Americans for a Clean Energy Grid

Comments of Americans for a Clean Energy Grid[1]

On the DOE National Electric Transmission Congestion Study issued in September 2020

November 23, 2020

We thank the Department for the opportunity to comment on the congestion study. These comments are in response to the Department's request for comment.[2]

Our general comments are:

1. We do not oppose the Department's determination that no designations are needed at this time.
2. We disagree with the Department's conclusion that transmission is adequate.
3. We urge the Department to keep the option to designate open, and avoid limiting its own authority.
4. We generally support the criteria for application-based designation but offer some minor suggestions.

We take these points in turn:

1. **We do not oppose the Department's determination that no designations are needed at this time.**

We recognize that corridor designation can create concern among potentially affected communities and local and state government. We believe federal backstop permitting should only be used in very limited, narrow, and rare circumstances. It is difficult to identify specific corridors from large aggregate reviews of congestion.

2. **We disagree with the Department's conclusion that transmission is adequate.**

In the congestion study, the Department said,

- "Transmission Investments Have Addressed Transmission Constraints in a Timely Manner." (p. 11)
- "transmission to support delivery appears to be adequate from the perspective of overall impacts on current transmission constraints and congestion." (p. 25)
- "congestion costs, as reported by each RTO/ISO, have decreased over time" (p. 15)

[1] Americans for a Clean Energy Grid (ACEG) is a non-profit broad-based public interest advocacy coalition focused on the need to expand, integrate, and modernize the North American high voltage grid.

[2] https://www.federalregister.gov/documents/2020/09/24/2020-21040/request-for-public-comment-on-the-2020-national-electric-transmission-congestion-study

We believe these claims are unfounded.

A number of studies show the need for significantly expanded transmission

- A study by leading grid experts at the National Oceanic and Atmospheric Administration (NOAA), found that moving away from a regionally divided network to a national network of HVDC transmission can save consumers up to $47 billion annually while integrating 523 GWs of wind and 371 GWs of solar onto the grid.[3]

- The NREL *Interconnections Seam Study* shows that significant transmission expansion and the creation of a national network will be essential in incorporating high levels of renewable resources, all the while returning more than $2.50 for every dollar invested.[4] The study found a need for 40-60 million MW-miles of AC and up to 63 million MW-miles of DC transmission for one scenario. The US has approximately 150 million MW-miles in operation today.

- A study by ScottMadden Management Consultants on behalf of WIRES concluded, "as more states, utilities, and other companies are mandating or committing to clean energy targets and agendas, it will not be possible to meet those goals without additional transmission to connect desired resources to load. Similarly, the current transmission system will need further expansion and hardening beyond the traditional focus on meeting reliability needs if the system is to be adequately designed and constructed to withstand and timely recover from disruptive or low probability, high-impact events affecting the resilience of the bulk power system."[5]

- Dr. Paul Joskow of MIT has reviewed transmission planning needs and concluded that "[s]ubstantial investment in new transmission capacity will be needed to allow wind and solar generators to develop projects where the most attractive natural wind and solar resources are located. Barriers to expanding the needed inter-regional and internetwork transmission capacity are being addressed either too slowly or not at all."[6]

- FERC recently reviewed transmission needs and barriers and "found that high voltage transmission, as individual lines or as an overlay, can improve reliability by allowing utilities to share generating resources, enhance the stability of the existing transmission system, aid with restoration and recovery after an event, and improve frequency response and ancillary services throughout the existing system."[7]

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[3] Alexander E. MacDonald et al., *Future Cost-Competitive Electricity Systems and Their Impact on US CO2 Emissions*, Nature Climate Change *6*, at 526-531, January 25, 2016.
[4] Aaron Bloom, *Interconnections Seam Study*, August 2018.
[5] Scott Madden, Informing the Transmission Discussion: A Look at Renewables Integration and Resilience Issues for Power Transmission in Selected Regions of the United States, January 2020.
[6] Paul Joskow, *Transmission Capacity Expansion is Needed to Decarbonize the Electricity Sector Efficiently*, Joule *4*, at 1-3, January 15, 2020.
[7] FERC, *Report on Barriers and Opportunities for High Voltage Transmission*, at 39, June 2020.

- A study of the Eastern Interconnection for the state of Minnesota found that scenarios with interstate transmission expansion can introduce annual savings to Minnesota consumers of up to $2.8 billion, with an annual savings for Minnesotan households of up to $1,165 per year.[8]

- Analysts at The Brattle Group estimate that providing access to areas with lower cost generation to meet RPS and clean energy needs through 2030 could create $30-70 billion in benefits for customers, and multiple studies have identified potential benefits of over $100 billion.[9]

- A recent study to compare the "flexibility cost-benefits of geographic aggregation, renewable overgeneration, storage, and flexible electric vehicle charging," as "pathways to a fully renewable electricity system" found that "[g]eographic aggregation provides the largest flexibility benefit with ~5–50% cost savings.[10] The study found that "With a major expansion of long-distance transmission interconnection to smooth renewable energy variation across the continent, curtailment falls to negligible levels" at a 60% renewable penetration, from 5% in the case without transmission. In the 80% renewable case, transmission reduced curtailment from 12% to 5%."[11]

- The Brattle Group analysts find that "$30–90 billion dollars of incremental transmission investments will be necessary in the U.S. by 2030 to meet the changing needs of the system due to electrification, with an additional $200–600 billion needed from 2030 to 2050."[12]

- Analysis conducted for MISO found that significant transmission expansion was economical under all future scenarios, with the largest transmission expansion needed in Minnesota, the Dakotas, and Iowa. In the carbon reduction case, transmission provided $3.8 billion in annual savings, reducing total power system costs by 5.3%.[13] MISO's Renewable Integration Impact Assessment conducted a diverse set of power system studies examining up to 50% VER (570GW VER) in the eastern interconnection. Within the MISO footprint, this included the following transmission expansion: 590 circuit-miles of 345kV and below, 820 circuit-miles of 500kV, 2040 circuit-miles of 765kV and 640 circuit-miles of HVDC.[14]

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[8] Vibrant Clean Energy, *Minnesota's Smarter Grid*, July 31, 2018.
[9] J. Michael Hagerty, Johannes Pfeifenberger, and Judy Chang, Transmission Planning Strategies to Accommodate Renewables, at 17, September 11, 2017.
[10] Bethany A. Frew et al., *Flexibility Mechanisms and Pathways to a Highly Renewable US Electricity Future*, Energy, Volume 101, at 65-78, April 15, 2016.
[11] Bethany A. Frew et al., *Flexibility Mechanisms and Pathways to a Highly Renewable US Electricity Future*, Energy, Volume 101, at 65-78, April 15, 2016.
[12] Dr. Jürgen Weiss, J. Michael Hagerty, and María Castañer, *The Coming Electrification of the North American Economy*, at ii, March 2019.
[13] Vibrant Clean Energy, *MISO High Penetration Renewable Energy Study for 2050*, at 23-24, January 2016.
[14] Wind Solar Alliance, *Renewable Integration Impact Assessment Finding Integration Inflection Points of Increasing Renewable Energy*, January 21, 2020.

- Brattle group analysts, on behalf of WIRES, demonstrate that transmission expansion creates trading opportunities across existing regional and interregional constraints. The report finds, using existing wholesale power price differences between SPP and the Northwestern U.S., that "adding 1,000 MW of transmission capability would create approximately $3 billion in economic benefits on a present value basis."[15]

- In its HVDC Network Concept study, MISO estimates that expanding east-to-west and north-to-south transmission interties can generate investment cost savings of approximately $38 billion through load diversity benefits that would reduce nation-wide generation capacity needs by 36,000 MW.[16]

- A study prepared for the Eastern Interconnection States Planning Council, National Association of Regulatory Utility Commissioners, and the Department of Energy estimates that $50–110 billion of interregional transmission will be needed over the next 20 years to cost-effectively support new generation investment. A co-optimized, anticipatory transmission planning process is estimated to reduce total generation costs by $150 billion, compared to a traditional transmission planning approach, and would generate approximately $90 billion in overall system-wide savings.[17]

- SPP found that a portfolio of transmission projects constructed in the region between 2012 and 2014 at a cost of $3.4 billion is estimated to generate upwards of $12 billion in net benefits over the next 40 years. The net present value is expected to total over $16.6 billion over the 40-year period, resulting in a benefit-to-cost ratio of 3.5.[18]

- MISO estimates that its 17 Multi-Value Projects (MVPs), approved in 2011, will generate between $7.3 to $39 billion in net benefits over the next 20 to 40 years, which will result in a total cost-benefit ratio of between 1.8 to 3.1. Typical residential households could realize an estimated $4.23 to $5.13 in monthly benefits over the 40-year period.[19]

- A study conducted by the Eastern Interconnection Planning Collaborative on the need for interregional transmission projects to meet national environmental goals found that an efficient interregional transmission planning approach to meet a 25% nation-wide RPS standard would reduce generation costs by $163–197 billion compared to traditional planning approaches.[20] Phase 2 of the study found that the transmission investment necessary to support the generation and the environmental compliance

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[15] Johannes Pfeifenberger and Judy Chang, *Well-Planned Electric Transmission Saves Customer Costs: Improved Transmission Planning is Key to the Transition to a Carbon Constrained Future*, at 16, June 2016.
[16] MISO, *HVDC Network Concept*, at 3, January 7, 2014.
[17] Andrew Liu et al., *Co-optimization of Transmission and Other Supply Resources*, September 2013.
[18] SPP, *The Value of Transmission*, at 5, January 26, 2016.
[19] MISO, *MTEP19*, at 6-7, n.d.
[20] Eastern Interconnection Planning Collaborative, *Phase 1 Report: Formation of Stakeholder Process, Regional Plan Integration and Macroeconomic Analysis*, December 2011.

scenarios associated with these savings ranges from $67 to $98 billion.[21] These results indicate that the combination of interregional environmental policy compliance and interregional transmission may offer net savings of up to $100 billion.

Customer and reliability benefits from an increase in transmission construction have also been noted in studies focused on networks outside of the U.S. that have the same fundamental physics and economics at work.

- The "European e-Highway 2050" study found that interregional transmission investments allow for the integration of lower-cost, region-wide renewable resources, which reduce the cost of achieving a low-carbon electricity sector. Additionally, in high-renewable generation scenarios, interregional transmission investments are found to be highly cost effective with a payback period of just one year.[22]

- A study conducted by McKinsey & Company analysts found that, in Europe, the most cost-effective way to reach 40% to 45% renewable generation targets in 2050 requires doubling existing region-wide transmission capabilities by 2020 and quadrupling transmission capabilities by 2050. Germany, in particular, would need to significantly expand its interregional transmission capabilities to facilitate Europe-wide resource planning coordination.[23]

- Achieving Europe's overall renewable energy policy objectives, according to a report prepared for the Directorate General for Energy of the European Commission, finds the most cost-effective path to achieving Europe's renewable energy policy objectives involves a substantial expansion of transmission networks, which composes 15% to 20% of total investment needs in all scenarios. A delay or lack of regional and interregional transmission was found to increase overall system-wide costs as well as increase levels of price volatility within regional markets.[24]

An expanded transmission network would also support reliability and resilience

When FERC opened a proceeding about system resilience, grid operators and experts emphasized first and foremost the importance of robust regional and interregional transmission in protecting against modern threats. For example:

[21] Eastern Interconnection Planning Collaborative, *Phase 2 Report: Interregional Transmission Development and Analysis for Three Stakeholder Selected Scenarios and Gas-Electric System Interface Study*, June 2, 2015.
[22] E-Highway 2050, *D2.3 System Simulations Analysis and Overlay-Grid Development*, Modular Development Plan of the Pan-European Transmission System 2050, April 16, 2015.
[23] McKinsey & Company, *Transformation of Europe's power system until 2050Including specific considerations for Germany*, October 2010.
[24] DNV GL - Energy, *Integration of Renewable Energy in Europe*, June 12, 2014.

- NYISO: "[R]esiliency is closely linked to the importance of maintaining and expanding interregional interconnections, [and] the building out of a robust transmission system";[25]
- ISO-NE: "The system's ability to withstand various transmission facility and generator contingencies and move power around without dependence on local resources under many operating conditions . . ., results in a grid that is, as defined by the Commission, resilient."[26]
- PJM: "Robust long-term planning, including developing and incorporating resilience criteria into the [Regional Transmission Expansion Plan], can also help to protect the transmission system from threats to resilience."[27]
- SPP: "The transmission infrastructure requirements that are identified through the [Integrated Transmission Plan (ITP)] process are intended to ensure that low cost generation is available to load, but the requirements also support resilience in that needs are identified beyond shorter term reliability needs. For example, the ITP identified the need for a number of 345 kV transmission lines connecting the panhandle of Texas to Oklahoma. These lines were identified as being economically beneficial for bringing low-cost, renewable energy to market, but their construction has also supported resilience by creating and strengthening alternate paths within SPP."[28]
- Brattle Group analysts: "The power system can be vulnerable to disruptions originating at multiple levels, including events where a significant number of generating units experience unexpected outages. The transmission system provides an effective bulwark against threats to the generation fleet through the diversification of resources and multiple pathways for power to flow to distribution systems and ultimately customers. By providing customers access to generation resources with diverse geography, technology, and fuel sources, the transmission network buffers customers against extreme weather events that affect a specific geographic location or some external phenomenon (unavailability of fuel and physical or cyber-attacks) that affect only a portion of the generating units."[29]

Similarly, a National Academies of Sciences study of power system resilience noted the need for planning improvements to protect against modern threats.[30] The report draws several conclusions that weigh toward enacting reforms to ensure that regional transmission plans improve system resilience:

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[25] *Response of the New York Independent System Operator, Inc.*, Docket No. AD18-7, at 4, March 9, 2018.
[26] *Response of ISO New England Inc.*, Docket No. AD18-7, at 15, March 9, 2018.
[27] *Comments and Responses of PJM Interconnection, L.L.C.*, Docket No. AD18-7, at 49, March 9, 2018.
[28] *Comments of Southwest Power Pool, Inc. on Grid Resilience Issues*, Docket No. AD18-7, at 8, March 9, 2018.
[29] Mark Chupka and Pearl Donohoo-Vallett, *Recognizing the Role of Transmission in Electric System Resilience*, at 3, May 9, 2018.
[30] National Academies of Sciences, Engineering, and Medicine, *Enhancing the Resilience of the Nation's Electricity System*, The National Academies Press, 2017.

- "[L]arge-scale physical destruction of key parts of the power system by terrorists is a real danger."[31]
- "[T]he risks posed by cyber attacks are very real and could cause major disruptions in system operations."[32]
- "The probability, intensity, and spatial distribution of many of the hazards that can disrupt the power system are changing. These changes are due in part to the consequences of ongoing climate change. Traditional measures, based on an assumption of statistical stationarity (e.g., 100-year flood), may need to be revised to produce measures that reflect the changing nature of some hazards."[33]
- "As the complexity and scale of the grid as a cyber-physical system continues to grow, there are opportunities to plan and design the system to reduce the criticality of individual components and to fail gracefully as opposed to catastrophically."[34]
- "In most cases, an electricity system that is designed, constructed, and operated solely on the basis of economic efficiency to meet standard reliability criteria will not be sufficiently resilient."[35]

The evidence above does not support the Departments conclusion that the current transmission system is adequate.

3. We urge the Department to keep the option to designate open, and avoid limiting its own authority.

Nothing in the Department's study should limit its authority to designate a corridor based on current or prospective congestion. We agree with AWEA's comments generally and specifically this passage related to prospective evaluation of constraints and congestion:

> AWEA also notes that several aspects of 216(a)(4) allow DOE to consider *potential* future changes – including whether economic vitality and development, or end markets, "*may* be constrained by lack of adequate or reasonably priced electricity", and whether economic growth "*may* be jeopardized by reliance on limited sources of energy." Had Congress required DOE to make a finding of these consequences at the time of the Congestion Study, it clearly could have used phrases such as "is constrained" or "is jeopardized." Similarly, the

[31] National Academies of Sciences, Engineering, and Medicine, *Enhancing the Resilience of the Nation's Electricity System*, The National Academies Press, at 64, 2017.
[32] National Academies of Sciences, Engineering, and Medicine, *Enhancing the Resilience of the Nation's Electricity System*, The National Academies Press, at 64, 2017.
[33] National Academies of Sciences, Engineering, and Medicine, *Enhancing the Resilience of the Nation's Electricity System*, The National Academies Press, at 65, 2017.
[34] National Academies of Sciences, Engineering, and Medicine, *Enhancing the Resilience of the Nation's Electricity System*, The National Academies Press, at 67, 2017.
[35] National Academies of Sciences, Engineering, and Medicine, *Enhancing the Resilience of the Nation's Electricity System*, The National Academies Press, at 71, 2017.

statute does not limit DOE's economic analysis to the scope of a corridor; instead, it *specifically* allows for consideration of economic vitality, development, and growth in the end markets served by the corridor, as well as within the corridor. DOE's past interpretation of Section 216, as advanced in the 2007 Congestion Study, is that it has the ability to use its authority to designate NIETCs to head off incipient risks, and has broad statutory authority to consider a wide range of benefits. AWEA urges DOE to continue to act consistent with this interpretation, which it has not publicly retracted revised."

4. We generally support the criteria for designation but offer some minor suggestions

The Department describes a process whereby applicants can bring project-specific to the Department's attention for potential designation. We support the approach of application-based project-specific processes.

The Department suggests criteria for such applications. "If an advocate of a proposed transmission project wishes to seek the designation of a National Corridor, the Department requests relevant supporting information." We appreciate the specific request for input. We offer some minor suggested changes in red-line/strikeout below.

1. Where transmission congestion is occurring, or is very likely to occur, in a specific geographic area, with adverse impacts on consumers;
2. How the proposed transmission project would alleviate current or future ~~the~~ congestion;
3. How the proposed National Corridor would be bounded, and the rationale for those boundaries; and,
4. ~~In this particular case, the reason it would be in the national interest for the Secretary of Energy to intervene in a matter that is normally wholly under the jurisdiction of the affected state(s).~~
5. How the proposed designation satisfies the statutory criteria:
    - The economic vitality and development of the corridor, or the end markets served by the corridor, may be constrained by lack of adequate or reasonably priced electricity;
    - Economic growth in the corridor, or the end markets served by the corridor, may be jeopardized by reliance on limited sources of energy; and
    - a diversification of supply is warranted;
    - The energy independence of the United States would be served by the designation;
    - The designation would be in the interest of national energy policy; and
    - The designation would enhance national defense and homeland security."[36]

[36] § 824p(a)(4).

We appreciate the opportunity to comment.

Signed,

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