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In First Step to Address Essential Reliability Services, FERC Launches Inquiry Into Provision and Compensation of Primary Frequency Response

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The notice of inquiry relies heavily on the work of the North American Electric Reliability Corporation's (NERC) Essential Reliability Services Task Force, which was initiated in 2014 to analyze how changes in the nation's generating resource mix impact the availability of three "essential reliability services": frequency support (including primary frequency response), ramping capability, and voltage support. This inquiry also comes on the heels of FERC's November 2015 proposal to require all new wind plants interconnecting to the transmission grid to possess reactive power capability and its November 2015 final rule (Order No. 819) allowing third parties to sell primary frequency response service to transmission utilities at market-based rates.

Primary frequency response is one tool that is used to ensure that an electric system maintains a balance between generation and consumption of electric power, and that the system frequency remains at or near a scheduled value (60 Hz in the United States). "Frequency response" measures a system's ability to stop and stabilize frequency deviations caused by the sudden loss of a generation resource or load, before such contingencies cause the loss of additional generation or load or cascading outages. Frequency response is provided automatically (i.e., without manual action by system operators) by both (1) "inertial response," which is the inherent capability of rotating synchronous generating resources that are online (generally large, traditional, fossil fuel-fired generators) to slow frequency deviations; and (2) "primary frequency response," which are the automatic and autonomous actions of turbine equipment controls (such as governors) and other technologies to respond to frequency deviations. Reliable operation of the electric grid requires a sufficient amount of these automatic frequency responses (which occur within five to 15 seconds) to ensure that

system frequency does not drop to the point that load is lost and generators are tripped offline. "Secondary frequency response," which involves manual changes in the output of resources in response to operator dispatch instructions, typically takes much longer to restore system frequency (from 30 seconds to five minutes).

FERC expresses concern that the anticipated retirement of large numbers of baseload, synchronous resources that provide system inertia, combined with the addition of more distributed generation, demand response, natural gas-fired generation, and variable energy resources like wind and solar, will reduce the inertial and primary frequency response available within some interconnections. In particular, FERC notes that large baseload resources that inherently provide rotational inertia are being replaced with variable energy resources that either do not have rotating inertia (such as solar) or can provide system inertia only if they are specially configured to do so (such as wind). Additionally, variable energy resources must be specially equipped to provide primary frequency response.

Adding to its concerns, FERC explains that, even if generators have the technical capability to provide primary frequency response, in many cases, they may not actually be providing it. FERC points to NERC's conclusion last year that a significant portion of generators in the Eastern Interconnection operate their equipment in a manner that inhibits or prevents the provision of primary frequency response. While the reliability standards obligate balancing authorities to have a proportionate share of the primary frequency response capability required by the interconnection, no reliability standards, tariff requirements or interconnection agreements **require** resources to provide such capability. FERC also notes that few, if any, resources are compensated for providing primary frequency response as a stand-alone service, and there are no rates currently in place for primary frequency response alone.

With these concerns in mind, FERC states that there is "a substantial body of evidence . . . warranting consideration of possible actions to ensure that resources capable of providing primary frequency response are adequately maintained as the nation's resources mix continues to evolve." FERC's notice of inquiry identifies three areas for possible action by the agency and seeks comment on each of them:

- Modifications to the Pro Forma Large Generator Interconnection Agreement and Small Generator Interconnection Agreement – FERC seeks comment on whether the pro forma generator interconnection contracts it adopted in Order Nos. 2003 (large generators) and 2006 (small generators) should be revised to include requirements to

(1) install the capability to provide primary frequency response, (2) ensure that governors and other frequency control equipment are properly set and in use, and (3) ensure that the megawatt response provided is sustained and provided without undue delay. In addition, FERC asks for information on the costs and technical challenges of making new generation resources capable of providing primary frequency response, including new "non-synchronous" resources (such as wind and solar), and how transmission providers can verify primary frequency response performance and ensure compliance with performance requirements.

- Adoption of Primary Frequency Response Requirements for Existing Generators – FERC also seeks comment on whether it should implement primary frequency response requirements for existing generators, and what means it should use to implement such requirements. For example, FERC could adopt new transmission tariff requirements or require the development of new or modified reliability standards. FERC additionally seeks information on the cost of retrofitting existing generators to provide primary frequency response, and whether there are technical limitations or concerns that would apply to existing generators' provision of primary frequency response.
- Compensation for Primary Frequency Response – Finally, FERC asks several detailed questions regarding procurement and compensation mechanisms for primary frequency response. The questions seek to assess how primary frequency response is currently procured and compensated, whether there are benefits to co-optimized procurement and dispatch of resources to provide primary frequency response (either within balancing authorities or within an entire interconnection), whether mandated provision of primary frequency response would result in economic inefficiencies and whether payment for primary frequency response should be based on capacity or actual performance.

By inquiring into both whether new requirements to provide primary frequency response should be placed on new and existing generating resources and whether additional market-oriented procurement and compensation mechanisms should be pursued, FERC sets up a classic regulatory debate: **command and control or reliance on markets**? FERC explicitly acknowledges this debate, asking for comment on "whether and to what extent balancing authority demand for voluntary purchases of frequency response would be reduced if all or all newly interconnecting resources were required to provide frequency response service," and on "the impact this would have on the Commission's efforts under Order No. 819 to foster

the development of a bilateral market for market-based rate sales of primary frequency response service as a means of cost-effectively meeting such demand."

While FERC has generally preferred market-oriented solutions over the last 20-plus years, in more recent years, it has also aggressively implemented its authority over the development and modification of reliability standards to address emerging grid reliability challenges. How FERC resolves the command and control vs. reliance on markets debate here may provide significant clues as to how it will address the other "essential reliability services" identified by the NERC task force.

Categories

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