Via email

December 21, 2023

Mr. Herb Schrayshuen, Secretary
Reliability Rules Subcommittee/Reliability Compliance Monitoring Subcommittee
New York State Reliability Council, L.L.C. (NYSRC)

herb@poweradvisorsllc.com

RE: Comments on Request to Develop or Modify Reliability Rules and Requirements (NYSRC Policy No. 1-11)

Dear Mr. Schrayshuen,

AES Clean Energy, LLC ("AES") appreciates the opportunity to provide comments on the final draft of the reliability rule PRR-151 based on IEEE 2800-2022. In New York, in order to meet the goals of the Climate Protection and Community Protection Act (CLCPA), many renewable Inverter Based Resources (IBRs) are being deployed and it is imperative that we ensure these resources operate reliably on the grid. AES provides several comments and suggestions to improve the implementation of PRR 151 and to ensure the reliability of the grid as these IBR renewables continue and begin operations. AES also supports ACE NY's comments to the NYSRC on the final draft of PRR 151.

AES has spent more than two decades building projects in New York as one of the state's leading developers. AES' development pipeline in New York includes more than 2.4 GW of clean energy projects including utility-scale solar, wind, community solar, and energy storage. AES owns and operates one of the largest renewable energy portfolios in New York with 62 projects representing more than 850 MW of energy resources including Valcour Wind, a portfolio of 612 MW of operating wind projects.

I. AES Suggestions

A. Attestation requirements

As the new rule eliminates a thorough review of developer/owner attestations and methods to meet the requirements of PRR 151, AES is concerned that the standard will be inconsistently applied and create difficulty in evaluating compliance. The developers would be increasing their legal risk without a mechanism for feedback. Without proper oversight, the rule would not increase reliability.

Thus, AES suggests the following changes in 7. Section B - Requirements:

1. Change the language in R1.1.: "~~Attest~~ Will design ~~that their~~ its IBR plant ~~will be designed~~ to be in compliance with the mandatory requirements of IEEE 2800-2022, as amended by "NYSRC Procedure for Application of IEEE 2800-2022 Standard for the New York Control Area""
2. Change the language in R1.2.: "~~Attest~~ Provide ~~that~~ the best and most up to date models and data ~~provided~~ for use in NYISO's *Interconnection Studies* to accurately simulate the performance of their compliant IBR plant per R1.1."
3. Change the language in R2.1.: "~~Attest that~~ Will design its ~~their~~ IBR plant ~~will be designed~~ to be in compliance with the mandatory requirements of IEEE 2800-2022, as amended by "NYSRC Procedure for Application of IEEE 2800-2022 Standard for Large IBR
   Generating Facilities for the New York Control Area"
4. Change the language in R2.2.: "~~Attest that~~ Provide the best and most up to date models and data ~~provided~~ for use in NYISO's Interconnection Studies to accurately simulate the performance of their compliant IBR plant per R2.1."
5. Add R3: "The NYISO shall perform assessments to ensure the model and data provided by Large IBR Generating Facility Developer meet R1 and R2 of PRR 151. If NYISO's assessments identify deficiencies with the model and/or data provided, NYISO shall notify the Large IBR Generating Facility Developer within X[1] calendar days of identification of deficiencies. The Large IBR Generating Facility Developer shall resolve the deficiencies and provide corrected model and/or data to NYISO within X calendar days after notification.

In addition, to accompany the new R3, in 8. Section C – Compliance Elements:

6. Add M3: The NYISO certifies that assessments have been performed for model and data provided by each Large IBR Generating Facility Developer and that any identified deficiencies have been resolved.

B. 10. Comments

In addition to the changes to the requirements listed above, AES would like to call attention to the exclusion of Section 10 – Modeling Data of IEEE 2800 from PRR 151. AES requests confirmation that developers are to follow the *Reliability Rules & Compliance Manual*[2]*:* I. Modeling and Data, I.4 Transmission Data when submitting modeling and data on their IBRs, as described in the requirements.

[1] Number of days to be decided by NYSRC and NYISO

[2] New York State Reliability Council, Reliability Rules & Compliance Manual. Version 46. June 10, 2022. https://www.nysrc.org/wp-content/uploads/2023/07/RRC-Manual-V46-final.pdf

C. 6. Section A – Reliability Rule Elements, 2.

1. AES suggests a change to "NERC: All Standards under review for IBR Application per FERC Order 901 and RD22-4."

D. Clause 4: General Interconnection Technical Specifications And Performance Requirements

AES suggests that NYSRC adopt the language and requirement from IEEE 2800, 4.2 Reference Points of Applicability (RPA) to replace the language in Clause 4.2 of PRR 151 Procedure Document. AES recommends that the RPA is assessed and determined on a project-by-project basis and the final determination of the RPA is agreed upon by the TO and the project developer/owner.

1. Replace Clause 4.2 with: "Reference points of applicability (RPA). RPA for ac-connected IBR. Except as otherwise stated in this standard, the *reference point of applicability* (RPA) for all technical minimum requirements for the interconnection, capability, and performance requirements in this standard shall be the *point of measurement* (POM) of the IBR plant as shown in Figure 1. The interconnecting *TS owner/TS operator* may adapt some or all performance requirements, as specified in this standard, and move their respective RPA to another location, including the *point of interconnection* (POI).

E. Clause 7 – Response To TS Abnormal Conditions

1. Clause 7.2.2.3.4 is listed twice in Section 7 #5 and #6 and should be re-numbered.

AES appreciates being able to comment on the final PRR 151 draft and looks forward to additional stakeholder discussions.

Sincerely,

Katherine Bennett
Lead Regulatory Analyst
AES Clean Energy

GE Vernova

GE Comments to PRR-151, draft dated 11-10-2023

Submitted Dec 22, 2023

GE submits the following comments to latest revision of PRR-151, Request to Develop or Modify Reliability Rules and Requirements (NYSRC Policy No.1-11).

Clause 5

Item 5: Clause 5.2.2: Recommend to modify "…when the system short-circuit strength at the RPA is the minimum short-circuit strength identified…" to "…when the system short-circuit strength at the RPA is *equal to or above* the minimum short-circuit strength identified…" for clarity.

Item 5: Clause 5.2.2: The 10 second maximum step response time is more aggressive than typical responses today in many locations and could be problematic in weak grids and possibly in situations with multiple plants in close proximity, if not coordinated. The damping ratio of 0.3 may not be achievable for a 10 second response in weak grids, so language should be added to address such a situation.

Clause 7

Item 7: Clause 7.2.2.3.5: Recommend removing the last sentence of this item. This infers that utilization of this settling time and settling band is in all cases beneficial and should be targeted as a goal; in fact, there are grid conditions where implementation of the settling time requirement could cause instability and should be avoided. GE Vernova can provide further information on the risks of using this requirement where not beneficial, or as a default requirement.

Item 8: Clause 7.2.2.4: Design of proper control responses and associated models requires validation and testing of the product. Unless defined prior to OEM design processes, requested ride-through performance requirements from a project-specific study would need to be within the capabilities of the equipment. Language must be added to address this situation.

Item 10: Clause 7.2.2.6: IEEE 2800-2022 defines the settable range for active power recovery as 1-10 seconds (default 1 second), but the language here states "less than or equal to one second". Recommend changing this to "equal to on second", otherwise clarifying language is needed that explains that there could be a requirement for less than one second recovery, which is outside of the standard.

Via electronic submission

December 21, 2023

Mr. Herbert Schraysheuen, Secretary
New York State Reliability Council

RE: Ørsted comments on revised NYSRC PRR 151: Establish minimum interconnection standards for Large Inverter Based Resources Generating Facilities based on IEEE Standard 2800-2022

Dear Mr. Schrayshuen,

I. Introduction

Please accept the following comments in response to the New York Reliability Council's (NYRC) revised PRR 151: Establish minimum interconnection standards for Large Inverter Based Resources (IBR) Generating Facilities based on IEEE Standard 2800-2022. Ørsted appreciates the desire and need to have uniform technical minimum requirements for the interconnection, capability, and lifetime performance of IBRs connecting to the transmission (and sub-transmission) system. We submitted comments in response to the PRR 151 original proposal on April 27, 2023. The NYRC posted a revised PRR 151 on November 16, 2023. Ørsted offers the following comments on the revised proposal. Specifically, changes are needed to the revised proposal to accommodate evolving technologies. This includes the need for a good cause exemption; the ability for IBR developers to self-attest to models with the best available data; and a recognition that IBR developers will not be able to self-attest to all elements of IEEE 2800-2022.

II. Comments

A. The NYSRC should include a "good cause" exemption as part of the final PRR 151 as the drafters of IEEE 2800 envisioned.

A good cause exemption from compliance is needed as some technologies used by IBR developers may not be able to demonstrate conformance with IEEE 2800. The standard itself plainly recognizes this fact. IEEE 2800 1.4 General Remarks and Limitations the standard provides:

> "It is not the intent of this standard to limit the adoption of emerging use cases of synchronous machines, for example, the use of a synchronous condenser as a supplemental IBR device to improve the ride-through capability of an IBR plant under extreme contingency conditions. At the time of writing of this standard, neither design details, test data, nor technical literature is available to confirm that these emerging use cases (i.e., synchronous condenser as a

> supplemental IBR device) will be able to meet all specified requirements of this standard, unless the synchronous condenser exceeds applicable equipment standards, for example, IEEE Std C50.12™ [B60], IEEE Std C50.13 [B61], and IEC 60034-3 [B30] for synchronous machines, including synchronous condensers, and ANSI/NEMA MG-1 [B4] for motors and generators. Due consideration should be given to the benefits and risks of the emerging use cases of synchronous machines in deciding which IBR plant requirements of this standard should be adopted and which may be exempted. This should be done in coordination between IBR owner and TS owner/TS operator not later than the IBR plant design evaluation where capabilities and performance of a synchronous condenser are adequately considered."

Ørsted notes that at the time the IEEE 2800 standards were under development, it was unclear if grid forming (GFM) technologies would comply with these standards.[1] Hence, a good cause exemption would allow deployment of new technologies, like GFM battery energy storage systems, that provide multiple benefits to the grid. Therefore, Ørsted recommends that the NYRC amend PRR 151 to clearly establish a "good cause" exemption provision. Under such a provision, IBR developers who incorporate new technologies would qualify for a good cause exemption and would not need to demonstrate conformance with IEEE 2800.

B. PRR 151 should recognize that any self-attestation of IBR plant models needs to be based on the best data available to the IBR plant developer at that point in time.

If an IBR plant developer needs to provide self-attestation to IBR plant models, the IBR plant developers should be allowed to provide the best information/model/data they have at that point in time. This is due to the fact that for some technologies, a final IBR plant model will not be available until fairly late in the interconnection process. This is especially true for HVDC equipment, where IBR site-specific equipment models are not finalized until tuning has been completed near the time of commercial operation. Ørsted recommends that any self-attestation requirements should be based on the best available information an IBR plant developer has from the original equipment manufacturer and the NYISO/Transmission Owner and not on final models.

C. Absent EMT models IBR plant developers are not able to test to portions of IEEE 2800 and PRR 151 should recognize and codify these elements.

Without adequate representation of the grid for EMT studies IBR plant developer cannot attest to sub-sections of Clause 7 in IEEE 2800. Specifically, without EMT study (as stated by NYSRC in PRR 151, Nov 2023 revision "EMT models and studies are not required by this PRR but may be required by the as-built requirements, to be covered in future PRRs.") and

[1] See: https://www.nerc.com/comm/RSTC_Reliability_Guidelines/White_Paper_GFM_Functional_Specification.pdf

appropriate grid/transmission system models, self-attestation cannot be done for IBR plant performance referring to the following in Clause 7 of IEEE 2800:

- unbalanced faults;
- negative sequence current injection;
- those sub-clauses that require three phase representation (including PLL response, weak grid fault response, transient overvoltage ride though -Table 14).

IBR plant developers are unable to self-attest to these portions because even assuming accurate models are available from the original equipment manufactures, changes to the grid topology may occur that preclude the IBR plant developers from having a full understanding the grid. This does not allow an IBR plant developer to self-attest. If the IBR plant is not designed to meet these requirements, then complying with these requirements after the plant is built is not cost efficient as it may require expensive hardware and IBR unit retrofits. If NYSRC chooses to not require EMT studies in this round of PRR 151 adoption, then they should not mandate compliance for these requirements retrospectively (i.e., after NYISO accepts the IBR plant design and interconnection studies are complete).

III. Conclusion

Ørsted appreciates the efforts of the NYRC to maintain reliability in the NYCA. We recognize that standards like IEEE 2800 will have an important role in the grid of the future and we look forward to continued dialog with the NYRC and NYISO on how PRR 151 can improve system reliability. We intend that the comments provide herein assist the NYRC. Ørsted is concerned that without additional clarifications, there is a potential for unintended consequences that will delay the adoption of IBRs and endanger both reliability and New York's ability to meet its clean energy and climate requirements as articulated in the Climate Leadership and Community Protection Act. We urge the NYRC to address compliance and verification at an appropriate time in the future when those portions of the standards are available.

Respectfully submitted,
/s/ Eric Wilkinson
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ALLIANCE FOR CLEAN ENERGY NEW YORK, INC.

VIA ELECTRONIC DELIVERY

December 21, 2023

Mr. Herbert Schrayshuen
Secretary
New York State Reliability Council

Mr. Christopher Wentlent
Executive Committee Chair
New York State Reliability Council

Re: Revised Proposed IBR Reliability Rule 151 & Procedure

Gentlemen,

The Alliance for Clean Energy New York (ACE NY) appreciates the opportunity to provide this feedback to the New York State Reliability Council (NYSRC) on Proposed Reliability Rule 151 (PRR151) released on November 1, 2023: *Establish minimum interconnection standards for Large Inverter Based Resource (IBR) Generating Facilities based on IEEE Standard 2800™ 2022 (IEEE 2800).*

We appreciate the efforts to revise the rule to date to address New York's system as it evolves in response to the State's nation-leading clean energy initiatives. On behalf of our member companies, ACE NY offers the following comments and suggestions designed to improve the rule's effectiveness while further facilitating clean energy development in New York:

1. **PRR 151 should not apply to projects in the queue as of 12/8/23.**

Item 4 of PRR 151 states:

> "*The NYISO Interconnection Queue as of 6/30/23 has approximately 120,000 MWs of Large Facility (>20 MW) Inverter Based Resources (IBR). NYSRC does not presently have specific IBR interconnection criteria in its Reliability Rules. PRR 151 is therefore proposed for EC approval to be applicable to all future IBR projects seeking interconnection to the NYCA.*" (emphasis added)

ACE NY appreciates that the NYSRC has made it clear PRR 151 will not apply to projects in completed Class Years and projects currently in Class Year 2023. That point was discussed at length during NYSRC presentations at NYISO committees. Expressly recognizing that new obligations should not be placed on projects that have completed the NYISO's interconnection process is a critical step forward and a major improvement to the draft rule. The same rationale applies with equal force to modifications to these projects as they are being permitted and constructed. **ACE NY thus respectfully requests that the NYSRC further revise PRR 151 to clarify that modifications to these projects are also exempt if they do not require an entirely new interconnection study to be conducted, including any additions or expansions thereto**.

With respect to the rule's proposed applicability to future projects seeking interconnection, ACE NY urges the NYSRC to carefully assess New York's system needs and circumstances. While the experiences in other regions can be instructive, they are not determinative. New York's region-specific characteristics, including its upstate versus downstate dichotomy, must be considered. ACE NY has previously taken the position that PRR 151 (or any new versions, or modifications thereto) should not apply to projects already in queue that will have to withdraw and enter the transitional cluster upon the NYISO's implementation of its new Order No. 2023-mandated interconnection process. **ACE NY continues to believe existing projects that have already entered the interconnection queue, as of December 8, 2023, should be exempt from this reliability rule.**

2. **PRR 151 Should Require Design to IEEE 2800-2022, but not an Attestation.**

ACE NY respectfully requests the following amendments to PRR 1515, Item 7:

R1. The NYISO shall prepare and maintain ~~procedures~~ rules for the NYISO's Interconnection Studies process requiring that each *Large IBR Generating Facility Developers* shall:

R1.1. ~~Attest that~~ Design ~~their~~ its IBR plant ~~will be designed~~ to be in compliance with the mandatory requirements of IEEE 2800-2022, as amended by "NYSRC Procedure for Application of IEEE 2800-2022 Standard for the New York Control Area".
R1.2. ~~Attest that~~ Provide the best models and data that are available at the time they are provided for use in NYISO's Interconnection Studies to accurately simulate the performance of ~~their~~ its compliant IBR plant per R1.1.

R2. Each Large IBR Generating Facility Developer subject to the NYISO's Interconnection Studies process shall:

R2.1. ~~Attest that~~ Design ~~their~~ its IBR plant ~~will be designed~~ to be in compliance with the mandatory requirements of IEEE 2800-2022, as amended by "NYSRC Procedure for Application of IEEE 2800-2022 Standard for Large IBR Generating Facilities for the New York Control Area".
R2.2. ~~Attest that~~ Provide the best models and data that are available at the time they are provided for use in NYISO's Interconnection Studies to accurately simulate the performance of ~~their~~ its compliant IBR plant per R2.1.

ACE NY appreciates the fact that the NYSRC has made revisions from the original proposal, and has limited the scope of how PRR 151 will be applied during the interconnection process. As ACE NY has previously explained, currently many IBR resource control designs are under development by the original equipment manufacturers (OEMs). As such, they do not yet have models that reflect as-built, commercially available facilities.

The changes offered herein are intended to recognize that a developer can only provide the best model available at the time of its submission. For example, IEEE 2800-compliant equipment models are not currently available from OEMs. Yet, per the Cluster Study rules under NYISO development, models must be submitted with an application. If the models must be provided on a preliminary basis at the time of the Interconnection Request to accommodate these and other relevant circumstances, developers should be allowed to subsequently augment their submission with an improved or otherwise updated OEM model, and it should not be a requirement that developers submit a new interconnection request because of this updated model. This will allow for, among other things, developers to meet Application Window deadlines while providing the OEM's additional time to build out models in the future.

Regarding the PRR 151: Procedure Document posted 11/1/23.

3. **Establish Technology-Based Exemption Provisions**

Clause 1.4 – General Remarks and Limitations

Some technologies used by IBR developers may not be able to demonstrate conformance with IEEE 2800 due to their nature. For example, as of the time of standards development, it was unclear if Grid Forming (GFM) technologies could comply with these standards. The standard itself recognizes this. (See IEEE 1.4 General Remarks and Limitations.) Therefore, ACENY recommends that the NYSRC amend PRR 151 to clearly establish technology-based exemption provisions. This will allow IBR developers who incorporate new technologies, such as synchronous condensers, to qualify for an exemption from IEEE 2800 for good cause. Hence, a good cause exemption would allow deployment of new technologies, like GFM BESS, that are deemed beneficial to grid operations.

4. **Reflect the Requirements of IEEE 2800 in Clause 5.2.2.**

   Clause 5.2.2 – Voltage Control (dynamic performance) should be revised as follows:

   "The voltage control small-signal dynamic performance specified in Table 5 of the Standard shall be applicable when the system short-circuit strength at the RPA is the minimum short-circuit strength identified in cases provided by the NYISO for a minimum feasible generation scenario and NYSRC Reliability Rules, Table B-1, Category I, Item 2 contingencies (Opening of elements without fault) local to the POI. The maximum step response time for this condition shall be ~~less than 10 seconds~~ consistent with, and as specified in, Table 5 of IEEE Standard 2800-2022."

   The 10 second response time specified in the Procedure Document is more stringent than that defined in IEEE 2800. IEEE 2800 was expressly designed to reflect the need for longer ranges of possible response times to account for different technologies. That same need must be reflected in the final reliability rule for it to be viable. ACE NY thus requests that NYSRC reflect the requirements of IEEE 2800.

5. **Delete Statement in Clause 6.1.1 Concerning NYISO Discretion**

   In Clause 6.1.1 – PFR Capability (supply of primary frequency response) – the final sentence should be struck, which reads.

   "In operation, selection of whether the underfrequency response or the power curtailment limits have priority shall be at the discretion of the NYISO System Operator."

   Each IBR will be equipped with automatic primary frequency response (PFR), which will increase power from a curtailed generator to resolve the underfrequency event. It is not feasible for NYISO operators to notify each affected unit at the time of an underfrequency event to indicate whether it should increase operation above its curtailment level. With automatic PFR in operation at all times, it can automatically adjust unit output so that, during an underfrequency event, the curtailed signal is overridden, and the plant is allowed to respond.

   While the system operator may seek to maintain system security through curtailment, overriding PFR in favor of curtailment may ultimately be counterproductive. PFR may, in fact, be favorable under system duress or avoid system duress.

6. **Limits NYISO Discretion in Clause 7.2.2.3.2**

   In Clause 7.2.2.3.2 – Low and High-Voltage Ride-Through Capability (reactive power priority in mandatory operation range), the following sentence should be struck:

"*The relationships between voltage deviation at the POCs of IBR units and the reactive components of current from these units shall be determined by NYISO based on interconnection studies with consideration of the characteristics of the IBR units.*"

ACE NY is concerned that NYISO may dictate a required relationship between reactive current and voltage deviation that is not available from certain vendors, making the requirement vendor biased. For example, some vendors have a control strategy that incorporates a proportional relationship between reactive current injection during a fault and the size of the voltage dip, while others use a proportional integral (PI) controller. Clearly, the exact nature of the response of a proportional only control and a PI control are different. However, it is well recognized given the numerous examples available in the industry that both controls can be made to work in an application with proper tuning and engineering. If NYISO becomes too prescriptive in its exact requirement of the relationship of reactive current to voltage deviation, it may preclude the use of *e.g.*, PI versus proportional control and thus become biased towards one vendor versus another. Given supply chain considerations and other factors delaying construction, arbitrarily limiting available vendors at this stage will only unnecessarily hamper the State's ability to meet its CLCPA mandates.

7. **Provide flexibility in the range and duration specified in Clause 7.2.2.2.**

Clause 7.2.2.2 – Voltage Disturbances Within Continuous Operating Region (extended voltage imbalance) states:

"Active power changes, due to voltage deviations for which all applicable voltages at the RPA remain within the continuous operating region shall not cause a change in active power greater, in per-unit of the ICR (or the ICAR for energy storage in the charging mode), than twice the magnitude of abrupt voltage change, in per-unit of the nominal voltage. The active power output shall return to within ± 0.05 p.u. of the lesser of the pre-disturbance active power and the available active power, on the base of the ICR or ICAR, as applicable, within one second of the disturbance." (highlights added)

During voltage deviations for which all applicable voltages at the reference point of applicability (RPA) remain within the continuous operating region, an IBR plant shall continue to inject pre-disturbance active power or the available active power if such is less than pre-disturbance active power. Active power deviation caused by voltage deviation shall be returned to pre-disturbance or available active power within 1 – 10 seconds.

If the RPA voltage stays within the continuous operating range, it is imperative that an IBR plant inject rated active power or available active power if such is less than rated active power. IBR units should have a design margin to compensate for reduced voltage by means of increasing the

active component of current while still fulfilling Clause 5.1 of IEEE 2800. Moreover, the amount of active power deviation that is acceptable due to a drop in RPA voltage within the continuous operating range depends on system strength, pre-disturbance operating conditions, and other factors. Limiting such a drop to "twice the magnitude of voltage deviation" is too prescriptive. Finally, the duration for active power delivery to return to pre-disturbance or available active power within one second could be too restrictive and ultimately counterproductive in a weak grid. ACE NY asserts that a range is highly desirable and exact duration can be mutually agreed upon based on study outcome.

The Alliance for Clean Energy New York, on behalf of our member companies that have contributed to these comments, appreciates the opportunity to comment on this revised proposed reliability rule 151. We look forward to continuing dialog on these issues.

Sincerely,

Reid Wagner
Clean Energy Markets Analyst
Alliance for Clean Energy New York (ACE NY)