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September 27, 2022

Via Electronic Submittal

Ms. A. Shonta Dunston
Chief Clerk, N.C. Utilities Commission
430 North Salisbury Street
Dobbs Building, 5th Floor
Raleigh, NC 27603-5918

Re: *Duke Energy Progress, LLC and Duke Energy Carolinas, LLC, 2022
Biennial Integrated Resource Plans and Carbon Plan
Docket No. E-100, Sub 179A*

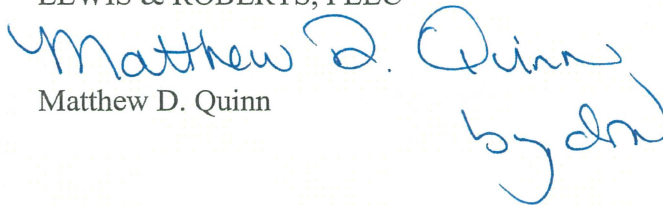
Dear Ms. Dunston:

Pursuant to the North Carolina Utilities Commission's August 30, 2022 *Order Establishing Expert Witness Hearing Procedures*, attached for filing is the Summary of the Direct Testimony of William E. Powers submitted on behalf of NC WARN and Charlotte Mecklenburg NAACP.

If you have any questions, please do not hesitate to contact me. Thank you for your assistance with this matter.

Very truly yours,

LEWIS & ROBERTS, PLLC


Matthew D. Quinn

Attachment

cc: All Parties of Record

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Sep 27 2022

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of the foregoing document upon all counsel of record by email transmission.

This the 27nd day of September, 2022.

/s/ Matthew D. Quinn

Matthew D. Quinn

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Sep 27 2022

**Summary of the Direct Testimony of William E. Powers on Behalf of
NC WARN and Charlotte Mecklenburg NAACP**

N.C. Utilities Commission, Docket No. E-100, Sub 179

1 I greatly appreciate the opportunity to offer testimony before this Commission. I
2 am William E. Powers, P.E. I have been involved in the fields of power plant operations
3 and environmental engineering for over forty (40) years, and I have offered reports and
4 testimony in numerous utility resource planning proceedings throughout the country.

5 On September 2, 2022, I caused to be filed with the Commission my pre-filed direct
6 testimony. The purpose of my direct testimony was to explain several critical errors in the
7 proposed Carbon Plans of Duke Energy Carolinas, LLC (“DEC”) and Duke Energy
8 Progress, LLC (“DEC”) (collectively, the “Companies”). In my direct testimony, my
9 various criticisms were organized into the following six (6) topics:

- 10 I. Modeling—Methodology, Assumptions and Other Modeling
11 Issues;
- 12 II. Near-Term Procurement Activity;
- 13 III. Near-Term Development Activity;
- 14 IV. Transmission Planning, Proactive Transmission and RZEP;
- 15 V. EE/DSM Issues / Grid Edge; and
- 16 VI. Reliability

17 The Companies’ proposed Carbon Plan made multiple critical modeling errors. For
18 example, the Companies’ demand growth forecast is flawed. DEC’s retail sales growth
19 from 2016 through 2021, the most recent five-year period shown in the Carbon Plan,
20 averaged 0.0 percent. Even more significantly, DEP’s retail sales growth over the most
21 recent five-year period (2016-2021) was -0.7. Despite these strong reasons to believe that

1 load growth has stabilized or is shrinking, the Companies have forecasted load growth of
2 0.8 percent for DEC and 0.4 percent for DEP. These erroneously high forecasts are
3 consistent with the Companies' history of overstating future demand growth in Integrated
4 Resource Plan (IRP) proceedings.

5 The Companies also made several critical modeling errors regarding capital costs.
6 For example, the Companies appear to have vastly understated the capital costs of natural
7 gas Combustion Turbines ("CT") and Combined Cycles ("CC"). The Companies have
8 recent experience with constructing both CTs and CCs. For example, the actual capital cost
9 of the 560 MW Asheville CC, which came online in 2020, was \$817 million. This is
10 equivalent to a unit CC cost of about \$1,460/kW. The 402 MW Lincoln CT is the most
11 recent example of a CT built and owned by the Companies. The capital cost of the Lincoln
12 CT was filed under seal. Instead of relying on these hard CC and CT capital cost numbers
13 derived from recent, actual experience, the Companies opted to develop more favorable
14 hypothetical CC and CT capital cost estimates for use in portfolio modeling.¹

15 The Companies' capital cost projections are also flawed with respect to solar plus
16 storage. Other investor-owned utilities operating in the markets of the Companies' sister
17 operating companies view solar plus battery storage as a superior alternative to CTs for
18 cost reasons alone. For instance, NextEra Energy, parent company of Florida Power &
19 Light, states that "batteries are now more economic than gas-fired peakers (CTs), even at
20 today's natural gas prices." *See* page 25 of direct testimony. For unaccountable reasons,

¹ The Companies treated capital cost estimates used in Carbon Plan modeling as proprietary information. NC WARN declined to sign an NDA to review the capital costs assumed by the Companies in the Carbon Plan for modeling purposes. However, in the Companies' precursor to the Carbon Plan, the 2020 Climate Report, the assumed CC capital cost of \$650/kilowatt was less than half the actual \$1,460/kilowatt capital cost of the Asheville CC. I assume the cost of CTs in the 2020 Climate Report is underestimated by a comparable factor.

1 the Companies' modeling of the cost of solar plus storage was inconsistent with the
2 Companies' competitors.

3 The Companies' modeling related to the planning reserve margin was also flawed,
4 and in my direct testimony, I discussed aspects of these errors in both the Modeling section
5 and the Reliability section. In summary, the Companies' are operating with excessive
6 reserves of firm assets as they seek to add substantial amounts of new firm assets,
7 particularly CTs and CCs. Through data request responses received from the Companies,
8 I determined the CT, coal, and DSM capacity that went unused by the Companies at the
9 2021 and 2022 winter peaks. This is a subset of the Companies' total supply assets. More
10 than 7,000 MW of CT, coal, and DSM capacity went unused by the Companies at the 2021
11 and 2022 winter peaks. *See* p. 13 of direct testimony. The 2022 DEC/DEP coincident
12 winter peak of 29,028 MW (January 27, 2022) was representative of the historic DEC/DEP
13 "typical year" peak that is used to calculate the planning reserve margin. *See* pp. 17-20 of
14 direct testimony. Considering only idle CT, coal, and DSM capacity, the Companies had
15 reserves far in excess of the 17 percent PRM at the 2022 actual winter peak. Further, the
16 Companies' Transmission Panel testified that the Companies assume reliance upon 2,000
17 MW of non-firm imports to meet winter peak, yet the Companies consistently import far
18 less than this amount at the winter peak from neighboring balancing authorities while
19 maintaining reserve margins far above 17 percent. In the Companies' Reliability Panel
20 direct testimony, the Companies cited to the CAISO blackouts in August 2020 to illustrate
21 the supposed flaws in relying upon non-firm imports. That testimony by the Companies is
22 objectively wrong. I was an expert in that proceeding. Over-reliance on imports was not a
23 significant factor in the CAISO August 2020 blackouts; instead, market mismanagement

1 by CAISO – allowing 1,000s of MW of exports at the peak – was overwhelmingly the
2 primary cause.

3 Regarding the Near-Term Procurement Activity topic, the Companies committed
4 yet further mistakes. For example, the Companies made errors related to their analysis of
5 the likely performance of solar plus storage. As described in my direct testimony, the
6 Companies currently lag far behind their peers in implementing battery storage, and the
7 Companies’ proposed Carbon Plan illustrates the types of mistakes that have caused the
8 Companies to fall behind. The Companies undersized the battery storage component of
9 solar plus storage, and furthermore, the Companies failed to assume for modeling purposes
10 that the storage component of solar plus storage can be charged from either the associated
11 solar array or the grid. These errors constitute serious flaws which resulted in a minimal
12 amount of battery storage in the Carbon Plan in the near term.

13 The Companies’ proposed conversion from natural gas to “green hydrogen” is
14 highly speculative and not supported by the evidence. The Companies propose a
15 tremendous build-out of natural gas capacity—specifically, 800 MW to 2,400 MW of CCs
16 and 6,400 MW to 10,900 MW of CTs. It would be impossible for the Companies to achieve
17 carbon neutrality by 2050 with this substantial reliance upon natural gas. To overcome this
18 problem, the Companies argue that their natural gas fleet can be converted to 100% green
19 hydrogen. However, the Companies acknowledge such a green hydrogen conversion is an
20 unproven prospect, pointing to “significant uncertainties” in the future supply of green
21 hydrogen. Even gas turbine manufacturers, based on the high cost of green hydrogen
22 production, forecast that green hydrogen will only be used sparingly in gas turbines located
23 in geographic regions with high power costs. *See* pp. 41-42 of direct testimony. The

1 Companies are projecting only 5 percent of the heat content in its blended natural gas fuel
2 will be provided by hydrogen in 2041.

3 I also testified that the Companies' natural gas price projections are erroneous.
4 Natural gas prices are currently quite volatile, with the May 2022 Henry Hub price over \$8
5 per million Btu. Yet the Companies' proposed Carbon Plan assumes a low base price for
6 natural gas, under \$4/MMBtu through 2032 rising to \$5/MMBtu in 2050. This projection
7 is at odds with the facts.

8 Regarding the Near-Term Development Activity issue, I testified that small
9 modular reactors ("SMR") are an unproven option without any history of success in the
10 power industry. There are currently no operational SMRs in the United States, and all
11 efforts to develop an operational SMR have resulted in both cost overruns and delays.
12 Furthermore, there are several additional problems with nuclear technology in general,
13 including how to safely manage spent fuel and other waste streams for generations to come.

14 I also provided testimony on the Transmission Planning, Proactive Transmission
15 and RZEP issue. The Companies claim that building large-scale solar in the "Red Zone"
16 would be the least-cost solar energy alternative. This is not correct. These transmission
17 upgrade costs reflect project developer preference to locate these projects in transmission-
18 limited rural areas where land costs are low. The Companies imply that this is sufficient
19 reason (*i.e.*, solar developer preference) for the proposed extremely extensive Red Zone
20 Expansion Plan (RZEP). To the contrary, reliance on wholesale rooftop and parking lot
21 solar plus storage in the Carbon Plan would largely eliminate transmission upgrades that
22 would otherwise be necessary to interconnect utility-scale solar proposed in areas of the
23 state with inadequate transmission capacity. Indeed, there are far less transmission cost

1 impacts with smaller (< 5 MW) arrays connected at the distribution level, where, according
2 to the Companies, over 95 percent of North Carolina's 4,350 MW of solar has been
3 interconnected to date. *See* p. 50 of direct testimony. In my direct testimony, I explain why
4 there is sufficient distribution level wholesale solar potential in or near demand centers to
5 prioritize this solar resource.

6 Finally, my direct testimony discussed the Companies' inadequate commitment to
7 EE/DSM and the "Grid Edge" program. Throughout the Companies' proposed Carbon
8 Plan, the Grid Edge program is given first priority. Yet, by way of example, the Companies'
9 growth projection for Net Energy Metering (NEM) has substantially declined between the
10 2020 Integrated Resource Plan proceeding and the present proceeding. This contradicts the
11 "first priority" categorization of NEM, and may be partly driven by the Companies' less
12 favorable (to NEM customers) proposed NEM tariffs in the Commission's Docket No. E-
13 100 Sub 180. The Companies should be ordered to place greater priority on EE/DSM and
14 the Grid Edge program.

15 This completes the summary of my direct testimony. I appreciate the Commission's
16 consideration of these important issues.