THE CASE FOR INTEGRATED PLANNING UNDER FERC ORDER 1920

GE VERNOVA | UTILITY DIVE

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WHAT FERC ORDER 1920 REQUIRES

The Federal Energy Regulatory Commission's (FERC) Order 1920 seeks to ensure that the planning necessary for the transmission system to affordably fulfill its essential role takes place at the cadence and with the rigor required. Finalized in 2024, FERC Order 1920 applies to ISOs and RTOs as well as vertically integrated utilities that own, control, or operate transmission facilities that are subject to FERC regulation.

FERC Order 1920 establishes four core requirements for transmission planning:

1. **Conduct long-term regional transmission planning over a minimum 20-year horizon.** This defines the exact timeframe that constitutes long-term planning: 20 years. Transmission providers must identify both long-term needs and evaluate facilities and solutions to address those needs cost-effectively. The 20-year horizon acknowledges the reality that the future could look very different from today and that planning must recognize that infrastructure decisions made today will impact grid economics and reliability long into the future.

2. **Update plans at least every five years.** The entire electric power system is evolving quickly, thanks to load growth, an influx of renewables, and always-evolving technologies and policies. As a result, transmission providers can't treat planning as a one-time exercise. FERC Order 1920 requires reassessments at least every five years to ensure that long-term plans reflect the impact of inevitable change.

3. **Use a plausible and diverse set of at least three scenarios using the best available data.** If the past decade has proven anything, it's that the precise future evolution of the power sector is extraordinarily difficult to predict. It is far more useful for planners to consider a variety of future scenarios. FERC Order 1920 requires planners to stress test future transmission needs against multiple visions of the future, not just what appears to be the most likely one. Each of the scenarios must incorporate at least seven categories of factors that could impact the long-term transmission landscape. Transmission providers must also test how their plans can withstand extreme weather, meaningful forecast errors, and fuel price volatility.

4. **Consider the use of grid-enhancing technologies (GETs) and the potential to right-size rather than replace aging infrastructure.** Newly built or fully replaced transmission infrastructure is expensive. While there are circumstances when this is necessary, FERC Order 1920 also requires providers evaluate whether grid-enhancing technologies such as dynamic line ratings and targeted upgrades can expand capacity and meet transmission needs more efficiently. This requirement reflects the priority to ensure that transmission investments are both cost-effective and achieve their technical objectives.

THE PLANNING GAP FERC ORDER 1920 EXPOSES

Traditionally, transmission planning takes place in three distinct verticals: economic analysis, reliability assessment, and policy evaluation. These workflows are usually led by separate teams using their own tools and data sets. FERC Order 1920 requires those responsible for transmission planning to work in fundamentally different and more collaborative ways.

Here's the challenge: while each is important, FERC 1920 compliant long-term transmission planning requires each of these workflows to be reconciled. This usually requires approximations, manual work, and inefficiencies that elevate the risk of errors and inconsistencies. For example, a long-term capacity expansion study relies on input and analysis about market impacts, resource adequacy, reliability, and new generation siting. If planners working on each of these areas don't share the same assumptions and underlying data, they may reach very different conclusions about what factors will most profoundly shape the future transmission system.

Planners must consider when transmission projects will be placed into service, when new generation plants will come online and retiring plants will go offline, the future trajectory of fuel prices, and incentives for renewable energy and emissions mandates. All these factors must be integrated with assumptions about load growth across multiple scenarios and then synchronized across the different tools used by separate planning teams.

At a very basic level, the need to reconcile data from different teams and tools raises the risk of errors and slows down actual vital planning work. “There is a challenge in simply organizing the input data and assumptions, as well as making sure that these are effectively reflected in the same way across toolsets that have different formats for input and look at a different aspect of the larger problem,” said John Meyer, technical director at GE Vernova’s Consulting Services. “Slipping up in the communication and synchronization of input data and assumptions here can cause a good deal of rework, considering the many scenarios to look at in long-term planning, and risks needing to orchestrate the larger study all over again.”

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THE DEFENSIBILITY IMPERATIVE

The purpose of FERC Order 1920 is to ensure that the kind of rigorous long-term transmission planning needed to prepare for an inevitably uncertain future takes place and is updated regularly to account for changed circumstances. But FERC Order 1920 also acknowledges how important long-term transmission planning is to the economy and society at large by requiring that plans be explained and defended to a wide audience of regulators, policymakers, ratepayers, and other stakeholders.

To that end, FERC Order 1920 mandates that transmission plans include transparent and traceable assumptions and for planners to be ready to explain both their conclusions and the logic and data that got them there. Before Meyer joined GE Vernova, he worked at the New York Independent System Operator (NYISO). At NYISO, he had firsthand experience with what defensibility demands.

“Defensible to me means you’re able to go in front of stakeholders not only with a verified and validated plan that a transmission project is going to meet the system’s needs economically, with the best impact on reliability and within the policy goals of the states involved,” Meyer said. “But you also have to be able to talk about how you got those results, what data was modeled, why that data was chosen, and how you modeled it, to a wide range of folks, like economists and lawyers. You’re not just talking to an inner circle of grid planners and regulators.”

Fragmented workflows, data, tools, and teams involved with transmission planning make it challenging to provide clear, coherent, and understandable explanations of planning decisions. The questions are logical: What data led to this recommendation? What changed from a previous study to a recent one? How can two analyses reach such different conclusions about a single scenario?

WHAT INTEGRATED PLANNING ACTUALLY LOOKS LIKE

Meeting the requirements of FERC Order 1920 efficiently and confidently means moving away from running multiple studies using discrete datasets and assumptions. Instead, it requires a common data environment with a unified model of the power system from which economic, reliability, and capacity expansion studies can all be run.

The benefits a shared data foundation provides planners are immediate and practical. For example, very different conclusions about the future transmission system are the inevitable result when planning teams use different tools and data sets with input assumptions that vary slightly. In a long-term capacity expansion study, those misaligned assumptions introduce errors that are time-consuming to fix and difficult to explain or defend. “An escaping defect in a long-term capacity expansion study has an adverse effect on credibility,” Meyer said. “In large studies like these, you don’t want stakeholders to question the methods and tools you’re using.”

Simplifying and consolidating the data, tools, and processes planners use makes it easier to communicate the rationale for decisions. It also allows planners to devote their time to the actual work of planning instead of the traditional preparation needed beforehand. “Having simpler tools and processes can help planning engineers and analysts focus more on drawing insights from a study and testing the right thing, versus getting buried in the details of how to make the study work across multiple toolsets and formats,” Meyer said.

PlanOS takes this further by enabling a more rigorous approach to the analysis itself. Traditionally, planners have had to approximate reliability within a capacity expansion study by assuming a reserve margin because the tools used for each type of analysis don't natively share data.

In PlanOS, a planner can run a resource adequacy analysis in combination with a capacity expansion analysis on the same data to accurately calculate and action minimum reserve margins - eliminating the guesswork of yesterday.

One of FERC Order 1920's most demanding requirements is to complete scenario analysis across a 20-year horizon. When multiple scenarios produce widely divergent generation mix outcomes, the question of which future to plan around is far from straightforward. PlanOS's stochastic capacity expansion feature resolves that by assigning probability weights to multiple plausible futures and optimizing across all of them simultaneously. Rather than committing to a single scenario, planners get a near-term recommendation that holds up across the range of futures they must consider.

GE Vernova's PlanOS software supports confident answers with many of its features, particularly its versioning capabilities. Instead of depending on analysts to track changes across disconnected systems, PlanOS versioning provides a clear, auditable record of the inputs used to arrive at conclusions and what changed between studies and why. It provides the sort of visibility and traceability that enhances planning efficiency, eliminating the time and effort to manually pinpoint changes. Just as important, PlanOS also provides a strong foundation to explain and justify planning decisions that can withstand scrutiny.

THE CONSULTING LAYER

Planning software provides the structure, consistency, and traceability that FERC Order 1920 demands. GE Vernova's consulting services provide the judgment and experience required to use that structure effectively and to stand behind the results it produces.

GE Vernova's consultants help transmission providers design the assumption governance frameworks that keep studies aligned, define which inputs must remain consistent across workflows, and stress-test results before they face regulatory scrutiny. The goal is to ensure that planning outcomes are not just technically sound but prepared to withstand the questions that decision-makers pose.

The value of an independent consulting partner is arguably most apparent when planning decisions involve weighing and resolving competing interests. For example, decarbonization mandates from state policymakers, reliability concerns from system operators, and affordability pressures from regulators can come into conflict. In those situations, having a technically credible and neutral party conduct analysis and facilitate dialogue between stakeholders can make the difference between a contested outcome and compromise that leads to meaningful compromise.

GE Vernova Consulting Services played the role of facilitator and independent analysis in a comprehensive grid reliability study commissioned by the New York State Energy Research and Development Authority (NYSERDA) to support New York's Climate Leadership and Community Protection Act. Working with a steering committee of about 35 experts from organizations including the New York Independent System Operator (NYISO), the New York Power Authority (NYPA), ConEd, and National Grid, GE Vernova conducted integrated adequacy modeling, production cost simulations, and grid stability screenings across multiple decarbonization scenarios.

The study identified two big gaps: the need for approximately 25 gigawatts of clean capacity by 2040 to replace retiring fossil generation, and emerging grid stability risks from increasing inverter-based assets. By bringing together voices that rarely collaborate and grounding the analysis and discussions in rigorous integrated modeling, the study produced findings that informed state energy policy.

GE Vernova also supports planning organizations that have expertise but whose staff is too occupied on other tasks to do integrated planning. Integrated planning is analytically intensive, and many utilities and system operators face resource constraints that limit how many scenarios they can run and how much time they can devote to analyzing results. In those cases, consulting support can complement the work of utility and system operator staff.

LONG-TERM PLANNING, SHORT-TERM ACTION

While formal compliance deadlines for FERC Order 1920 will phase in over the next several years, modernizing the tools, data, and processes used for transmission planning should begin today. Utilities and system operators that invest in integrated, defensible planning capabilities—along with the expertise to get the most out of those capabilities—will be better positioned to make confident and cost-effective infrastructure decisions for decades to come.

GE Vernova's Consulting Services provides advanced power system planning, integration studies, a comprehensive system planning software suite and targeted protection solutions to help energy leaders navigate complexity, inform investment decisions, and strengthen grid and asset performance.

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