

BUILDING THE TRANSMISSION INFRASTRUCTURE FOR 100% CLEAN ENERGY

April 2023

We can build the transmission infrastructure necessary to drastically accelerate our transition to clean energy, while preserving critical environmental, health and community protections, such as the National Environmental Policy Act, the Clean Air Act, and the Clean Water Act. We will build faster and more fairly by addressing key policy barriers that thwart transmission expansion and community engagement. This explainer provides an overview of: **(1)** how the existing rules governing transmission expansion must evolve; **(2)** additional key obstacles to expanding transmission; **(3)** administrative solutions that can be enacted now, under existing authorities; and **(4)** accompanying legislative solutions that should be considered.

The electric grid in the United States was designed to generate electricity in urban centers by burning fossil fuels. The transition to 100% clean energy requires that we upgrade America's grid; build high-voltage, long distance power lines; rapidly connect thousands of renewable energy projects; empower and protect communities with local, distributed power; and support consultation and advanced planning with communities, especially those who have already borne disproportionate impacts such as environmental justice communities and tribal nations. Over the last year, FERC issued two rulemakings to implement reforms that, if done correctly, could address many of the obstacles described here and FERC intends to issue a third rulemaking in 2024 to reform the interregional transmission planning process.

Rapid expansion of transmission infrastructure by 2030 is necessary.

Transmission is the critical bottleneck to achieving a 100% clean power sector. To realize the benefits of the Inflation Reduction Act's (IRA) historic climate

and clean energy investments, we must rapidly expand our transmission infrastructure. Experts estimate that our nation must construct at least double the amount of transmission infrastructure by 2030 to achieve the emissions reductions that the IRA makes possible.¹ Renewable energy facilities are often built in areas optimal for wind and solar production but far from homes, businesses, and existing transmission infrastructure. Even in places that already have high-power transmission lines, the grid lacks the capacity to connect new renewable generators. We must build transmission not only faster, but more fairly to cut emissions without leaving communities behind. With key reforms and dedicated funding, new transmission could unlock an economy-wide clean energy transformation for all.

The current pace of transmission infrastructure expansion must at least double

The Federal Energy Regulatory Commission (FERC) regulates the nation's "bulk power system," a network of high-voltage transmission lines needed to operate the interconnected grid and keep the lights on.² Large-scale regional high-voltage lines are not being built at the pace and scale necessary to keep up with demand. Under FERC's current regulatory framework for transmission, the annual growth rate for transmission infrastructure projects is just one percent, which is woefully insufficient to accommodate the existing backlog of 8,000 generators (mostly renewables) waiting to connect to the grid, let alone any new prospective IRA-funded projects. To meet the existing and future interconnection needs using routes that minimize environmental and community impacts, the annual growth rate of new transmission lines must average a year-over-year growth rate of roughly 9% until 2030.

¹ Net Zero America, Final Report Summary at slide 15: [https://netzeroamerica.princeton.edu/img/Princeton%20NZA%20FINAL%20REPORT%20SUMMARY%20\(29Oct2021\).pdf](https://netzeroamerica.princeton.edu/img/Princeton%20NZA%20FINAL%20REPORT%20SUMMARY%20(29Oct2021).pdf)

² FPA Section 215 (16 U.S.C. § 824a(a)); N. Am. Elec. Reliability Corp., 146 FERC ¶ 61,199 (2014); <https://www.nerc.com/pa/RAPA/Pages/BES.aspx>.

FERC's existing process for planning, participation, paying, and permitting transmission infrastructure is insufficient to connect IRA projects.

FERC's rules require transmission owners to coordinate with the 11 FERC-approved transmission planning regions (planners), as shown in Figure 1, to identify various transmission needs and related transmission projects; engage with affected stakeholders; and allocate the project costs to those who benefit

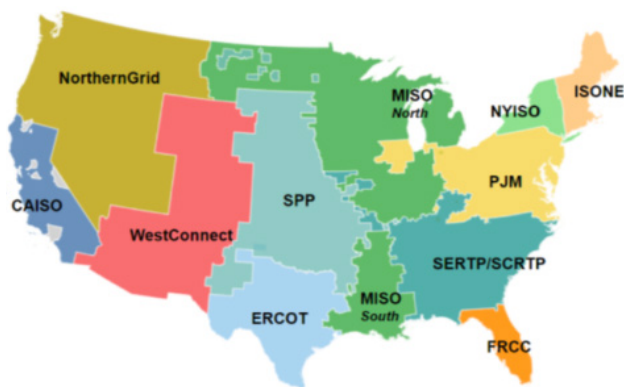


Figure 1 – Transmission Planning Regions³

from new transmission lines (cost allocation). For transmission infrastructure that resides in a corridor that the Department of Energy (DOE) designates as being in the national interest, FERC has authority to grant construction permits under certain conditions (federal backstop permitting). Otherwise, state and local governments – not FERC or any other federal body – have siting authority to determine whether a transmission infrastructure project can be located in a specific area.

While the planning regions manage much of the planning and cost allocation activity, FERC's rules require involvement and, therefore, some degree of buy-in from a vast network of actors, who have different motivations. Collectively, the planning regions must coordinate with thousands of stakeholders, including more than one hundred balancing authorities, most state commissions across the country, roughly 1,200 generator owners,⁴ four multi-state grid operators, such as the Midcontinent Information System Operator (MISO), and numerous advocates.⁵

Importantly, the planning regions rely on technical data from the entities that own and operate transmission lines, such as the over 160 investor-owned utilities (IOU), which provide over 70 percent of the nation's electricity and own most of the nation's high-voltage transmission lines (though customers fund the lines through utility rates).⁶

The divergent motivations of the various stakeholders under FERC's jurisdiction along with flaws in FERC's transmission planning, cost allocation and interconnection processes (discussed below), are the main obstacles to building out the transmission grid at the pace and scale needed to facilitate the just and equitable transmission to carbon-free economy.

The existing regulatory framework is slowing transmission expansion.

Transmission planning and cost allocation processes do not yet prioritize construction of new transmission to drive development of interstate projects.

The current transmission planning process at FERC (set out in FERC's Order No. 1000) fails to spur development of interstate projects and reform is needed. This explainer primarily focuses on obstacles with the regional transmission planning process, as identifying regional projects is a prerequisite for identifying interregional projects. As summarized below, FERC's rule fails to (1) require planners to build transmission lines that achieve a broader set of benefits and goals including decarbonization of the grid (2) provide needed guidance for planners to develop interstate cost allocation arrangements, (3) require planners to consider and prioritize environmental justice and equity, (4) require that investor owned utilities (IOUs) provide comprehensive technical and operational data to planners and improve engagement in all processes that identify regional and interregional projects.

1. Require planners to build transmission lines that achieve a broader set of benefits and goals including decarbonization of the grid.

³ Niskanen Center, *FERC is Coalescing Around the Idea of Minimum Transfer Capacity But Needs Data and Definitions*: <https://www.niskanencenter.org/ferc-is-coalescing-around-the-idea-of-minimum-transfer-capacity-but-needs-data-and-definitions/>.

⁴ Am. Elec. Reliability Corp., *2022 State of Reliability 1* (July 2022), https://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/NERC_SOR_2022.pdf

⁵ MISO is a transmission planning region and regional transmission operator (RTO) that covers 15 states located in the Midwest and Gulf States.

⁶ NERC's 2022 State of Reliability Report, <https://www.erc.org/todayinenergy/detail.php?id=40913>.

FERC's rule gives planners discretion to identify benefits associated with meeting reliability standards, providing economic benefits, and achieving public policy goals but this creates an incomplete picture that ultimately hinders the speed at which transmission can be built. These benefits do not require planners to identify transmission needs that will drive the development of interstate projects needed to facilitate the just and equitable transition to a clean energy grid. For example, FERC's rule omits as a benefit the ability to interconnect new renewable generators to help decarbonize the power sector. It also fails to include a firm requirement for planners to identify transmission needs that can improve access to clean, low-cost electricity from renewable generators. The result is that key needs and projects go unaddressed, causing increased congestion and bottlenecks. Ultimately, failing to require the full benefits for building transmission will result in our nation not having the requisite transmission infrastructure to interconnect new renewable generators on the scale and pace needed to achieve climate goals.

2. Provide guidance for planners to develop interstate cost allocation arrangements.

FERC's current rule does not provide a clear pathway for cost allocation between states for regional and interregional projects and for a broad set of benefits, as noted earlier. While FERC's rule allows planners to identify the transmission needs related to a state's public policies, such as Renewable Portfolio Standards (RPS), the respective state is typically on the hook to pay for the entire project, even though other neighboring states receive benefits from the project. For example, in 2022, New Jersey used PJM's "State Agreement" process to initiate plans to construct transmission lines to interconnect offshore wind generates associated with the state's solicitation process. While places in neighboring states, such as Manhattan, will likely benefit from the offshore wind generators, only New Jersey residents will be on the hook to pay for the high-voltage transmission lines that carry power from the wind generators to the grid.

3. Require planners to consider and prioritize environmental justice and equity.

The nation's energy system has been planned, sited, and operated in ways that disproportionately burden disadvantaged communities and reinforce structural racism and oppression. These injustices have historic roots in the design of the bulk power system, which disproportionately places polluting fossil-fuel power plants in communities with majority low-income, Black, and Brown residents. Aside from increased health harms from pollution, affected communities shoulder energy bills that are six to ten percent of their incomes. In other words, communities of color and low income bear the health and environmental burdens of fossil fuel energy production, and, in addition, they are still forced to pay higher rates for the very power that harms their health. Recognizing the opportunity to redress these injustices, some states have enacted equity and environmental justice legislation calling for utility commissions and other governmental actors to consider these issues in their decisions concerning the public interest. FERC's planning rule fails to require that planners consider and prioritize transmission needs that will redress these historical inequities.

4. Require that IOUs provide comprehensive technical and operational data to planners and improve engagement in all processes that identify regional and interregional projects.

Transmission owners are not required to inform regional planners of their intention to implement certain local projects, including projects to replace old transmission facilities (e.g., between 40 and 90 years' old). This voluntary participation model also allows IOUs to evaluate related projects individually, which precludes planning regions from determining whether a regional alternative that has multiple benefits could be more efficient or cost-effective than the aggregate of the IOUs' related local projects. In addition, the overall transmission framework is at odds with the IOU business model and the result is obstruction. FERC's planning rule requires IOUs to compete to build regional and interregional

transmission lines, but not local projects. Because IOUs' revenues are largely dependent upon capital investments, they have no incentive to compete to build regional and interregional transmission projects, as they risk losing the bid, and even if they win, allowing new low-cost electricity into their service territory could displace revenues from the IOUs' generator fleet. Yet, these are precisely the lines that we need to achieve the nation's clean energy goals.

The result of these flaws is that local projects are incentivized over regional and interregional transmission lines. To illustrate this misalignment, between 2014 and 2019, the cost of PJM's local transmission projects increased from \$1.25 billion to \$3.73 billion, which is 65 percent of the total amount that PJM spent on transmission projects during that time. Similarly, MISO's 2021 planning process identified 349 projects, 80 percent of which were local projects costing ratepayers \$2.5 billion. Meanwhile, at that time, MISO continued to have no space on the transmission grid to transmit electricity from the renewable generators waiting to interconnect to the grid, as demonstrated with red and light green areas in Figure 2.

Current processes for interconnection of new generators and allocating costs hamper clean energy expansion.

The purpose of the generator interconnection process is to identify and implement upgrades to the

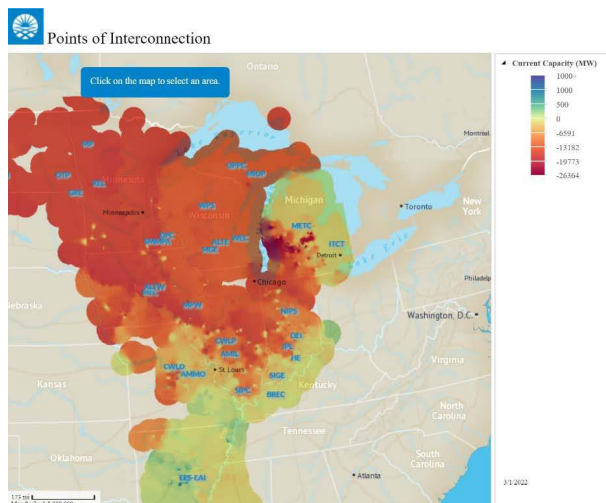


Figure 2 – Current Generator Interconnection Capacity in MISO North⁷

grid to ensure that the additional electricity from the new generator does not cause reliability issues (e.g., overload the transmission line) at the point of interconnection and to the transmission grid. Grid operators assess interconnection requests using a variety of studies, including an analysis of the system impacts and an analysis that identifies costs that the generator must pay to connect to the grid. In several planning regions, grid operators require the interconnecting generator to pay all costs necessary to connect to the grid, referred to as Participant Funding. This process is outdated as it was designed to encourage fossil generators to choose locations at interconnection points that have available capacity to transmit the additional electricity from the new generators. In contrast, solar and wind resources are location-constrained since the optimal areas to construct these resources are where the wind and sunshine are abundant, and land is affordable and abundant. Thus, in addition to paying to interconnect to the grid, new generators, particularly those located in western states, are required to foot the bill to build high-voltage, long-distance transmission lines, which typically make the project uneconomic and is inconsistent with FERC's rule that transmission costs must be allocated to all who benefit. Because transmission owners are opting to build local projects, rather than regional and interregional projects that expand transmission capacity, new generators are often faced with the option of either aborting the project or paying to build expensive high-voltage lines as well as other upgrades. Further, grid operators are woefully behind with conducting interconnection studies.

Consequently, over 8,000 interconnection requests, mostly for renewable generators, are waiting in interconnection queues, which have an average four-year wait time that will likely increase given the volume of the current backlog.

⁷ MISO, Points of Interconnection Interactive Map: <https://giqueue.misoenergy.org/PoiAnalysis/index.html>.

SOLUTIONS: Reforms to FERC transmission planning, cost allocation, and interconnection policies would substantially increase the rate of transmission expansion.

Over the last year, FERC issued two rulemakings to implement reforms that, if done correctly, could address most of the obstacles noted here. FERC intends to issue a third rulemaking in 2024 to reform its interregional transmission planning process.⁸

Fixing transmission Planning and cost allocation

As noted, earlier, FERC's rule fails to (1) require planners to build transmission lines that achieve a broader set of benefits and goals including decarbonization of the grid (2) provide needed guidance for planners to develop interstate cost allocation arrangements, (3) require planners to consider and prioritize environmental justice and equity, (4) require IOUs to provide comprehensive technical and operational data to planners and fully participate in all processes that identify regional and interregional projects. To remove or mitigate these obstacles, FERC initiated a long-term transmission planning rulemaking propose the following reforms, among others.

First, FERC proposes to require that planners identify transmission needs that will facilitate the energy transition and incentivize IOUs and other transmission owners to refocus their attention on building regional and interregional projects. For example, FERC contemplates requiring planning regions to develop plans that expand the transmission system to accommodate interconnecting renewable generators that will be developed pursuant to state initiatives and laws, such as renewable portfolio standards (RPS). To help unlock the interconnection queue, FERC proposes to help fix the Participant Funding issue by requiring planning regions to include popular but aborted interconnection locations in their regional transmission plans since these locations are likely optimal areas to develop renewables but

lack the high-voltage, long-distance transmission infrastructure.

Second, to improve cost allocation for projects within a specific planning regional, FERC proposes an enhanced state agreement approach where transmission providers, state commissions, and other stakeholders all collaborate to develop a multi-state cost allocation method for projects identified through the long-term plan. To bolster this proposal, advocates filed comments recommending that FERC include a "tie break" option that could be used as a backup in instances where one or two states prevent a consensus on a cost allocation method from being reached. To put this into context in the New Jersey example, even if the project was initially framed as meeting New Jersey's public policy goals, the portion of benefits that New York receives would also be factored into how costs are divided.

In addition, FERC proposes to improve the transparency and coordination of planning processes between planning regions (e.g., between MISO and PJM). To bolster FERC's proposal, advocates recommended improvements, including one that would require neighboring regions to build transmission infrastructure to ensure that they can interconnect and transmit a certain amount of electricity when needed. This would establish that a certain amount of baseline interregional transmission is needed for reliability, and states and grid operators would work to allocate the costs associated with reaching at least this minimum amount.

Third, with respect to equity and environmental justice, a variety of stakeholders, from state agencies to advocates, filed comments recommend that FERC include mandatory provisions that require planners to identify transmission needs that ensure a just and equitable transition to 100% clean energy for disadvantaged communities.

Fourth, in the rulemaking, FERC also seeks to align IOU business models with a proposal to remove the competition requirement for regional and interregional projects, provided that the IOUs partner with independent developers. Advocates provided

⁸ Several advocates filed joint comments recommending proposals that FERC should adopt in its final rule. Public Interest Organizations August 17, 2022 Comments in FERC Docket No. RM21-17-000.

alternative proposals for FERC to consider, including expanding the competition requirement to all projects, lowering the return on equity for local projects and scrutinizing applications for cost recovery for local projects, both of which would make local projects riskier and less profitable. Similarly, FERC proposes to require transmission owners, including IOUs, to use a consistent and comparable method to justify their decisions to build certain local projects.

Reforming the generator interconnection process

FERC issued another rulemaking to reform the process for studying projects in generator interconnection queues. The proposed reforms include fast tracking interconnection requests related to a state-run renewable solicitation process and setting deadlines for when grid operators are required to complete interconnections studies, with penalties assessed for non-compliance.

Any legislative action should focus on codifying FERC's cost allocation regulations and expanding FERC's authority to issue permits for transmission projects.

The pending transmission-related reforms will substantially improve the pace of transmission expansion. As one example of the impact of such reforms, in the MISO region, improved planning models and cost allocation practices led to \$10.3 billion in new high voltage transmission capacity. (For more details, see last page). However, legislative changes could ensure that FERC incorporates environmental justice and equity needs into the planning process, expand FERC's federal permitting authority, and re-affirm FERC's cost allocation regulations are needed.⁹

While FERC has existing statutory authority to dictate how planners will allocate transmission project costs to consumers, in practice, FERC provides general direction to planners, who then implement cost allocations procedures that vary by region. Some of the procedures are comprehensive but many are not.

To ensure consistency, the Federal Power Act (FPA) should be revised to expand the scope of the benefits that qualify for regional and interregional cost allocation—for all planning regions—to ensure that transmission solutions holistically reflect multiple benefits including economic, reliability, operational, public policy, resilience to extreme weather, and environmental benefits (e.g., reductions in carbon emissions and reducing harm to environmental justice communities). Next, this legislative revision should codify FERC's cost allocation method, which allocates costs for transmission solutions in proportion to share of demand for energy within the region served by the line where multiple benefits exist across the load served or where a benefit is known to exist but cannot reasonably be quantified. Finally, the revision should apply to all transmission solutions, including projects that support offshore wind facilities.

With respect to permitting, the FPA should be revised to include a new path that gives FERC authority to directly site and permit transmission projects. Under FPA section 216, FERC currently has backstop authority to permit transmission projects that reside within DOE-designated National Interest Electric Transmission Corridors (NIETC) when a state or local government has either denied the permit or was unable to act on the permit application timely. To cover a broader range of projects and encourage the development of high-voltage lines, new legislation should allow FERC to site and permit projects that meet certain threshold criteria: (1) traverses two or more states, (2) seeks to build transmission lines that are 1000 megawatts or larger (3) enables renewables, reduces congestion or improves reliability, and (4) was selected through a FERC-approved transmission planning process.

Like the provisions governing DOE's designation of NIETC's, FERC's expanded authority should be accompanied with rules that provide protection for all impacted stakeholders, especially landowners, tribal and environmental justice communities. At a minimum these protections include that FERC must:

⁹ Several organizations, including Earthjustice, jointly developed a set of transmission principles, which include recommended revisions to the Federal Power Act to improve transmission infrastructure development, https://earthjustice.org/sites/default/files/files/transmission_principles_12.15.22.pdf.

1. Assess the environmental impacts on impacted landowners and communities, including tribal and environmental justice communities
2. Ensure its methodology accurately accounts for all impacted environmental justice communities
3. Ensure effective public notice to all impacted landowners and communities
4. Ensure that, to the extent reasonably feasible but without impairing its mandate to assess and minimize environmental impacts on EJ and Tribal communities, the route makes use of any already disturbed existing rights of way, for any type of infrastructure
5. Ensure meaningful and timely opportunity for input from impacted landowners and communities, including tribal and environmental justice communities, and state and local governments
6. Ensure close and proactive interagency coordination where overlapping permitting jurisdiction exists, especially with agencies charged with managing federal public lands and waters
7. Incorporate a transmission advisory board provision similar to what is in the CHARGE Act, with the addition of mechanisms to ensure accountability.

MISO Case Study: An example of how reforms to transmission planning and cost allocation processes can unlock transmission development

The scenario-based planning that FERC proposed in the long-term transmission planning rulemaking is based in part on MISO's existing planning process, which has recently resulted in MISO identifying several regional transmission projects. MISO's scenario-based process uses various future scenarios that model the range of electrification and energy mix transition that the states in the region plan to achieve.

Using the transmission needs identified from its futures planning approach, in 2022, MISO identified 18 regional transmission projects that must be built in the northern sub-regional area of its service territory before 2030. Complications with its cost allocation methodology prevented MISO from approving the projects through its FERC-approved regional planning process, which is necessary to allocate costs to ratepayers on a regional, rather than local, basis. MISO overcame this roadblock by revising the cost allocation provisions in its tariff. Following FERC's approval of the tariff revisions, MISO's board approved 18 regional projects, as noted in Figure 3 below.

The \$10.3 billion dollar investment in these regional transmission projects will provide 2000 miles of high-voltage transmission lines and 53 GW of much needed transmission capacity.

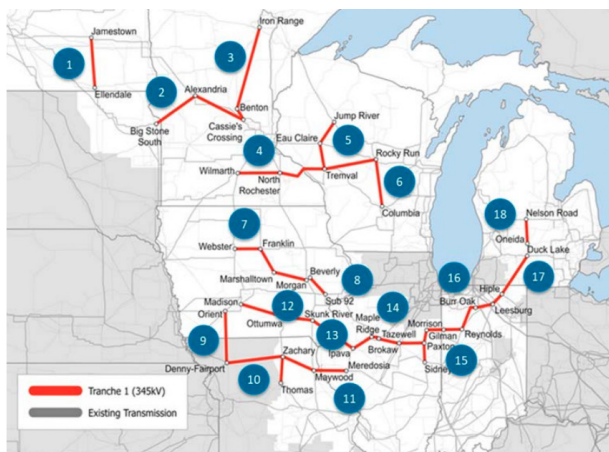


Figure 3 – MISO Tranche 1 Regional Transmission Projects¹⁰

¹⁰CleanTechnica, MISO Let's Renewable Genie Out of the Bottle With Biggest Ever Transmission Project: <https://cleantechnica.com/2022/07/28/miso-lets-renewable-energy-genie-out-of-bottle-with-biggest-ever-transmission-project/>; see also MISO, LRTP Workshop Item 2 Tranche 1 Projects, Slide 7: <https://cdn.misoenergy.org/20220325%20LRTP%20Workshop%20Item%2002%20Tranche%201%20Portfolio%20and%20Process%20Review623633.pdf>.