Nevada Regional Transmission Task Force
November 15, 2023

Agenda

- Greenlink Nevada
- Resource Adequacy
- Status of Market Efforts
  - Day Ahead Markets Updates
  - Western Markets Exploratory Group Cost Benefit Study Overview
- Regional Transmission Organization Evolution
  - Market Governance of M+, EDAM, Pathway Initiative
  - Alternate Regional Transmission Efforts
- Potential Future Transmission

Greenlink Nevada Transmission

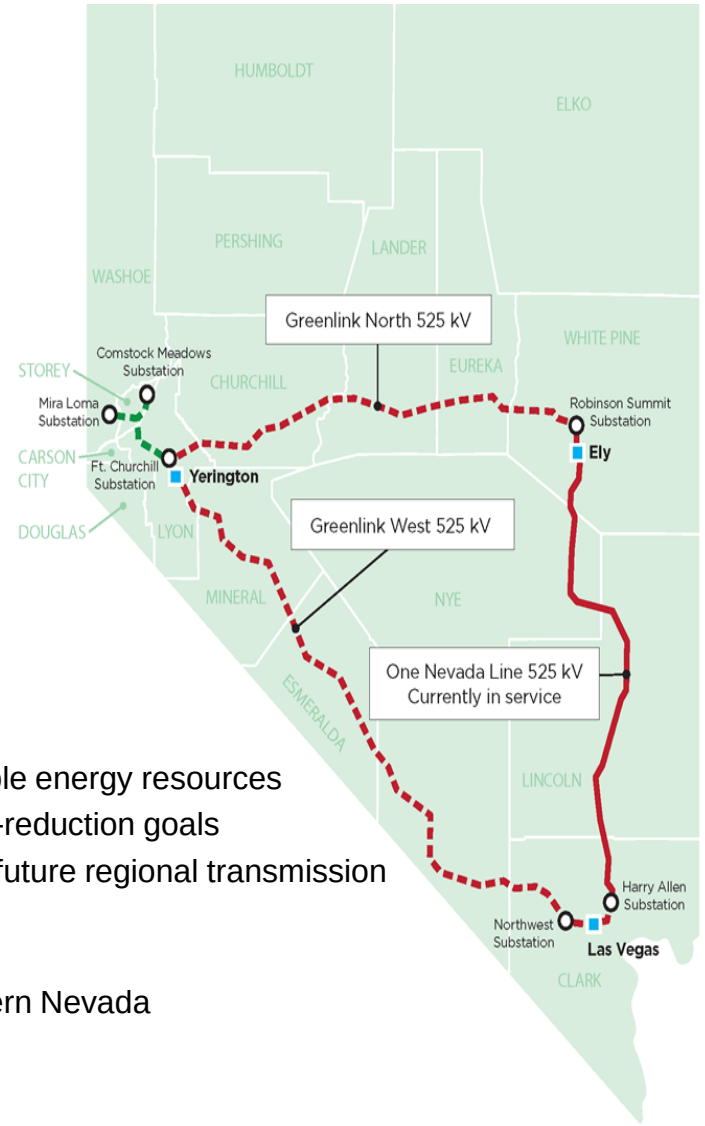
Greenlink Nevada Transmission Benefits

Greenlink Nevada is a transmission initiative that will make Nevada a leader in the clean energy economy

- **Environmental Benefits**
  - Moves Nevada closer to a future powered by 100% renewable energy
  - Creates a renewable energy highway that allows access to Nevada's resource-rich renewable energy zones that could not previously be developed due to the lack of necessary transmission infrastructure
  - Positions Nevada to diversify its renewable portfolio by creating access to affordable wind and hydro energy across the western United States
  - It is important to note that Greenlink does not provide resources. It enables resources to be connected and delivered reliably. NV Energy would seek approval from the Commission to own and purchase resources
- **Economic Recovery**
  - Generates $690 million in economic activity
  - Creates nearly 4,000 good-paying jobs
  - Allows NV Energy to meet future energy demands, allowing for economic growth and job stability
  - Promotes economic diversification by making Nevada a smart investment for businesses interested in relocating to States that offer affordable clean energy
  - Supports underserved communities by enabling job creation in rural and hard-to-reach communities
- **System Reliability**
  - Improves system reliability and ability to transfer electricity within Nevada and to other states
  - Provides a second transmission path between northern and southern Nevada

Greenlink Nevada Transmission Project

- **Greenlink West**
  - Fort Churchill to Northwest 525 kV
  - Northwest to Harry Allen 525 kV
  - Northwest substation expansion
  - Amargosa and Esmeralda 525/230 kV collector substations
- **Greenlink North**
  - Fort Churchill to Robinson Summit 525 kV
  - Lander 525/230 kV collector substation
- **Common Ties**
  - Fort Churchill 525-345-230-120 kV substation
  - Fort Churchill to Mira Loma 345 kV
  - Fort Churchill to Comstock Meadows #1 345 kV
  - Fort Churchill to Comstock Meadows #2 345 kV
- **Benefits for customers and the state of Nevada**
  - Creates access to new areas of the state to develop affordable renewable energy resources
  - Facilitates ability to meet Nevada's renewable development and carbon-reduction goals
  - Positions Nevada to benefit from renewable energy resource mix when future regional transmission projects interconnect at Robinson Summit
  - Strengthens electric reliability for Nevada
  - Aligns with long-term statewide economic growth in northern and southern Nevada
  - Positions Nevada as an energy leader in western U.S.



Greenlink Nevada Transmission Status

Milestone	Status	
	Greenlink West	Greenlink North
Pre-planning/data gathering	Complete	Complete
Engineering design	30% to 60%	10% to 30%
Series capacitors, circuit breakers, switches, control cable, transformers, reactors	Purchase order issued	Purchase order issued
Transmission line construction, conductor	Contract negotiations	Contract negotiations
Substation construction	Technical evaluation	Technical evaluation
Telecommunications construction, poles	Request for proposals	Request for proposals
BLM Notice of Intent	Complete	Complete
BLM Draft Environmental Impact Statement	Complete	December 2023
BLM Final Environmental Impact Statement	March 2024	June 2024
BLM Record of Decision	June 2024	September 2024
BLM Notice to Proceed	December 2024	February 2025
In-Service	May 2027	December 2028

Project (Includes contingency and AFUDC)	Length	Voltage	In-Service
Greenlink West (Fort Churchill substation to Northwest substation)	326 miles	525 kV	2027
Greenlink West (Harry Allen substation to Northwest substation)	33 miles	525 kV	2028
Common Ties	81 miles	345 kV	2027
Greenlink North	234 miles	525 kV	2028

Nevada Will Receive Immediate Benefits

Nevada's job market and economy will immediately see benefits of this initiative while customers will not see rate impacts for Greenlink Nevada before 2025 at the earliest.

- NV Energy will make all efforts to control project costs and reduce rate impacts for the initiative by exploring options such as extending the amortization period for cost recovery and levelizing rates over the life of the project.

- Customers' electric prices will be favorably impacted as the initiative will create more opportunities for low-cost renewable development in the state and will allow for both the import of low-cost resources from out of state markets and export of the state's energy into western energy markets.

- Portions of these projects would be paid for by other states and private companies that choose to utilize Nevada's new clean energy highway created by this transmission infrastructure.

Resource Adequacy

Western Resource Adequacy Program ("WRAP")

- A voluntary Resource Adequacy program that models and plans for Resource Adequacy at a regional level
  - Northwest and Southwest remain separate
- The program includes a planning component and an operational component
  - Planning component: A Forward Showing to cover load + a Planning Reserve Margin (PRM) determined for each month
  - Operational Component: A program that matches participants that have excess supply and those that are deficit to share during scarcity events
- The Planning Reserve Margin currently ranges between 12-22% varying monthly for 2023 -2024 and between 15-32% for 2026-2027
- The WRAP Program is in a transitional phase as participants sign up to join as a binding participant by selecting which season to become binding
  - (Summer 2025 – Winter 2027- 2028)

Planning Reserve Margins Future Years

- Metrics provided are based on modeling completed with data that was provided by participants before the WRAP tariff was approved
- Metrics are representative of:
  - The participants that were in WRAP before the tariff was approved
    - Public Service Company of New Mexico was not a part of the footprint during this Phase
  - The modeling assumed full participation and not a transitional period where not all members would be binding. Non-binding members are not included in the footprint to increase the diversity benefit. Meaning the Planning Reserve Margin may increase

	Summer 2027			
	Jun	Jul	Aug	Sep
DSW/E	20.1%	14.7%	15.8%	23.2%

Summer 2027 Forward Showing

Requirements Summary					
	Season	June-2027	July-2027	August-2027	September-2027
Program Monthly PRM	Summer	20.1%	14.7%	15.8%	23.2%
Forward Showing Obligation	Summer	9,355.8	9,782.8	9,517.6	9,175.9
Surplus/Deficient Capacity	Summer	-1,387.7	-1,669.8	-1,459.2	-1,514.2
Forward Showing Requirement Met	Summer	No	No	No	No

» Notes:

1. This capacity contribution does not include any capacity that was proposed in the 5th Amendment
2. Do not have a load forecast from SPP, therefore, the NVE 5th Amendment forecast for July 2027 was used
3. Planning Reserve Margin reflects a full footprint from WRAP that was modeled during phase 3A, we will not achieve this until Summer 2028, therefore, we expect the Planning Reserve Margin to be a little higher
    1. PRM does reflect diversity with the Desert Southwest Region, but not with the Northwest because WRAP assumes zero connectivity
4. Using Qualifying Capacity Contribution (QCC) values for resources that were received from SPP for year's 2023 and 2024
5. If we cannot meet the Forward Showing requirement, then penalties will be applied

Supply Requirements

- If an Entity needs to purchase additional supply to meet the Forward Showing Requirement, there are requirements for that supply to qualify:
  - Source Specific
    - Source of the supply must be specified in the contract
  - Firm Transmission Path
    - Firm transmission path from source to sink must be specified in the contract
  - Signed Affidavit
    - stating the resource is not used for other resource adequacy needs and an assurance that the seller will not fail to deliver
  - The contract should be in place by the Forward Showing submission
    - 7 months prior to the start of the season

- Resource Adequacy Transfer: WRAP Participants may agree to transfer their Forward Showing Capacity Requirement amongst one another. Such transfer must be submitted by both Participants to the WPP along with the transmission service arrangement between the two Participants' systems supporting such transfer

Day Ahead Market Updates

Day Ahead Energy Market Development

- Participation in a day-ahead market could allow for:
  - Additional fuel and purchase power cost savings
  - More efficient and diverse renewables integration
- Being a Participant in a day-ahead market is not equivalent to becoming a full member of CAISO or SPP RTO. NV Energy would retain the following functions:
  - Transmission control, planning and cost allocation remains with NV Energy
  - Resource Adequacy and Resource Planning will continue to remain with member utilities and their respective regulating authorities
- EDAM
  - The EDAM would extend the CAISO's day-ahead market to WEIM Entities who choose to participate, leveraging existing systems
  - Along with the implementation of EDAM, CAISO will also implement enhancements to its Day Ahead Market at the same time which create new market products and enhance their reliability product
- SPP Markets +
  - SPP is currently developing its Markets + day-ahead market that would provide offerings to its non-RTO members. This will include the development of a real time market in future offerings

EDAM Timeline

- September 15, 2022 – Release tariff framework outline
- September 26, 2022 – Comments on Revised Straw Proposal
- October 31, 2022 – Post Draft Final Straw Proposal
- November 7, 2022 – Publish tariff framework
- November 14, 2022 – Stakeholder Meeting
- November 22, 2022 – Comments on Draft Final Proposal
- November 28, 2022 – Comments on tariff framework
- December 7, 2022 – Publish Final Proposal
- December 14, 2022 – Briefing to WEIM Governing Body and Board of Governors
- Q1 2023 – Publish draft tariff
- August 2023 – EDAM/Day Ahead Market Enhancements tariff filing at FERC
- December 2023—FERC Approval
- 2025 – Systems, Testing and Implementation
- 2026 – EDAM go-live

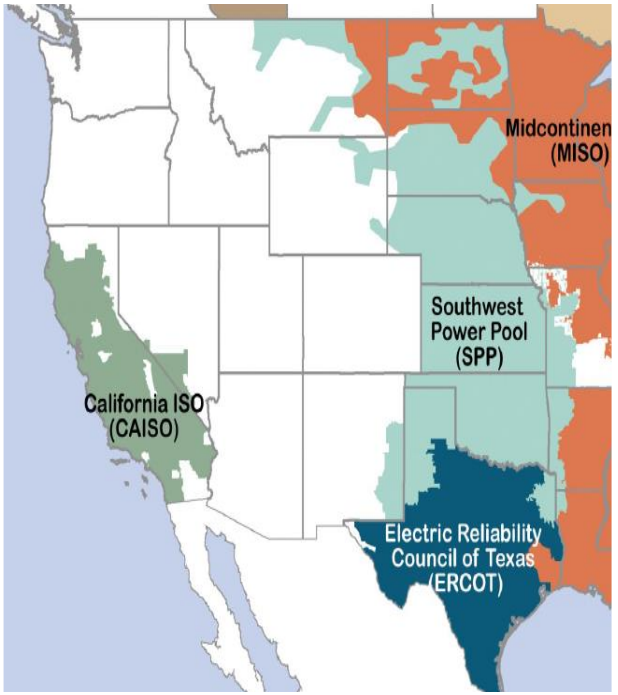
Markets + Timeline

- September 30, 2022 – Draft Markets + Service Offering
- October 28, 2022 – Comments on the draft service offering
- November 1, 2022 – Webinar on Phase I cost estimates and funding methodology
- November 15 -16, 2022 – Development sessions in Denver
- November 18, 2022 – Final service offering
- Q1 2023 – Commitment to Phase I participation
- April 1, 2023 --Phase I
  - Phase 1 was originally projected to last 21 months and cost $9.7m total, which will be split by entities net energy and generation. Run beyond 21 months billed at $500k monthly. Phase 1 participants expressed an eagerness to accelerate Phase 1 to have draft tariff language filed by Q1 2024.
  - Phase I participants will establish business practices, operational criteria, and draft tariff language
- Q1 & Q2 2024—FERC Filing and approval
- 2024 – Phase II—escalation of implementation/ procurement of systems
- 2025– Systems, Testing and Implementation
- October 2026– Markets + Go Live

WMEG Cost Benefit Study Background

Western Markets Exploratory Group

- Formed in 2021, the WMEG is focused on developing long-term approaches to improve market efficiencies in the West and incorporating lessons learned from existing regional markets
- Western Markets Exploratory Group Members (25)
  - NV Energy
  - PacifiCorp
  - Idaho Power
  - Public Service Colorado
  - Black Hills Energy
  - Platte River
  - Public Service New Mexico
  - Arizona Public Service
  - Salt River Project
  - Tucson Electric Power
  - Portland General Electric
  - Puget Sound Energy
  - Seattle City Light
  - Los Angeles Department of Water and Power
  - Northwestern
  - Bonneville Power Administration
  - WAPA
  - El Paso Electric
  - Arizona Electric Power Cooperative
  - Tri-State Generation
  - Avista
  - Chelan County Public Utility District
  - Tacoma Public Utilities
  - Grant County Public Utility District



- The group initiated a cost benefit study to compare the EDAM and Markets + day ahead market offers and incremental steps to RTO participation.

Footprints Scenarios by Utility

Zone	EDAM Bookend	Markets+ Bookend	Main Split	Alt Split 1	Alt Split 2	Alt Split 3	Alt Split 4
CAISO	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM
BANC	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM
LADWP	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM	CA-EDAM
WAPA SNR	CA-EDAM	NW-Markets+	CA-EDAM	NW-Markets+	CA-EDAM	NW-Markets+	NW-Markets+
PAC	NW-EDAM	NW-EDAM	NW-EDAM	NW-EDAM	NW-EDAM	NW-EDAM	NW-EDAM
IPCO	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	NW-EDAM	NW-EDAM	NW-EDAM
NWMT	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	NW-EDAM	NW-EDAM	NW-Markets+
Avista	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	NW-EDAM	NW-Markets+	NW-Markets+
BPA	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	NW-EDAM	NW-Markets+	NW-Markets+
Chelan	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	NW-EDAM	NW-Markets+	NW-Markets+
Grant	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	NW-EDAM	NW-Markets+	NW-Markets+
PGE	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	NW-EDAM	NW-Markets+	NW-Markets+
PSE	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	NW-EDAM	NW-Markets+	NW-Markets+
SCL	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	NW-EDAM	NW-Markets+	NW-Markets+
Tacoma	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	NW-EDAM	NW-Markets+	NW-Markets+
WAPA UGP	NW-EDAM	NW-Markets+	NW-Markets+	NW-Markets+	RK-Markets+	NW-Markets+	NW-Markets+
NVE	SW-EDAM	SW-Markets+	SW-Markets+	SW-EDAM	SW-Markets+	SW-EDAM	NW-EDAM
AEPCO	SW-EDAM	SW-Markets+	SW-Markets+	SW-EDAM	SW-Markets+	SW-EDAM	SW-Markets+
APS	SW-EDAM	SW-Markets+	SW-Markets+	SW-EDAM	SW-Markets+	SW-EDAM	SW-Markets+
EPE	SW-EDAM	SW-Markets+	SW-Markets+	SW-EDAM	SW-Markets+	SW-EDAM	SW-Markets+
PNM	SW-EDAM	SW-Markets+	SW-Markets+	SW-EDAM	SW-Markets+	SW-EDAM	SW-Markets+
SRP	SW-EDAM	SW-Markets+	SW-Markets+	SW-EDAM	SW-Markets+	SW-EDAM	SW-Markets+
TEP	SW-EDAM	SW-Markets+	SW-Markets+	SW-EDAM	SW-Markets+	SW-EDAM	SW-Markets+
WAPA DSW	SW-EDAM	SW-Markets+	SW-Markets+	SW-EDAM	SW-Markets+	SW-EDAM	SW-Markets+
Black Hills	RK-EDAM	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+
PRPA	RK-EDAM	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+
PSCo	RK-EDAM	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+
TSGT	RK-EDAM	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+
WAPA RMR & CRSP	RK-EDAM	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+	RK-Markets+

E3 Cost Benefit Study
WECC-wide results

E3 Key Results: Single Market 2026

Cost Impact of EDAM Bookend (2026)

+ On a WECC-wide basis, the EDAM shows $60 million* cost reduction vs. BAU
+ Individual entity and regional results vary widely

Among WMEG Members

+ $20 million net cost increase overall

Among 25 WMEG members:

+ 18 entities with net cost savings (ranging from $0.5 to $55 million)
+ 7 entities with net cost increases (ranging from $10 to $111 million)

For Non-WMEG Entities

+ $80 million savings vs. BAU
  - Savings driven by reduced curtailment and reduced internal gas generation (replaced by imports from rest of market)
+ Non-WMEG Entities are primarily California-based (80% of load and 66% of gen capacity)

*$60 million WECC wide cost reduction for DA market represents 0.6% savings compare to $9.7 billion total production cost in BAU Case, which already reflects EIM/EIS markets in RT

*WECC adjusted production costs represent the variable cost (fuel + VOM + startup) of dispatching generators in the US WECC, net of revenue from exports to Alberta or the Eastern Interconnection, plus the GHG wheeling cost for powered imported to GHG regulated areas (CA, WA, and CO state) not allocated as GHG net revenue to market generation

E3 Key Results: Split Footprint 2026

Cost Impact of Main Split Footprint (2026)

+ On a WECC-wide basis, the Main Split shows $221 million more cost than BAU
+ Individual entity and regional results vary widely

Among WMEG Members

+ $26 million cost savings overall

Among 25 WMEG members:

+ 16 entities with savings (ranging from $4 to $134 million)
+ 9 entities with net cost increases (ranging from $0.3 to $190 million)

For Non-WMEG Entities

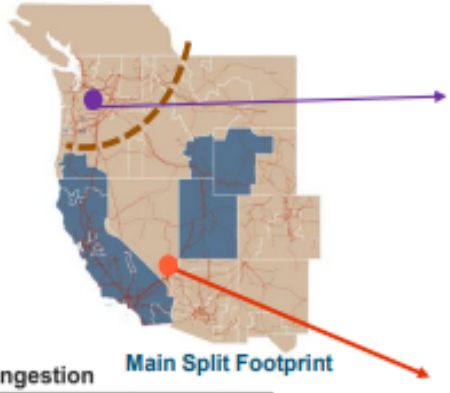
+ $247 million net cost increase vs. BAU
  - Costs increase from higher internal gas generation to replace cost of imports from rest of market
+ Non-WMEG Entities are primarily California-based (80% of load and 66% of gen capacity)

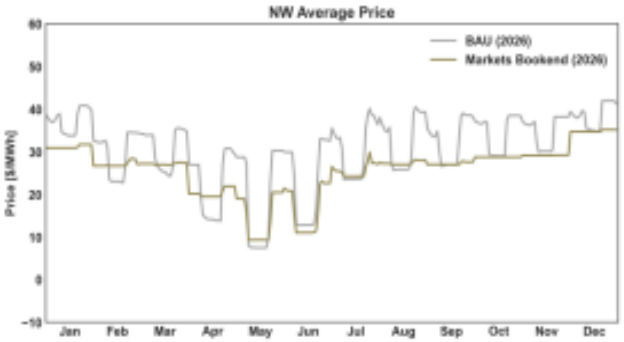
Markets+ Bookend case produces similar results as Main Split on a WECC wide basis and among WMEG members

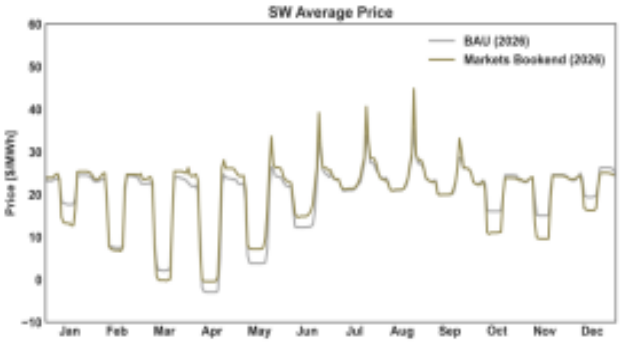
Transmission Utilization

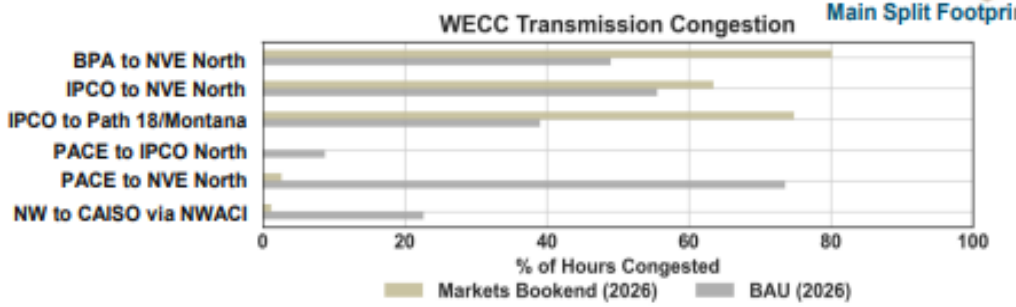
Results highlight importance of critical transmission lines for connecting Northwest & Southwest in Main Split Case

+ **In the Main Split Footprint, transactions between the NW and SW portions of Markets+ depend heavily on key paths through ID, NV, and MT**
  - Otherwise, necessary to wheeling into and out of the EDAM footprint through California or PacifiCorp
  - The Northwest portion of Market+ often has more local flexibility locally that it can use locally; transmission to the Southwest enables it to be more useful







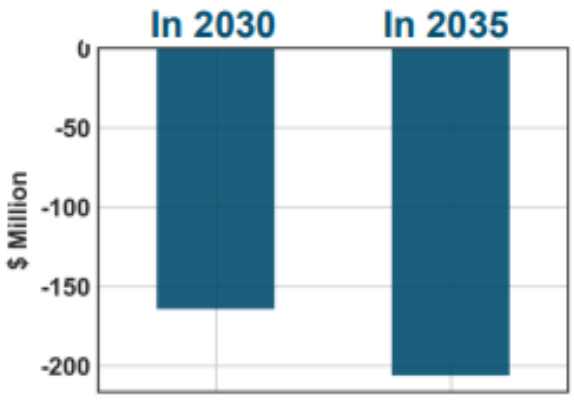


Seams between Markets

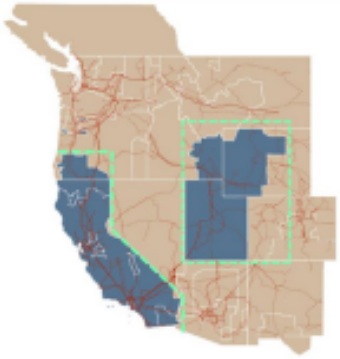
Improving Market-to-Market (M2M) coordination over seams can drive cost savings

- The WECC-wide cost increase in the Main Split Case was driven by a high cost of transactional friction over seams between the EDAM and Markets+ footprints
- Lowering the cost to transacting between markets reduced WECC-wide costs by over $150 million per year in the 2030 and 2035 M2M Cases
  - How to reduce cost of transacting between markets may take significant effort through market design and practices; this model result emphases that effort is worthwhile to pursue

WECC-wide annual cost change due to improved Market to Market Coordination



Market Seams in Main Split Footprint



Note:
In the Main Split Cases, exports from each market were modeled based on the weighted average of transmission wheeling costs of the market participants, plus $10/MWh of total of transactional friction and congestion risk in DA and RT

In the M2M Cases, the cost of transactional friction was reduced to $6/MWh in DA and $3/MWh in RT, resulting in significant WECC-wide savings

RTO

RTO Impacts: Coordination of Additional Transmission within Markets could reduce generation costs

- **The Study modeled a 2035 Split Footprint case with significant additional transmission for connecting each market**
- **Adjusted production costs in this case are $349M lower WECC-wide than the 2035 without the additional transmission additions**
  - Individual impact varies by participant with some seeing reduced cost and others increased cost compared to the case without additional transmission, but positive for majority of WMEG members
- **These savings represent variable production cost impacts only**
  - Total savings from transmission may also bring capacity and procurement benefits which could represent larger total impacts

2035 RTO Case

*Locations illustrative

WECC-wide Results

Results Summary

- **The EDAM Bookend with a single WECC market produces the lowest WECC-wide net cost, but with a wide range of results for individual entities (some positive, some negative) compared to the 2026 BAU case which includes the EIM and EIS in real-time**
  - The magnitude of WECC-wide production cost savings ($60 million) is relatively small (0.6% vs. $9.7 billion WECC wide cost in BAU);
- **The Main Split Footprint and Markets+ Bookend produces WECC-wide increase in net cost but with significant variation among entities**
  - The vast majority of this increase is an impact on non-WMEG members
- **Improved market to market coordination in the 2030 and 2035 cases reduce transactional costs to trading between zones and reduces WECC-wide net costs by over $150 million**
- **Transmission connecting the Northwest and Southwest is congested frequently in the Main Split Case, resulting in differences in prices between these zones**
- **This model has a starting platform that forms a core for future analysis**
  - any CBS funding members could choose to delve into additional questions or refine analysis for their own territory – as more details emerge or to test out other sensitivities for their own systems

NV Energy-Specific Cost Benefit Study Results

Generation Sufficiency

- NV Energy provided generation for the 2026, 2030 and 2035 cases in line with the assumptions used in NV Energy's Fourth Amendment of the 2021 Integrated Resource Plan
- Subsequently, NV Energy joined the Western Resource Adequacy Program
- NV Energy's initial results that showed planning assumptions for generation resulted in negative impacts to our customers from joining a market as a net importer (i.e. holding an open position for resources to serve load)
- Once NV Energy updated its generation assumptions to be in line with the WRAP requirements and NV Energy's preferred case in its Fifth Amendment of the 2021 Integrated Resource Plan, all market options show a benefit to NV Energy's Customers

Footprint Matters

- Two factors that most affect individual entity Total Net Costs are:
  1) whether the entity is a net purchaser or seller and whether the market footprint increases or decreases market prices
  2) the allocation of wheeling and congestion revenues—particularly on market seams. The market rules for these allocations are still being defined but could affect the individual benefits of many entities in the West.
- Absent transmission revenues and congestion revenues as calculated in this study, both markets are on a relatively level playing field for production cost benefits
- Continued Market design:
  - Wheeling Revenues
    - May not be allocated to all entities on a load ratio share at seams.
    - Congestion Revenues
  - May not be allocated on a load ratio share to market exports at seams
    - In Markets + NVE is allocated only to prevailing flows
    - In EDAM, congestion/transfer revenues are allocated 50/50 between BAs on interties and 100% when congestion occurs within a BA
- Footprint matters

NV Energy Prices

- EDAM Pricing
  - Lower midday prices during solar hours
  - EDAM has negative pricing due to solar penetration in the market April through June
  - Alt Split 4 (2 day ahead markets with NV Energy in EDAM) cases have lower pricing in day ahead and higher in real time, due to wind and solar load forecast errors between real time and day ahead, and due to day ahead Flex Reserve holdback

- Markets + Pricing in the Main Split
  - Main Split (2 day ahead markets with NV Energy in Markets +) cases have higher pricing in day ahead and lower in real time; Markets + includes fast start pricing adders in the day ahead, but not real time

- As time moves forward into different years with additional load and resources being added, we see that on an annual average the markets are very similar due to the lower pricing in EDAM during the spring months and the higher pricing in EDAM in the summer

- NV Energy's average energy pricing is higher in Markets +

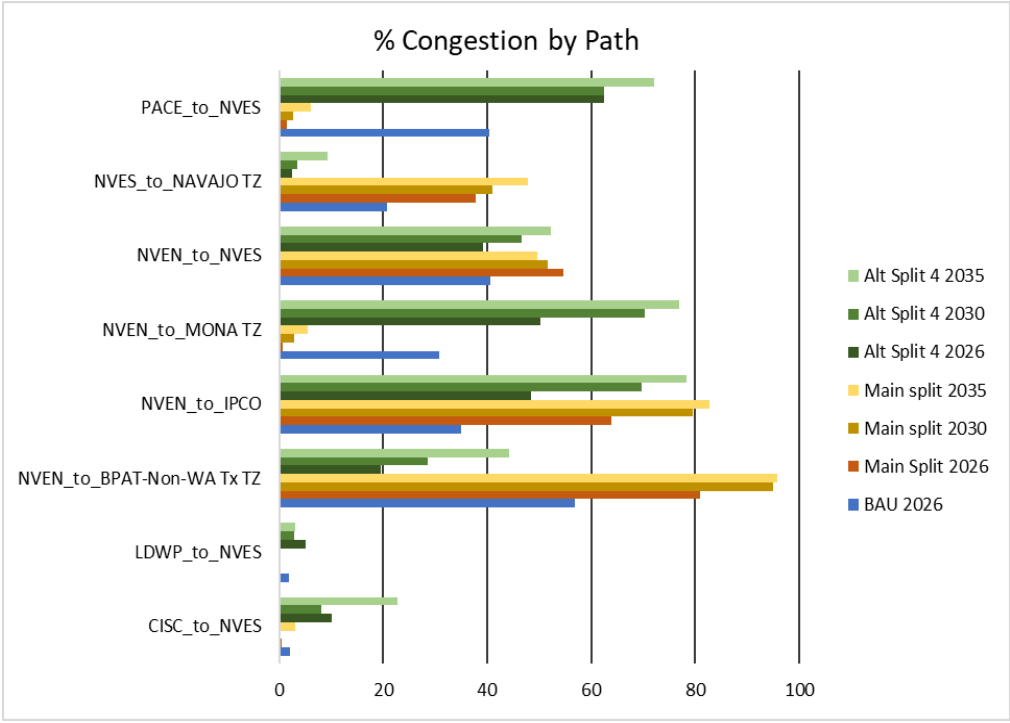
NV Energy-Specific 2026/2030/2035 Dispatch

- NV Energy is a net purchaser in the market
- Higher battery in EDAM; Higher solar in Markets +
- Increased curtailment of NVE resources in EDAM
- Alt Split 4 (2 day ahead markets/ NVE in EDAM)—increased gas generation in 2026/2030
- NV Energy Resource Sales - Increased in both markets- particularly Markets +

		Everyone but CA, PAC, WAPA SNR in M+	NW and SW go Markets+	Everyone but CA, PAC, WAPA SNR in M+	NW and SW go Markets+	Everyone but CA, PAC, WAPA SNR in M+	NW and SW go Markets+
		NVE in M+	NVE, ID in EDAM	NVE in M+	NVE, ID in EDAM	NVE in M+	NVE, ID in EDAM
		Case					
Annual Summary (MWh)	BAU (2026)	Main Split (2026)	Main Split (2030)	Main Split (2035)	Alt Split 4 (2026)	Alt Split 4 (2030)	Alt Split 4 (2035)
Nuclear	-	-	-	-	-	-	-
Other	1,905,237	1,905,518	1,092,050	294,636	1,905,458	1,093,675	294,636
Coal	-	-	-	-	-	-	-
Hydro	538,090	538,090	503,828	503,828	538,090	503,828	503,828
Gas	15,251,011	16,755,352	16,509,117	14,971,727	17,757,153	16,597,332	13,478,542
Customer Solar	513,241	513,241	879,442	1,249,056	513,241	879,442	1,249,056
Solar	11,947,814	12,160,049	17,386,701	20,448,946	11,775,149	16,883,161	18,331,696
Wind	160,088	160,088	160,088	2,994,297	160,088	160,088	2,994,297
Battery Storage	2,588,217	2,593,857	5,009,302	5,203,565	2,763,178	5,199,650	5,775,890
Pumped Hydro	-	-	-	-	-	-	-
Purchases--Gen Sufficier	6,553,926	5,548,142	4,623,292	4,058,788	5,345,411	4,974,864	5,714,132
Sales--Gen Sufficient	1,009,057	1,715,430	2,783,813	4,676,021	2,099,834	2,703,205	2,639,701
Curtailment--Gen Sufficient	389,642	177,408	432,324	944,468	562,308	935,863	3,061,719
Native Load	35,537,677	35,537,677	37,629,245	39,057,262	35,537,677	37,629,245	39,057,262
Load	38,448,567	38,458,907	43,380,006	45,048,823	38,657,933	43,588,836	45,702,376

Transmission Congestion Summary

- NV Energy has critical paths that connect the NW to the SW in the Main Split or connect ID/PAC to CA in the Alt Split 4
- M+ has higher congestion revenues due to higher flows
- Highest flows on a path on NVE system is between NVE North and NVE South
- Main Split (2 day ahead markets /NVE in Markets+)
  - 2030 NVE lines are importing more than they are exporting
  - 2035 NVE lines are exporting more than they are importing
- Alt Split 4 (2 day ahead markets /NVE in EDAM)
  - 2030/20235 NVE lines are importing more than they are exporting



Case	Alt Split 4 2030 DA	Alt Split 4 2030 RT	Alt Split 4 2035 DA	Alt Split 4 2035 RT
import	6,787,778.02	7,800,289.89	9,776,854.77	10,628,161.75
export	5,698,703.49	5,904,499.86	7,244,852.22	7,115,952.40
Case	Main Split 2030 DA	Main Split 2030 RT	Main Split 2035 DA	Main Split 2035 RT
import	11,543,162.78	13,022,671.12	10,134,745.34	11,714,302.04
export	10,296,515.89	9,841,559.48	13,724,906.01	13,555,829.96

Adjusted Production Cost Savings

- Adjusted Production Cost = load cost+ gen cost-gen revenues
- Load cost is higher in Markets+ due to higher pricing
- Gen cost is higher than Business as Usual due to increased sales in the Market
- Small cost savings to adjusted production cost in EDAM

	BAU (2026)	Main Split (2026)	Alt Split 4 (2026)	Main Split (2030)	Alt Split 4 (2030)	Main Split (2035)	Alt Split 4 (2035)
Load Cost	810.5	818.1	769.0	896.2	859.6	1004.5	843.5
Generation Cost	356.9	391.8	419.9	418.3	429.5	437.3	403.3
Reserve Cost	0.0	0.1	0.1	0.0	0.1	1.5	0.4
Generation Revenue	-686.8	-720.6	-715.6	-835.0	-810.8	-956.6	-762.3
APC	480.5	489.3	473.4	479.5	478.4	486.7	485.0
Cost vs BAU		8.8	-15.9	6.2	-1.2	8.3	-1.7

NV Energy-Specific 2026 Results

Generation Revenue:

- Increased in Markets+ since we make more sales in Markets+

Wheeling revenue:

- Wheeling charges (and revenue) are applied to all exports from the Market footprint– these charges are waived inside each market footprint
- Representative that Markets+ will make more sales outside of the footprint than EDAM
- NV Energy has long term firm point-to-point revenues not accounted for in the Wheeling Cost

Congestion Revenue:

- More in Markets+ due to much higher flows over our lines and increased sales

Base Results & APP 1 2026	Case							
Cost/Benefit ($ millions)	BAU (2026)	EDAM Bookend (2026)	Markets Bookend (2026)	Main Split (2026)	Alt Split 1 (2026)	Alt Split 2 (2026)	Alt Split 3 (2026)	Alt Split 4 (2026)
Load Cost	810.5	771.3	788.2	818.1	745.2	821.7	763.8	769.0
Generation Cost	356.9	348.0	388.0	391.8	366.9	385.7	354.1	419.9
Reserve Cost	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Generation Revenue	-686.8	-644.4	-689.9	-720.6	-640.3	-716.4	-641.9	-715.6
Reserve Revenue	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1
Wheeling Revenue	-7.8	-4.1	-27.2	-27.1	-1.5	-18.3	-2.2	-3.5
Congestion Revenue	-13.8	-18.8	-30.6	-30.7	-11.8	-19.5	-15.1	-18.3
GhG Revenue	0.0	-0.4	0.0	0.0	-2.0	0.0	-1.8	-1.8
Net Cost	459.0	451.5	428.5	431.5	456.4	453.3	456.8	449.6
COST VS BAU		**-7.5**	**-30.5**	**-27.5**	**-2.5**	**-5.7**	**-2.1**	**-9.3**
Purchases	6,553,926	7,095,441	5,695,061	5,548,142	6,651,314	5,868,261	6,970,112	5,345,411
Sales	1,009,057	1,274,684	1,668,593	1,715,430	1,404,679	1,785,595	1,218,098	2,099,834
Curtailment	389,642	336,389	188,657	177,408	436,211	134,480	409,854	562,308
Average Day Ahead NV Energy energy prices ($Mwh)	$ 21.43	$ 20.46	$ 20.19	$ 20.97	$ 19.58	$ 21.32	$ 19.92	$ 20.04
Average Real Time NV Energy energy prices ($Mwh)	$ 19.74	$ 20.15	$ 20.14	$ 20.32	$ 19.47	$ 20.44	$ 19.81	$ 20.44

NV Energy-Specific Results 2030/2035 Cases

- Both markets show continual decline in NV Energy's net cost showing increasing benefits over time
- Higher volume of sales in Markets + drives higher wheeling and congestion revenues in the Main Split
- Congestion Revenue

  2035 Alt Split 4 congestion: Increased flows over from NV Energy to PAC and CAISO; Increased exports from EDAM seam to CFE (Baja Mexico) in which NV Energy gets a load ratio share. Line congests due to tight summer 2035 conditions and a cap of exports limited to line rating.

		Everyone but CA, PAC, WAPA	NW and SW go Markets+	Everyone but CA, PAC, WAPA SNR	NW and SW go Markets+	Everyone but CA, PAC, WAPA	NW and SW go Markets+
		NVE in M+	NVE, ID in EDAM	NVE in M+	NVE, ID in EDAM	NVE in M+	NVE, ID in EDAM
	Case						
Cost/Benefit ($ million	BAU (2026)	Main Split (2026)	Alt Split 4 (2026)	Main Split (2030)	Alt Split 4 (2030)	Main Split (2035)	Alt Split 4 (2035)
Load Cost	810.5	818.1	769.0	896.2	859.6	1004.5	843.5
Generation Cost	356.9	391.8	419.9	418.3	429.5	437.3	403.3
Reserve Cost	0.0	0.1	0.1	0.0	0.1	1.5	0.4
Generation Revenue	-686.8	-720.6	-715.6	-835.0	-810.8	-956.6	-762.3
Reserve Revenue	0.0	-0.1	-0.1	0.0	-0.2	-1.3	-0.3
Wheeling Revenue	-7.8	-27.1	-3.5	-36.7	-3.3	-34.1	-13.4
Congestion Revenue	-13.8	-30.7	-18.3	-27.9	-23.0	-34.2	-72.0
GhG Revenue	0.0	0.0	-1.8	0.0	-0.7	0.0	0.0
Net Cost	459.0	431.5	449.6	415.0	451.3	417.2	399.2
Cost VS BAU		-27.5	-9.3	-44.0	-7.7	-41.8	-59.8
Net Cost excl. wheeling and congestion revenue	480.5	489.3	471.5	479.5	477.5	485.4	484.6
Cost VS BAU		8.7	-9.1	-1.0	-3.0	4.9	4.1

NV Energy Conclusions from NV Energy-Specific Study Results

- NV Energy is a net buyer in the market
- EDAM (regardless of footprint) tends to have lower prices which is better for a net buyer
- Adjusted Production Cost = load cost+ gen cost-gen revenues; both markets are relatively similar with EDAM being slightly better, but probably negligible benefit
- Markets + offers more transmission and congestion revenues
  - Transmission revenues are higher in Markets+ due to higher sales at the seams and due to CAISO not being attributed a load ratio share reducing our transmission revenues
  - Congestion revenues are higher in Markets+ due to the higher market flows we see on our transmission lines
- Due to NV Energy's geographic location, NV Energy sees more benefits from a market from transmission and congestion revenues
- With Market to Market coordination, consolidated balancing areas and transmission expansion, NV Energy's congestion revenue benefits reduce due to less price separation in a consolidated balancing area. Transmission revenues are reduced with consolidated balancing areas due to the reduced hurdle rates

Summary of Results & Next Steps

- The study results indicate NV Energy would achieve production cost savings by joining a day ahead market

- Over time, cost to serve load increases as energy prices increase; offset by a reduction of purchases from the market, additional sales into the market and increased transmission and congestion revenue

- Markets + offers more savings to Nevada Customers

- Next Steps:
  - Further assessment of Transmission and Congestion Revenues
  - Completion of market design for Markets+ and EDAM
  - Hold stakeholder meetings and make recommendation to PUCN

Governance

Governance

- Regional Transmission Owner Governance Comparison – CAISO and SPP

- Proposed Governance of the Day-Ahead Market Options

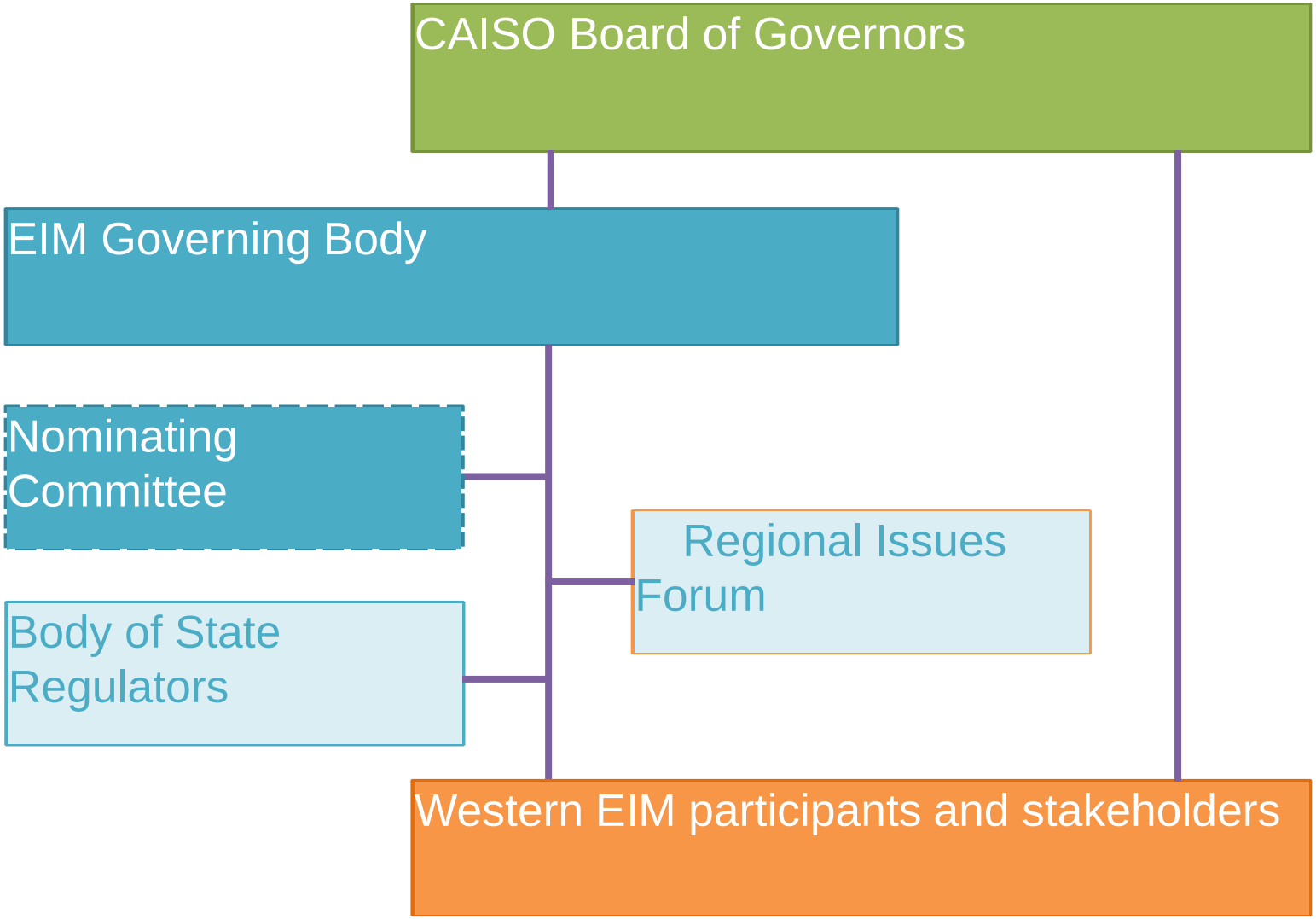
Full Regional Transmission Organization Governance
CAISO and SPP

	CAISO	SPP RTO
Board Structure	5 Directors (Governors)	Between 7 and 10 Directors; elected except for seat for SPP CEO
Board Selection	**Appointed by the Governor of California and subject to confirmation by the Senate** Unsuccessful legislative efforts to change: SB 350 (2015-2016); AB 813 (2017-1018); and AB 538 (2023)	Corporate Governance Committee nominates with potential additional candidates from SPP members. Two voting sectors (transmission owning and transmission using). If there is more than one candidate need to receive over 50% of the sector vote; If only one candidate needs to receive 66% or more of the sector vote
Term	3 years	3 years
Role of State Authorities	Advisory only - State agencies do have not have Section 205 filing rights under the Federal Power Act	On matters over which the Regional States Committee has responsibility such as transmission cost allocation and resource adequacy, SPP files the Regional States Committee's recommendations; however, nothing prohibits SPP from filing a competing proposal. Advisory on other areas
Stakeholder Process	Each Initiative is a separate stakeholder process; no voting structure; meetings open to the public	Hierarchal committee structure; votes limited to members; meetings are open to the public
Market Monitor	Internal Market Monitor reports to the Board; external Market Surveillance Committee provides comments on initiatives	Internal Market Monitor reports to the Board
Proposed Oversight of Day-Ahead and Real-Time Market	**EIM Governing Body as a Subcommittee of the Board**	**Markets+ Independent Panel (MIP) as a Subcommittee of the Board**

CAISO EIM Governing Body

- 5 members serving 3-year terms
- Selection - eight-member, sector-based nominating committee recommends. EIM Governing Body approves
- Role
  - The WEIM/EDAM Governing Body will have joint authority with the Board of Governors to approve or reject a proposal to change or establish a tariff rule applicable to the WEIM/EDAM balancing authority areas, WEIM/EDAM Entities, or other market participants within the WEIM/EDAM Entity balancing authority areas, in their capacity as participants within the WEIM/EDAM. The WEIM/EDAM Governing Body will also have joint authority with the Board of Governors to approve or reject a proposal to change or establish any tariff rule for the day-ahead or real-time markets that directly establishes or changes the formation of any locational marginal price(s) for a product that is common to the overall WEIM or EDAM markets. The scope of joint authority excludes, without limitation, any other proposals to change or establish tariff rule(s) applicable only to the CAISO balancing authority area or to the CAISO-controlled grid. {red indicated changes to accommodate EDAM}
- Joint approval over the members of the Market Surveillance Committee
- Authorized to retain a market expert for independent advice (Currently Dr. Susan Pope from FTI Consulting)
- One of its members is a non-voting participant at the Department of Market monitoring Oversight Committee of the CAISO Board

EIM Governance

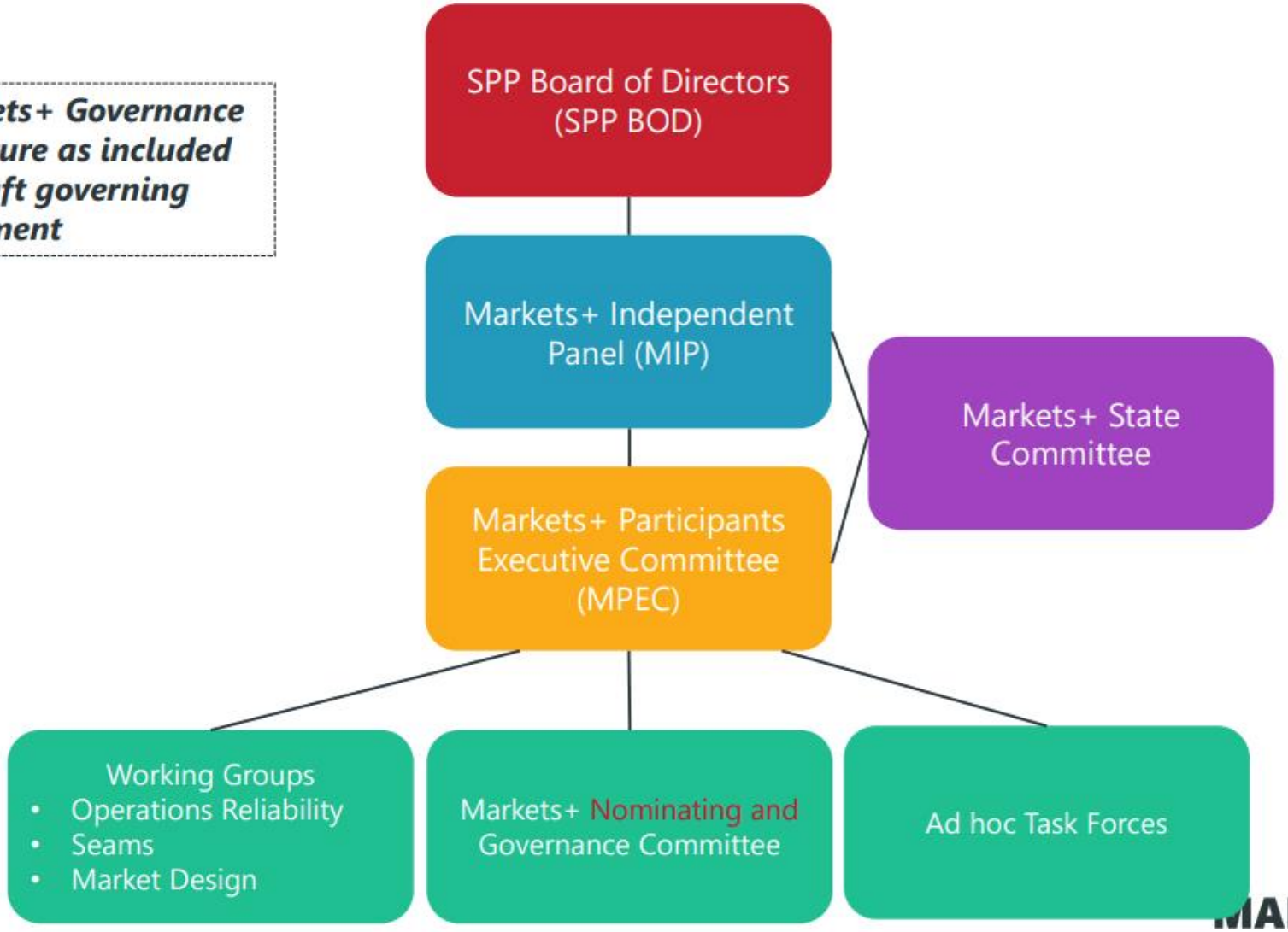


BOSR and RIF

- **Body of State Regulators**
  - One commissioner from each state commission in which a load-serving utility participates in the CAISO real-time market, including both the CAISO and EIM Balancing Authority Areas. Each commission selects its own representative. A commission may choose a representative who is not a commissioner
  - Budget assessed to investor-owned utilities
    - Funding assessment allocated to State-Regulated Market Participants (SRMPs) using a two-tier methodology. First allocated to each state; states with small amounts of electric load participating in the WEIM receive a discount. Second, each SRMP within a state is allocated a funding amount based on its percentage share of the electric load within the state
    - Budget for 2024 is $402,881; NV Energy share is $47,090
- **Regional Issues Forum**
  - 11 sector liaisons
  - Forums held approximately three times a year

SPP Markets+ Governance

Markets+ Governance Structure as included in draft governing document



Markets+ Stakeholder Voting Rights

- **Markets+ Market Participant**
  - Executed the participant agreement
  - Contributes generation and/or load to the Markets+ market

- **Markets+ Market Stakeholder**
  - Executed the stakeholder agreement
  - Pays an annual fee of $5,000
  - Fee may be waived for nonprofit organizations

- **Non-Voting Stakeholder**
  - meetings open to the public
  - Not eligible to vote

Markets+ Independent Panel

- 5 members, one is an SPP director; elected members serve four-year terms
- Selection - 11-member sector-based nominating committee recommends; approved by majority of entities eligible to vote
- Role
  - Can set priorities and direct the Markets+ Participant Executive Committee to investigate potential market design and tariff revisions
  - Approve or reject proposed tariff amendments to Markets+ Tariff
  - Consider, approve or reject market rules if such rules solely apply to the administration of the Markets+ market and have no application to the SPP Integrated Marketplace or any other service provided by SPP. To the extent such rules do apply to the SPP RTO or any other service provided by SPP, the MIP shall be afforded the opportunity to provide advisory input
  - Collaborate with SPP staff on the development of Markets+ tariff provisions, market protocols, business practices and interregional agreements
  - Evaluate and provide consultation to SPP on the Markets+ administration budget
  - Resolve disputes regarding working groups or task forces
- The SPP Board of Directors can review and consider
  - Changes to agreements between SPP and participants or stakeholders
  - Issues or concerns raised by the market monitor that has been previously raised to the MIP
  - Legal and/or litigation disputes or actions involving SPP or the implementation of Markets+;
  - Financial ramifications or corporate risk to SPP
  - Markets+ budgets, any debt obligations related to Markets+ or material changes to SPP's staffing requirements
  - Appeals from the MIP made by any member of the MIP
-

Markets+ Participants Executive Committee

- Role
  - Review all system or process enhancements recommended by SPP staff, the State Committee, stakeholders, or any working group, committee or task force
  - Provide the Markets+ Independent Panel recommendation on proposals
  - Recommendations are advisory and non-binding; report includes any minority views

- Membership
  - Each Markets+ market participant and Markets+ market stakeholder appoints one representative
  - Assigned to one of three membership sectors: investor-owned utilities, public power and independent.

- Voting
  - Each sector's vote is calculated separately; each of the three sectors represents 33 1/3% of the vote
  - An action is approved if the average of these percentages is at least 67%

- Work Groups and Task Forces
  - Market Design, Congestion Rent, Seams, GHG, Operations and Reliability, Transmission Rates, and Resource Adequacy
  - Each representative of a working group has one vote.; simple majority decision

Markets+ State Committee

- One representative from each state in which a Markets+ market participant has generation or load participating in the Markets+ may participate as a member.
  - Each state representative will be appointed by the utility commission in that state
  - The MSC shall have the discretion to determine participation of representatives from other state agencies, including state energy offices, state environmental offices and state consumer advocates, in the MSC's governing structure

- Provides advice to the Markets+ Independent Panel, the Markets+ Participants Executive Committee and any working group or task force

- SPP will facilitate the retention of independent staffing for the MSC to support the MSC's ability to develop analytical and legal analysis in order to present independent positions related to the Markets+ market and before FERC. The MSC shall annually submit a proposed budget to the MIP for approval. Before approval, the MIP shall seek comment from the MPEC. The approved MSC budget costs will be allocated to the Markets+ market participants

Pathways Initiative

- On July 14, 2023, a coalition of western state public utility commissioners and other officials announced an initiative to create an independently governed entity that can deliver market services throughout the West, including California

- This West-Wide Governance Pathways Initiative (Pathways Initiative) is focused on creating an entity that could allow the independent governance of the Energy Imbalance Market and the Extended Day Ahead Market and enable a path forward for a potential Regional Transmission Organization, should participants later so choose

- The Initiative is just beginning to examine possible structures. Significant questions that will need to be addressed include:
  - The division of responsibilities between the CAISO and the new entity
  - Whether this division can be accomplished within the boundaries of existing California law, and
  - What would be the scope of services, formation and administrative costs, and rules of participation and withdrawal for this new entity

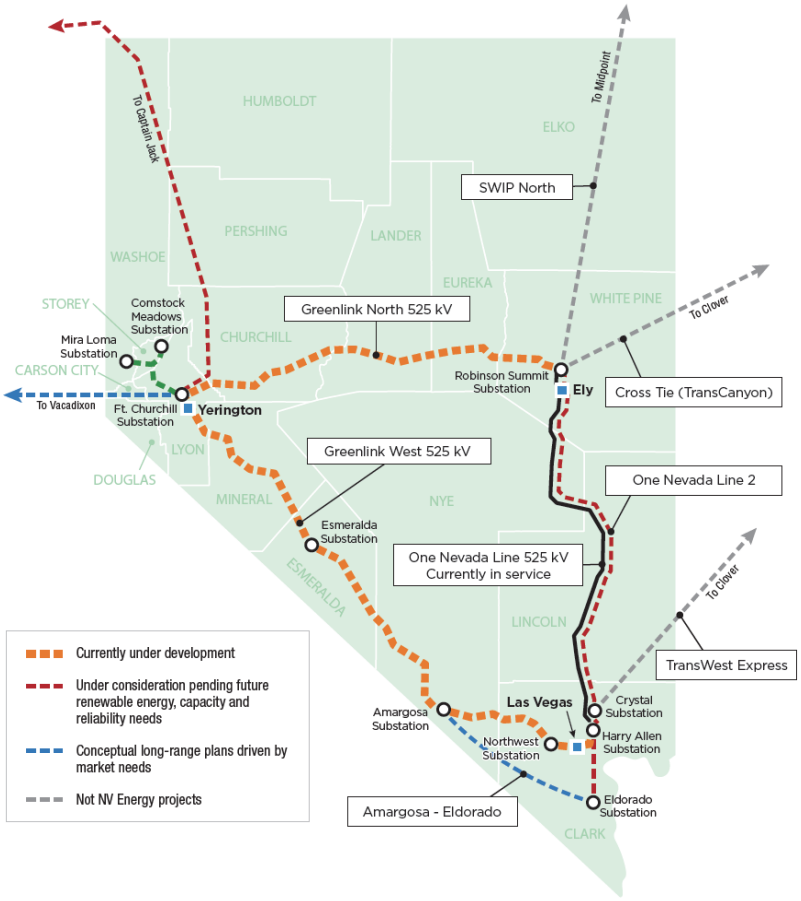
Potential Future Transmission Projects

Potential Future Transmission Projects

Greenlink Connects Regions

Current or Potential Regional Projects Connecting to Greenlink Nevada Transmission

- SWIP North – Will connect Idaho Power to Greenlink at Robinson Summit Substation
- Fort Churchill to Captain Jack 525 kV – Will connect Pacific Northwest to Greenlink at Fort Churchill Substation
- Amargosa to Eldorado 525 kV – Will connect Southern California through Eldorado Substation to Greenlink
- Cross Tie – Will connect Central Utah to Greenlink at Robinson Summit Substation
- ON Line 2 – Provides a third high voltage transmission line between Northern and Southern Nevada
- TransWest Express – Will connect to NV Energy's Crystal Substation, adjacent to Greenlink's terminal at Harry Allen Substation



NVEnergy