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**VIA ELECTRONIC FILING**

Chief Clerk's Office
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

**RE: Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Response to Commission Questions in July 23, 2019 Order**
**Docket No. E-100, Sub 157**

Dear Chief Clerk:

I enclose Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Response to the Commission's July 23, 2019 *Order Scheduling Technical Conference and Requiring Responses to Commission Questions*, for filing in connection with the referenced matter.

Thank you for your attention to this matter. If you have any questions, please let me know.

Sincerely,

Lawrence B. Somers

Enclosures

cc: Parties of Record

**Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Response to July 23, 2019 Order Scheduling Technical Conference and Requiring Responses to Commission Questions**
**Docket No. E-100, Sub 157**
**August 21, 2019**

1. Is Integrated Systems and Operations Planning (ISOP) intended to be an integral component of Integrated Resource Planning (IRP), or is it envisioned to be a separate exercise? If the latter, then how will the output of ISOP relate to or affect the biennial IRP process?

   **Response:**

   ISOP is intended to be an integral part of the IRP in the future, complementing existing IRP tools and processes. The objective is to progressively improve analysis of potential system impacts and benefits of distributed energy resources (DERs) and new customer programs as technology advances over time. Duke Energy views this as a necessary evolution to address trends in the development of DER technology, declining cost projections of these technologies, changing customer preferences, and planning needs in the future for an increasingly dynamic grid. To be clear, the ISOP effort is not prejudging the analytical outcome of comparing DERs to central station generation. The effort is intended to provide the methodology and tools to enable a fair and thorough comparable evaluation reflecting all practical sources of value.

2. Will ISOP result in publication of a formal planning report and, if so, to whom will that report be distributed?

   **Response:**

   No. At this point, we do not anticipate new reports resulting from the ISOP effort, but instead the IRP will be the primary medium reflecting the incorporation of new modeling tools and processes for ISOP.

3. Is ISOP a precursor to or an initial element of integrated distribution and transmission planning?

   **Response:**

   No. Considering the developmental nature of this effort for the industry, the Company supports a less prescriptive approach for integration of distribution and transmission planning, provided that utilities are demonstrating reasonable progress toward improving modeling tools and processes related to DERs. ISOP is intended to provide increasingly robust analysis of operational impacts and benefits of integrating DERs and other non-traditional solutions across Distribution, Transmission, and Generation Planning disciplines and to provide those analyses in support of the IRP and existing reporting mechanisms. Duke Energy's initial efforts are intended to focus on benefits to customers in the vertically integrated regulatory structure in North and South Carolina, and extending to the other Duke Energy jurisdictions as distributed resource deployment and technology evolve over time.

4. What are the issues, in priority order, that Duke anticipates addressing through its ISOP effort?

**Response:**

ISOP is a multi-faceted effort due to the necessary coordination between multiple planning disciplines. Each part is important to the whole, and most of the workstreams must progress in parallel due to the need to work out coordination of analysis and data hand-offs between distribution, transmission, and generation planning disciplines, as well as the upstream input processes. At a high level, the key components are:

- Development of hourly load forecasts for each of the more than 4500 distribution circuits in the Carolinas over a sufficient time-period to reasonably capture the potential deferred distribution, transmission, and generation capacity benefits for DERs. ISOP currently plans to use a 10-year forecast horizon. Development of the circuit level load forecast includes propensity modeling for energy efficiency and other customer programs, electric vehicles, and rooftop solar.
- Development of Advanced Distribution Planning capabilities:
    - Time series power flow to characterize need profiles (8760 hours/year) for various use cases.
    - Prescreening to identify focus areas for detailed analysis.
    - Optimized selection of both traditional and non-traditional solutions (such as DERs and customer programs).
    - Automation to improve efficiency of more complex analytical processes.

- Implementation of an hourly transmission (DC) power flow model to complement the more detailed AC power flow model currently in use.
- Derivation of ancillary requirements as a function of penetration of varied renewable portfolios.
- Improved production cost modeling capability to enhance valuation of energy storage, and potentially recognize additional value with sub-hourly modeling.
- New processes to coordinate modeling and analysis across distribution, transmission, generation for each potential value stream – with the objective of determining achievable cumulative value for multiple use cases.

5. What are the industry best practices in ISOP?

**Response:**

At this time, very few other utilities appear to be proactively embarking on holistic integrated planning across distribution, transmission, and generation planning, which is at least partially due to the reality that utilities within organized markets have limited control of transmission planning. There appears to be a broader but still relatively small group of utilities working on specific aspects of DER integration, driven primarily by regulatory mandates such as renewable portfolio targets or other limits on conventional generation. Requirements to evaluate DERs against traditional solutions have led some utilities to examine hosting capacity analysis in an attempt to identify the optimal locations for the development of DERs. However, no standardized industry methodology for defining and calculating hosting capacity has emerged at this time. Integration across all planning disciplines in the industry is still in a nascent stage, but the Company believes that components listed in response to question 4 represent the key building blocks to advance the integration of distribution, transmission, and generation planning.

6. What skill sets and tools does Duke intend to employ in order to implement ISOP?

**Response:**

From a practical change-management perspective, ISOP is viewed as an evolution or advancement of distribution, transmission, and generation planning skills, tools, and processes. For example, circuit level load forecasting requires similar skills to that of system level forecasting, but naturally involves much larger data sets, requires a more detailed understanding of a wide range of customer use patterns applied appropriately for each specific circuit, and also requires interaction between distribution planners and circuit level load forecasters. Duke Energy has formed a new group to develop the necessary analytical processes to evaluate resource options from distribution, transmission, and generation planning on a common basis for comparable evaluations of traditional and non-traditional solutions. This common basis is expected to draw from traditional industry standard regulatory economic evaluation methods, including resource investment comparisons using present value revenue requirements ("PVRR") as is common practice in IRPs. From the tools perspective, this effort requires the items described in the responses to questions 4 and 7.

7. Will some of the capabilities required by ISOP be supplied in-house versus outside contract? If so, describe those that will be supplied in-house and those that will be supplied by outside contract.

**Response:**

Although the final mix of in-house and vendor solutions will evolve with the project, the ISOP project is leveraging Duke Energy personnel and existing third-party models

and tools to the extent practical. Where existing third-party models are insufficient, new modeling capabilities and tools are developed with industry software vendors and/or Duke Energy internal resources. The software for circuit level load forecasting is being developed internally. The basic capabilities of Advanced Distribution Planning (ADP) are being developed by the vendor for ADP (CYME), with efforts by Duke Energy in parallel focused primarily on enhancing automation of modeling processes and resolution of data issues, improving computational speed, issue screening/filtering, and solution development. Duke Energy has also begun development and testing of utility-specific cases in the PROMOD (DC) Power Flow model to provide temporal transmission analysis capability. Duke Energy is still in the process of testing production cost models capable of improved energy storage optimization and sub-hourly analysis. The development of coordinated modeling and analytic processes is expected to be primarily supported in-house. Throughout the course of the ISOP project, Duke Energy has sought to gather input from other utilities, national labs, EPRI, consultants, and academic groups to inform our vision and work-scope to better address the challenges of modeling renewables and energy storage, and this is expected to continue. Duke Energy has also been invited to (and will) participate in the upcoming NARUC-NASEO Task Force on Comprehensive Energy Planning to support the sharing of knowledge and ideas in this developing area.

8. What is Duke's ISOP implementation plan, including its proposed timeline?

**Response:**

Recognizing that development of new tools and analytical methods involve significant uncertainty of timing and outcomes, Duke Energy's goal at this point is to incorporate some of the basic elements of integrating (capacity and energy) resource planning across distribution, transmission, and generation planning disciplines in the 2022 biennial Carolinas IRPs. This timeline is based on the Company's perspective that ISOP would provide tools and processes to support the IRP within the existing NCUC and PSCSC regulatory framework. Our objective is to balance the consideration of cost and change management risks of the ISOP effort with the potential benefits, recognizing that it will likely take some years before technology advances and cost declines of DERs create significant effects across all parts of the grid.

CERTIFICATE OF SERVICE

I certify that a copy of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Response to Commission Questions in July 23, 2019 Order, in Docket No. E-100, Sub 157, has been served by electronic mail, hand delivery or by depositing a copy in the United States mail, postage prepaid to the following parties of record:

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This is the 21st day of August, 2019.

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