

**Western Area Power Administration (WAPA)
FERC Order 842 Implementation Requirements
Business Practice**

This Business Practice (BP) documents and clarifies specific implementation requirements for FERC's Order No. 842 (Primary Frequency Response) incorporated into WAPA's Open Access Transmission Tariff (OATT) as filed with FERC under Docket No. NJ20-6-000 on December 13, 2019 ("December 13th Filing").

Operating Requirements for Droop and Deadband

- The requirements are minimum requirements. If an interconnection customer wishes to implement more stringent deadband and droop settings, it may do so. (Order 842 at ¶ 64)

Allowance for Future NERC Reliability Standard

- Interconnection customers that are required to comply with Order 842 will be required to do so until such time as FERC approves a NERC Reliability Standard with equivalent or more stringent parameters. For example, such a Reliability Standard may have requirements for tighter droop (maximum 4 percent droop) and/or deadband settings (e.g., ± 0.017 Hz). If FERC approves such a Reliability Standard, interconnection customers subject to Order 842 will be required to comply with the operating requirements of the Reliability Standard if it applies to them. However, interconnection customers that are not Applicable Entities of the Reliability Standard will continue to be required to comply with the operating requirements contained within the pro forma LGIA and SGIA as adopted in Order 842. (Order 842 at ¶ 69 and footnote 158)

Requirements for Droop and Deadband

- The use of the term "nameplate capacity" refers to the maximum MW rating of the facility as defined by the Energy Information Administration – i.e.: "[t]he maximum rated output of a generator, prime mover, or other electric power production equipment under specific conditions designated by the manufacturer. Installed generator nameplate capacity is commonly expressed in MW and is usually indicated on a nameplate physically attached to the generator." (Order 842 at ¶ 71 and footnote 161)
- If a modification to a generating facility causes its nameplate capacity to increase or decrease, then the droop parameter should be based on the updated nameplate capacity value. (Order 842 at ¶ 71)
- For the purposes of calculating the expected amount of primary frequency response that is provided in response to frequency deviations, the calculation should still be based on a generating facility's full nameplate capacity even if the level of requested interconnection service or the steady state operating limit is below that nameplate capacity. As an example, in the case of a generating facility with a 5 percent droop, as the Interconnection's frequency error changes from 0 to 3 Hz and as the system frequency transitions outside of the deadband parameter, the

expected change in the generating facility's MW output should range from 0 MW to full nameplate capacity. (Order 842 at ¶ 74)

- A generating facility that responds to frequency deviations is not required to provide and sustain a value of primary frequency response that causes its MW output to exceed its maximum steady state operating limit. For example, under-frequency conditions outside of the deadband parameter would result in an automatic increase in the generating facility's MW output. However, if the calculated incremental MW value that would be provided as primary frequency response per the droop parameter would cause the generating facility to exceed its maximum steady state operating limit, the interconnection customer would be permitted to limit the increase in the generating facility's MW output such that its MW output (after primary frequency response has been provided) does not exceed its maximum steady state operating limit, since doing so may cause facility-level reliability concerns. Should a generating facility's maximum operating limit per its interconnection agreement be less than its nameplate capacity, nothing in Order 842 would require an interconnection customer to violate the terms of its interconnection agreement. In such a situation, an interconnection customer would be permitted to limit the increase in the generating facility's MW output such that its MW output does not exceed the maximum operating limit as described in the interconnection agreement. Similarly, if the calculated value of primary frequency response would cause the facility's MW output to drop below its minimum operating MW limit, an interconnection customer will be permitted to limit the decrease in the facility's MW output such that the facility does not operate below its minimum steady state operating limit. (Order 842 at ¶ 75-76)
- The deadband parameter should be implemented without a step. Accordingly, the droop curve is to be implemented in a manner such that as frequency transitions outside of the deadband (both for under-frequency and over-frequency conditions), the generating facility's expected MW response should start from 0 MW and increase linearly to the nameplate capacity of the generating facility, as the Interconnection's frequency error changes from 0 Hz to the generating facility's percentage droop multiplied by 60 Hz (e.g., in the case of a 5 percent droop, this would be 3 Hz.) (Order 842 at ¶ 77-78)
- Nothing in Order 842 prohibits the implementation of asymmetrical droop settings (i.e., different droop settings for under-frequency and over-frequency conditions), provided that each segment has a percent droop value of no more than 5 percent. For example, our requirements would not prohibit the implementation of a droop curve that has a five percent droop for over-frequency conditions (e.g., between 60.036 and 61.000 Hz) and a 3 percent droop for under-frequency conditions (e.g., between 59.964 and 59.000 Hz). (Order 842 at ¶ 80)

Requirement to Ensure the Timely and Sustained Response to Frequency Deviations

- Generating facilities that respond to abnormal and sustained frequency deviations outside of the deadband parameter are required to provide and sustain primary frequency response until system frequency has returned to a value within the deadband parameter. If frequency recovers to within the deadband but suddenly deviates outside of the deadband parameter again, the

interconnection customer will be required to provide and sustain its response until such time that frequency returns to a value within the deadband. (Order 842 at ¶ 104)

- Order No. 842 does not relieve a generating facility from any requirement that it may have as a condition of an existing interconnection agreement or any other requirement to provide primary frequency response. Order No. 842 does not obviate the need for primary frequency response from existing generating facilities and was not intended to limit the supply of primary frequency response to only newly interconnecting generating facilities. Rather, the requirements in Order No. 842 are intended to build on primary frequency response provided by existing generating facilities. (Order 842-A at ¶ 19 and 21)

No Generic Headroom Requirement

- Order 842 does not mandate a headroom requirement. WAPA has not required any headroom. (Order 842 at ¶ 109-110)

No Mandatory Compensation

- Order 842 does not mandate compensation for primary frequency response service. WAPA does not provide compensation to new or existing generators. (Order 842 at ¶ 119-126, Order 842-A at ¶ 22)

Application

- The primary frequency response requirements adopted in Order 842 apply to all newly interconnecting generating facilities as well as to all existing large and small generating facilities that take any action that requires the submission of a new interconnection request that results in the filing of an executed or unexecuted interconnection agreement on or after the effective date of Order 842. Should an existing interconnection customer sign a new or amended interconnection agreement for reformatting purposes only, those existing generating facilities would not be subject to the requirements of Order 842. (Order 842 at ¶ 132)
- Under the pro forma LGIP, a “material modification” to an existing generating facility would result in an interconnection request requiring a new interconnection agreement, thereby subjecting the existing generating facility to the requirements adopted in Order 842. (Order 842 at ¶ 133)
- Order 842 is intended to apply to all existing generating facilities that submit a new interconnection request that results in an executed or unexecuted interconnection agreement, regardless of whether that agreement is filed at FERC or merely reported in EQRs. (Order ¶ 842 at ¶ 135)

Combined Heat and Power (CHP) Facilities

- Newly interconnecting CHP facilities that are sized to serve on-site load and have no material export capability are exempted from the operating requirements of Order 842. However, considering the low costs associated with governor installation, all newly interconnecting CHP

facilities, including those sized-to-load, are required to install a governor or equivalent control equipment capable of providing primary frequency response as a condition of interconnection. CHP facilities that are “sized-to-load” as those generating facilities that are behind-the-meter generation and are sized-to-load, i.e., the thermal load and the generation are near-balanced in real-time operation and the generation is primarily controlled to maintain the unique thermal, chemical, or mechanical output necessary for the operating requirement of its host facility. (Order ¶ 842 at ¶ 155)

Electric Storage Resources

- Both the physical limitations of the electric storage resource, as identified by the interconnection customer, and the expected primary frequency response system requirements, as identified by the transmission provider, may be necessary to determine the appropriate operating range for an electric storage resource. Therefore, it is necessary to provide the interconnection customer with the ability to propose an operating range with its initial interconnection request, but also allow the transmission provider and/or balancing authority to consider the system needs for primary frequency response prior to reaching an agreement on the final operating range among the parties in a LGIA or SGIA. Transmission providers must treat electric storage resources in a not unduly discriminatory or preferential manner when determining the appropriate operating range. (Order ¶ 842 at ¶ 181)
- The term “physical energy limitation” in new pro forma LGIA Article 9.6.4.2 (Timely and Sustained Response) and SGIA article 1.8.4.2 (Timely and Sustained Response) is defined to mean the circumstance when a resource would not have the physical ability, due to insufficient remaining charge for an electric storage resource or insufficient remaining fuel for a generating facility to satisfy its timely and sustained primary frequency response service obligation, as dictated by the magnitude of the frequency deviation and the droop parameter of the governor or equivalent controls. However, when a generating facility experiences a physical energy limitation, then the interconnection customer must be able to demonstrate to the transmission provider, and to the extent applicable, the relevant balancing authority, that such a physical energy limitation existed before or during an abnormal frequency deviation outside of the deadband parameter. (Order ¶ 842 at ¶ 185)
- A generating facility’s minimum set point is not used in the calculation of the MW droop response. We clarify that for all generating facilities, the calculation of the MW droop response is based on a generating facility’s nameplate capacity (i.e., for a five percent droop curve, a generating facility would be expected to increase its output by 100 percent of its nameplate capacity for a five percent change in frequency). While it is true in theory that an electric storage resource may have a greater operating range over which to provide primary frequency response, from a practical standpoint the droop parameter limits the percentage of nameplate capacity that a generating facility will provide in response to abnormal frequency deviations. For example, a five percent droop setting and ± 0.036 Hz deadband equates to an individual resource having a

frequency response of about two percent of nameplate capacity per tenth of a Hz at a tenth of a Hz frequency deviation. (Order ¶ 842 at ¶ 186)

- If an electric storage resource is charging at two MW prior to an abnormal under-frequency deviation, and the calculated response per the droop parameter is to increase real-power output by one MW, the electric storage resource could satisfy its obligation by reducing its consumption by one MW (instead of completely reducing its consumption by the full two MW and then discharging at one MW, which would result in a net of three MW provided as primary frequency response). If an electric storage resource is charging at one MW prior to an abnormal under-frequency deviation, and the calculated response per the droop parameter is to increase real-power output by three MW, the electric storage resource could satisfy its obligation by switching from charging at one MW to discharging at two MW. (Order ¶ 842 at ¶ 187)

Distributed Energy Resources (DER)

- The requirements of Order 842 apply to newly interconnecting DERs that execute, or request the unexecuted filing of, an LGIA or SGIA on or after the effective date of Order 842. (Order ¶ 842 at ¶ 195)
- The sustained response provisions in the revisions to the pro forma LGIA and SGIA apply only when a generating facility is allowed to ride through, and do not supersede a generating facility's ride through settings, or require an interconnection customer to override anti-islanding protection or any protective relaying that has been set to disconnect the generating facility during certain abnormal system conditions. Further, for those abnormal system conditions in which a generating facility is not tripped offline by anti-islanding or protective relays and remains connected, to the extent it has the necessary MW operating capability in the appropriate direction to correct the frequency deviation, it would be expected to provide and sustain primary frequency response. (Order ¶ 842 at ¶ 196)

Nuclear Generating Facilities

- Nuclear generating facilities are exempted from Order 842 due to their unique regulatory and technical requirements. Nuclear generating facilities have separate licensing requirements under the NRC which often restrict or severely limit those facilities from providing primary frequency response, and they are designed to maintain internal steam pressure and are not intended to react to changes in the grid. (Order ¶ 842 at ¶ 203)

No Waiver Process

- Order 842 declines to adopt a waiver process for new generating facilities. Should the new primary frequency response requirements present obstacles to new, more efficient generating facilities that may be developed in the future, nothing in Order 842 prohibits prospective interconnection customers owning such facilities from seeking appropriate relief from FERC. (Order ¶ 842 at ¶ 229-231)