

## Impacts Of FERC's Order On Primary Frequency Response

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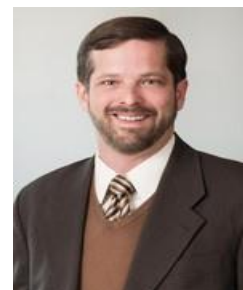
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On Feb. 15, 2018, the Federal Energy Regulatory Commission revised its regulations to require all newly interconnecting generation facilities to install, maintain and operate equipment capable of providing primary frequency response as a condition of interconnection.[1] The evolving generation resource mix, along with recent technological advancements that now enable nonsynchronous generation facilities, such as wind and solar facilities, to have primary frequency response, led FERC to revise its regulations to uniformly mandate such generation facilities to provide primary frequency response service.

The revised regulations, implemented through modifications to FERC's pro forma Large Generator Interconnection Agreement (LGIA) and Small Generator Interconnection Agreement (SGIA), aim to ensure that the future generation resource mix will be capable of providing primary frequency response, and to arrest the general long-term declining trend in resources providing this essential reliability service to the grid.[2]

In addition to mandating every new interconnecting generation facility, both synchronous and nonsynchronous, be capable of providing primary frequency response service, FERC established certain uniform operating requirements for generation facilities, which include specific maximum droop and deadband parameters, and that all new generation facilities provide timely and sustained primary frequency response to frequency deviations. However, in adopting these new requirements, FERC provided certain "special accommodations" for electric storage resources.

Significantly, as part of this order, FERC does not mandate that energy resources subject to Order No. 842 retain headroom (i.e., restricting output below maximum operating capability) for purposes of ensuring each online resource is capable of providing primary frequency response, but also stops short of mandating that transmission providers compensate newly interconnecting energy resources that will be required to provide frequency response service.[3]



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**Compliance with Order No. 842**

FERC directed all transmission providers with a pro forma LGIA or SGIA on file at FERC to submit a compliance filing within 70 days following publication in the Federal Register, demonstrating that the reforms adopted by FERC in its pro forma LGIA and SGIA are incorporated into each transmission provider's Open Access Transmission Tariff.[4] FERC made clear that the new requirements contained in Order No. 842 are minimum interconnection requirements for new generation facilities, and transmission providers may propose in their compliance filings more stringent operating requirements that are "consistent with or superior to" FERC's reforms.[5]

Projects that are currently being developed and are not expected to execute an LGIA or SGIA with the transmission provider prior to the effectiveness of the reforms from Order No. 842 should carefully review the new requirements imposed by FERC and any resulting proposal submitted by the transmission provider in compliance with Order No. 842 to ensure that these projects will be able to meet the new requirements that will be contained in transmission provider's revised LGIA and SGIA.

### **Imposed Operating Requirements Under Order No. 842**

Beyond the requirement that all new generation facilities install, maintain and operate equipment capable of providing primary frequency response, Order No. 842 adopted as mandatory the primary frequency control guidelines issued by the North American Electric Reliability Corporation, which were previously voluntary.[6] Under these operating standards, all new generation facilities are required to install, maintain and operate governor or equivalent controls with the ability to operate with a maximum 5 percent droop and  $\pm 0.036$  Hz deadband parameter. The droop characteristic is to be based on nameplate capacity, which is used to determine the MW response to frequency deviations, without a step to avoid a sudden spike in the generator's output, as NERC recommended.[7]

Generation facilities subject to Order No. 842 will no longer have the option of selecting the appropriate governor settings or blocking or otherwise inhibiting the governor or equivalent controls' ability to respond to frequency deviations. Order No. 842 outright prohibits such practices for newly interconnecting generation resources or existing resources that submit a new interconnection request.[8] Further, each new generation facility must install plant controls to ensure the facility provides "timely and sustained response to deviations." [9] By timely and sustained, FERC means generation facilities must immediately, or without undue delay, provide primary frequency response when system frequency deviates outside the mandated deadband parameter and continue to provide the response until system frequency has returned to a value within the deadband parameter.[10]

### **Special Accommodations for Electric Storage Resources**

While this order may create an additional barrier to entry for certain non-synchronous generation facilities, such as wind and solar facilities, by imposing the requirement that all new energy resources be capable of providing primary frequency response service as a condition of interconnecting to the grid, FERC carefully carved out certain exemptions and "special accommodations" for electric storage resources in providing primary frequency response service.[11] FERC found that electric storage resources could experience disproportionate harm from the adopted requirements under some circumstances.[12] Specifically, transmission providers are to limit the operating range within which electric storage resources will be required to provide primary frequency response, identify particular operating circumstances when electric storage resources will not be required to provide primary frequency response and include energy limitations associated with electric storage resources among the exemptions from the requirement to provide primary frequency response.[13]

## **Impacts of Order No. 842**

By restricting the applicability of the new requirements to newly interconnecting generation facilities, FERC did not require the owners of existing facilities to retrofit their generation facilities to enable such facilities to provide primary frequency response in order to remain interconnected to the grid.[14] As a result, new generation facilities could be at a relative disadvantage due to the cost of adding, maintaining and operating equipment used to provide frequency response within the mandated operating requirements.

While FERC found that the cost of retrofitting some existing generation facilities may be cost prohibitive in justifying its decision to only apply the new frequency response requirements on newly interconnecting generation facilities,[15] FERC did not address the additional costs associated with providing primary frequency response under its mandated operating requirements for newly interconnecting generation facilities. Without providing compensation for this service, the owners of new generation facilities likely will shoulder the burden of having to provide primary frequency response more often and for a longer duration, possibly increasing their operating costs over competitors. FERC recognized that many existing generation facilities are electing not to provide frequency response or choose to prematurely withdraw their response, but determined it is unnecessary to require retrofitting or to incentivize it through compensation for the service.[16]

FERC's reforms on primary frequency response are not likely to have an immediate impact on the markets due to FERC's decision to phase in the requirements slowly by applying the requirements to new generation facilities. However, this order may result in significant long-term impacts on the markets. As more generation capacity is added to the system that will be subject to strict operating requirements, markets are likely to procure less regulation service from generation resources. Such a scenario — more frequent primary frequency response coupled with lower procurement of regulation service — occurred in ERCOT due to the implementation of Texas Reliability Entity Inc.'s (TRE) Regional Reliability Standard BAL-001-TRE-01 (Primary Frequency Response in the ERCOT Region).

BAL-001-TRE-01 requires, among other things, generator owners to operate each generating unit/generating facility that is connected to the interconnected transmission system with the governor in service and responsive to frequency at certain specified deadbands and droop parameters. In effect, BAL-001-TRE-01 tightened the governor deadbands that generators must implement to comply with TRE's Regional Reliability Standards, which has caused online generation facilities to have their governor engaged more frequently and to provide primary frequency response service in ERCOT.

Based in large part to the tightening of the governor deadbands ordered by TRE, ERCOT made significant reductions (approximately 20 percent) in the procurement obligations for the Up- and Down-Regulation product. The loss of regulation service revenue due to the mandatory droop and deadband parameters imposed by FERC may adversely affect the value of certain generation facilities and could affect the viability of some projects in the planning or development phases.

## **Beyond Order No. 842**

While FERC's actions in Order No. 842 are attempting to address the potential reliability impact of the evolving generation resource mix, there will be more work required to solve the issue of decreasing system inertia due to the portion of non-synchronous generation facilities, such as wind and solar generation facilities, interconnected to the grid, which is projected to only increase further with the passage of time.

Because Order No. 842 may impose significant costs and disadvantage new generation in the marketplace without requiring compensation for mandating that only newly interconnecting generation facilities provide primary frequency response service, challenges to FERC's reforms adopted in Order No. 842 are likely. To preserve the right of appeal to the U.S. Court of Appeals Circuit Courts, interested parties seeking to challenge Order No. 842 must have submitted a request for rehearing to FERC by March 19, 2018.

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[1] Essential Reliability Services and the Evolving Bulk-Power System — Primary Frequency Response, Order No. 842, 162 FERC ¶ 61,128 (2018).

[2] Id. P 57.

[3] Id. P 2.

[4] Id. P 253.

[5] Id. PP 58, 64.

[6] See Electric Power Research Institute, Recommended Settings for Voltage and Frequency Ride-Through of Distributed Energy Resources, at 27 (May 2015), <http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002006203>. See also National Renewable Energy Labs (NREL), Advanced Grid-Friendly Controls Demonstration Project for Utility-Scale PV Power Plants, at 1-2 (Jan. 2016), <http://www.nrel.gov/docs/fy16osti/65368.pdf>.

[7] Order No. 842 at PP 70, 78.

[8] Id. P 99.

[9] Id. PP 94, 101.

[10] Id. PP 101, 104.

[11] Id. PP 33, 176.

[12] Id. P 178.

[13] Order No. 842 at P 177.

[14] While FERC generally did not impose the new requirements on existing generation facilities, FERC clarified that any for existing generation facility that takes any action that requires a new interconnection agreement on or after the effective date of Order No. 842 (e.g., a material modification to the generation facility may trigger the need for a new interconnection agreement), the new primary

frequency response requirements would apply to this generation facility under the new interconnection agreement. Id. P 132.

[15] Id. P 143.

[16] Id. PP 8, 94.