Stakeholder Comment on the CETA Transmission Capacity Expansion Study

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The huge opportunity of ATT and NWA should be captured by the CETA study

INTRODUCTION

At present, the focus of the CETA study seems restricted to building new transmission as the only way to expand capacity. While new transmission is of course needed, the low-hanging fruit of increasing the capacity and throughput of the existing transmission system would complement new transmission and has the potential to reduce the overall cost of capacity expansion considerably, as well as to expedite and simplify capacity expansion by making use of existing rights-of-way.

The existing transmission system is very far from optimal, as it has grown organically, one project at a time, for many decades. In addition, new technologies and techniques that can increase the capacity of the existing transmission system have been developed and proven in recent decades. It makes sense to optimize the existing system before (or while) expanding it, especially when the benefits of an optimized system could be enormous. If CETA does not look at the option of optimizing the current transmission system as described herein, then one risk is that these modern technologies will eventually be implemented anyway and the CETA study will end up being based on an outdated reference case.

The essence of this proposal is to suggest that CETA could and should evaluate the opportunity represented by widespread adoption of **Advanced Transmission Technologies (ATT)** and **Non-Wires Alternatives (NWA)**. Examples of how this might be implemented include:

1) as a scenario in its own right;
2) as an alternative or "option B" reference case for scenarios to build upon, one in which a more efficient baseline transmission system reduces the set of circumstances where new-build transmission is needed.
3) as a primary consideration in any gap analysis, toward meeting transmission needs not identified in known transmission plans;
4) at a minimum, as a thorough cost/benefit analysis in the CETA report; or
5) some other approach that brings ATT and NWA into CETA's current analysis framework, or modifies the current framework to incorporate these technologies and expand the scope of the study while it is in its early stages, in order to substantially increase the future utility of the CETA study.

I urge the study team to brainstorm and to struggle with the complexity of how to incorporate an analysis of ATT and NWA into the study framework, as the benefits of ATT and NWA may greatly outweigh the costs, and this study is the optimal time to find out.

In this proposal, ATT and NWA are defined to include the following elements:

- **The "Grid-Enhancing Technologies" (GETs)**: Dynamic Line Ratings (DLR); Advanced Power Flow Control (APFC); and Topology Optimization.
- **Advanced carbon core conductor, especially reconductoring**: Some brands of this conductor are a drop-in replacement for ACSR or ACSS, that features: double the capacity for the same wire size; lower all-in cost due to the ability to reuse existing structures (unlike uprate projects that use ACSR); and huge ratepayer savings from ~40% lower line loss due to higher conductivity. This member of the ATT family is the primary focus of this proposal.
- **Transmission-connected energy storage**: Maximizes utility of the available transmission capacity while reducing curtailment, among other benefits.
- **Distribution-level NWA and DER**, such as aggregated Virtual Power Plants, other Demand-Side Management measures, and distribution-connected generation and storage, can shape and reduce the load that must be served by the transmission system.

These technologies and techniques are for the most part already proven. There's no need for each utility to do it's own pilot studies rather than learn from others. In some cases, such as DLR, it is reasonable to assume that it will already be widely implemented by the 2035 timeframe given the high interest and ongoing consideration of DLR at FERC, and therefore DLR might merit inclusion as an assumption in the reference case.

THE OPPORTUNITY PRESENTED BY ATT AND NWA

Below are links to several resources that support claims made in this proposal. But first, a word about my "credentials" on this topic. Over the last 3 Rule 3627 cycles, I have pushed for transmission planning rules that require the consideration of ATT and NWA alternatives for utility-proposed transmission projects, with some success as the Commission has strongly supported these ideas in its Decisions on these Rule 3627 proceedings, and it has included numerous questions about these ideas in its framing of the ongoing transmission planning pre-rulemaking proceeding (23M-0472E). I was also the only pro se party admitted to the Power Pathway proceeding (21A-0096E), for the purpose of bringing ATT and NWA into the conversation. Some of my most informative filings in these proceedings are linked below, as they provide copious information about the opportunity that could be realized by bringing the existing Colorado transmission system into the 21st century.

Recommended reading:

1. **UC Berkeley's Haas Energy Institute study of reconductoring with advanced conductor**, entitled "*Accelerating Transmission Expansion by Using Advanced Conductors in Existing Right-of-Way*" (**PDF**). The analysis shows that reconductoring with advanced conductor can double the capacity of existing lines at half the cost of new transmission. Reconductoring is also far easier and faster to

implement than building new transmission, because existing rights-of-way are used and only a maintenance permit is required. Please consider watching the webinar about the Berkeley study that was presented by its authors (**slides**; **recording**).

2. **Grid Strategies report on reconductoring with advanced conductor**, entitled "*Advanced Conductors on Existing Transmission Corridors to Accelerate Low Cost Decarbonization*" (**PDF**). This report discusses the use of advanced carbon core conductor for capacity expansion, energy efficiency (i.e., reduced line loss), and the cost-effective integration of renewable energy. While the focus of the report is on reconductoring, carbon core conductor is similarly beneficial for transmission rebuilds (at higher voltage) and for new-build transmission.

3. **Brattle Group study of GETs on the SPP transmission system**, entitled "*Unlocking the Queue with Grid-Enhancing Technologies: Case Study of the Southwest Power Pool*" (**PDF**, **GTM article**). This is a production cost modeling study showing that implementing the GETs technologies on the SPP system in Oklahoma and Kansas could double the amount of renewable energy connected to the system, could do so far more quickly than building new transmission, and could do so at a cost that is paid for by the benefits within 6 months, with substantial ongoing economic benefits. Presumably this result would be substantially amplified if reconductoring with advanced conductor was also considered.

4. **My filing about the role of ATT and NWA in Proceeding No. 23M-0472E**, the ongoing transmission planning pre-rulemaking (**PDF**). My comments summarize the case for considering ATT and NWA in transmission planning, and argue for strong rules that require the consideration of ATT and NWA in Rule 3627 reports, Rule 3206 reports, and CPCN applications. The filing explains why utilities haven't jumped on this opportunity to save ratepayers hundreds of millions of dollars (the short answer: 1) inertia, 2) misaligned financial incentives, and 3) a stagnant and siloed transmission planning process). This filing also summarizes the Commission's findings about ATT and NWA in previous Rule 3627 Decisions, and it provides informational references about ATT and NWA to build the record, and it replies to and rebuts PSCo's position that the current (almost non-existent) rules requiring evaluation of ATT and NWA alternatives are sufficient.

This filing also responds in the affirmative to the Commission's question about the need for a statewide transmission system optimization study to evaluate the opportunity offered by ATT and NWA. It concludes that such a study is needed as soon as possible in order to first extract substantial new capacity from the existing system before making huge investments in new transmission, which I contend is just common sense. The filing also suggests that the study should be conducted by an independent contractor, but upon reflection, the CETA study seems like the ideal time to consider optimizing the existing transmission system using ATT and NWA.

The filing further suggests that implementation of ATT and NWA, especially reconductoring with carbon core conductor, would likely save ratepayers hundreds of millions of dollars on PSCo's proposed $2+ billion transmission plan to address expected congestion in the Denver Metro area once Power Pathway is operational.

5. **My Answer testimony (PDF) and Statement of Position (PDF) in the Power Pathway Proceeding No. 21A-0096E**. The Answer testimony provides background, informative reference materials, and justification for the consideration of cost-effective ATT and NWA in transmission planning, including

a detailed cost and performance analysis of carbon core conductor (see Section IV, "*Advanced carbon core conductor*"). Other relevant sections include: Section III ("*Grid-Enhancing Technologies and Non-Wires Alternatives*"); Section VI ("*Available Injection Capacity on the Existing Transmission System*"), including the idea of allowing additional ERIS (non-firm) generator interconnections as a means of addressing identified transmission needs without building new traditional transmission projects; and Section VII concerning the role of local distribution-level generation, DER, and demand-side resources in addressing transmission capacity needs.

The Statement of Position counters erroneous statements about carbon core conductor made in PSCo's Rebuttal testimony, which merits keeping in mind to guard against such tactics in the future (see Section IV, "*Unraveling the truth about carbon core conductor*", especially the subsection entitled "*Errors and shortcomings in the Company's analysis of carbon core conductor*").

CONCLUSION

Please give serious consideration to incorporating into the CETA study the idea of using ATT and NWA to substantially increase the capacity and throughput of the existing transmission system, either as a study scenario in its own right, or in order to provide a higher-performance baseline (or reference case) that would simplify and likely reduce the cost of any new transmission needed to address future load growth or other scenarios. It just makes so much sense to do a once-in-a-lifetime optimization of a transmission system that has grown organically and piecemeal over many decades. From my perspective, there is no better or more relevant opportunity to investigate optimizing our existing transmission system than as part of this long-term study of capacity expansion.

It is important in any transmission planning exercise such as the CETA study to consider the interests of ratepayers. Accomplishing transmission expansion at a considerably lower cost using ATT and NWA would also accelerate the renewable energy transition. ATT, especially reconductoring with carbon core conductor, is dramatically faster and easier to implement than building new transmission because existing rights-of-way are used and only a maintenance permit is required. Optimization of the existing transmission system is an ideal complement to the new-build transmission resources envisioned in the current CETA study framework.

Thank you very much for your consideration!

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