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July 8, 2022

Via Electronic Filing

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

> **Re: Docket No. E-100 Sub 179** – Carbon Plan of Duke Energy Progress, LLC, and Duke Energy Carolinas, LLC, Pursuant to Session Law 2021-165

Dear Ms. Dunston,

SACE, Sierra Club, and NRDC, jointly with NCSEA (Intervenors), respectfully submit this informational filing regarding the EnCompass modeling datasets produced by Duke Energy Carolinas and Duke Energy Progress (Duke) pursuant to the Commission's March 22, 2002 *Order Regarding Data Inputs and Assumptions, and Scheduling Additional Update on Stakeholder Process Sufficiency* (Order Regarding Data Inputs). Intervenors jointly retained the firm Synapse Energy Economics, Inc. (Synapse) to review Duke's modeling and perform its own EnCompass modeling. This filing is intended to keep the North Carolina Utilities Commission (Commission) apprised regarding difficulties and discrepancies that Synapse encountered in performing EnCompass modeling using the datasets produced by Duke. As explained in more detail below, these discrepancies and difficulties presented technical challenges that significantly slowed the progress of Synapse's analysis.

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At root, the problems encountered by Synapse with the datasets produced by Duke center around a mismatch between the inputs provided by Duke for the EnCompass model and the outputs the software produces. With any modeling project, the first step is validating the model, which means ensuring that the model reliably produces results against an external source. Models like EnCompass include thousands or millions of variables that interact in analytically complex ways when the model runs. Reliably producing results that can be confirmed with an external source provides assurance that the model is working correctly and therefore that the model presents an analytically valuable representation of the real-world dynamics of the system being modeled. Conversely, models that fail to produce a validating result indicate that something about the model's configuration or inputs is not working appropriately. This undermines confidence that the model is able to accurately represent the system being modeled, and severely limits the analytical value of the model.

In its Order Regarding Data Inputs, the Commission ordered, among other things, that "Duke shall provide complete Encompass input and output data files [to] intervenors, upon request and subject to any necessary confidentiality agreements." Order Regarding Data Inputs at 3. Duke produced a number of EnCompass input and output files (known as "datasets") to Intervenors and other parties on May 16, 2022.

Synapse was unable to validate the model using the datasets produced by Duke on May 16. At first, the EnCompass capacity expansion model would not run at all, instead returning an error message. After time-intensive troubleshooting and

communication with the vendor, Synapse identified a problem with the "HB 951 CapEx-No Partial Units" dataset. Had Duke validated its dataset before sharing it with other parties, it could have identified and fixed this problem. Counsel for NCSEA, on behalf of Intervenors, first alerted counsel for Duke on May 31, 2022 of the discrepancies and requested a discussion with Duke's technical experts. Subsequently, on June 7, 2022, Duke filed a letter with the Commission scheduling "a second voluntary informational session regarding the EnCompass modeling data" for June 14. It was not until June 8, 2022 that Duke confirmed the problem with the "HB 951 CapEx-No Partial Units" dataset and provided some guidance on how to work around it.

Between the time the intervenors received the database on May 16 and Duke's clarifying statement on June 8, Intervenors had access to a set of inputs and a set of outputs that were incapable of being reconciled, although they were represented as consistent. Synapse staff spent significant time and effort attempting to validate these inputs and outputs, based on the expectation that validation was possible.

Even after fixing that discrete issue and following instructions for initializing the database from Duke, Synapse's EnCompass modeling continued to produce significantly different results from those provided by Duke, even though Synapse was using the same inputs. The outputs provided to intervenors for validation came from a slightly different EnCompass database than the one provided to the intervenors. As the outputs of models that fail to validate are of limited analytical value, the Synapse team continued to trouble-shoot the validation process. This

long validation process inhibited Synapse's capability to conduct the substantive modeling analysis of analyzing inputs and assumptions, making revisions, and evaluating results.

Duke confirmed in its June 8th clarifying statement that specific manual changes were required in order for the database originally provided to intervenors to be able to produce Duke's outputs. For example, Duke bypassed EnCompass's endogenous capital expenditure function and choose to calculate economic carrying costs for capital expenditures in a series of spreadsheets outside of EnCompass, despite EnCompass having the capability to handle this analytical task. This practice conflicted with the Intervenors' expectation that capital expenditure estimates would be transparent in the EnCompass database.

After extensive additional troubleshooting, the Synapse team was able to narrow the discrepancies enough to be able to move forward with its analysis and modeling work. But unexplained discrepancies between the database provided to intervenors and the database used to generate the Carbon Plan remain. Synapse is not aware of any intervenor that has been able to successfully replicate the outcomes provided by Duke, and Duke has indicated in responses to discovery that it has not attempted to validate its results with the database it provided to intervenors.

Intervenors are sensitive to the tight timeline that the Commission is working under and are not at this time requesting an extension of the July 15, 2022 deadline for intervenors to file their own proposed Carbon Plans or evaluations of Duke's proposed Carbon Plan, despite the technical challenges that Synapse has

encountered with Duke's EnCompass datasets. Nevertheless, Intervenors believe

the Commission should be aware that unresolved issues with Duke's datasets

remain which may require additional work to resolve after the July 15 deadline.

Respectfully,

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CERTIFICATE OF SERVICE

I hereby certify that all persons on the docket service list have been served true and accurate copies of the foregoing letter by electronic mail.

This the 8th day of July, 2022.

/s/ Gudrun Thompson
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