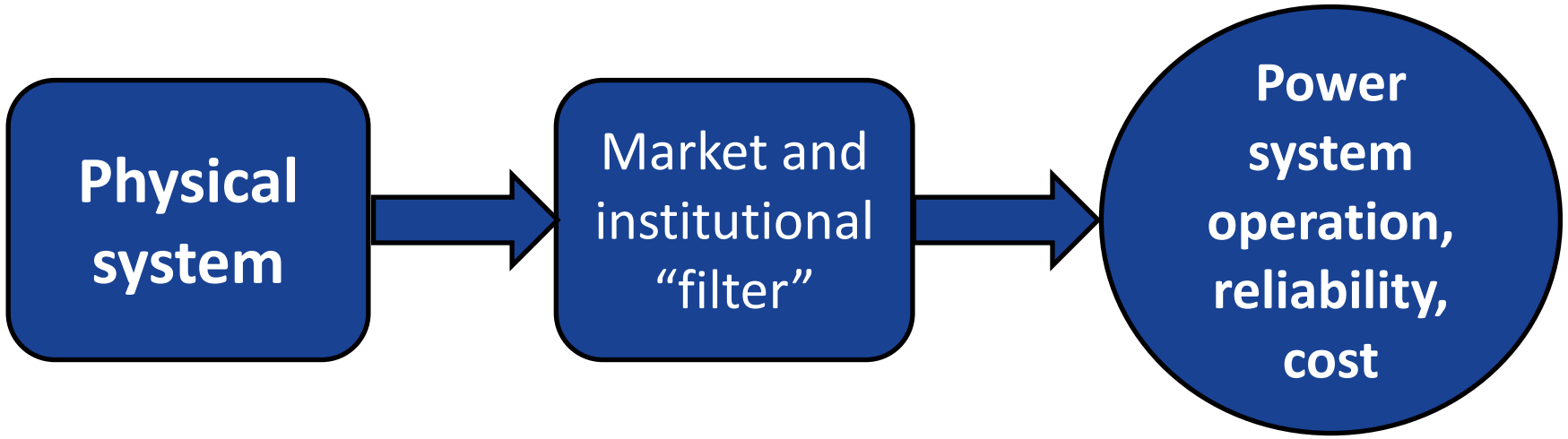
Milligangridsolutions.com

Outline

- **Characteristics of efficient markets**
  - Principles: Technology agnostic, performance based
- **Electricity market principles and the Sumo Wrestler principle**
- **Reliability and resilience: To successfully ride thru severe weather, the grid must be larger than the storm**

Smart grids require smart markets

- **The power system is made up of two critical systems**
  - Physical power system – generators, transmission…
  - Institutional system, including markets, reliability rules, general operating practice
- **Efficient markets should allow "putting the pedal to the metal"**

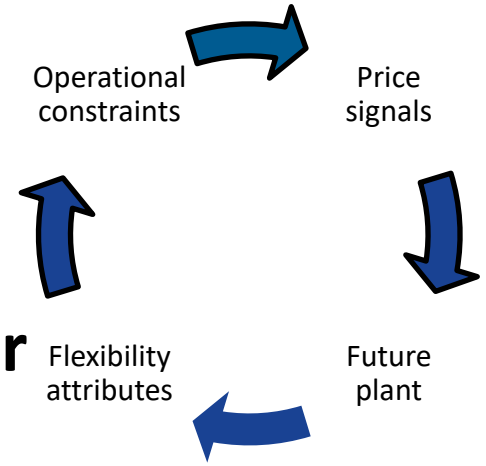


Electricity Markets

- **Primary market is electricity – energy measured in kWh (MWh, GWh)**
- **Ancillary markets and services are various technical requirements to keep the grid balanced and in "good health"**
- **Key services include**
  - Ramping service
  - Frequency regulation (primary, secondary)
  - Voltage support
  - Spinning and non-spinning reserves (extra available resources, just in case)

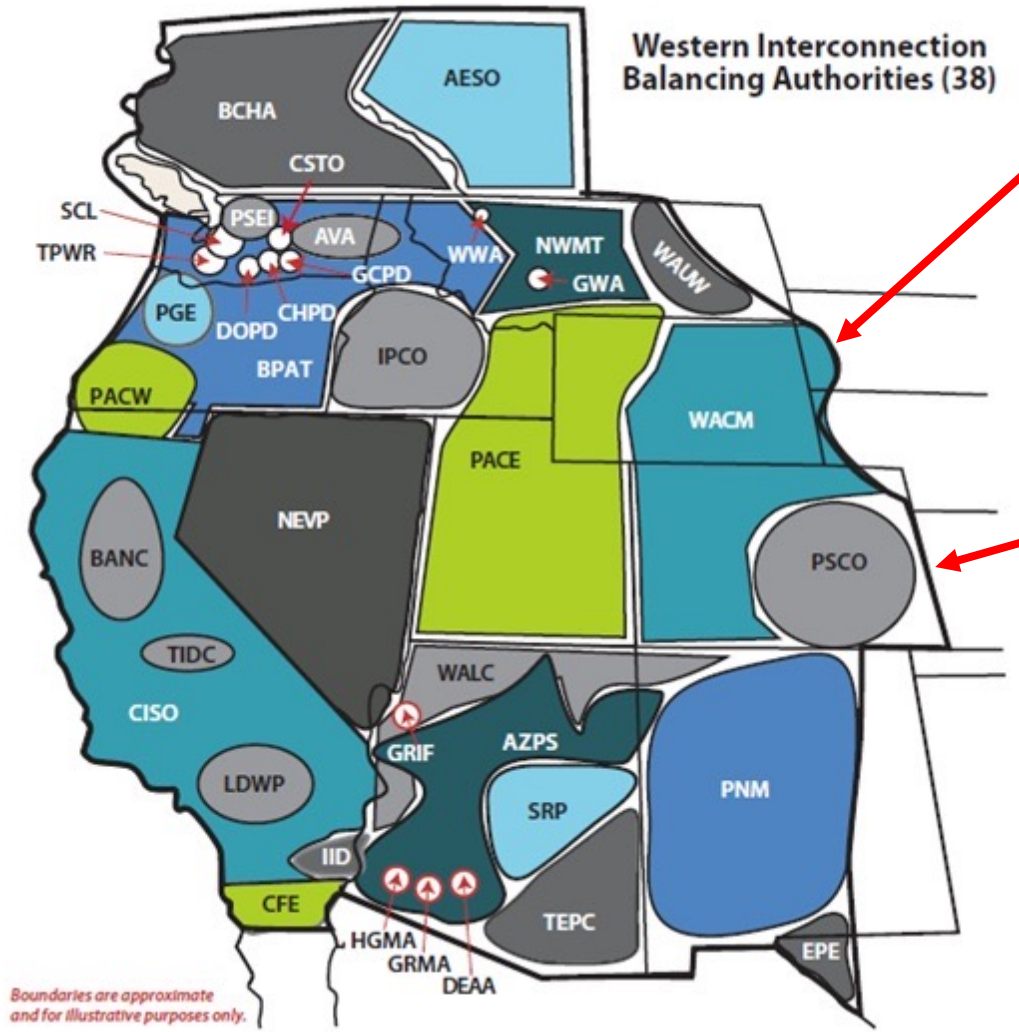
Market principles

- **Technology neutral**
- **Performance based**
- **Clear definition of the product**
  - What
  - When
  - How much
  - How often
  - Notification period
  - Clear incentives
- **Larger is better**
- **Faster dispatch (economic re-balancing) is better**
- **Transmission enables markets**
  - (conversely, transmission constraints prevent market efficiency)



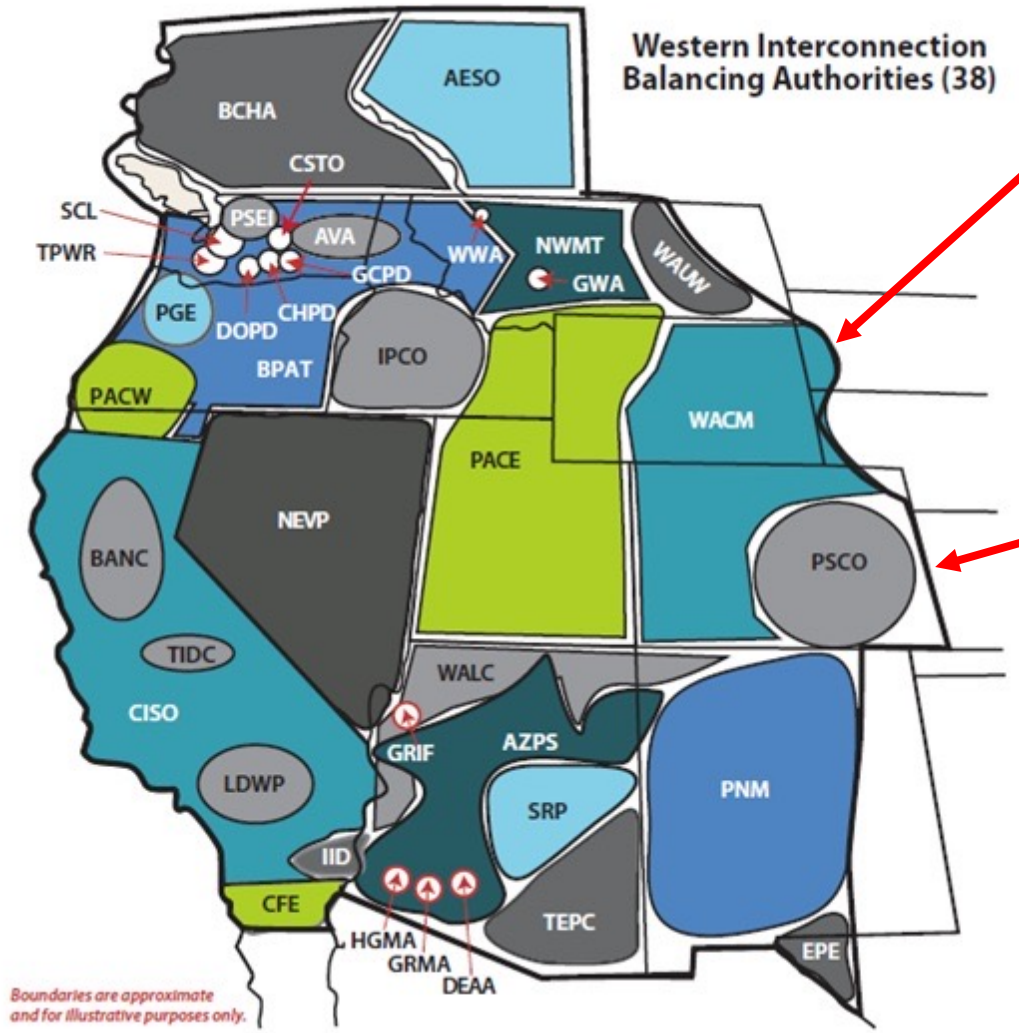
Geographic diversity results in "smoothing" of demand, wind, solar generation. It is accomplished by combining balancing areas, usually via a market, and can delivery significant economies of scale.

Example of resource “pooling” in market



- WACM’s demand increasing by 200 MW at same time PSCO’s demand decreasing by 200 MW
- Pooling: the ramps “cancel” to 0 MW

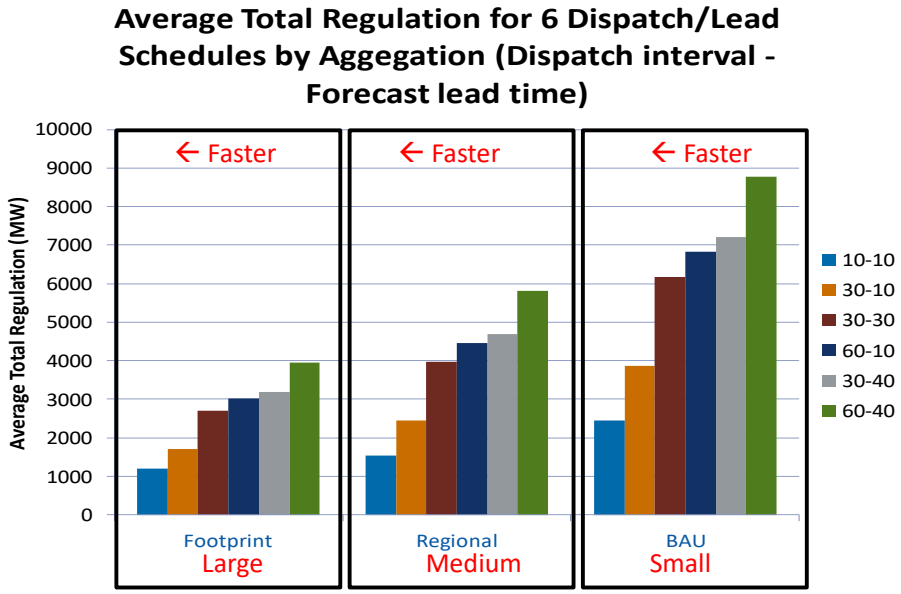
Example of resource “pooling” in market



- WACM’s demand increasing by **200 MW** at same time PSCO’s demand decreasing by **100 MW**
- Pooling: the ramps net to **+100 MW**

Overview: Sumo-wrestler Theory of Effective Markets

- **Electricity markets should be as *big* and *fast* as possible to achieve efficiency**

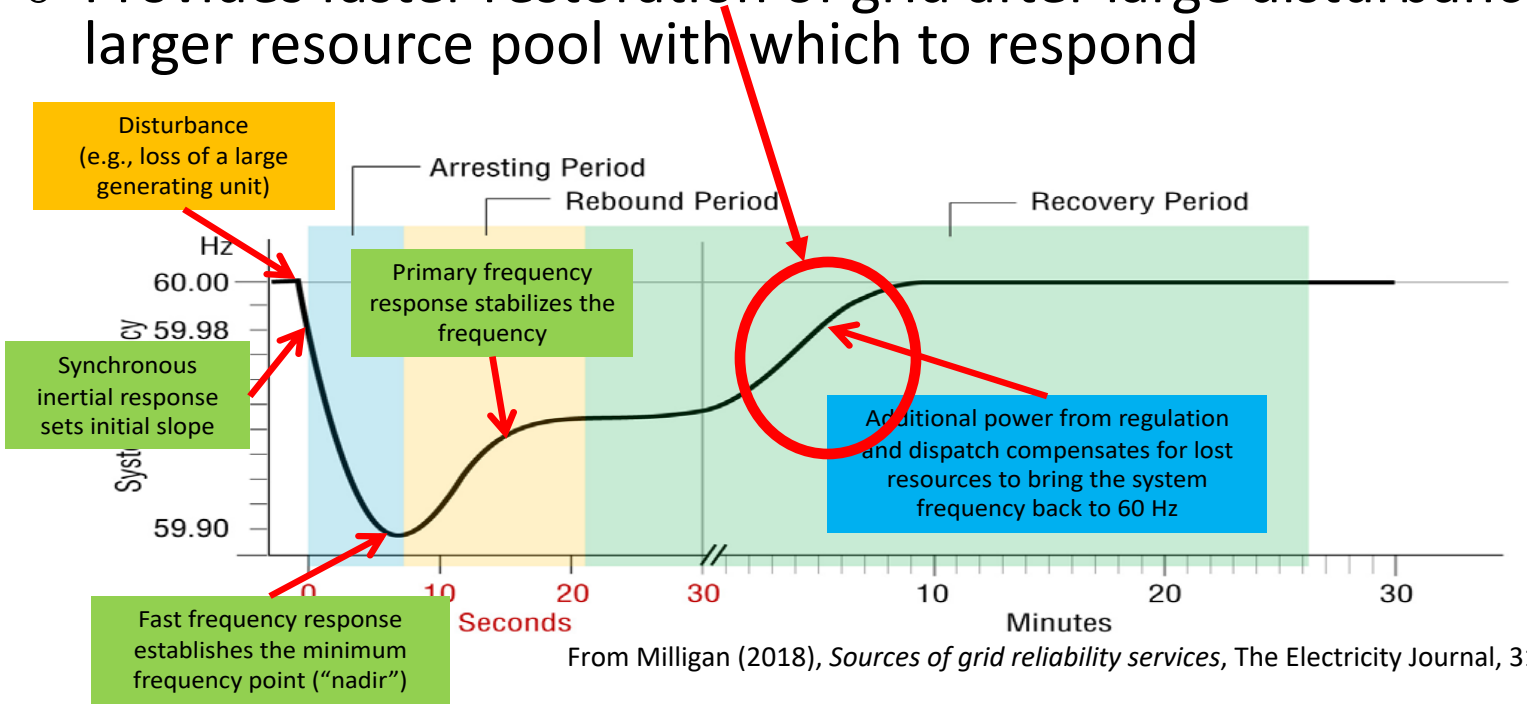


- **Reserves can be reduced, freeing more generation to serve load, increasing reliability and efficiency**

Kirby, King, Milligan, Beuning (2012), Operating Reserve Reductions From a Proposed Energy Imbalance Market With Wind and Solar Generation in the Western Interconnection. https://www.nrel.gov/docs/fy12osti/54660.pdf

Large/fast energy markets help reliability

- **Provide better visibility of system conditions to operators in both normal and abnormal conditions**
- **System is "re-balanced" every 5 minutes in U.S. wholesale markets**
  - Provides faster restoration of grid after large disturbance and larger resource pool with which to respond



From Milligan (2018), *Sources of grid reliability services*, The Electricity Journal, 31(9), pp. 1-7.

See also FERC staff paper: Qualitative Assessment of Potential Reliability Benefits from a Western Energy Imbalance Market. https://www.caiso.com/Documents/QualitativeAssessment-PotentialReliabilityBenefits-WesternEnergyImbalanceMarket.pdf

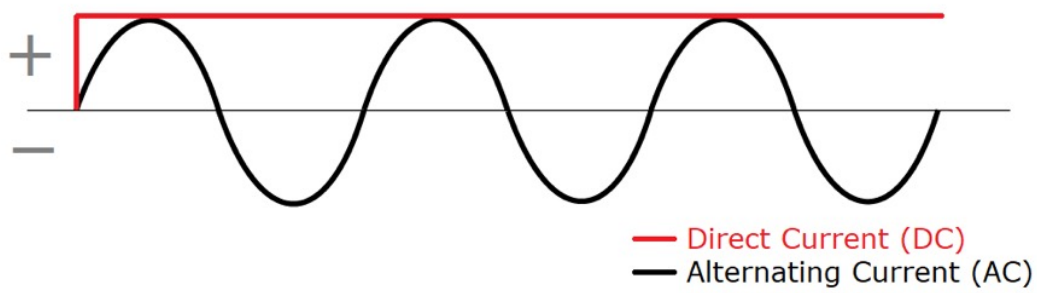
Large planning areas/markets can reduce need for installed generation

- Ibanez and Milligan (2012) developed reliability model of the Western Interconnection
- Objective: evaluate the reduction possible in installed capacity with extensive transmission and regional coordination
- Used typical reliability target: Loss of load expectation 1 day/10 years
- Found that *up to* 60 GW (peak system of 244 GW) of capacity could be replaced if a "perfect" transmission grid were built
- We'll never get to perfection, but this demonstrates how transmission and coordinate regional planning and markets could result in more cost-effective reliability

E. Ibanez and M. Milligan, "Impact of transmission on resource adequacy in systems with wind and solar power," *2012 IEEE Power and Energy Society General Meeting*, San Diego, CA, USA, 2012, pp. 1-5, doi: 10.1109/PESGM.2012.6343955.

The digital revolution and the power system

- **Digital revolution* at the same time as technology revolution**
  - Power electronics/software coupling from DC devices to AC grid: wind, solar, battery, …



  - Within physical limits we can now specify responses, which can be fast and accurate
  - An ***inverter*** "translates" the DC signal into a synchronous AC signal, under the direction of software
- **Wind, solar, and battery storage all operate with an inverter, and can therefore supply many grid services required for reliability**

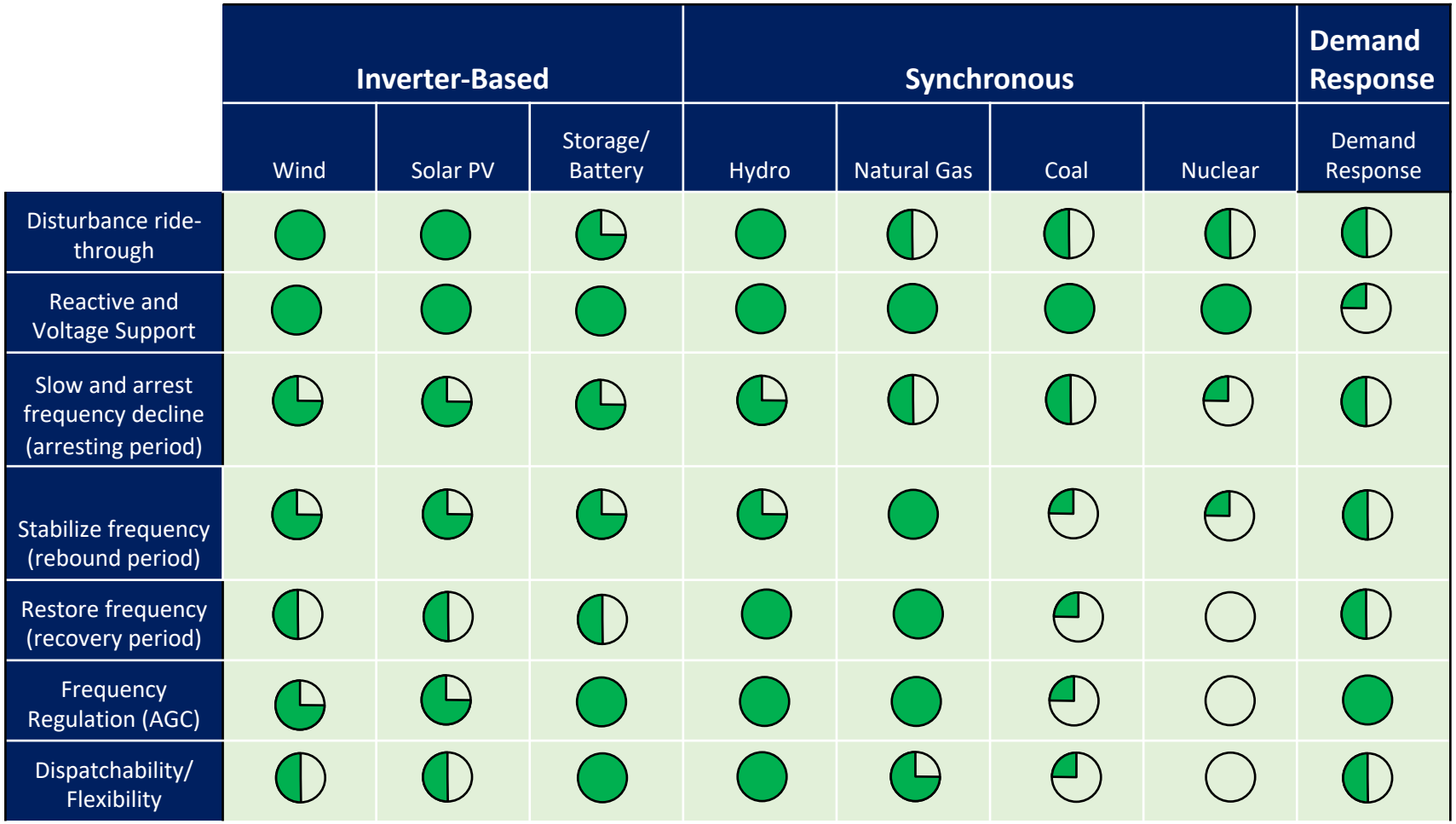
*Thanks to Mark Ahlstrom for this interesting perspective.

The supply of grid services will change

- Grid services (balancing, frequency regulation, etc.) historically provided by thermal resources
- Many of these resources have retired, or announced future retirement
- Renewables can provide most of these services, in most cases more accurately and faster than conventional resources
- However, in some markets, rules prevent renewables/storage from providing these services
- This prohibition, if left unchecked, could threaten reliability

The supply of grid services should not be artificially constrained by rules that discriminate based upon resource type and are not based upon performance.

Sources of grid services



From Milligan (2018), *Sources of grid reliability services*, The Electricity Journal, 31(9), pp. 1-7. Available at milligangridsolutions.com/pubs. Modified with First Solar data

Resilience

- **Example from MISO during winter storm Elliot (Operations Report to Entergy Regional State Committee, Feb 13, 2023)**

MISO consistently exported power to southern neighbors with a maximum value of nearly 5 GW

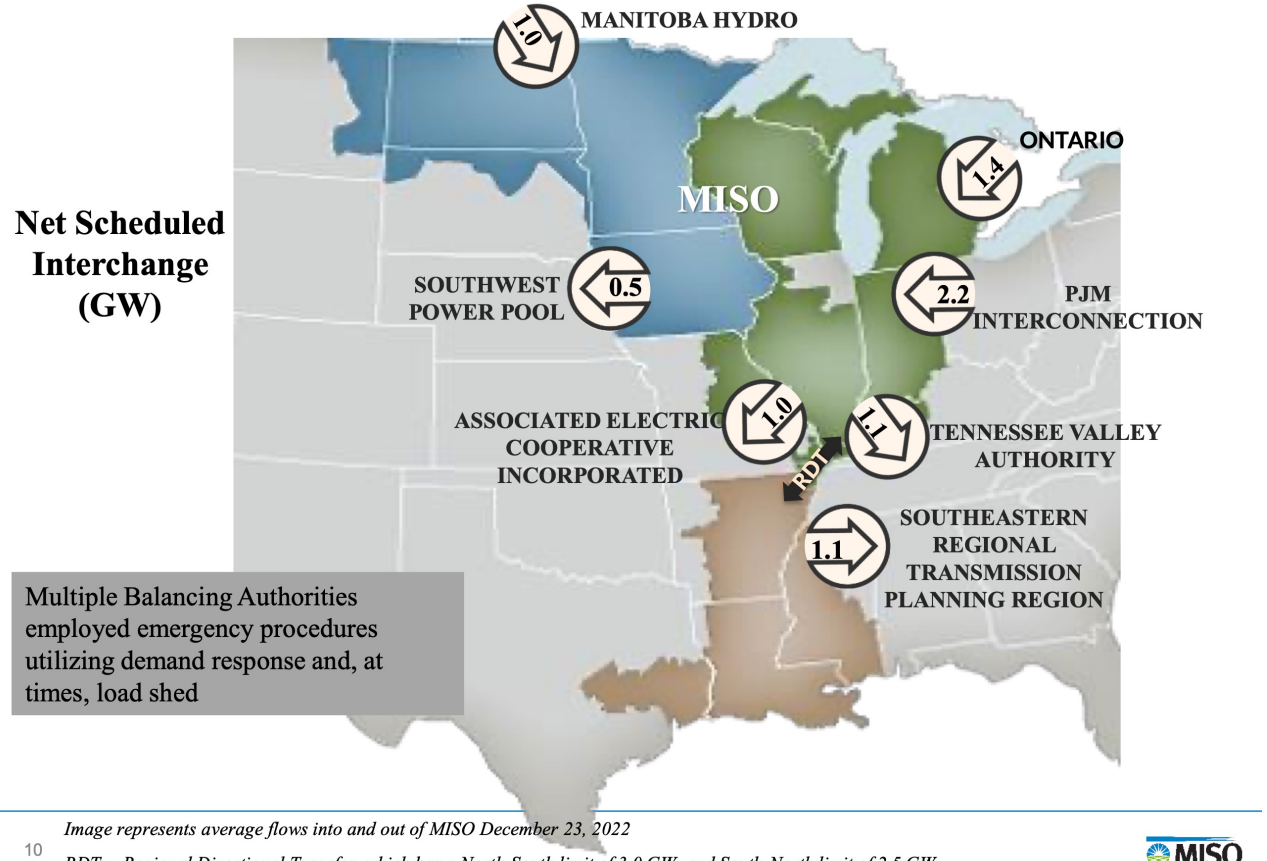


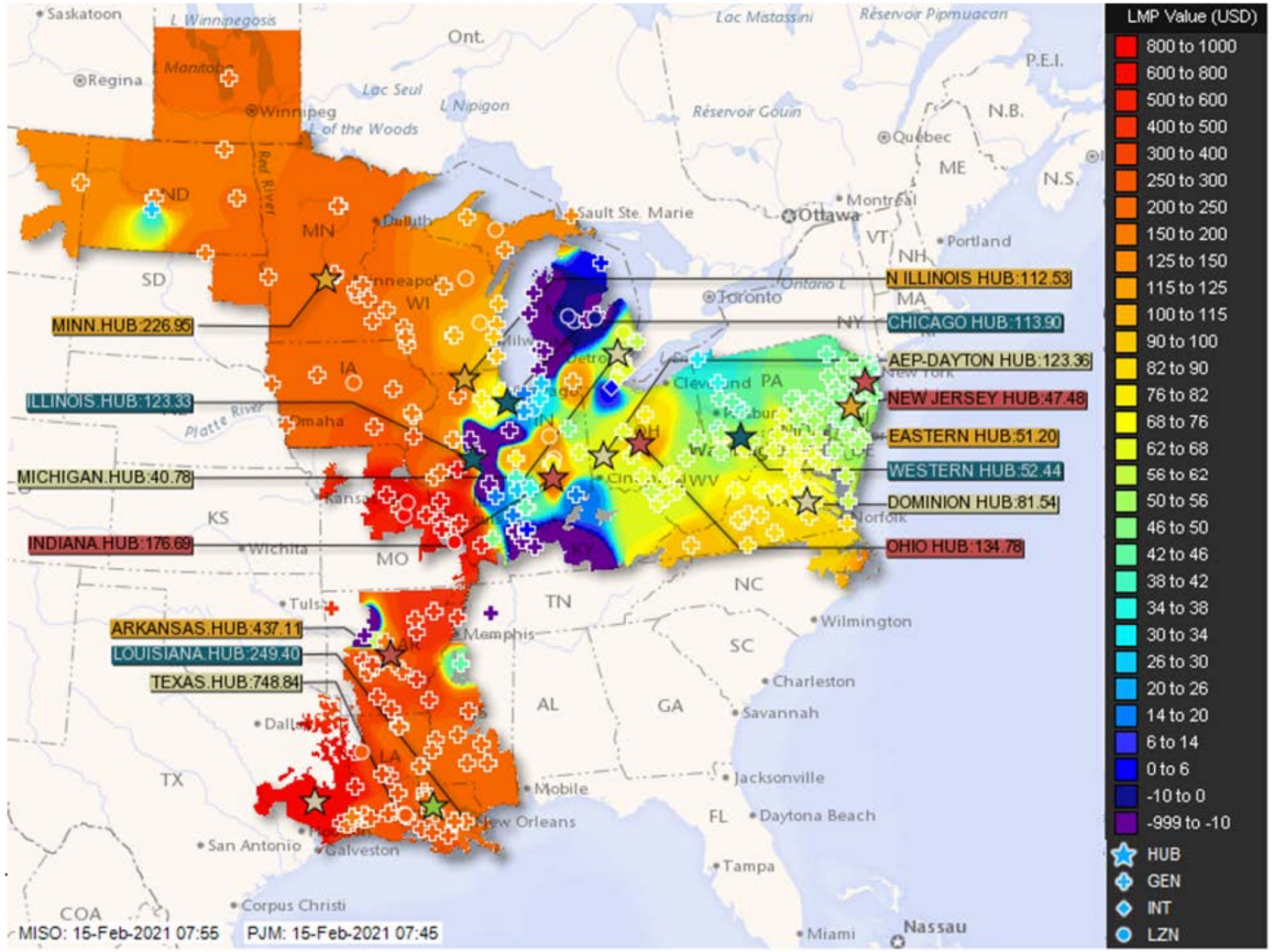
Image represents average flows into and out of MISO December 23, 2022

RDT = Regional Directional Transfer, which has a North-South limit of 3.0 GW and South-North limit of 2.5 GW

10

- **https://cdn.misoenergy.org/20230213%20ERSC%20Item%2006%20South%20Operations627868.pdf**

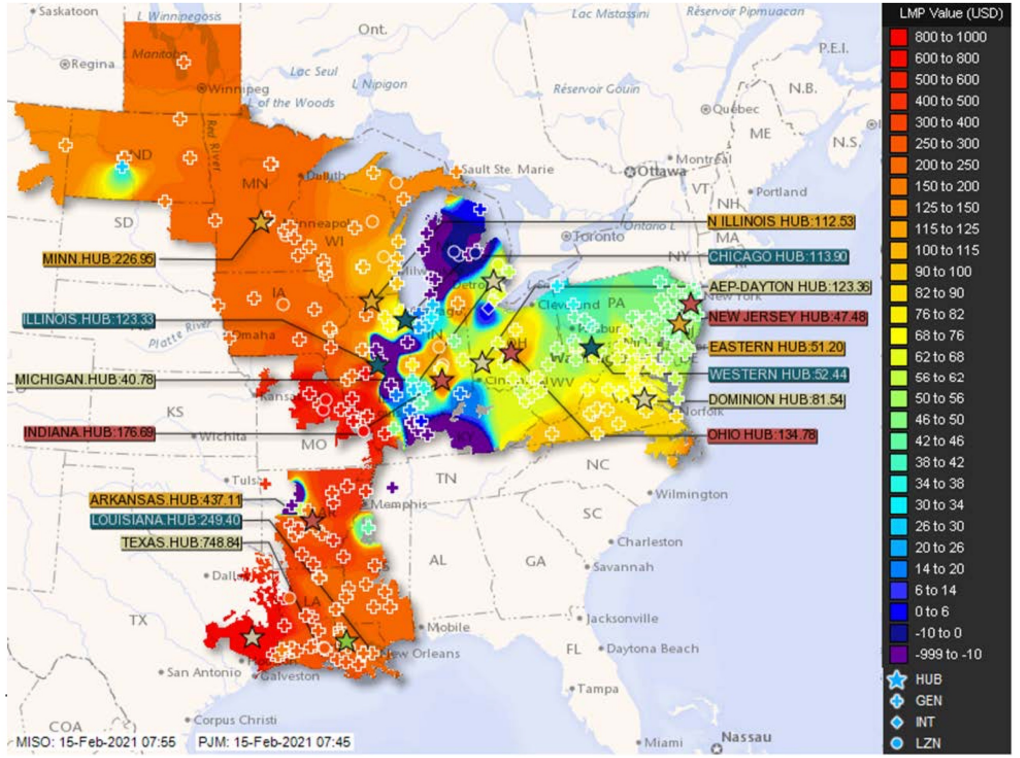
Energy prices during Uri



Gramich and Goggin: https://gridprogress.files.wordpress.com/2021/11/transmission-makes-the-power-system-resilient-to-extreme-weather.pdf

Markets greater than storm footprints help

- **Energy exports into shortage regions were stranded**
- **Regions in blue/purple have excess generation**
- **Red/orange are experiencing shortages**
- **A single, large market *with* significant new transmission would help**



SPP, MISO, and others have, or are in process of, revising emergency procedures that include resource sharing during extreme weather

Recommendations

- **Large markets have significant benefits to cost, reliability, and resilience**
- **Market products should be well-defined**
- **Any resource that is capable of providing a service should be able to compete to provide it**
- **Transmission is necessary to enable markets to unlock their potential benefits**

Numerous studies have confirmed

Questions?

2023-2024 Campaign Plan

ABOUT WESTERN FREEDOM

Bringing energy freedom to the West

Western Freedom is a broad coalition of large customers working with a diverse set of partners - energy experts, nonprofits, and thousands of grassroots supporters advocating for a more affordable, reliable and cleaner energy future made possible through a Western RTO. Western Freedom is a single-purpose organization focused solely on supporting a Western RTO that holds the largest benefits for customers, while also recognizing the unique needs and makeup of all Western states and utilities.

WHY A WESTERN RTO

Stronger, more reliable grid

Using the latest technology, an RTO will balance supply and demand on the grid across the West – creating a more reliable system, particularly in periods of extreme weather and increased demand.

Low-cost energy

Designed to automatically dispatch the lowest-cost electricity available. Industrial and large commercial customers poised to save a meaningful amount.

Diverse energy resources

A west-wide approach to balancing our grid makes it easier to integrate the variable output of renewable power and new resources like hydrogen. This makes it easier to reach corporate, government, and utility climate and sustainability goals.

Why it matters to large customers?

Greater reliability: An RTO enables power-sharing across large regions when subregions are short on generation

Low-cost resources: An RTO provides greater access to low-cost, more diverse resources across the Western region

Transparency and data: An RTO will create more transparency and access to data

Regional planning: Transmission and capacity planning will be more efficient and cost-effective

Evolving movement

Day-ahead markets

California ISO EDAM and Southwest Power Pool's Markets+ competing for participants

California governance bill

Critical legislation needed in California to open the CAISO market and create equal playing field for all Western states

New leadership in some western states

2022 elections creating the opportunity to educate and engage new policy makers

FERC regulatory dockets

Federal action impacted resource adequacy, transmission and markets

CAISO: Extended Day Ahead Market

FERC process

- Likely to begin in late Spring 2023
- Likely be extensive stakeholder engagement
- Once FERC approves the application, expected to take 12-18 months for implementation and full launch of EDAM

Adoption

- PacifiCorp is the only utility to have committed to EDAM
- Expect several other utilities will commit within the next few months
- Western Freedom signed onto a coalition letter of support to CAISO board and WEIM Governing Body
- EDAM expected to be operational by 2025
- 22 entities participate or committed to participate in Western Energy Imbalance Market
    - 6-month notice requirement to leave WEIM, which has not yet been exercised by any utility

SPP: Markets+

Stakeholder engagement

- Detailed service offering issued Nov. 30, 2022
- Next phase of development funded by stakeholders and utilities

Timeline

- Phase 1 to begin April 2023, lasting between 12-21 months
- Expect Markets+ to be operational in early 2026

Adoption

- BPA, Northwest public power utilities, Arizona utilities committed to fund Phase 1
- Powerex only entity to have committed to Markets+ upon implementation
- 10 entities participating in Western Energy Imbalance Services market

SPP: RTO West

Structure

- SPP's RTO West is an expansion of SPP's RTO into the Western Interconnection
- Will be governed by the same body/oversight as currently exists
- The implementation of SPP's RTO West will happen in parallel with Markets+

Adoption

- Potential market participants who have already proposed to join SPP's RTO West must officially commit to join by March 1, 2023
- 2-year timeline to fully integrate
- Ability to join depends on whether the Balancing Authority is committing to join

Western Power Pool's Western Resource Adequacy Program

Program

- Establishes consistent metrics for reliability across the region and all participants must show they have the required capacity to meet those metrics
- When weather conditions or other factors result in different resources in real time than what was forecast, the WRAP can pool resources and enable participants with shortages to obtain resources from those with surplus
- SPP program operator
- PacifiCorp's announcement committing to both EDAM and WRAP will serve as a forcing mechanism to ensure these programs are compatible

Approval process

- Tariff proposal filed with FERC on Aug. 31, 2022
- FERC issued a deficiency letter requesting more information
- Expect FERC order as soon as this week

Adoption

- 11 utilities announced a formal commitment to participate in the WRAP on Dec. 8, 2022

California

AB 538: Multistate regional transmission system organization: membership

- Assemblymember Holden introduced AB 538 on Feb. 8, 2023
- Would change CAISO's governance structure and enable CAISO to transition into a regional transmission organization
- At least 30 days until first hearing
- California has a 2-year legislative session; we are in the first year of the 2023-24 session

Lights On California

- Initial phase: socializing RTO issues (Fall 2022 - Spring 2023)
  - Message Development, Communications Infrastructure, Materials
  - Coalition-building
- Next phase: Advocacy and active campaigning (March 2023 - end of 2023-24 Session)
  - Member Education and Outreach, Coalition Management
  - Earned, Social, Paid Media


2023-2024 CAMPAIGN PLAN

Campaign plan assumptions

Core assumptions

- Successful launch and implementation of CAISO's EDAM is essential.
- Appetite for a Western RTO varies across the western states.
  - Commissioners from several states are still publicly vocal about not wanting to join an RTO with California and are skeptical of RTOs generally.
- Day-ahead market is predicted to build upon benefits already demonstrated by real time markets and build trust across states in regional collaboration.
- The passage of the governance bill in California (2023-2024 session) is a critical milestone to the path toward a Western RTO that includes California.

Campaign goals

Primary:

- Secure governance legislation in California in the 2023-24 legislative session
- Amplify customer perspective in SPP's Markets+ and CAISO's EDAM
- Develop public benefit narrative to create political cover to secure critical utility support for CAISO's EDAM

Secondary:

- Be known as the voice of customers in the West on RTO matters
- Build partnerships/coalition with utilities in support of a western RTO
- Drive collaboration to achieve faster RTO development
- Shape favorable RTO policy in select states; prevent unfavorable policy from passing that would discourage utility participation in a day-ahead market
- Enable more utilities to participate in day-ahead market by creating political cover and support
- Garner support from select commissions around day-ahead market
- Garner support from rural co-op utility associations
- Build awareness with BPA of the large customers' position

Target audiences

Primary

- Utility executives and decision makers
- Regulators / commissioners in the 11 Western states
- Energy policy makers at the state and, to a lesser extent, federal level in the 11 Western states
- Executives and decision makers at BPA and public power
- Industry influencers
- Labor union leaders
- Residential, commercial and industrial customer advocates

Secondary:

- Select western tribal leaders
- Select national energy reporters
- Environmental groups and Environmental and Social Justice influencers


WESTERN FREEDOM

Thank you!

- Lauren McCloy, NW Energy Coalition, lauren@nwenergy.org
- Robin Arnold, Renewable Northwest, robin@renewablenw.org

NW Energy Coalition
for a clean and affordable energy future