

Emissions reductions from electricity transmission provisions in energy permitting legislation

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Summary

The electric transmission components of siting legislation proposed by Senators Schumer and Manchin could facilitate enough grid development to reduce U.S. carbon dioxide pollution by hundreds of millions of tons per year. This is a significant share of the 1.70 billion tons of carbon dioxide emitted by the U.S. electric sector in 2021,¹ and an essential portion of the emissions reductions that must be achieved to reduce U.S. total carbon dioxide emissions by 40% by 2030.

The transmission provisions in the bill are designed to facilitate the construction of new power lines by giving the Federal Energy Regulatory Commission the authority to permit and allocate costs for new transmission, and speed up processes under the National Environmental Policy Act (NEPA). These provisions would significantly reduce carbon dioxide emissions and consumer electric bills by enabling development of low-cost and highly productive wind and solar resources that cannot currently be developed due to a lack of transmission lines to deliver their electricity to population centers. New transmission lines will also facilitate the integration of larger amounts of wind and solar by tapping geographically diverse renewable resources, and ensuring more constant output by reducing the impact of localized weather events. Aside from the benefits driven by spurring renewable development, a stronger transmission system will reduce consumer bills and improve electric reliability by providing greater access to low-cost power, including during severe weather events that have led to blackouts like Winter Storm Uri.

Introduction

The power sector offers the fastest and lowest cost means of major greenhouse gas reductions in the 2020s because of the affordability of carbon-free electricity sources like wind and solar, and because electricity can very efficiently displace fossil fuel consumption in transportation and heating in the 2020s. Renewable energy sources, however, are held up by transmission limitations. There are presently well over 1,000 gigawatts of wind, solar, and storage projects waiting in transmission interconnection queues, largely because of limited transmission delivery capacity.² US transmission capacity will need to expand two to three times in order to decarbonize.³ Arguably, transmission is the biggest barrier to US emissions reductions.

We characterize the barriers to transmission as the “3Ps”: planning, permitting, and paying. Planning is required across large regions to produce the most efficient and reliable network, yet the electric industry only has relatively new regional institutions and regional regulatory policies layered on top of the hundreds of electric utilities around the country. Permitting is a barrier for long linear infrastructure because the regulatory authorities are largely local and state-level, and each authority operates independently from every other, making it difficult to acquire the rights for a contiguous plot of land across the hundreds of miles required for the needed lines. “Paying” is a barrier because transmission

¹ United States Environmental Protection Agency, “[Power Plant Emissions Trends](#).”

² Lawrence Berkeley National Laboratory Electricity Markets & Policy, “[Generation, Storage and Hybrid Capacity in Interconnection Queues](#).”

³ Brown and Botterud, “[The Value of Inter-Regional Coordination and Transmission in Decarbonizing the US Electricity System](#),” *Joule*, January 2021. Eric Larson et al., “[Net-Zero America: Potential Pathways, Infrastructure, and Impacts](#),” Princeton University, December 2020. James H. Williams et al., “[Carbon-Neutral Pathways for the United States](#),” AGU Advances, November 2020.

lines are a classic “public good,” with beneficiaries across many states, yet we do not have a well-functioning means of either taxpayer- or ratepayer-funding by all those beneficiaries.

These barriers remain despite recent legislation. A federal tax credit for regionally significant transmission lines could drive significant transmission investment, yet that policy has not yet passed.⁴ The US Federal Energy Regulatory Commission has proposed transmission planning rules, yet the current proposal would not account for all of transmission’s benefits, potentially resulting in few transmission lines passing benefit-cost tests. The Bipartisan Infrastructure Law contained only \$5-10 billion for new transmission lines (despite general media reporting on the bill) which is only a couple months’ worth of national transmission spending. The Inflation Reduction Act included loans for transmission, but loans must be paid back of course, and most developers do not need or want loans or loan guarantees as the cost of capital is not the problem.

Thus, we still have significant planning, permitting, and paying transmission barriers that will prevent clean energy goals and carbon targets from being achieved.

The siting bill would allow proposed transmission lines to move forward while also enabling the development of new transmission lines that have not yet been publicly announced. To determine the emissions reductions from these provisions, we first analyze the policies and then calculate the impact from bringing proposed transmission projects online.

Policy Description

The bill includes provisions to:

- Enhance federal government permitting authority for interstate electric transmission facilities that have been determined by the Secretary of Energy to be in the national interest.
 - Replace DOE’s national interest electric transmission corridor process with a national interest determination by the Secretary of Energy that allows FERC to issue a construction permit.
 - Require FERC to ensure costs for transmission projects are allocated to customers that benefit.
 - Allow FERC to approve payments from utilities to jurisdictions impacted by a transmission project.
- Designate and prioritize projects of strategic national importance
- Set maximum timelines for permitting reviews, including two years for NEPA reviews for major projects and one year for lower-impact projects.

The cost allocation provisions enable FERC to allocate costs to all who benefit from large-scale regional and interregional transmission that are determined to be in the national interest.

The national interest determination would change the “backstop” federal permitting provisions in Section 216 of the Federal Power Act to no longer include the step of waiting to see what states do, and enable federal government designation and processes to permit in the near term. The permitting provision is project-based rather than corridor-based, potentially avoiding a time-consuming step in the

⁴ Michael Goggin and Rob Gramlich, “[Investment Tax Credit for Regionally Significant Electricity Transmission Lines](#),” May 2021

process because ultimately projects need to be approved, and the step of designating a corridor before identifying a project creates a delay.

The “projects of strategic national importance” would apply to some number of transmission projects and speed up their processing.

The NEPA implementation timelines and accountability would codify in statute certain requirements intended to speed project processing and utilize practices that have been under development through the Obama, Trump, and Biden administrations related to accountability and inter-agency coordination.

Policy Analysis

These policies are potentially very significant for deploying low-cost clean energy around the country. They address certain aspects of transmission planning, cost allocation, and permitting that could provide a pathway for transmission projects that does not presently exist. We analyzed the one page Schumer-Manchin proposal released in July and a leaked version of draft legislation, and confirmed our assessment of the bill when the bill was released.

Cost allocation policy

This is by far the most significant policy in this proposal and would be the most significant transmission legislation passed in at least 15 years. It creates a new process whereby transmission projects can be funded by all electricity customers who benefit from the lines. Presently, with transmission being a classic public good, the incentive of every electricity customer is to avoid having to pay for lines even if they benefit. This policy would institute a process of determining who actually does benefit and provide for each beneficiary to pay according to the magnitude of those benefits. This is grounded in standard public utility regulation principles, yet FERC has not yet been given a clear and direct mechanism for allocating costs in this way. Only certain entities with “filing rights” can make such proposals, and they usually cover only small geographic areas. Questions about whether FERC has this authority would be put to rest with this proposal. The “beneficiary pays” standard they would use is not new; it is in fact exactly how courts and FERC interpret the Federal Power Act. But the process opens up new opportunities for utilities and other types of transmission developers to develop lines that benefit large regions and have their costs allocated and recovered. The concept of the bill is similar to a bill introduced by then-Senate Majority Leader Harry Reid in 2009 entitled, “The Clean Renewable Energy and Economic Development Act.”⁵

This cost allocation policy, if enacted, could have a significant impact on new transmission lines to directly access clean energy, and indirectly enable high renewable energy penetration through general regional and interregional grid capacity expansion grid capacity. Since each project would have to be deemed by FERC to have benefits to every entity, and there will need to be a regulatory proceeding for each one, there are some uncertainties about how many such projects would qualify.

NEPA changes

⁵ Troutman Pepper, “[Senator Reid Introduces Bill to Give FERC Additional Backstop Siting Authority for Transmission](#),” Troutman Energy Report, March 6, 2009

The NEPA changes would likely speed up a number of projects. Many transmission projects are subject to NEPA because they cross federal lands or waters, or are subject to federal actions such as national interest designations. Transmission projects can sit in the NEPA regulatory approval process for longer than presidential administrations, and when new decision-makers and new policies enter, the project can be back at square one in processing. Efforts under the Obama administration to designate priority projects and speed processing were viewed as very helpful by transmission infrastructure developers.⁶ This approach has been formalized under the FAST Act and the Federal Permitting Improvement Steering Council. The NEPA changes that would be codified in this legislation would add meaningful improvements to timelines and accountability that would sustain under any future presidential administration.

National interest designation

This change from “backstop” to plenary federal authority for siting lines could potentially speed up the awkward multi-agency process involving multiple states, DOE, and FERC. The current National Interest Electric Transmission Corridor policy passed in the Energy Policy Act of 2005 has never actually resulted in any new transmission. While the improvement to federal backstop siting in the IJIA/Bipartisan Infrastructure Law could potentially make that policy finally workable, it would be beneficial to remove steps in the process and focus more on projects rather than broad “corridors.”

The Inflation Reduction Act also includes provisions that clearly align with this national interest provision such that once a line is designated in the national interest, it would be eligible for loans. There is \$2 billion in “credit subsidy cost” in the IRA, which translates to \$50 to \$200 billion in principal loan amount which is of course a very significant amount. Loans can significantly reduce the cost of capital of transmission. It is less clear whether these loans can be used if this legislation does not pass.

Strategic national importance designation

This provision will apply to a defined number of transmission projects. The changes associated with this designation provide all of the process efficiencies that can be made available while preserving the basic requirements of NEPA. For that limited set of projects, this designation could be significant. It is worth noting that transmission is far harder to permit than generation and just about every other type of energy infrastructure. One must gain approvals and lease agreements across an extremely long string of land plots to make a project work.

Emissions Reductions

U.S. carbon dioxide emissions would be reduced by 131 million short tons per year if all 22 planned lines identified in the recent “Transmission Projects Ready to Go” report⁷ were in service today. That estimate is calculated from estimates of the renewable generation delivered by the lines multiplied by the 2021

⁶ Grid Strategies has consulted to a number of transmission developers and to Americans for a Clean Energy Grid and other organizations that regularly evaluate permitting approval processes.

⁷ Michael Goggin, Rob Gramlich and Michael Skelly, “[Transmission Projects Ready to Go: Plugging into America’s Untapped Renewable Resources](#),” April 2021

regional emissions factors from EPA's AVERT tool for the regions receiving the power from the proposed transmission lines.⁸

That estimate is indicative of current emissions savings if these lines were in service today (the weighted average regional emissions savings for the 22 lines are 1390 lbs/MWh). Emissions savings in the future will likely be lower as fossil generation becomes less carbon-intensive. For example, if one assumes that all coal generation is retired, the carbon dioxide emissions savings from all 22 projects would be around 82 million short tons/year, based on the current gas generating fleet's average emissions of 859 lbs/MWh.

The siting bill would also likely spur the development of transmission projects that have not yet been proposed. Transmission projects proposed in the near future can be brought online by the year 2030,⁹ particularly because the draft legislation expedites the permitting of these lines. The "Transmission Projects Ready to Go" report found that the 17 million MW-miles added by the 22 planned projects are about 10% or less of the total transmission investment that is needed to decarbonize the power system. Power system modeling is likely the best way to estimate the amount of cost-effective transmission projects that will be enabled by the legislation removing permitting and cost allocation obstacles, and associated emissions reductions. For example, an MIT study found a doubling of transmission capacity would be necessary to decarbonize the power sector, or 150 million additional MW-miles.¹⁰ The Princeton Net Zero America study calls for a tripling of transmission capacity to decarbonize, or 300 million new MW-miles.¹¹ The NREL Interconnections Seam study, which only reaches 70% carbon-free electricity, calls for around 110 million new MW-miles. NREL's Renewable Energy Futures study called for 200 million additional MW-miles.¹² A recent study for the Eastern Interconnect projected a doubling of transmission capacity to reduce carbon emissions by over 95%,¹³ which, scaled to the country, would require 150 million MW-miles.

Conclusion

Because permitting and cost allocation are the two main barriers to transmission development, and because the need for transmission is much greater than is currently being planned, in the absence of power system modeling results it is reasonable to assume that emissions reductions from siting and cost allocation legislation will be at least as large as those from currently proposed projects, if not several times larger. This indicates that total emissions reductions from the proposed bill will likely total several hundred million tons of carbon dioxide per year by 2030.

⁸ [Spreadsheet](#) available from the United States Environmental Protection Agency.

⁹ Confirming that newly proposed transmission lines can be brought online by 2030, the grid operator MISO expects transmission lines that it approved in mid-2022 to come online starting in 2028 per [Ethan Howland, "MISO Board Approves \\$10.3B Transmission Plan to Support 53 GW of Renewables,"](#) Utility Dive, July 2022

¹⁰ Brown and Botterud, ["The Value of Inter-Regional Coordination and Transmission in Decarbonizing the US Electricity System,"](#) *Joule*, January 2021.

¹¹ Eric Larson et al., ["Net-Zero America: Potential Pathways, Infrastructure, and Impacts,"](#) Princeton University, December 2020. James H. Williams et al., ["Carbon-Neutral Pathways for the United States,"](#) AGU Advances, November 2020.

¹² Mai et al., ["Renewable Electricity Futures Study: Executive Summary,"](#) National Renewable Energy Laboratory, 2012.

¹³ Christopher T.M. Clack, Michael Goggin, Aditya Choukulkar, Brianna Cote, and Sarah KcKee, ["Consumer Employment, and Environmental Benefits of Electricity Transmission Expansion in the Eastern U.S.,"](#) at 17, October 2020.