

PROPOSED NYSRC RELIABILITY RULES:

TRANSITION TO INTERMITTENT RESOURCES & ENERGY STORAGE SYSTEMS PER CLCPA RENEWABLE RESOURCE CAPACITY MANDATES

INTRODUCTION

New York State's Climate Leadership and Community Protection Act (CLCPA) mandates that New York's power supply is 70% emission free energy by 2030, 100% emission free energy by 2040 and statewide net zero emissions from all sources by 2050. CLCPA's Climate Action Committee's Draft Scoping Plan for the power sector, Scenario C indicates that new storage and variable resource capacity will be required starting in 2025 at ~15,000 MW and rising to ~116,000 MW in 2050 in order to meet these goals. It is noted that the New York Independent System Operator (NYISO) interconnection queue had ~78,000 MW of potential wind, solar and storage resources listed as of April 30, 2022. This capacity will be interconnected to the New York Control Area (NYCA) Bulk Power System (BPS) utilizing Inverter Based Resources (IBR) which have radically different performance characteristics from conventional synchronous generators.

It is clear that there will be an unprecedented change in the magnitude and performance capability of new generating resources in the NYCA in the near future. In addition, ride through performance of existing IBR after routine system disturbances is lacking as demonstrated in several recent disturbance analyses in California^{1,2} and Texas³. These events make the case for the need to improved reliability standards and interconnection requirements in this technical area.

New York State Reliability Council's (NYSRC) 2022 Goal A-2 is intended to address the need for mandatory standards in New York for the interconnection of IBR resources and for the evaluation of system performance with IBR resources. Goal A-2 identifies actions to preserve adequate NYCA reliability for the high levels of renewable resource capacity mandated by the CLCPA. This goal calls for developing new rules and modifying existing rules, including resource adequacy and transmission planning design requirements, recognizing the transition to reliance on utility connected IBR resources and energy storage systems, and Behind The Meter (BTM) Distributed Energy Resources (DER). The performance of the NYCA power system depends on appropriate interconnection standards being in place before the replacement fleet of IBR resources is designed and installed. NYSRC's Goal A-2a of developing a scope for a white paper was approved by NYSRC's Executive Committee (EC) on June 10 2022. This document presents a white paper based upon that scope in accordance with NYSRC's Goal A-2b and was approved by NYSRC's EC on July 8, 2022.

¹ [Multiple Solar PV Disturbances in CAISO - April 2022](#)

² [San Fernando Disturbance - November 2020](#)

³ [Odessa \(TX\) Disturbance - September 2021](#)

BACKGROUND

There are many local, regional and national initiatives active in this area intended to provide guidance for interconnecting intermittent resources to the power system. These include:

- Distributed Energy Resources (DER) radially connected including Behind the Meter (BTM) resources
 - NY Department of Public Service (DPS) Interconnection Technical Working Group (ITWG)
 - Northeast Power Coordinating Council (NPCC) - Distributed Energy Resources (DER) Considerations to Optimize and Enhance System Resilience and Reliability (V3 12-9-21)
- Inverter Based Resources (IBR) connected to Bulk Electric Systems (BES) or Bulk Power Systems (BPS)
 - NERC Reliability Guideline – Improvements to Interconnection Requirements for BPS-Connected Inverter Based Resources (approved September 2019)⁴
 - Institute of Electrical and Electronics Engineers (IEEE) 2800 2022 - IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems (approved February 2022)
 - IEEE P2800.2 - Guide for Test and Verification Procedures for Inverter-Based Resources Interconnecting with Bulk Power Systems (pending)

It is intended for the NYSRC to build on these initiatives in developing new or revised NYSRC Reliability Rules.

IEEE 2800-2022. IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems⁵

Noting that NERC’s Reliability Guideline was intended to be a bridge solution until IEEE 2800 is approved and adopted by the relevant authority having jurisdiction, it follows that IEEE-2800 is expected to be the defining standard. NYSRC is the authority governing reliability standards in New York and NYSRC will utilize IEEE-2800 as the basis for development of reliability rules for New York.

IEEE 2800 specifies verification methods and range of conformance requirements. The associated BPS standard IEEE P2800.2 covers IBR test and evaluation procedures and has an expected approval date of Q2, 2024. However, it is not recommended to delay adoption of P2800 pending approval of P2800.2 given CLCPA’s Scenario C projected need for ~15,000 MW of new IBR resources by 2025 and significantly more in later years, as well as the potential interconnection of ~78,000 MW of IBR resources listed in the NYISO’s interconnection queue.

⁴ [NERC: Improvements to Interconnection Requirements for BPS-Connected Inverter-Based Resources](#)

⁵ <https://ieeexplore.ieee.org/document/9762253>

Therefore, it is proposed that NYSRC immediately start the process of developing Potential Reliability Rules (PRRs) based on IEEE-2800-2022 and other requirements for IBR resource interconnections.

IMPLEMENTATION PLAN

The white paper scope is broken into three phases as follows:

Phase 1 (To be completed Q4, 2022)

- Concentrate initially on IBR resources connected to the NYCA BPS system or at lower voltages but under NYISO control
- RRS to implement the adoption of IEEE 2800 for all new IBR interconnections to the NYCA BPS.
- Work closely with the NYISO, Transmission Owners (TOs), DPS and manufacturers to obtain their input
- Consider IBR aspects for inclusion:
 - Data specifications
 - Wind, solar & storage model standardization
 - Model verification requirements
 - Protection and performance settings
- Monitor NERC, NPCC, EPRI and IEEE forums
- Monitor best practices from other ISOs, e.g. ERCOT, ISO-NE
- Develop PRRs as appropriate
 - IBR interconnection requirements based on IEEE 2800-2022

Phase 2 (To be completed Q2, 2023)

- Develop PRRs as appropriate
 - Resource adequacy requirements
 - Transmission planning requirements
 - System performance evaluations (e.g., RNA, CRP, IRM)

Phase 3 (To be completed Q2, 2024)

- It is recognized that BTM DER may have a significant impact on BPS performance, but that initiative is presently covered by DPS's ITWG activities.
- It intended to closely coordinate with ITWG and develop new or revised NYSRC Reliability Rules covering BPS performance as affected by BTM DER.