

FERC Order 2023 - Improvements to Generator Interconnection Procedures and Agreements (July 28, 2023)

*Preliminary Review of Reforms to “Incorporate Technological
Advancements into the Interconnection Process”*

Presentation to NYSRC Executive Committee Meeting 292

August 11, 2023

FERC Order 2023 - Need for Reforms

Summary - FERC is adopting reforms to its pro forma LGIA Procedures, pro forma SGIA Procedures, pro forma LGIA Agreement, and pro forma SGIA Agreement to address :

- Interconnection queue backlogs
- Improve certainty
- Prevent undue discrimination for new technologies

The reforms are intended to ensure that the generator interconnection process is just, reasonable, and not unduly discriminatory or preferential

FERC Order 2023 - Actions

Introduction - Actions (C4, p5):

- Implement a first-ready, first-served cluster study process
- Increase the speed of interconnection queue processing
- **Incorporate technological advancements into the interconnection process**

Incorporate Technological Advancements into the Interconnection Process

Excerpt from Order 2023 Table of Contents:

- C. Reforms to Incorporate Technological Advancements into the Interconnection Process
 - Increasing Flexibility in the Generator Interconnection Process
 - Incorporating the Enumerated Alternative Transmission Technologies into the Generator Interconnection Process
 - **Modeling and Ride-Through Requirements for Non-Synchronous (IBR) Generating Facilities**

Incorporate Technological Advancements into the Interconnection Process

Introduction - Interconnection customers requesting to interconnect a nonsynchronous generating (IBR) facility must (C7, p7):

- Provide the transmission provider with the models needed for accurate interconnection studies
- Have the ability to maintain power production at pre-disturbance levels and provide dynamic reactive power to maintain system voltage during transmission system disturbances and within physical limits

Modeling and Ride-Through Requirements for Non-Synchronous Generating (IBR) Facilities

Commission Determination - Modeling Requirements (C1659, p1064)

- Each interconnection customer requesting to interconnect a non-synchronous generating (IBR) facility to submit to the transmission provider:
 - Validated user-defined RMS positive sequence dynamic model
 - Appropriately parameterized generic library RMS positive sequence dynamic model, including a model block diagram of the inverter control system and plant control system, that corresponds to a model listed in a new table of acceptable models or a model otherwise approved by WECC
 - Validated EMT model, if the transmission provider performs an EMT study as part of the interconnection study process.

FERC Order 2023 - Affirmation

Commission Determination - Modeling Requirements (C1661, p1065-1066)

- Order affirms the Commission's preliminary finding in the NOPR that the pro forma LGIP and pro forma SGIP are unduly discriminatory or preferential because they do not require non-synchronous generating (IBR) facilities to provide:
 - Accurate and validated models to transmission providers during the generator interconnection process AND
 - That provide a comparable degree of accuracy as the models required of a synchronous generator

FERC Order 2023 - Attestation

Commission Determination - Modeling Requirements (C1675, p1075)

The interconnection customer must provide evidence that the equipment behavior is consistent with the model behavior for a model to be “validated”, for example:

- An attestation from the interconnection customer that the model accurately represents the entire generating facility
- Attestations from each equipment manufacturer that the user-defined model accurately represents the relevant component of the generating facility, or
- Test data

FERC Order 2023 - Modifications

Commission Determination - Modeling Requirements (C1668, p1070-1071)

- Section 4.4.4 of the pro forma LGIP and section 1.4 of the pro forma SGIP require that any modification of the interconnection request be accompanied by updates to the models:
 - Models are required to be updated as project components are changed
 - Ensuring that the model of the proposed generating facility is accurate throughout the interconnection study process will allow the interconnection customer to understand the actual, potential impact on their interconnection request of changing these project components as they are considering such technological advancements

Modeling and Ride-Through Requirements for Non-Synchronous Generating (IBR) Facilities

Commission Determination - Ride-Through Requirements (C1711-1712, p1095-1096)

- To date, non-synchronous generating facilities often cease injecting current during transmission system disturbances through “momentary cessation” which can pose significant risk to the reliability of the bulk power system
- Therefore, each interconnection customer requesting to interconnect a non-synchronous generating facility is required to establish:
 - Ride through requirements during abnormal frequency conditions and voltage conditions within the “no trip zone” defined by NERC Reliability Standard PRC-024-3 or successor mandatory ride through reliability standards

Modeling and Ride-Through Requirements for Non-Synchronous Generating Facilities

Commission Determination - Ride-Through Requirements (C1715, p1097-1098)

- Specific ride-through requirements, within any physical limitations of the generating facility and its control and protection settings, are configured or set to:
 - Continue active power production during disturbance and post disturbance periods at pre-disturbance levels unless providing primary frequency response or fast frequency response
 - Minimize reductions in active power and remain within dynamic voltage and current limits, if reactive power priority mode is enabled, unless providing primary frequency response or fast frequency response
 - Not artificially limit dynamic reactive power capability during disturbances
 - Return to pre-disturbance active power levels without artificial ramp rate limits if active power is reduced, unless providing primary frequency response or fast frequency response.

Commission Determination - Applicability

Pro Forma LGIA to be revised (C1733, p1103)

- Require all newly* interconnecting large generating facilities provide frequency and voltage ride through capability consistent with any standards and guidelines that are applied to other generating facilities in the balancing authority area on a comparable basis

*Note: FERC NOPR “Reliability Standards To Address Inverter-Based Resources” RM22-12-000 (November 17, 2022) addresses requirements for new and existing "registered IBR, unregistered IBR, and IBR-DER projects“. This NOPR and associated decision is still pending at FERC.

Commission Determination - Compliance

Compliance Deadline (C1762, p1126)

- Order requires the submission of compliance filings within 90 calendar days of the publication date of final Order 2023 in the Federal Register
- Order states that it is important to implement this final rule in a timely manner, given the pressing need to reform the interconnection processes

FERC Order 2023 - Miscellaneous

- IEEE 2800-2022 - Order states that it is unclear whether IEEE 2800-2022 would adequately address the problem identified by the Commission because the Commission would have limited authority to enforce these discretionary provisions (C1719,p1100)
- Material Modifications
 - Order addresses material modifications with respect to cluster studies & clarifies process (C9, p8 et al)
 - Defined in section 1 of the pro forma LGIP as modifications that have a material impact on the cost or timing of any interconnection request with an equal or later queue position (C337, p238-239 et al)

Preliminary Comparison between PRR 151 IBR Requirements & FERC Order 2023 IBR Requirements

Items	Scope	Implementation	IEEE 2800-2022 Standard			Exclusions	Exception Process
			Compliance	Requirements	Clarifications		
PRR 151	New only	≥CY2024	Yes	Yes	Yes	Yes	Existing
Order 2023	New only	>FR+90+Transition	Applicable Reliability Standards apply			Yes	Existing
Items	RMS Models			EMT Models	More Specific & Stringent		
	Dynamic	Power Flow	Short-Circuit		NYISO	TO	GO
PRR 151	Yes	Yes	Yes	Pending	Yes	Yes	Yes
Order 2023	Yes	Not addressed	Not addressed	Depends	Local	Local	Local

Yellow highlights indicate areas of possible significant differences

Next Steps

- Continue detailed review of FERC Order 2023
- Research differences between PRR 151 & FERC Order 2023 and report at next EC meeting
- Discuss FERC Order 2023 with the NYISO

Any Questions?