



CREC Position Statement on Transmission November 2023

Introduction

With Colorado enacting HB19-1261, the state has set itself on a fairly rapid de-carbonization path. To achieve the goals of HB-1261, utilities will have to deploy gigawatts of new solar, wind, and energy storage resources. Transmission will play a key role in this decarbonization program both in Colorado and across the country. However, transmission has a long history of delays and disappointments.

Experts in the field often refer to the "Three P's of Transmission": Planning, Permitting, and Paying. Each of these steps has many risks, and each has derailed a project. But the one that always seems to rear its ugly head is the Paying step. Developing an equitable cost allocation approach that satisfies all stakeholders is always a difficult and fraught process.

Across the country, the difficulty of building adequate transmission has become a major issue, drawing the attention of the Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs), the Federal Energy Regulatory Commission (FERC), Congress, and Public Utility Commissions (PUCs). No simple solution exists to cure all the ills that impact transmission planning and development. FERC has approved new Transmission Planning Reform Notice of Proposed Rulemaking (FERC Order 2023), which has improved on transmission planning rules. There have also been widespread calls for Congress to enact "permitting reform," which includes provisions for transmission and pipelines.

Meanwhile, it has been widely reported the ISOs and RTOs struggle mightily to resolve enormous interconnect queue backlogs that are slowing, if not halting in some cases, the deployment of new wind, solar, and energy storage resources.

The magnitude of the problem only grows when one considers the 2X to 3X growth in the load that is expected by 2050 due to transportation and building electrification. This load growth will impact both transmission and distribution system planning.

Summary of Problems and Issues

Need for more inter-regional transmission.

Grid planners all agree that the deployment of new inter-regional transmission is vital to the nation's decarbonization efforts. This would allow the aggregation of disparate wind and solar resources across a larger physical area. Here in Colorado, this is a major issue in that our inter-regional transfer capacity is quite limited. As an example, we host one of the seven DC interties

that connect the Eastern and Western Interconnections. Our tie, which is located in Lamar, and managed by Xcel Energy has a total transfer capacity of only 210 MW. All seven DC ties have a cumulative transfer capacity of only 1.3 GW.

This issue becomes more critical when one looks at things like the level of curtailment of wind in the western part of the Southwest Power Pool's (SPP) operating area. If we had much greater transfer capacity in and out of the Eastern Interconnection, we could make much more use of renewable power that is currently being curtailed. Additionally, major High Voltage Direct Current (HVDC) transmission projects are being proposed or built in our region that could yield many benefits if connected to the Colorado grid.

Here are two examples:

Grain Belt Express – This 5 GW HVDC system will run from Dodge City, Kansas deep into MISO and PJM territory. It will allow the export of some of SPP's excess wind power to the east. Interestingly, Dodge City is only 165 miles from Lamar. Just imagine if we could connect the Grain Belt Express to a vastly expanded Lamar DC tie that also connected to Xcel's Colorado Power Pathways system. This alone could be the secret to decommissioning 2 GW of combustion turbines by 2035.

TransWest Express – The TransWest Express (TWE) was finally fully approved in May 2023 after 18 years of planning! The project runs from Cheyenne, Wyoming to Las Vegas, Nevada. TWE will allow the transport of gigawatts of low-cost wind power from Wyoming to the desert Southwest. Interestingly, the project runs through northwest Colorado and past Craig. There may be a case for a connection of the TWE to the Craig Station. The coal-fired Craig Station is slated to be retired by 2030, and planning is now underway to determine if there are other viable uses for the facility. Resources such as solar, battery storage, thermal storage, and hydrogen are on the table.

Need for additional transmission capacity in and out of the San Luis Valley

The San Luis Valley (SLV) has some of the best solar resources in Colorado. The SLV is very sunny and relatively cool during the summer allowing for greater solar power production than other parts of the state. Unfortunately, transmission constraints have halted further solar development in the SLV. Years ago, an effort was made to build a new transmission line from La Veta down into the SLV. However, in addition to limited opposition from an environmental group, a wealthy landowner blocked access to a needed right of way. The impacted land has changed hands, and this project may now be under reconsideration.

Another stopgap option to ease this constraint could be to reductor the existing 230 kV and 115 kV lines owned by Xcel and Tri-State that run down into the valley from Poncha Springs. There is a question of whether sufficient transmission backhaul exists from Poncha Springs to the Front Range load center to make this practical. Reconductoring these lines with Advanced Carbon Core Conductors (ACCC) and implementing dynamic line rating technology could approximately double the transfer capacity on these two lines.

Of special relevance is the fact that the aquifer in the SLV has fallen precipitously. Farmers and ranchers are concerned about the long-term viability of their operations. Hosting utility-scale solar could provide a financial lifeline to some of these farmers and ranchers. For this reason, the SLV may be prove to be much more solar-friendly than other areas on the Western Slope.

Need for the Colorado Power Pathways (CPP) project to proceed on schedule

So far, the CPP permitting and planning process appears to be moving at light speed in terms of most transmission projects. The six segments that make up the CPP have in-service dates ranging from 2025 to 2027. The completion of the CPP will allow the development of gigawatts of new wind and solar resources on the Eastern Plains. This project needs to be watched carefully, as it is so critical to the achievement of Colorado's 2030 decarbonization goals.

There is a looming need for a large number of "gen-tie" radial transmission lines to connect wind and solar resources to Xcel's CPP. Developing these will not be a trivial undertaking.

Stimulate the adoption of "Grid Enhancing Technologies" or GETs by Colorado's utilities.

Traditionally, Colorado's utilities have been reluctant to embrace new transmission technologies that can improve performance, flexibility, and reliability. As an example, the PUC strongly encouraged Xcel to explore the use of Advanced Carbon Core Conductors on the CPP project. Xcel claimed to have reviewed this option but rejected it based on cost considerations.

In the GETs space, new technologies such as dynamic line ratings, power flow controls, and topology optimization offer ways to increase transmission line throughput while also boosting reliability and flexibility.

Aerial and underground HVDC transmission lines offer improved capacity and efficiency, yet none have been deployed in Colorado. Additionally, the prospect of installing buried HVDC lines along railroad rights of way is extremely compelling, as it largely eliminates the NIMBY risk. This is the deployment model that the SOO Green HVDC project is following. These types of projects are opportunities that Colorado should explore.

Need to consider Tri-State, since it operates a highly valuable transmission asset.

Tri-State Generation and Transmission Association is a large co-op that serves a 42-member system across four states. Seventeen of Tri-State's member systems, and by far most of its load, are in Colorado. Tri-State operates three large coal-fired power stations and also has a sizable set of natural gas generation resources. Tri-State is also deploying an extensive new wind and solar resources, as it strives to achieve its 2030 decarbonization targets. Tri-State's most valuable asset is its 6,000 miles of transmission lines that span four states.

Is it time for a re-charter of WAPA?

The Western Area Power Authority (WAPA) was created in 1977 to transmit low-cost hydropower across 15 western states. For the past 40 years, WAPA has played a vital role in moving this carbon-free power reliably across almost half of the US. Unfortunately, hydro flows across the Pacific Northwest and the Southwest are declining. Some hydropower experts predict that in the next decade or sooner, in the absence of major cutbacks in water consumption (primarily reducing flood irrigation for alfalfa and hay for livestock), Glen Canyon Dam and even Hoover Dam could reach a power pool (or power cutoff) condition in the next decade or sooner.

WAPA operates 17,000 miles of transmission across the western US, including quite a sizable amount in Colorado. As hydro outputs decline, a lot of unused capacity on the WAPA transmission system could be used for other purposes. Given the massive planned buildout of solar and wind projects in our region, there may be some utility in considering an expanded role for WAPA to transport wind and solar power, in addition to hydro. And, if Tri-State transmission assets become available, could WAPA be the best home for this asset?

Colorado is currently in a transitional period as it relates to transmission planning.

We currently have the utility-driven Western Electricity Coordinating Council's (WECC) Colorado Coordinated Planning Group (CCPG) that addresses regional transmission planning in the state but does not have authority over transmission projects.

Several years ago, the Colorado Electric Transmission Authority (CETA) was created by statute. The CETA charter appears to give this new organization significant authority over transmission planning. It will be interesting to gain more information on the planning process and stakeholder process that the CETA will use. One issue is how will the CETA work within an organized regional market once that entity comes to Colorado. We are mandated by statute to join or implement a Regional Transmission Organization (RTO) by 2030. There is much discussion about the best option for a western RTO, but we are likely far from having a firm plan for this next huge step.

Help move things along at the federal level.

In September 2023, Senator John Hickenlooper and Representative Scott Peters (CA) introduced the "Big Wires Act." This act is intended to stimulate the deployment of large amounts of inter-regional transmission to significantly grow our capability to transfer large amounts of power between regions and markets. The act tasks the FERC to analyze the situation and make recommendations that would govern the transmission buildout. In addition, the Big Wires Act encourages the adoption of a wide range of grid-enhancing technologies that have thus far seen very limited application in the US grid.

References

- Senator Hickenlooper's "Big Wires Act": <https://www.hickenlooper.senate.gov/wp-content/uploads/2023/09/BIG-WIRES-One-Pager-Sep.-20231.pdf>
- Atlantic Monthly Article
- [How Trump Appointees Short-Circuited Grid Modernization - The Atlantic](#)

- Americans for a Clean Energy Grid (ACEG) - [Home \(cleanenergygrid.org\)](http://cleanenergygrid.org)
- Major Transmission Projects:
 - Trans West Express - [TransWest Express Transmission Project: Delivering Wyoming Wind Energy](#)
 - SOO Green - [Home - SOO Green HVDC Link](#)
 - Grain Belt Express – [Home - Grain Belt Express](#)
 - Colorado Power Pathways - [Home - Xcel Energy Colorado Power Pathway \(coloradospowerpathway.com\)](#)
- FERC Transmission Planning Reform NOPR:
 - NOPR Opening - [FERC Begins Reform Process to Build the Transmission System of the Future | Federal Energy Regulatory Commission](#)
 - NOPR Issued - [FERC Transmission Reform Paves Way for Adding New Energy Resources to Grid | Federal Energy Regulatory Commission](#)
- Transmission Maps
 - Colorado wide – <https://www.dropbox.com/scl/fi/a8f6st922a8gwrfig8b9z/CO-Transmission-Map.jpg?rlkey=6ixdz2zx9j51d7mc8mnc3i0yi&dl=0>
 - Denver – <https://www.dropbox.com/scl/fi/g9vm9ftadgv7yo33yog6t/Denver-Transmission-Map.jpg?rlkey=j07huscmq1obv4n5oz6xgfzte&dl=0>
- NRRI Insights Transmission white paper – https://www.dropbox.com/scl/fi/fuiqewzhqgunbh9vbuy9t/NRRI_Insights_Transmission_Gramlich_FINAL.pdf?rlkey=vcx4i3n6yem5hu7u9azm59gbl&dl=0
- Transmission planning organizations
 - West Connect/CCPG website – [WestConnect Regional Planning -](#)
 - West Connect main website - [WestConnect](#)
 - WECC website – <https://www.wecc.org/>
 - CETA website - [CETA \(cotransmissionauthority.com\)](http://cotransmissionauthority.com)
- “Create a new RTO for the West” white paper - RTO Insider Proposed New Western RTO Discussed at CREPC. A state-led study found that an RTO covering the entire US portion of the Western Interconnection could save the region \$2 billion in annual electricity costs by 2030. <https://www.dropbox.com/scl/fi/0v3efoysrpl7v2s3jxnmn/Proposed-New-Western-RTO-Discussed-at-CREPC.pdf?rlkey=dh6b21m0r401hzqnhczk0jpm4&dl=0>
- Morey Wolfson’s presentation to CRES Jefferson Chapter, describing the benefits of a SuperGrid to create a national market for renewable energy via an HVDC system: <https://youtu.be/ipvkl-j4UNA>