UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Joint Federal-State Task Force on Electric Transmission	))	Docket No. AD21-15-000

COMMENTS OF THOMAS DONAHUE

Pursuant to the Federal Energy Regulatory Commission's ("FERC") 30 August 2021 Order listing members of the Joint Federal-State Task Force on Electric Transmission ("Task Force"), announcing meetings, and inviting agenda topics,[1] Thomas Donahue—an electrical engineer residing in western Loudoun County, Virginia—submits the following comments for the 28 February 2024 meeting to be held in Washington, DC on the topic area of barriers that inhibit planning and development of more efficient and effective transmission necessary to achieve federal and state policy goals.

I. COMMENTS

The national grid is challenged by the growth of electricity demand, including from the explosive proliferation of energy-intensive data centers, during a time when the sources of power generation are shifting asynchronously from fossil-fuel sources to renewable sources of energy.[2] Power companies seeking to fill the gap that is emerging in areas such as Northern Virginia are looking to increase the availability of transmission capacity.

- The regional transmission operator PJM, in particular, on 11 December 2023 approved a $5 billion plan (2022 RTEP Window 3) that primarily seeks to bring three additional

[1] *Joint Fed.-State Task Force on Elec. Transmission*, 175 FERC ¶ 61,224 (2021) (Establishing Order).
[2] PJM, *Inside Lines*, 24 February 2023, "PJM Details Resource Retirements, Replacements, and Risks," https://insidelines.pjm.com/pjm-details-resource-retirements-replacements-and-risks/;
Robert Walton, *Utility Drive*, 14 December 2023, "Rising peak demand, 83 GW of planned retirements create blackout risks for most of US: NERC," https://www.utilitydive.com/news/generator-retirements-threaten-grid-reliability-NERC/702504/.

500 kV transmission lines into the data center area east of Leesburg, Virginia plus other lines to move the power around that area.[3]

- The planned transmission lines would traverse Virginia, West Virginia, Maryland, and Pennsylvania. The transmission lines would mostly use large lattice towers and would use conventional aluminum-conductor-steel-reinforced (ACSR) wires.[4]
- In addition to increasing the capacity of power delivered to the data centers, PJM's plan seeks to increase resilience by adding path diversity to the existing grid. Toward this end, two of the planned lines involve new "greenfield" rights of way cutting diagonally across Maryland's agricultural region and diagonally across the historic and agricultural region of western Loudoun County (including the Waterford National Landmark).
- This plan also calls for widening existing rights of way along many segments to accommodate a second or third set of lines, along with moving existing lower voltage lines to be mounted below the 500 kV lines.

Needless to say, this massive project already is beginning to receive pushback from community stakeholders and local governments, particularly in the case of western Loudoun County where a concerted effort has been under way for more than 75 years to preserve open spaces and viewsheds in an historical area first settled by the Quakers during the mid-18th Century. Large blocks of the land that would need to be traversed are in permanent conservation easements and historic districts, as well as the Waterford Landmark. This land is also part of the Journey Through Hallowed Ground National Heritage Area.[5] In addition, over the past 40 years, western Loudoun has developed an agri-tourism business built around wineries, breweries,

[3] PJM, *Inside Lines*, "PJM Board of Mangers Approves Critical Grid Upgrades," 11 December 2023, https://insidelines.pjm.com/pjm-board-of-managers-approves-critical-grid-upgrades/.
[4] PJM, 5 December 2023, "Reliability Analysis Update," at p. 5, https://www.pjm.com/-/media/committees-groups/committees/teac/2023/20231205/20231205-item-15---reliability-analysis-update-2022-window-3.ashx.
[5] The Journey, Hallowed Ground, accessed 8 January 2024, https://www.hallowedground.org/.

equine sports, and recreational trails (including the Appalachian Trail, the Regional W&OD Trail, the new Sweet Run State Park, and more than 250 miles of historical gravel roads).

- These businesses have helped counter what had been a decline in the county's conventional agriculture business that resulted from broader national economic trends and the explosive housing development in Northern Virginia. All of these businesses depend on the viewshed for their viability.
- Despite a late awareness of the PJM planning process, more than 300 letters were sent by residents, businesses, officials of Loudoun County, and elected representatives to the Virginia General Assembly to the PJM Board of Managers ahead of their 11 December 2023 decisional meeting.[6]

Plans such as those put forward by PJM excessively require the imposition of eminent domain on property owners because the regional competition process disincentivizes the use of better technology that could deliver greater power and resilience using existing transmission lines in combination with a smaller number of new lines in existing rights of way.

- As the chair of the PJM Transmission Expansion Advisory Committee (TEAC) noted at the 5 December "second reading," the 2022 RTEP Window 3 plan falls "uncomfortably" between PJM's normal short-term planning and its 15-year forecasts.[7]

[6] PJM, Disclosure of Letters Submitted to PJM for 5 December 2023 TEAC Meeting, https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20231201-letters-re-proposed-transmission-upgrades-advance-of-20231205-teac.ashx; https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20231203-letters-re-proposed-transmission-upgrades-advance-of-20231205-teac.ashx; https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20231204-letters-re-proposed-transmission-upgrades-advance-of-20231205-teac.ashx; https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20231205-additional-letters-received-regarding-proposed-transmission-upgrades-in-advance-of-teac.ashx.

[7] Statement made at the 5 December 2023 PJM TEAC meeting in response to a question by Thomas Donahue regarding why it was acceptable to allow for increasing costs and schedule slippage to 2030 in view of the presumed need for implementation by mid-2027.

PJM's plan was the result of pulling together hundreds of plan elements submitted in 72 proposals from energy companies. The winning proposals were those that stuck to conventional technology and delivered a useful short-term result at the lowest possible cost. The few proposals that tried to take a longer-term perspective were rejected. This mostly sounds sensible, except that by the time the final plan is implemented (especially the new rights of way), it will most likely already be obsolete relative to growing load demands from data centers and without the ability to scale readily going forward.

- Local jurisdictions are not obliged to consider the availability of energy when approving zoning for data centers, assuming such information would even be available.
- Coal-fired plants face pressure to shut down[8] from economic pressure[9] and statutory requirements such as the Virginia Clean Economy Act[10] (case in point, the former Dickerson coal plant in Maryland, across the Potomac River from Leesburg[11]).
- And thus, PJM most likely will have to plan once again yet more transmission lines, seeking to fill every empty space in the region's rural landscape regardless of all other economic interests and societal values.
- There is no certainty that even the coal plants in West Virginia, which will be a major source of power for the new transmission lines from the west, will even last through the lifetime of these planned transmission lines.

This cannot be sustained. Obviously, the expectation is that new sources of power generation, hopefully closer to areas of new load demand, will catch up and provide relief for the transmission

[8] Ethan Howland, *Utility Dive*, 22 March 2022, "Coal plant owners seek to shut 3.2 GW in PJM in face of economic, regulatory and market pressures," https://www.utilitydive.com/news/coal-plant-owners-seek-to-retire-power-in-pjm/620781/.
[9] Christine Condon, *Baltimore Sun*, 23 November 2023, "Western Maryland coal-burning power plant to retire in 2024, becoming state's last to announce closing," https://www.baltimoresun.com/2023/11/15/western-maryland-coal-burning-power-plant-to-retire-in-2024-becoming-states-last-to-announce-closing/.
[10] Virginia Legislative Information System, 2020 Session, HB 1526 Electric utility regulation; environmental goals," https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+HB1526.
[11] Global Energy Monitor Wiki, Dickerson Generating Station, accessed 6 January 2024, https://www.gem.wiki/Dickerson_Generating_Station.

planners. Nonetheless, if Dominion Energy's latest integrated resource plan (which the Virginia State Corporation Commissioner examiner in December 2023 recommended be rejected[12]) and the actions of county Boards of Supervisors approving new, massive data centers are any indication,[13] then the region will still be leaning heavily on ever increasing amounts of transmission at least through the 2030s and even to 2050.

Europe appears to be ahead of the United States in the development and implementation of new power technologies, in part because of different regulatory incentives. The European approach is driven by the technology and efficiency requirements for moving large quantities of power, especially from renewable energy sources, but also by the lack of space and tolerance in European communities for overhead lines.[14] This approach includes High Voltage Direct Current (HVDC) transmission underwater and underground.[15] Technology developed in Europe is helping countries such as the United Kingdom, Germany, the Netherlands, and the Scandinavians move toward an HVDC network (not just point-to-point one-way links).[16]

The US approach to new power technology appears disjointed in comparison but has not been without some progress. The Champlain Hudson Express (339 miles/1,250 megawatts) in September 2023 began construction of a line using rivers and underground paths along the Hudson Valley to New York City.[17] The SOO Green line (350 miles/2,100 megawatts) in the mid-west plans to use mostly railroad and

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[12] Charlie Paullin, *Virginia Mercury*, 12 December 2023, "Dominion regulator recommends rejection of utility's long-term plan," https://www.virginiamercury.com/2023/12/12/dominion-regulator-recommends-rejection-of-utilitys-long-term-plan/.
[13] Antonio Olivo, *Washington Post*, 13 December 2023, "Prince William County board approves controversial data center project," https://www.washingtonpost.com/dc-md-va/2023/12/13/prince-william-digital-gateway-data-centers/.
[14] Power Grid International, 1 October 2011,"Going Underground, European Transmission Practices," https://www.power-grid.com/td/going-underground-european-transmission-practices/#gref.
[15] Pamela Largue, *Power Engineering International*, 19 July 2023, "Construction begins on pioneering UK-German NeuConnect link, https://www.powerengineeringint.com/smart-grid-td/td-infrastructure/construction-begins-on-the-pioneering-uk-german-neuconnect-link/.
[16] Peter Fairley, *IEEE Spectrum*, 28 December 2023, "HVDC Networks Come to Europe," https://spectrum.ieee.org/multiterminal-hvdc-networks.
[17] Champlain Hudson Power Express, accessed 6 January 2023, "About the Project," https://chpexpress.com/project-overview/.

some highway rights of way for buried lines, avoiding costly delays from public resistance.[18] After more than 15 years of planning efforts, the TransWest Express[19] (732 miles/3,000 megawatts) and the SunZia[20] (550 miles/3,000 megawatts) overhead DC lines have finally begun construction to bring wind power westward from Wyoming and New Mexico. In part because of the still limited market and supply chains in the United States, this approach to new technology remains relatively expensive. In addition, the short-term incremental approach devoid of longer-term objectives taken in projects such as PJM's 2022 RTEP Window 3 plan lack the scale needed to make the cost of DC/AC conversion facilities worthwhile.

Another more affordable technology that can be implemented selectively at much less cost than underground lines and is specifically promoted by the Federal government, is advanced conductors, notably composite core wires.[21] These wires can carry twice the power on lighter-weight lines, with fewer losses, and less sagging.[22]

- ***The additional capacity of these wires, which can be mounted on existing towers, would be available for delivering more power, handling peak loads, or serving as reserve capacity in the event of an outage on another line.***
- This technology has been deployed at voltages up to 230 kV in the United States,[23] and two of the five composite core wire manufacturers that I could identify operating in the

[18] SOO Green HVDC Link, accessed 6 January 2023, "An Innovative New Model," https://soogreen.com/.
[19] TransWest Express, accessed 6 January 2023, "Schedule and timeline," https://www.transwestexpress.net/about/timeline.shtml.
[20] Michelle Lewis, 28 December 2023, "The largest clean energy project in US history closes $11B, starts full construction," https://electrek.co/2023/12/28/largest-clean-energy-project-us-sunzia/.
[21] Peter Behr, *E&E News/Energy Wire*, 13 July 2023, "Grid rewiring: An answer for Biden's climate goals?", https://www.eenews.net/articles/grid-rewiring-an-answer-for-bidens-climate-goals/.
[22] Southwire, *Utility Drive* (sponsored content), 18 April 2022, "How composite core conductors reduce the costs of transmission projects," https://www.utilitydive.com/spons/how-composite-core-conductors-reduce-the-costs-of-transmission-projects/621481/;
Jeff St. John, *Canary Media*, 17 November 2021, "New transmission tech can easily double clean energy capacity. Will utilities buy it?", https://www.canarymedia.com/articles/transmission/new-transmission-tech-can-easily-double-clean-energy-capacity-will-utilities-buy-it.
[23] Basin Electric Power Cooperative, 26 January 2023, "Neset-to-Northshore Transmission Project Energized," https://www.basinelectric.com/News-Center/news-briefs/Neset-to-Northshore-transmission-project-energized.

United States have participated in the building of at least two 500 kV lines in the challenging environment of Indonesia.[24] China has also built at least one line at 500 kV.[25]

- The implementation of new technologies in developing countries ahead of more developed countries with extensive legacy infrastructures is a pattern that also occurs in telecommunications. Given the massive, unanticipated growth of electricity demand, perhaps the United States has reached a point where new technologies would be useful and cost effective on a broader scale than heretofore implemented.

Unfortunately, effective incentives do not exist for thinking ahead to provide the best long-term performance, to make best use of the rate payers' capital, and to consider the full cost and impact on affected communities. The capability of a composite core approach offers the potential to eliminate the need for new rights of way, avoid community resistance, save money, and get new capacity in place sooner. In particular, the PJM plan could have used composite core wires on existing lines and built into the transmission network greater capacity for future growth and current resiliency needs. And critically for the residents of western Loudoun County and western Maryland, there would be no need for the new transmission lines in the new "greenfield" rights of way, thereby compensating for the additional cost of the composite core wires elsewhere. PJM added three years to the schedule and more than $510 million to the expected cost of the transmission line project for western Loudoun (later reduced to adding $260 million for a total of $940 million) because of anticipated resistance.[26] It is also worth noting that the company slated to

[24] Epsilon Cable, accessed 6 January 2023, "500 kV Line in Jakarta Indonesia (2017)," https://www.epsilon-cable.com/case-studies/500kv-line-in-jakarta-indonesia;
CTC Global, August 2018, "PLN Completes 500 kV ACCC Conductor Upgrade in Indonesia," https://myemail.constantcontact.com/ACCC-Conductor-Update-from-CTC-Global.html.
[25] Wang Junwei, *China Daily*, 16 December 2019, "World's 1st carbon fiber UHV power line starts operation," https://global.chinadaily.com.cn/a/201912/16/WS5df75007a310cf3e3557e77c.html.
[26] PJM, 8 December 2023, "Reliability Analysis Report," at pp. 55, 70, https://www.pjm.com/-/media/committees-groups/committees/teac/2023/20231205/20231205-2022-rtep-window-3-reliability-analysis-report.ashx;
PJM, November 2023, "Constructability and Financial Analysis Report," at pp. 61-63, https://www.pjm.com/-/media/committees-groups/committees/teac/2023/20231205/20231205-2022-rtep-window-3-constructability--financial-analysis-report.ashx.

build the transmission line through western Loudoun County in November 2023 applied to FERC for Abandoned Plant and Construction Work in Progress incentives even before PJM approved the proposal.[27]

The shortcomings of the PJM process mean that the individual regulators in four different states are left to consider the individual proposals from the various energy companies building in each of the four states. Nowhere in this regulatory process is there any certainty that the regulators will have the benefit of understanding the range of available technical options (which was PJM's job). Nor are regulators in individual states well positioned to see how the full plan fits together and understand how their respective decisions might change the reliability and stability calculus underlying PJM's planning process. Nor would they be in a position to evaluate how the decisions of other regulators to change or reject another part of this complex project might expand the routing options that should be considered because previously committed capacity had become available in an existing right of way or substation.

II. Suggested Agenda Items for the Task Force

In view of all of the above challenges in the planning and implementation of transmission lines, in the face of a growing gap between demand and availability of power during an unprecedented transition from fossil fuels to renewable energy, I request that the Task Force consider the following agenda items:

- How can regional planners and energy companies be incentivized to move beyond what the Organization for PJM States in November 2023 described as "siloed, reactive planning"[28] to consider longer-term planning approaches and more advanced technologies that could

[27] NextEra Energy Transmission Mid-Atlantic Indiana, Inc., Letter to FERC, 22 November 2023, "Request for Approval of Transmission Rate Incentives," Docket No. ER24-472-000.
[28] OPSI, 28 November 2023, Letter to PJM, https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20231128-opsi-letter-re-grid-reliability.ashx.
Also see the Maryland Office of the People's Counsel, Letter to PJM, 8 December 2023, https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20231208-pjm-board-letter-2023-12-08-md-opc-final.ashx.

provide greater capacity, resilience, and stability for the national grid while also minimizing the impact on communities of the use of eminent domain for new rights of way?

- Does the United States need a more architectural approach to incentivize the adoption of technology and planning for future upgrades—rather than incremental, isolated planning—to meet the national grid's expected needs for 2050?
- How can we improve interaction among different levels of government and across multiple states to ensure synchronized, coordinated decision making at the various stages of approving zoning that creates demands for electricity, planning new electric power infrastructure, and evaluating and approving such infrastructure by the regulators?
- How can we improve the evaluation of the true cost of transmission lines in terms of the full life cycle, schedule delays, and the impact on adjacent communities, particularly as open space and agricultural land becomes increasingly scarce, to create forward-looking criteria for adopting new technologies with the prospect of improved outcomes?

I appreciate the opportunity to comment on the topics for the Task Force's 28 February 2024 meeting and respectfully request consideration of the items listed above for its agenda.

Respectfully submitted on 8 January 2024,

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