



Jason A. Higginbotham
Associate General Counsel

525 S. Tryon Street, ECA3
Charlotte, NC 28202

o: 704.731.4015

Jason.Higginbotham@duke-energy.com

April 6, 2023

VIA ELECTRONIC FILING

Ms. Shonta A. Dunston
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

**RE: Duke Energy Carolina, LLC's and Duke Energy Progress, LLC's
Transmission Connected Inverter Based Resource Interconnection
Requirements – Informational Filing
Docket No. E-100, Sub 101**

Dear Ms. Dunston:

Duke Energy Carolinas, LLC's ("DEC") and Duke Energy Progress, LLC's ("DEP" and, together with DEC, the "Companies" or "Duke Energy") hereby file with the North Carolina Utilities Commission (Commission) for informational purposes the Companies' newly-effective Transmission Connected Inverter Based Resource Interconnection Requirements ("IBR Interconnection Requirements"). The Companies are filing the IBR Interconnection Requirements with the Commission for informational purposes as these documents describe new technical and operational requirements that will be included in Appendix 5 of North Carolina Interconnection Agreements ("NCIA") entered into under the North Carolina Interconnection Procedures ("NCIP").¹ As further detailed below, the Companies have presented these new IBR Interconnection Requirements to technical representatives participating in the Companies' Technical Standards Review Group ("TSRG") and recently posted the requirements to their respective Open Access Same-Time Information System ("OASIS") effective March 27, 2023. The IBR Interconnection Requirements are now applicable to North Carolina jurisdictional Interconnection Customers executing NCIA's in the future, including Interconnection Customers completing the transitional cluster study process which will soon be provided NCIA's on or about April 10, 2023.²

¹ Capitalized Terms not otherwise defined in the letter shall have the meaning ascribed to them in Attachment 1 of the NCIP.

² The IBR Interconnection Requirements are also now applicable to all Federal Energy Regulatory Commission ("FERC") jurisdictional Interconnection Customers interconnecting to the Companies'

Ordering Paragraph 8 of the Commission’s June 14, 2019 *Order Approving Revised Interconnection Standard and Requiring Reports and Testimony* (the “2019 NCIP Order”) requires the Companies to file with the Commission for informational purposes any significant modifications to the requirements set forth in the NCIP, along with information regarding the implications of those changes. *2019 NCIP Order* at 65. In addition, Ordering Paragraph 8 requires the Companies to post information regarding the modification on their applicable websites and present the topic for discussion at a meeting of the TSRG in advance of implementation. As described in more detail below, the Companies developed the IBR Interconnection Requirements to ensure reliable interconnection and parallel operation of inverter-based resources (“IBRs”) to the Companies’ respective transmission systems. Duke Energy presented to technical representatives on the development of the IBR Interconnection Requirements at each of the last three quarterly TSRG stakeholder meetings and has published the current version of the Requirements, Rev. 0, to DEC’s and DEP’s respective OASIS sites.³

I. Background on Need for IBR Interconnection Requirements

NERC’s *Reliability Guideline: Improvements to Interconnection Requirements for BPS-Connected Inverter-Based Resources*, published in September 2019, recommends significant enhancements to transmission owner interconnection requirements per NERC FAC-001 and modeling and study requirements per NERC FAC-002.⁴ This guideline served as a pillar for development of the Institute of Electrical and Electronics Engineers (“IEEE”) Standard 2800-2022 released in April 2022, which Duke Energy team members helped develop. IEEE 2800-2022 outlines performance and capability requirements for IBR plants connected to the transmission grid. Other peer utilities in the region have developed and released similar new technical standards and interconnection requirements for IBRs interconnecting to their transmission systems.⁵

transmission systems under the Companies’ Large Generator Interconnection Procedures (“LGIP”) interconnection process.

³ The IBR Interconnection Requirements can be accessed online through DEC’s and DEP’s respective OASIS sites as follows: DEC OASIS, Generator Interconnection Information, IBR Interconnection <http://www.oatioasis.com/duk/>; DEP OASIS, Generator Interconnection Information, IBR Interconnection, <https://www.oasis.oati.com/cpl/>.

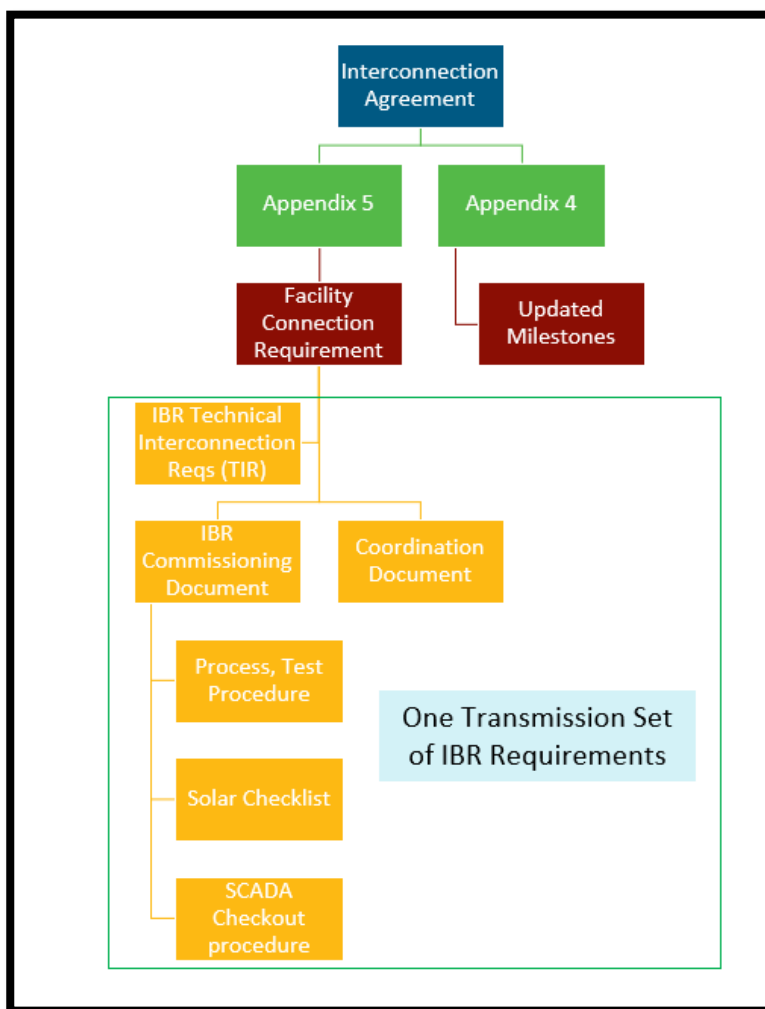
⁴ See Reliability Guideline: Improvements to Interconnection Requirements for BPS-Connected Inverter-Based Resources (September 2019), *available at* [extension://elhekieabhbkmcefcobjddigicaadp/https://www.nerc.com/comm/RSTC_Reliability_Guidelines/Reliability_Guideline_IBR_Interconnection_Requirements_Improvements.pdf](https://www.nerc.com/comm/RSTC_Reliability_Guidelines/Reliability_Guideline_IBR_Interconnection_Requirements_Improvements.pdf).

⁵ See, e.g., Florida Power & Light, Facility Interconnection Requirements at 33 (Inverter Based Resources Requirements), *available at* https://www.oasis.oati.com/woa/docs/FPL/FPLdocs/Facility_Interconnection_Requirements.pdf; Southern Company, Transmission Interconnection Technical Requirements for Inverter-Based Resources, *available at* https://www.oasis.oati.com/woa/docs/SOCO/SOCODocs/SOCO_IBR_Interconnection-Technical-Requirements_Effective_2022-09-15.pdf.

II. IBR Interconnection Requirements

Duke Energy developed the IBR Interconnection Requirements in response to NERC’s Reliability Guideline to address those issues and in response to incorporate Standard IEEE 2800-2022 issued April 2022. Implementation of the IBR Interconnection Requirements by Interconnection Customers will improve reliable interconnection and parallel operation of IBR facilities to the Companies’ transmission grid. The IBR Interconnection Requirements will become part of the Companies’ Facility Connection Requirements (“FCR”) and will be incorporated into Appendix 5 of the NCIA as shown in figure below.

Figure 1: Duke Energy IBR Documents



A. **Technical Interconnection Requirements**

The Technical Interconnection Requirements (“TIR”) establish the technical (capability and performance) requirements for all IBR facilities connecting to the Duke Energy transmission system. The location of the connection and its impacts on the transmission system or other interconnected Duke Energy facilities determine the

requirements. The TIR are designed to ensure the safe operation and reliability of the Duke Energy's transmission system. The topics covered in this document have been identified in the NERC Reliability Standards & Guidelines, NERC Event Reports,⁶ and the IEEE IEEE Standard 2800-2022.

B. Interconnection Commissioning Document

The Interconnection Commissioning Document provides an overview of the process, requirements, and timeline for commissioning of an IBR facility connecting to the Duke Energy transmission system. The document includes nine attachments as follows: (1) Duke Energy IBR Interconnection Commissioning Checklist; (2) Duke Energy Transmission-Connected IBR SCADA Checkout Procedure; (3) Duke Energy Transmission-Connected IBR Plant Verification Process; (4) Transmission Interconnection Verification Requirement Documents; (5) Reactive Power Capability Verification Results Template; (6) Primary Frequency Response Verification Results Template; (7) Voltage and Reactive Power Control Verification Results template; (8) Post-Event Data Monitoring Data Results Template; and (9) Duke Energy Transmission-Connected IBR Site As-Builts.

C. IBR Plant Coordination Document

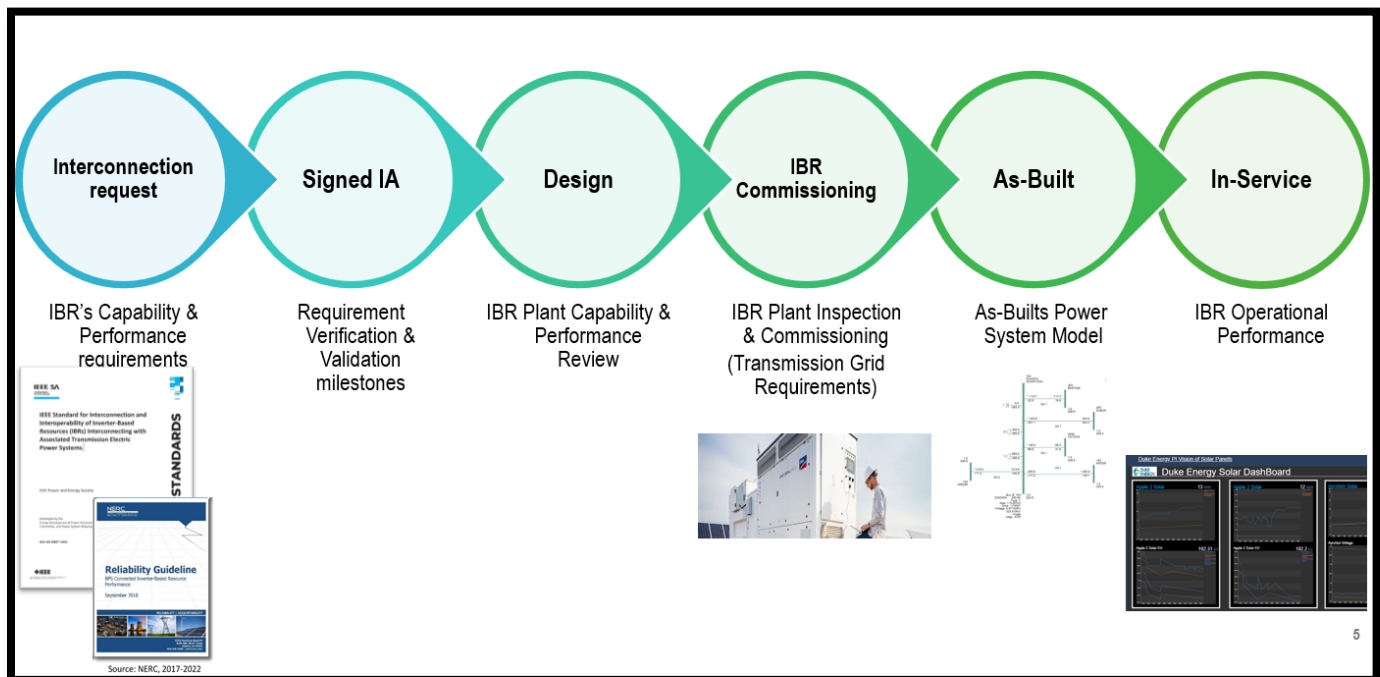
The IBR Plant Coordination Document is intended to aid with the implementation of best practices for reliable interconnection of IBRs to the Duke Energy transmission system. The topics covered in this document have been identified in the Duke IBR Interconnection Technical Requirement, NERC Reliability Standards & Guidelines, NERC Event Reports, and the IEEE 2800 standard.

The Interconnection Customer is expected to provide qualitative and quantitative information for all topics referenced by the document. The intent is to gain a common understanding between Duke and the Interconnection Customer concerning how the basic design of the facility will meet the various interconnection requirements.

III. Transmission-Connected IBR Interconnection Life Cycle Improvements

Duke Energy is implementing the Interconnection Life Cycle improvement for transmission connected IBR plants by requiring new IBR capability and performance requirements along with updating the interconnection milestones which will require collaboration between the Interconnection Customer and Duke Energy to ensure appropriate verification and validation steps are completed for reliable interconnection.

⁶ NERC, Major Event Analysis Reports, <https://www.nerc.com/pa/rrm/ea/Pages/Major-Event-Reports.aspx>.



IV. Implementation Plan

Duke Energy plans to include Rev 0 of the IBR Interconnection Requirements in Appendix 5 of the Interconnection Agreements for all FERC and NC jurisdictional Interconnection Customers in the Transitional Cluster Study, which are now at the Interconnection Agreement execution phase of the interconnection process.⁷ These projects range from 31-75 MW nameplate capacity and will interconnect to the DEC and DEP transmission grids. Duke Energy shared the IBR Interconnection Requirements with all Transitional Cluster Study Interconnection Customers and has also held technical meetings to review and discuss the documents with each Interconnection Customer.⁸ Duke Energy will continue to provide guidance and support to customers during the lifecycle of interconnection as the new IBR Interconnection Requirements are implemented. Duke Energy plans to incorporate lessons learned, external/internal stakeholder feedback and industry updates (NERC/IEEE) to develop Rev 1 of the IBR Interconnection Requirements in late 2023 for implementation in Q1 2024 for 2022 DISIS projects.

⁷ There are five NC jurisdictional Interconnection Customers and two FERC jurisdictional transmission connected Interconnection Customers in the Transitional Cluster Study.

⁸ Duke Energy has also provided notification of the IBR Interconnection Requirements to all Interconnection Customers in the 2022 DISIS and identified that these requirements will be applicable to their project's Interconnection Agreement.

V. Ongoing Engagement with TSRG and Interconnection Customers

Duke Energy discussed its progress developing the IBR Interconnection Requirements at the last three quarterly TSRG meetings. At the July 20, 2022 meeting, Duke Energy presented on the following topics: (1) transmission vs. distribution solar connections definition; (2) solar disturbances, including NERC Reports and NERC Guidelines; (3) future of transmission solar in the Carolinas, including challenges, goals, and potential approaches to addressing NERC Guidelines; (4) review of pilot transmission solar commissioning inspections; (5) transmission commission inspections moving forward; and (6) future transmission connected IBR performance, inspection, and commissioning requirements.

At the October 26, 2022 TSRG meeting, the Companies provided an update on IBR interconnection improvements. In particular, the Companies provided an overview of areas of improvement for IBR plant interconnection to Transmission grid, including need for capability & performance requirement along with verification and plant level commissioning tests.

Finally, at the January 25, 2023 TSRG meeting, the Companies discussed the draft IBR Interconnection Requirements and reviewed the high-level scope of each document. The Companies also shared that the final version of the requirements would be available in late March 2023. Copies of the Companies' presentations regarding IBR Interconnection Requirements at the July 2022, October 2022, and January 2023 TSRG meetings are available through the Companies' TSRG webpage.⁹

Duke Energy shared the final, Rev. 0, IBR Interconnection Requirements with TSRG stakeholders on March 23, 2023 and published them to DEC's and DEP's respective OASIS sites on March 27, 2023. Duke Energy plans to engage in further discussion with technical representatives regarding the IBR Interconnection Requirements at the April 19, 2023 TSRG meeting and will continue providing updates regarding the North Carolina Transition Cluster projects implementation of the IBR Interconnection Requirements at subsequent TSRG meetings.

If you have any questions regarding any of the above information, please let me know.

Sincerely,



Jason A. Higginbotham

Enclosure

cc: Parties of Record

⁹ Carolinas TSRG Updates, <https://www.duke-energy.com/business/products/renewables/generate-your-own/tsrg>

CERTIFICATE OF SERVICE

I certify that a copy of Duke Energy Carolinas, LLC's and Duke Energy Progress, LLC's Transmission Connected Inverter Based Resource Interconnection Requirements – Informational Filing in Docket No. E-100, Sub 101, has been served by electronic mail, hand delivery, or by depositing a copy in the United States Mail, 1st Class Postage Prepaid, properly addressed to parties of record.

This the 6th day of April, 2023.

Jason A. Higginbotham

Jason A. Higginbotham
Associate General Counsel
Duke Energy Corporation
525 S. Tryon Street, ECA3
Charlotte, NC 28202
Tel 704.731.4015

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