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Submitted electronically via email

Re: Public Comment - Draft National Transmission Needs Study

The Niskanen Center ("Niskanen") appreciates the opportunity to submit these comments on the U.S. Department of Energy's ("DOE") *2026 Draft National Transmission Needs Study* ("Needs Study"). Niskanen is a 501(c)(3) think tank and advocacy organization committed to robust markets and evidence-based policy. A key focus of our work is promoting grid modernization and expanding transmission infrastructure to meet the nation's growing electricity needs. We commend DOE's work to identify where the nation's electric transmission infrastructure requires improvement and are pleased to offer the following comments for inclusion in DOE's final report.

I. Introduction

The Needs Study notes that "transmission supports resource adequacy by ensuring that power generated by these resources can be delivered to load when needed by enabling the sharing of energy resources across regions with different load profiles, weather patterns, and generation mixes," and that "resource sharing between regions can offer large potential benefits given the longer distances involved."[1] This conclusion is supported by Niskanen's own analysis, which has shown that a lack of electricity transfer capacity between regions leaves several regions of the country vulnerable to shortfalls in power availability, especially during severe weather events.[2]

While the Needs Study correctly identifies the issues at play on the grid, it would benefit from greater emphasis on the role of high voltage direct current (HVDC) transmission lines in enabling cross-interconnection and interregional transmission to support resource adequacy and

[1] Needs Study, p. 82
[2] [FERC is coalescing around the the idea of minimum transfer capacity but needs data and definitions]

reduce transmission congestion. HVDC transmission lines have significant advantages over traditional alternating current (AC) lines, including lower energy losses over long distances, improved controllability for operators, and less land use.[3]

II. Comments

Section III.a. Role of Transmission in the Power Sector

The Needs Study mentions that "transmission networks are designed to transport energy over long distances with minimal power losses," and explains the role of AC transmission lines in achieving those objectives.[4] While we acknowledge that decisions on individual project design should always be left up to the engineers, it is important to note that HVDC transmission lines can also play an important role on the grid, particularly in circumstances where HVDC lines are the clearly superior choice or the only technically viable option.

HVDC lines are the more technically sound choice in the following scenarios:[5]

- *Long distances* - AC is less stable than DC along very long distances because long AC transmission lines produce reactive power, which is power from the system that's recycled through grid equipment without ever reaching end users. In small amounts, this reactive power is useful. But in excess, it can cause voltage instability, leading to shorts and power outages.
- *Narrow corridors* - HVDC systems use more compact towers because fewer wires are required to transmit the same amount of energy. HVDC electricity can be transferred using two wires vs. the three wires needed for AC transfer.
- *Underground or underwater* - Engineers almost exclusively use HVDC for long-distance underground and underwater transmission applications. AC lines can typically only be buried in stretches extending no longer than 40 miles. This is because power lines that are designed to be buried need an outer shell of insulation separating the lines from the ground. This insulation constantly absorbs and releases some of the power flowing through the system. This can lead to issues with voltage control in insulated AC cables at longer lengths that are not present in HVDC cables.
- *Cross-interconnection transfers* - discussed below in our comments on Section V.a of the Needs Study.

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[3] Unlocking HVDC: How Congress can enable a more resilient grid, p. 1
[4] Needs Study, p. 7
[5] Why are utilities building tomorrow's grid with yesterday's technology?

We recommend that DOE outline these scenarios in *Section III.a* to recognize the unique contribution HVDC lines can make to our grid, alongside existing content on AC transmission and grid-enhancing technologies. Including these points would give developers, planners, and other readers valuable insight into not only HVDC's technical attributes, but also the broader role that HVDC can play in grid modernization.

Section V.a. National and Interregional System Congestion and Transfer Capabilities

The Needs Study notes that "transmission links crossing electricity market seams between regions or interconnections show the highest potential for transmission congestion value."[6] These interregional and cross-interconnection links are precisely where HVDC lines will be necessary.

It is technically impossible for AC transmission lines to link the three major grid regions because of frequency mismatches between the systems. However, HVDC lines can operate asynchronously, enabling controlled movements of electricity between the interconnections.[7] This can happen through two possible approaches, either by way of long-haul HVDC transmission lines which can traverse the interconnection seams, or by way of so-called 'back to back' converter stations. These compact facilities consist of two co-located converter stations, which convert AC electricity to DC and then back to AC. There are nine existing back-to-backs in the Great Plains and Texas that enable domestic energy transfers, any of which could be upgraded to improve cross-interconnection transfer capability.[8]

Within a single interconnection, AC interregional transfers are possible, but AC power spreads across many paths, often making large transfers of power across a region hard to control for grid operators. HVDC avoids this problem by keeping flows on a precise path.[9] As is being demonstrated by proposed merchant and independently-developed HVDC lines across the U.S., these lines will also likely play a critical role in fulfilling the interregional transfers DOE and the North American Electric Reliability Corporation[10] have deemed to be essential.

We request that DOE include an explanation of why HVDC should be used to link regions and interconnects in *Section V.a* of the report. This information would assist grid planners who are looking for ways to increase grid connections with neighboring regions.

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[6] Needs Study, p. 38-39
[7] How HVDC transmission can keep Texas independent and resilient
[8] Boosting reliability: How HVDC 'back-to-backs' improve power sharing between grids
[9] The price of power: How HVDC wires can bring cheaper electricity
[10] NERC Interregional Transfer Capability Study, p.xiii

III. <u>Conclusion</u>

Thank you for the opportunity to submit this response. We look forward to continuing to work with DOE and others on opportunities to address America's pressing electric transmission needs.

Sincerely,

/s/ Liza Reed

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