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Unlocking U.S. Transmission Upgrades – Are We On the Cusp of Real Progress?

Bridging the Gap Between Planning and Permitting

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INTRODUCTION

In recent decades, the U.S. has not been able to construct the volume of high-voltage backbone transmission facilities needed to support the country's move to a 'greener' power system. This statement is repeated so often these days that it is likely to induce eye rolls in the industry.

The fact remains, though, that power generation infrastructure in the U.S. is changing fast with the growth of technologies including solar and wind power generation, as well as energy storage. Facilitating that change will require a grid that is able to reliably and cost-effectively deliver power to users. The inability to build backbone transmission infrastructure thwarts customer demands for a 'greener' power mix.

This report offers perspectives from a range of transmission experts about where the major roadblocks exist. We also examine the latest regulatory and legal changes that promise to bring greater unity between the divergent federal planning and state siting and permitting processes; and give hope that the U.S. can, belatedly, bridge the gaps that have delayed much-needed upgrades to the transmission system.

WHY GRID UPGRADES ARE NEEDED

Delivering transmission upgrades is important if the U.S. is to achieve its long- and short-term goals for renewable energy deployment. Jason Grumet, chief executive officer of the American Clean Power Association, recently issued a stern warning.

He said: "The clean energy transition will not succeed unless Congress and Governors enable the siting and construction of new energy facilities and support the build out of transmission that is required to bring clean power to the people."

We see four main benefits to unlocking new transmission projects across the country:

1) Saving customers money by relieving congestion

As more generation and load come onto the electric grid, existing constraints become more restrictive. Congestion

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costs consumers money as generation dispatch becomes less efficient and more costly. Transmission upgrades that reduce congestion can help to achieve significant customer savings.

2) Enhancing resilience and reliability

A stronger transmission system will help the energy industry face challenges posed by the changing climate and higher proportions of variable renewable generation in the energy mix. The grid must also evolve to accommodate more energy storage assets, which can play an important role in matching power supplies with demand.

3) Opening remote areas for renewables

The best sites for wind power are often in remote areas far from load centers, with transmission lines that cannot deliver power reliably or cost-effectively. New transmission lines will improve the deliverability of new renewable generation projects, and support the additional investment and jobs they create.

4) Meeting long-term decarbonization goals

If policymakers continue to make decarbonization a priority, a transmission highway is critical to achieving it. In its August 2023 report, 'Investing in American Energy,' the Department of the Interior (DOI) forecasts that the proportion of electricity generated by 'clean' sources is set to almost double from 42% in 2022 to between 72% and 81% in 2030. Decarbonizing the grid is only possible with transmission upgrades.

To achieve such improvements, we must examine existing obstacles.

MAJOR OBSTACLES TO U.S. TRANSMISSION UPGRADES

Many renewable energy developers see securing grid interconnections for projects as their main development risk.

"Transmission is the largest single, almost uncontrollable, risk we have in the project development cycle, and it's typically driving the timing for projects," says Michael Rucker, chief executive officer at solar and wind developer Scout Clean Energy. "The cost has gone up so much and the process itself has become so unpredictable."

But why exactly has this become such a challenge? We interviewed transmission experts who are tasked with delivering transmission upgrades, or are dependent on them. They said obstacles exist in four main areas:

- Planning
- Permitting
- Practicalities
- Paying for them

Planning – Why long interconnection queues harm grid planners too

We know that long interconnection queues are problematic for the firms developing generation projects. But they present difficulties for transmission planners too.

Lawrence Berkeley National Laboratory, which is funded by the Department of Energy (DOE), revealed the scale of the challenge this year. In April 2023, it reported that over 2TW of electricity generation and storage developments are waiting in queues for grid interconnection, of which solar, storage, and wind projects make up 95% of capacity.

Berkeley Lab's figures also show that the problem is getting worse. It reported that the queue is six times longer than it was in 2014, and there is now 60% more capacity waiting in interconnection queues than total U.S. power generating capacity (1.25TW). The queues have lengthened since the passage of the Inflation Reduction Act in 2022, and Berkeley Lab expects them to become even longer in the years ahead.

This means that developers submit more speculative generation projects into these queues, even if there is little chance they will be built. As a result, the bodies planning transmission upgrades have to assume that all of these projects will be built, however unrealistic they might be. This is time-consuming and expensive.

Adam Stern, director of utility-scale policy and business development at New Leaf Energy, says transmission planners suffer if too many speculative projects are in U.S. interconnection queues.

"For transmission planners to be able to trust that the projects in the queue are going to be real, we need to bring a degree of certainty to the interconnection process. One way to bring certainty and to help speed things up is to have more transmission being built and more places to connect to. That's the interplay. The success of one depends on the success of the other," he says.

Permitting – Why it takes so long to secure permits for grid upgrades

David Getts, general manager of transmission developer SouthWestern Power Group, says securing permits is the biggest obstacle for companies such as his – and for the electric utilities that deliver 98% of new U.S. transmission projects.

For example, SouthWestern sold phase one of its SunZia Transmission Line Project to Pattern Energy in July 2022, which Getts said had been in development for 17 years. He says a common obstacle for transmission developers is reluctance from landowners to accept new projects on or near their land.

He explains: "The fundamentals are the same everywhere, which is nobody wants a big ugly transmission line going near their back yard. I don't care how rich or poor you are, you don't want it. If you make money out of allowing a big transmission line to go across your land then you might be in favor of it – and, then again, you might not. The fundamental challenge as a developed society that depends on electricity to run, for the quality of life we have, is that people consider electricity to be a right and they don't want to put up with the increasing impacts that enable us to keep the lights on."

New transmission projects require extensive engagement with landowners, including private individuals, companies, tribal groups, and public agencies such as the Bureau of Land Management and U.S. Forest Service. This can delay transmission upgrades.

Getts adds that he thinks elected officials are generally "doing their best to try and improve things like the time it

takes to permit an electric transmission line, but they're up against some institutional challenges" such as the different layers of government, even at the state level. Transmission projects that cross state borders increases the number of bodies that need to be involved.

Other industry experts suggest streamlining permitting of transmission lines by empowering one federal agency to lead the process. This is not currently the case but, as we explain later, we believe this is starting to happen.

Shawn Schukar, chairman and president of Ameren Transmission Company of Illinois, says that permitting would be quicker if transmission providers were able to develop transmission lines along existing rights of way: "The opportunity is around re-using or re-looking at existing infrastructure right away, which land has already been impacted [by development]. While it isn't perfect, it would help move things along."

This underscores the need for a major streamlining of permitting processes across state and federal jurisdictions. This may not be easy to achieve given the inherent desire of state and local officials to stay in the driver's seat of such decisions, but we see reasons to be confident they can work more effectively with federal bodies.

Practicalities – Why industry skills and supply chain shortages hold up projects

Our interviewees revealed two practical obstacles that hold up U.S. grid upgrades: shortages of skilled people and essential equipment.

The workforce is a big concern, as transmission planners across the country are being asked to do more than ever before.

Rick Vail, vice president of transmission at PacifiCorp, says work is needed to address skills gaps: "There is a shortage, in my opinion, of the actual technical planners that can perform all the study work. And those studies, as we add more and more variable generation to the system, get more and more complicated. We used to do all of our studies and we were staffed up to handle that. Our staffing levels remain the same, but we have more studies to do and they are more complicated," he says.

Vail adds it is difficult to find external consultancies who could handle this complex analysis work, but doing so would enable companies to accelerate the transmission permitting process.

Practical supply chain issues may also be contributing to construction delays, even after a project is fully permitted. Ameren's Shawn Schukar explains that planning transmission upgrades is further complicated by the difficulty of securing the physical transmission infrastructure, including conductors and substations.

"It's hard for the suppliers. I can tell you that we have materials today that, a year ago, the time from order to delivery was about nine months. Today it's three to four years because, even though we told them three years ago that this growth was coming, they didn't expand because everybody wants to see the dollars upfront," he says.

These difficulties may not lend themselves to short-term solutions, but policymakers with a hand in the planning and permitting process should be mindful of these issues and do what they can to expedite processes to bring

projects along more quickly.

Paying for upgrades – Why grid upgrades require a strong financial case

Finally, we cannot ignore that transmission projects are capital-intensive and can raise the transmission component of customers' energy bills in the short-term.

These costs were once considered a negligible component of a customer's power bill, as a larger proportion of the total electricity cost was related to production. However, as large baseload plants depreciate and more transmission is built, transmission is now a bigger part of that overall cost.

Bill Marsan, executive vice president and general counsel at American Transmission Company (ATC), says: "The transmission build-out has to make sense on a customer's bill in relation to what we're charging them for the generation and what we're charging for the distribution; and there's got to be a rational allocation of cost to the consumer and probably not too much of a ramp-up in cost to customers."

This requires a candid discussion in the industry as transmission costs cannot be viewed in a vacuum. Rather, the benefits of new transmission include decreased production costs, better system reliability, and resilience; so the net impact of transmission investment should always be considered.

We would go further and suggest that transmission becoming a bigger component of energy bills in the long run may reflect success, as renewable production costs come down, and a stronger transmission system brings those benefits to customers. As ATC's Marsan says: "Without that strong transmission system, we'll never be able to effectively replace fossil generation with wind, solar, batteries or other generation."

HOW REGULATORY CHANGES CAN UNLOCK U.S. GRID UPGRADES

We have considered the obstacles to high-voltage backbone transmission upgrades in the U.S. As a result, building U.S. grid upgrades is a long and expensive process.

Just how long is revealed in the recently-released 2023 update of 'Transmission Projects Ready to Go' by Americans for Clean Energy Grid (ACEG), which estimates that it has taken almost 10 years for successful transmission projects to go from initial proposal to construction start – and that is only those that have been successful.

Of the 22 projects ACEG identified in the 2021 iteration of the same report as "ready to go," 12 have not yet broken ground. ACEG estimates that, since 2021, the costs of congestion – that is, increased production costs passed on to consumers as a result of transmission bottlenecks – have doubled, in just two years.

However, we are optimistic that regulators in the U.S. are aware of this challenge, and are taking steps to address it. Here is what is happening to improve the situation, including four reasons to be optimistic.

1) FERC is seeking to increase certainty for transmission planners

Transmission providers and the Federal Energy Regulatory Commission (FERC) have offered various

interconnection reforms to help reduce the long queues we discussed earlier. As yet, none have made the transformational progress that the industry needs.

However, FERC's most recent rule – Order No. 2023 – takes a more muscular approach.

In Order No. 2023, FERC's formal endorsement of the "first ready, first served" concept is truly consequential because it prioritizes generation projects that are commercially viable, and shows little tolerance for developers clogging the queue with speculative projects. This would give transmission planners greater certainty about the viability of the projects in their queues, and allow them to plan more effectively. This should help to bring down the interconnection queues that so frustrate wind and solar developers.

These reforms have not yet taken root, but many have been adopted by transmission providers. We will only see the full impact of this in the coming years. FERC Commissioner Allison Clements sought to manage expectations for the rule's impacts at an industry meeting in November 2023: "The reality is, when we have these complex issues, you don't just solve it, like the good old days, with one rule," Clements said. "This is going to be a series of steps."

2) Federal government looks to boost FERC's leadership role

Industry discussion about Order No. 2023 has highlighted a broader challenge of using the interconnection process to plan and deliver high-voltage backbone transmission upgrades. Put simply, this process was set up to consider a handful of fossil fuel plants each year. It is ill-suited to assessing hundreds of generation projects, while reducing congestion, boosting grid reliability, and planning interregional transfers.

Clements made that very point in her Order No. 2023 concurring opinion. She argued that interconnection processes are overloaded "in part because they are being relied on to build out core transmission system infrastructure that should be considered in regional planning processes."

It is positive, therefore, that federal government is looking to give FERC a bigger role in how it tackles interconnection problems.

In the last few years, a number of aggressive permitting reform proposals have been floated on Capitol Hill. A common theme of those proposals was a significantly enhanced federal role for FERC in acting as lead agency across federal and state permitting processes, to deliver projects deemed in the national interest. It is clear that the planning and delivery of U.S. backbone transmission upgrades cannot be left to one agency alone, but it makes great sense to have one agency in overall charge.

FERC has shown leadership recently on what it can control: improved use of adjustable and dynamic line ratings to get the most out of the transmission system we have, and what feels like a constant effort to improve transmission planning and coordination as well as interconnection processes. This is the product of its work over 20 years or more.

Having a lead agency can help to foster multi-agency coordination and accelerate the award of vital permits for much-needed backbone transmission developments.

3) Multi-agency coordination is a priority in the IIJA and IRA

The move towards greater multi-agency coordination on permitting U.S. transmission projects has gained further support in some headline-grabbing changes from Congress and the Department of Energy (DOE) over the last two years.

The primary legislative vehicles for advancing transmission reforms recently have been the Infrastructure Investment and Jobs Act (IIJA), which is also known as the 'Bipartisan Infrastructure Law;' and the Inflation Reduction Act (IRA), which has sought to unlock vast investment in renewables and supporting infrastructure in the U.S.

In addition, the DOE has established new programs, initiatives, and grants to facilitate transmission development, as discussed further below.

Infrastructure Investment and Jobs Act (IIJA)

- **Revised federal backstop siting authority:** The IIJA amended the Federal Power Act to, among other things:
  - give FERC the authority to issue transmission facility construction permits when a state (a) has not made a determination on a transmission siting application within one year, (b) has conditioned its approval in a manner that will not reduce congestion or constraints or renders the project economically unfeasible, or (c) has denied a transmission siting application; and
  - broaden DOE's National Interest Transmission Corridor (NIETC)-designation authority to areas experiencing, or expected to experience, transmission capacity constraints or congestion.
- **Transmission Facilitation Program:** Makes $2.5 billion of federal funds available through DOE to facilitate (1) development of large-scale new transmission lines, (2) upgrades to existing transmission, and (3) establish microgrids in select states and U.S. territories.
- **Grid Resilience and Innovation Partnerships (GRIP) Program:** Makes $10.5 billion in federal funds available through DOE to enhance grid flexibility and improve the resilience of the power system against growing threats of extreme weather and climate change.

Inflation Reduction Act (IRA)

- **Transmission facility financing:** Appropriates $2 billion to remain available until September 30, 2030, for direct loans related to transmission projects in DOE-designated NIETCs.
- **Grants to facilitate the siting of interstate electricity transmission lines:** Appropriates $760 million in grant funding to be made available through September 30, 2029, for, among other things, studying transmission siting impacts and participating in siting-related regulatory proceedings at the state and FERC levels.
- **Interregional and offshore wind electricity transmission planning, modeling, and analysis:** Makes $100 million in appropriated funds available until September 30, 2031, for grant recipients to convene stakeholders and conduct analysis related to interregional transmission development and development of transmission for offshore wind energy.

Additional DOE actions include:

- **Grid Deployment Office (GDO):** Launched by DOE in August 2022 to administer various programs facilitated by the IIJA and IRA. The GDO recently announced a funding opportunity of up to $300 million in grants to accelerate and strengthen electric transmission siting and permitting processes. The Transmission Siting and Economic Development (TSED) grant program is a new initiative designed to overcome state and local challenges to expanding transmission capacity while also supporting communities along major new and upgraded lines. DOE plans to use the money in part to provide financial support to state, Tribal, and local

permitting entities by funding studies and better inform decision making, in hopes of reducing the time it takes to process applications. The program also aims to facilitate participation in FERC proceedings.

- **Build a Better Grid Initiative:** The IIJA expands on current DOE authority to provide new tools and funding to advance transmission investments, including the above-noted $2.5 billion 'Transmission Facilitation Program,' $3 billion expansion of the Smart Grid Investment Grant Program, and more than $10 billion in grants for states, Tribes, and utilities to enhance grid resilience and prevent power outages. These programs expand on current initiatives such as the Loan Programs office and funds to expand transmission infrastructure in the Western Area Power Administration footprint.
- **Coordinated Interagency Transmission Authorizations and Permits (CITAP) Program:** The proposed CITAP program is an outgrowth of a May 2023 Memorandum of Understanding between DOE and eight other federal agencies, whereby DOE would implement authority under the Federal Power Act to be the lead agency for coordinating all federal authorizations and related environmental review for transmission siting. As described by DOE, "the CITAP Program does not replace any state or local government permitting or siting authorities or any requirement of Federal law. Rather, the Program seeks to coordinate, and thereby accelerate, Federal permitting reviews and decision making."

This package of statutory reforms has the potential to make a real impact.

First, on funding, the IIJA and IRA loan and grant programs create billions of dollars in funding opportunities for qualifying transmission projects and other activities that will promote the development of transmission.

Second, and perhaps the more interesting legal development, are the reforms to impact permitting. DOE's TSED program seeks to enhance and improve state and local permitting directly. Moreover, FERC's authority to actually site transmission facilities looms ever-present. Congress's effort to get FERC into the electric transmission siting game in the Energy Policy Act of 2005 was thwarted by court rulings interpreting the law to mean that FERC could only access its siting authority when a state siting authority failed to act at all on an application, as opposed to denying an application. Under FERC's revised statutory authority, it will be able to access its siting authority to effectively overrule a state siting authority's denial of a siting certificate for certain qualifying projects. Critics of the FERC's proposed siting regime suggest it is too cumbersome and exceeds FERC's legal authority as a result of extensive environmental considerations. It has also been suggested that FERC's process will be inherently controversial because FERC's authority would only be invoked for projects that a state commission has already rejected.

The uncertainty of these reforms notwithstanding, the significant federal attention to transmission should prove to be a consequential development.

4) FERC is engaging with state policymakers and regulators

State regulators remain involved in a range of key permitting processes for transmission projects in the U.S. This includes right-of-way acquisitions, environmental reviews, community opposition, and so on. Navigating these complex permitting challenges can cause headaches for developers. The decision to approve a transmission line is vested in a state agency that has to work in the "public interest" or to a similarly broad standard. This leaves a lot of room for different interpretations among states.

However, the result is that states will continue to have an important role to play if we want to unlock investments in the U.S. grid.

Another difficulty is that most state utility commissions are under no legal obligation to grant any weight to federally-approved planning processes, even if a proposed transmission upgrade would result in wider regional benefits. There is a role here for FERC: Section 209 of the Federal Power Act tells FERC it "may" coordinate with states on various issues within FERC's regulatory purview.

It has therefore been positive to see formal coordination among these regulators through the "Joint Federal-State Task Force on Electric Transmission" formed in 2021. The task force has met seven times so far and explored such issues as:

- Interconnection reform
- Transmission planning reforms
- Cost allocation
- Cost containment
- Physical security
- Grid-enhancing technologies

Despite the considerable work undertaken by the task force so far, it is not clear that state and federal decision-makers have come closer to developing a common vocabulary or set of principles to bridge the gap between planning and siting.

One statutory change that has been offered multiple times may hasten that process: the prospect of FERC acting as a substitute permit authority must necessarily bring these planning and siting worlds closer together.

We also do not yet know what weight, if any, FERC will give under its backstop siting authority to a state's denial of a transmission permit. However, it is clear that FERC will make its own decision under its Federal Power Act authority and need not concern itself, legally anyway, with whether or not the state commission's denial was lawful. A lot must be worked out.

And yet, we think this increased coordination should lead state and federal regulators to better understand the perspectives, and legal obligations, of the other. This, in time, should bring planning and permitting closer together.

CONCLUSION

We may be at a turning point on transmission, and greater collaboration may be the answer.

Everyone in the industry will have tales of when interconnection and transmission troubles have led to additional delays and costs. We expect this to remain a talking point in the industry for years to come. Indeed, some of the issues that delay transmission upgrades, such as community opposition, will never be fully removed. The reluctance to change and desire to protect local areas is part of human nature.

And yet, we see reasons to be optimistic that the system will work more efficiently in 2030 than it does today. With all the programs, reforms, and developments discussed in this report, we sense a potential turning point on transmission. New DOE funding opportunities and continued FERC reforms may, alone, make incremental gains.

But DOE attention to state and local permitting, FERC's backstop siting authority, and the continued work of the Federal-State Task Force could do more to bring planning and siting closer together and ease the transmission development process. As state and federal regulators continue this collaboration, we hope that each side gains a greater appreciation for the role and skills of each other. Bridging the gap between planning and permitting should remain a focus of all involved.

While we won't have a verdict on these predictions for several years to come, we are optimistic that these opportunities can be seized. We look forward to working with you on the opportunities that this will present.

Read the full report.

Research conducted independently by Tamarindo Group.

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