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The transmission challenge: More renewable energy is being generated, but distribution infrastructure is lacking

BY TYSON FREEMAN

The transition to renewable energy in the United States is facing a good news, bad news scenario. The good news: aggressive decarbonization goals, the growth of ESG investment strategies and a willing investor class have supported higher-than-expected delivery of renewable-energy power projects in recent years.

The bad news: in many parts of the country – mostly where it makes the most sense to build more solar and wind – there is not enough transmission grid capacity for the current pace of growth to continue.

"If the plan is to double the amount of renewable-energy generation, then we must more than double the grid," says Jeff Weiss, executive chairman of renewable energy services provider, Distributed Sun. "As it stands, with today's rate of grid development, there is zero chance for that to happen."

New and upgraded grid infrastructure is needed, and a lot of it. According to a comprehensive report published by Princeton University, *Net-zero America,* the United States will need to expand its electricity transmission systems by 60 percent by the year 2030, and may need to triple it by 2050 if it is to keep pace with various net-zero carbon goals.

In theory, such demand for infrastructure would provide an equal opportunity for infrastructure investors. In practice, however, private participation has been throttled by a nightmarish permitting process and outdated cost-allocation practices. The permitting process and stakeholder challenges are thorny even by infrastructure industry standards.

Rubber, meet road

The need for more and updated grid infrastructure has been a serious concern for some time, but what was once an abstract issue is now clearly affecting the growth in renewable-generation development. Until now, the existing electric grid has supported newly developed renewable-energy projects. It turns out the 20th century grid was not fully utilized by traditional energy-generation technology, which uses as little as 40 percent of grid capacity. That provided plenty of buffer for new renewable-energy projects to connect into the grid without breaking the system. Weiss says, however, that many grids are reaching points of friction. "In general, legacy grid infrastructure has been sufficient to connect a lot of the new renewable-energy sources since it was not fully utilized by traditional energy sources," says Weiss. "That technology has worked for a long time. But depending on the region, we are now reaching limits."

Himanshu Saxena, chairman and CEO of Lotus Infrastructure Partners (formerly known as Starwood Energy Group), agrees that finding underutilized transmission infrastructure to connect to is becoming more difficult. “Most of the low-hanging fruit has been picked,” says Saxena. “Finding spots to interconnect new renewable assets cheaply and quickly to existing infrastructure is no longer easy. In congested areas, some developers are recycling interconnection rights owned by older assets and are building wind and solar farms to replace the existing fossil fuel-energy generation. That may be a viable path forward for many projects.”

The lack of transmission capacity is already slowing the pace of renewable-energy development. Independent system operators (ISOs), the regional agencies that coordinate, control, and monitor the grid, are having trouble assigning new connections to the existing grid, and are struggling with the unrelenting flow of new renewable-generation proposals.

More than 8,100 projects, totaling 1,400 gigawatts of generation and storage, were stuck waiting in interconnection queues throughout the United States at the end of 2021, according to The Federal Energy Regulatory Commission (FERC).

Some ISOs are reacting to the logjam by pausing to refocus. The massive mid-Atlantic grid operator PJM has 225 gigawatts of new project proposals in the pipeline, 95 percent of which are renewable energy or storage. It recently made the decision to prioritize and expedite 1,000 of those backlogged projects, impose a two-year delay on the rest of the 1,250 proposed projects and will not accept new applications until the end of 2025.

Not all those proposed projects will make it to the finish line, of course, but the potential energy generation of stalled projects is significant. According to an April 2022 report, *Queued up: Characteristics of power plants seeking transmission interconnection,* from the Lawrence Berkeley National Laboratory (LBNL), 1,400 gigawatts is roughly the amount of energy needed for the United States to be 80 percent carbon-free by 2030.

To make matters worse, the pace of transmission grid development is not accelerating as it needs to. The same LBNL report found new transmission deployments fell from an annual average of 2,000 miles between 2012 and 2016 to an annual average of 700 miles between 2017 and 2021.

The state of the grid has clear effects on how investors allocate capital to renewable projects. Carolyn Arida, managing director and head of utilities at Harrison Street, says transmission capacity is a key part of their underwriting all the firm's power assets, especially for renewables.

It is simple. No transmission infrastructure; no renewable energy development. "You can only develop so many wind farms without increasing transmission capacity to move the energy from its origin to populated areas," says Arida. "Further development in many areas is going to become more difficult without building additional grid capacity."

The challenge

It is hard to imagine a more dramatic signal for the need for more transmission infrastructure and a better setup for private capital to go to work. So, what is the problem? According to investors, capital and technology are not the issues. The roadblocks are almost entirely related to the development process.

Patrick Langan, senior investment leader, private infrastructure at Partners Group, says when it comes to long-haul transmission projects, private capital has been hesitant mostly because of the long and uncertain lead time involved. The key challenges being acquiring rights-of-way and environmental permits.

Weiss says transmission lines of this type run intrastate and often interstate, making it complicated to get an agreement between the tangle of stakeholders involved. A typical stakeholder list might include FERC, Bureau of Land Management, regional ISOs, as well as concerned citizens, vested interests, and entities protecting their balance sheets. Proposed transmission lines can face multiple legal challenges from every

government entity and private landowner along its path, as well as from environmental and conservation groups worried about its impact.

Weiss estimates the average transmission-line development project takes 10 years "from the hello to turning the power on." He says "the smart people in the room" must figure a way to shorten the development timeline for developing grid infrastructure from 10 years to three years.

Saxena says it took Lotus Infrastructure Partners (then Starwood Energy Group) seven years just to obtain final approvals to build its most recent transmission project. The 3.2-gigawatt long-haul transmission project, Ten West Link, connects Arizona and California and is expected to be operational in 2023. "That timeframe has to be materially shorter if there is any hope in developing the necessary grid infrastructure," he says.

Saxena says another challenging piece of this puzzle is related to cost allocation. "A lot of time with transmission projects, everyone wants the infrastructure, but few want to pay for it," he says. "People want the benefits of new transmission lines, but there is either nimbyism, or no one is willing to commit to paying for them."

For readers interested in all the ways these deals can go sideways, research the plight of energy pioneer Michael Skelly's Clean Line Energy. The independent developer of long-haul transmission lines had four proposed projects and had obtained many of the permits and approvals to begin developing. But after 10 years of bureaucratic and business challenges, the firm eventually had to sell off the projects.

Saxena says there is no shortage of capital for these projects and the opportunity set is relatively low, so there should be a lot of competition for these deals. And while there are development risks, these projects deliver opportunistic-level returns. "It is remarkable," says Saxena. "There are many investors that want to participate in these large transmission infrastructure investments despite the pain and suffering."

Saxena stresses that the sector is not a lost cause. Lotus Infrastructure and a handful of experienced players are active in the market, and there are a handful of large-scale transmission grid projects underway.

Construction has begun on the 339-mile Champlain Hudson Power Express transmission line, after the project's developer finally reached an agreement with labor union leaders. The $4.5 billion project, being developed by Transmission Developers, Inc., a company owned by private equity firm Blackstone, will deliver 1,250 megawatts of hydropower from Canadian utility Hydro-Québec to Queens, N.Y.

According to its 2022 investor presentation, Berkshire Hathaway Energy plans to invest more than $18 billion, $5.8 billion of which has already been invested, to develop transmission grids in the Western United States and Canada.

But the development risk is just high enough to cast a pall on the market. Saxena notes that there are currently just four groups shortlisted for the transmission RFPs proposed by California ISO. That highlights how difficult the development process is and why only the most experienced players really play in this space, Saxena says.

Any answers?

What needs to happen to break the logjam? The consensus is that for this sector to attract serious investor interest, government must act. "If the government entities can provide clarity of who pays and can streamline the permitting process," says Saxena, "far more renewable energy would be built and built more quickly."

It is always difficult to gauge the seriousness of governmental action, but there seems to be political and legislative momentum building to address this dire state-of-affairs. The Infrastructure Investment and Jobs Act included $2.5 billion to fund a new Department of Energy Transmission Facilitation Program that supports development of certain new or upgraded high-voltage transmission federal loans for utilities or public-

private partnerships to build or upgrade certain lines.

The Build Back Better Act, which passed the U.S. House of Representatives in November 2021, included the creation of an investment tax credit (ITC) for high-voltage transmission lines.

But most agree that tax incentives alone will not be enough. "It's well established that there are issues with developing the infrastructure projects needed to harden the grid and support the evolving generation mix," says Langan. "If there was a coordinated push by the many stakeholders involved, you would see more large projects, but the number of stakeholders involved is inherently a driver of the complexity. Policy that addresses these development-level challenges would likely be even more impactful than tax incentives in accelerating transmission investment and project build-out."

Policy addressing those development-level issues is also in the works. In 2022, FERC proposed reforms to expedite the process for connecting new electric-generation facilities to the grid. Their notice of proposed rulemaking (NOPR) aims to address the significant backlogs in the interconnection queues by improving interconnection procedures and providing greater certainty. It also proposed reforms to cost-allocation rules.

The most important, and arguably heavy-handed, piece of legislation aimed at regulatory efficiency is the Energy Independence and Security Act proposed by West Virginia Senator Joe Manchin. The bill aims to drive efficiencies in energy-related permitting in general, and for long-haul transmission projects in particular.

Among other features, the bill would authorize the DOE to make "national interest" designations for individual transmission projects. This feature is controversial, as it transfers meaningful power of eminent domain to the Feds to eliminate squabbling between states and the private sector over siting. The latest version of the bill would also amend the Federal Power Act to make FERC the lead permitting agency for projects receiving

national interest designations and bestow more power to FERC in affecting cost allocation for projects.

Senators rejected the inclusion of the bill as part of the Fiscal Year 2023 National Defense Authorization Act by a 47-47 vote. Senate majority leader Chuck Schumer of New York had promised Manchin he would pass the bill in exchange for Manchin's support for the Inflation Reduction Act. But more left-wing Democrats threatened to revolt on several must-pass bills, and Republicans refused to support the package as it was written. The bill is now in limbo.

Weiss says that improving regulatory efficiency and cutting red tape has historically been a one-sided issue supported by Republicans. But the picture is shifting, he says, as Democrats see the danger of renewable-energy expansion running into so much red tape.

With so much at stake, it seems hard to imagine the status quo continuing, but it puts investors and the future of renewable energy development in the uneasy position of waiting for government to take meaningful action.

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