

**STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH**

DOCKET NO. E-100, SUB 190

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of)	DIRECT TESTIMONY OF
Biennial Consolidated Carbon Plan and)	KENDAL C. BOWMAN ON
Integrated Resource Plans of Duke Energy)	BEHALF OF DUKE ENERGY
Carolinas, LLC, and Duke Energy Progress,)	CAROLINAS, LLC AND DUKE
LLC, Pursuant to N.C.G.S. § 62-110.9 and)	ENERGY PROGRESS, LLC
§ 62-110.1(c))	

I. INTRODUCTION AND OVERVIEW

Q. MS. BOWMAN, PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND POSITION WITH DUKE ENERGY CORPORATION.

A. My name is Kendal C. Bowman, and my business address is 410 South Wilmington Street, Raleigh, North Carolina, 27601. I am the North Carolina President for Duke Energy Carolinas, LLC (“DEC”) and Duke Energy Progress, LLC (“DEP”) and together with DEC, “Duke Energy” or the “Companies”).

Q. PLEASE BRIEFLY SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL QUALIFICATIONS.

A. I have a Bachelor of Science in Psychology from the University of Virginia and a Juris Doctor from Stetson University College of Law.

Q. PLEASE DESCRIBE YOUR BUSINESS BACKGROUND AND EXPERIENCE.

A. I began my professional work experience in 1997 as an attorney for Florida Power & Light Company as an associate general counsel. In 1999, I joined Carolina Power & Light Company as an associate general counsel. Shortly after I joined Carolina Power & Light Company, it merged with Florida Power Corporation and became Progress Energy. After the close of that merger, I was Progress Energy’s attorney for Federal Energy Regulatory Commission (“FERC”) matters for all regulated utilities and our unregulated merchant generation operations. Upon Progress Energy’s exit from the unregulated merchant generation business in the early 2000s, I led Progress Energy’s legal

1 federal regulatory affairs group and was responsible for FERC legal, policy, and
2 compliance matters for Progress Energy Carolinas and Progress Energy Florida.
3 In 2010, I transitioned from FERC work to state regulatory legal work for
4 Progress Energy Carolinas in both North Carolina and South Carolina.
5 Following the merger between Duke Energy and Progress Energy, I became
6 Deputy General Counsel supporting all legal state regulatory functions for
7 North Carolina. In February 2013, I was named Vice President of Regulatory
8 Affairs and Policy where I was responsible for managing North Carolina regulatory
9 matters and directing North Carolina energy policy for DEC and DEP. I started my
10 current position at the beginning of this year.

11 **Q. WHAT ARE YOUR RESPONSIBILITIES IN YOUR CURRENT**
12 **POSITION?**

13 A. I lead Duke Energy's regulated electric utility businesses in North Carolina, which
14 serves approximately 3.7 million retail customers in DEP and DEC. I am
15 responsible for the performance of the Company's regulated electric utilities in
16 North Carolina and managing regulatory affairs, rates and regulatory filings, state
17 and local government affairs, and community relations.

18 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?**

19 A. Yes. I testified before this Commission in DEC's and DEP's 2014 and 2016
20 avoided cost proceedings (Docket Nos. E-100, Sub 140 and E-100, Sub 148),
21 in the initial 2022 Carbon Plan proceeding in Docket No. E-100, Sub 179, and
22 most recently in DEP's and DEC's Performance-Based Regulation Application
23 proceedings in Docket Nos. E-2, Sub 1300 and E-7, Sub 1276.

1 **Q. ARE YOU SPONSORING ANY EXHIBITS?**

2 A. Yes. I am sponsoring two exhibits in support of the Companies' proposed 2023–
3 2024 Carbon Plan and Integrated Resource Plan (“CPIRP” or the “Plan”).
4 Bowman Exhibit 1 presents the Companies' Requests for Relief from the
5 Verified Petition for Commission approval of the CPIRP, as recently filed with
6 the Commission on August 17, 2023. Bowman Exhibit 2 presents the
7 Companies' updated CPIRP near-term action plan (“NTAP”) for execution in
8 the 2023–2026 near-term period, as presented in Chapter 4 (Execution Plan)
9 Table 4-2 to the Plan.

10 **Q. PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY.**

11 A. The CPIRP presents the Companies' long-term integrated resource plan (“IRP”)
12 and near-term actions for execution that will provide for the continuation of
13 reliable service to meet the growing electricity needs of the Companies'
14 customers and satisfy the carbon emission reduction targets and energy
15 transition objectives of N.C.G.S. § 62-110.9 and Session Law 2021-165 (“HB
16 951”). The CPIRP reflects the dual-state utility systems and operations serving
17 both retail and wholesale customers across North Carolina and South Carolina
18 and is titled and sometimes referred to as the 2023 “Carolinas Resource Plan.”
19 Building on the 2022 Carbon Plan, the CPIRP advances an “all of the above”
20 strategy built around a significant deployment of increasingly clean resources
21 to meet the growing energy needs of the Carolinas, while also maintaining or
22 improving reliability and prioritizing affordability for customers.

1 As explained in Chapter 1 (Changing Energy Landscape) to the Plan,
2 the magnitude of the energy transition challenge has increased significantly
3 since the Companies developed the initial proposed Carbon Plan approximately
4 18 months ago. Over the next 15 years, annual electric use by Duke Energy
5 customers in the Carolinas is projected to grow significantly by around 35,000
6 gigawatt-hours due to several factors including economic development
7 successes, increased customer load due to vehicle electrification, and
8 population growth. Meeting the energy and capacity needs created by
9 increasing electricity demand while reliably retiring and replacing
10 approximately 8,400 MW of coal unit capacity at the Companies' remaining 15
11 coal units in North Carolina by 2035 will require decisive planning and
12 execution, as well as timely regulatory action to meet the State's policy goals.

13 To evaluate the most reasonable, least cost path towards achieving the
14 State's carbon reduction targets and reliably executing the Commission's initial
15 Carbon Plan, the CPIRP presents three Energy Transition Pathways achieving
16 the 70% carbon emissions reduction target ("Interim Target") by 2030, 2033 or
17 2035 and three Core Portfolios within each Pathway along with numerous
18 variant and sensitivity portfolios. As described in Chapter 2 (Methodology and
19 Key Assumptions), all three Energy Transition Pathways employ similar base
20 planning assumptions, but require a different pace, scope and scale of resource
21 additions to achieve the Interim Target on the path to carbon neutrality. As
22 explained in Chapter 3 (Portfolios) and Chapter NC, the Companies are

1 recommending Pathway 3 as the most reasonable, least cost and least risk
2 pathway for determining the next reasonable steps to execute the energy
3 transition at this time through 2026.

4 To continue to transition the Carolinas fleet, the Companies have
5 developed an updated execution plan for the near-term (2023–2026) informed
6 by the coal unit retirement and resource additions needed to meet recommended
7 Core Portfolio P3 Base’s least cost path towards achieving the Interim Target
8 on the path to carbon neutrality. Chapter 4 details the Companies’ proposed
9 selection of near-term actions to meet the targets established in HB 951 and to
10 transition the system to support coal unit retirements, increased reserve margin
11 requirements, and planned load growth in the current changing energy
12 landscape. The Companies’ proposed Execution Plan retires all remaining coal
13 generation by 2035 on the path to carbon neutrality by 2050, and replaces coal
14 with a diverse mix of solar, wind, advanced nuclear, hydrogen-capable natural
15 gas, battery energy storage and pumped hydroelectric storage, as further
16 detailed in Chapter 4 to the Plan and supported by other witness panels.

17 The Companies’ Requests for Relief, which were identified in the
18 Companies’ Petition accompanying the Plan, is replicated in Bowman Exhibit
19 1 and the recommended supply-side near-term actions presented in Bowman
20 Exhibit 2 present the diverse resource additions to be “selected” by the
21 Commission in this updated Carbon Plan and represents the “reasonable steps”
22 for Commission approval to guide the Companies’ continued execution of the

1 most reasonable, least cost and least risk path to meeting the requirements of
2 HB 951.

3 **Q. PLEASE EXPLAIN HOW THIS TESTIMONY IS ORGANIZED.**

4 A. Section II of the testimony describes how the Companies structured the direct
5 testimony and sponsorship of elements of the CPIRP. Section III summarizes
6 the Companies' progress in implementing the initial Carbon Plan Order and
7 associated stakeholder activities. Section IV describes several key factors of a
8 changing energy landscape that have impacted resource planning since the
9 Commission last considered the initial proposed Carbon Plan. Finally, Section
10 V explains the development of this CPIRP in supporting the NTAP and
11 execution plan, which are designed to meet the requirements of N.C.G.S. § 62-
12 110.9(1).

13 **II. SPONSORSHIP OF THE PLAN**

14 **Q. MS. BOWMAN, PLEASE EXPLAIN HOW THE COMPANIES ARE**
15 **APPROACHING THE DIRECT TESTIMONY BEING FILED TODAY.**

16 A. Recognizing the robust IRP analysis and significant execution planning
17 information presented in the CPIRP itself, the Companies have endeavored in
18 this direct testimony phase to present panel testimony by an array of subject
19 matter experts who were responsible for developing the CPIRP and to identify
20 which areas of the Plan each witness or panel of witnesses is sponsoring. In
21 addition to myself, the Companies' direct testimony witnesses/panels include:

1

Table 1. Witness Panels Sponsoring Direct Testimony

Panel Name	Witness/ Panels	Subject Matter
Lead Witness Sponsoring CPIRP	Kendal Bowman	CPIRP Overview and Policy, Present Requests for Relief
IRP and Near-Term Actions	Glen Snider, Michael Quinto, Thomas Beatty, Ben Passty	Modeling Methodology, Support Near Term Actions
Resource Adequacy Study	Nick Wintermantel, Cole Benson	Resource Adequacy Study Methodology and Planning Reserve Margin
Reliability and Operational Resilience	Sam Holeman, Patrick O'Connor	Reliability and Operational Resilience
Dispatchable Generation and Fuel Supply	Dan Donochod, John Verderame, Peter Hoeflich	Natural Gas Assets, Fuel Supply and Security, Hydrogen
Renewables and Energy Storage	Maura Farver, Justin LaRoche, Laurel Meeks	Solar, Solar Paired with Storage, Onshore Wind, and Battery Storage
Long-lead Generation and Pumped Storage Hydro	Steven Capps, Clift Pompee, Ben Smith	Nuclear, Offshore Wind, and Bad Creek II
Transmission and Interconnection	Sammy Roberts, Jing Shi	RZEP 2.0, Solar Interconnection Limits
Grid Edge and Customer Programs	Tim Duff, Jonathan Byrd	Demand Side Management, Energy Efficiency, Rate Design
Carolinas Utility Operations	Laura Bateman, Nelson Peeler	Rate Impacts, Merger

2 The Companies' direct testimony does not restate the detailed information
3 presented in the Plan; instead, the Companies' witnesses and panels focus on
4 highlighting for the Commission key issues presented in the proposed CPIRP

1 that is now before the Commission, with a specific focus on supporting the
2 requests for relief presented in the Companies' Petition as well as how the
3 CPIRP addresses directives from the Commission's December 30, 2022 Order
4 Adopting Initial Carbon Plan and Providing Direction for Future Planning
5 issued in Docket No. E-100, Sub 179 ("Carbon Plan Order").

6 **Q. MS. BOWMAN, WHAT ASPECTS OF THE 2023–2024 CPIRP ARE YOU**
7 **SPONSORING?**

8 A. I am responsible for the Companies' Plan in its entirety as presenting the most
9 reasonable, least-cost path forward to achieve the State's carbon emission
10 reduction goals while maintaining or improving reliability and prioritizing
11 affordability for our customers, though the various Company subject matter
12 experts providing direct testimony are responsible for the detailed analysis
13 relevant to their respective subject matter. I am also specifically sponsoring
14 Chapter NC, which details how the system-wide Plan meets the requirements
15 of North Carolina law and the Commission's Carbon Plan Order. Other Panels,
16 including the IRP and Near-Term Actions Panel, also support aspects of Chapter
17 NC and other portions of the Plan.

18 **III. IMPLEMENTATION OF THE COMMISSION'S INITIAL CARBON**
19 **PLAN**

20 **Q. HOW HAVE THE COMPANIES PROGRESSED IMPLEMENTATION**
21 **OF THE COMMISSION'S INITIAL CARBON PLAN ORDER?**

22 A. On December 30, 2022, the Commission issued in its Carbon Plan Order
23 adopting the initial proposed Carbon Plan as the initial reasonable steps to











1 execute HB 951 in North Carolina. Since that time, the Companies have
2 diligently worked to both execute the directives of the Carbon Plan Order and
3 to develop the 2023–2024 CPIRP, as filed in this docket on August 17, 2023.

4 Over the past year, the Companies have issued the largest ever solar
5 procurement and first-ever solar paired with storage procurement in the
6 Carolinas, advanced plans for new hydrogen-capable natural gas generation at
7 retiring coal sites in both DEP and DEC,¹ progressed work on Red Zone
8 Expansion Plan (“RZEP”) transmission projects and developed a new set of
9 strategic transmission projects referred to in the CPIRP as “RZEP 2.0,”
10 furthered our evaluations on the feasibility of siting both onshore and offshore
11 wind and associated transmission and advanced development of Bad Creek II
12 including requesting interconnection of the project, as well as continued to plan
13 for development of advanced nuclear small modular reactors (“SMR”) in the
14 Carolinas. Table 2 below presents a comprehensive summary of the supply-side
15 and transmission-related recent developments and how the Company is
16 implementing the Carbon Plan Order.

¹ These include a 1,360-MW hydrogen-capable natural gas combined cycle (“CC”) plant at DEP’s Roxboro site in Person County, N.C., and 900 MW of dual-fuel combustion turbines (“CT”) at DEC’s Marshall Steam Station in Catawba County, N.C. The Companies are contemporaneously filing pre-CPCN material for the Person County Energy Complex CC and will file similar pre-CPCN materials for the Marshall CTs by year end 2023 with a targeted in-service date for both by the end of 2028.

1

Table 2. Supply-Side and Transmission Recent Developments²

Activities		Recent Developments
	Advance Subsequent License Renewals (“SLR”) for existing Nuclear Units	Filed Oconee’s SLR application and expect Nuclear Regulatory Commission (“NRC”) approval in 2024. Preparing Robinson Unit 2 SLR application for submittal to NRC in 2025.
	Launch Early Site Permit (“ESP”) Activities	Pursuing advanced nuclear site options and preparing initial ESP for preferred Site 1. Evaluating reactor technologies.
	Solar and SPS Procurements	2022 Solar Procurement completed procuring 964.7 MW and seeking PSCSC approval of same. 2023 Solar and SPS Request for Proposals (“RFP”) issued August 2023 to procure 1,435 MW solar (approximately 700 MW of which would be paired with 260 MW battery storage).
	Onshore Wind Stakeholder Engagement and Site Assessment	Completed initial onshore wind siting analysis. Completed initial stakeholder engagement with onshore wind developers, including market intelligence RFI — additional engagement is ongoing.
	Offshore Wind Energy Areas (“WEA”) Evaluation	Completed the Offshore Wind Energy Area comparative evaluation.
	Red Zone Expansion Projects (“RZEP”)	All 14 RZEP 1.0 projects are underway — 13 projects planned to be in-service by end of 2026 with the final remaining project in service in 2027.
	Gas Generation	Generator Replacement Requests (“GRRs”) for DEP Person County (Roxboro) Combined Cycle (“CC”) (1,360 MW) and DEC Marshall Combustion Turbines (“CTs”) (900 MW) submitted in March 2023. Interconnection requests for additional capacity beyond GRR submitted in June 2023. The Companies plan to file pre-Certificate of Public Convenience and Necessity (“CPCN”) applications with the North Carolina Utilities Commission (“NCUC”) before year-end 2023. The Companies also intend to make informational filings with PSCSC.
	Hydrogen	Submitted U.S. Department of Energy (“DOE”) application for Southeast Regional Hydrogen Hub. Developing clean hydrogen studies and demonstration projects.
	Pumped Storage Hydro Development	Bad Creek II (1,680 MW) interconnection request progressing in DEC 2022 Definitive Interconnection System Impact Study (“DISIS”) Process. RFP for major equipment issued.
	Battery Development	Interconnection Requests for 800 MW of standalone storage projects entered 2022 (300 MW) and 2023 (500 MW) DISIS Process.

² CPIRP Chapter 4 at 6 (Table 4-1).

1 The Companies continue to work with stakeholders to expand both
2 demand-side management and energy efficiency (“DSM/EE”) initiatives to
3 “shrink the challenge,” including updates to the DSM/EE Cost Recovery
4 Mechanism and a proposal to streamline the regulatory process for
5 non-DSM/EE programs that will help to reduce or manage load, referred to as
6 “rapid prototyping” in the Carbon Plan.³ Figure 4-3 in Chapter 4 gives an update
7 on recent Grid Edge and Customer Program activities at both the Commission
8 and the Public Service Commission of South Carolina (“PSCSC”) and further
9 discussion can be found in Appendix H (Grid Edge and Customer Programs) as
10 supported by the testimony of the Grid Edge Panel.

11 The Companies have also been putting plans in place to pursue a merger
12 of DEC and DEP into one operating utility company that will deliver customer
13 benefits and is the best path to fully consolidate system operations to support
14 an efficient and orderly energy transition. The ongoing merger benefits study
15 and timeline for implementation of the merger are detailed in Chapter 4,
16 Chapter NC, and supported by the Carolinas Utility Operations Panel’s
17 testimony. Additionally, to address concerns regarding rate disparity in the short
18 term raised in the initial 2022 Carbon Plan proceeding, the Companies and the
19 Public Staff entered into a stipulation in the most recent rate cases to address

³ The Companies plan to file a rapid prototyping proposal that was developed following a robust stakeholder engagement effort with the Commission in the third quarter of 2023.

1 transmission costs associated with net energy transfers between DEP and DEC
2 in North Carolina under the Joint Dispatch Agreement.⁴

3 In addition to providing a comprehensive “CPIRP Update” in Chapter
4 NC of the Plan, the Companies have also provided Appendix N (Cross
5 Reference) which addresses how the Plan meets the Commission’s directives in
6 the Carbon Plan Order as well as the requirements of the proposed CPIRP Rule
7 R8-60A before the Commission in Docket No. E-100, Sub 191.

8 **Q. PLEASE DESCRIBE THE COMPANIES’ STAKEHOLDER**
9 **ENGAGEMENT EFFORTS IN DEVELOPING THE CPIRP.**

10 A. Starting in February of this year, the Companies began a stakeholder
11 engagement process to support development of the system-wide Carolinas
12 Resource Plan.⁵ Over the course of four months, the Companies held five
13 engagement meetings on technical, complex issues involving resource
14 planning, including load forecasting, solar, solar plus storage, natural gas price
15 forecast methodology, coal retirements modeling, resource adequacy and the
16 assumptions to integrate the benefits of the Inflation Reduction Act of 2022
17 (“IRA”), among others. In response to feedback from previous stakeholder
18 sessions, and to better facilitate constructive discussion on complex and

⁴ The Transmission and Cost Allocation Agreement and Stipulation of Settlement was approved by the Commission in the DEP rate case in Order Accepting Stipulations, Granting Partial Rate Increase, and Requiring Public Notice issued on August 18, 2023 in Docket E-2, Sub 1300 but is still pending in the DEC rate case in Docket No. E-7, Sub 1276.

⁵ The Companies’ notices of stakeholder meetings and topics to be covered were filed in Docket No. E-100, Sub 190S.

technical topics, participants from varying backgrounds were given the opportunity to identify themselves as Technical Representatives in the engagement sessions. In each of these sessions, Duke Energy subject matter experts and the Technical Representatives presented their perspectives to a diverse group of attendees that included customers, environmental advocates, community leaders, solar developers and other industry representatives. Participants not designated as Technical Representatives engaged in the process by submitting questions that were addressed in real time by the Companies' subject matter experts and the Technical Representatives. Figure 1 below summarizes the attendance and topics covered at each of the five pre-filing stakeholder meetings as further discussed in Appendix A (Stakeholder Engagement).

Figure 1. Technical Stakeholder Meetings, Topics and Participation⁶



⁶ CPIRP Appendix A at 2 (Figure A-1).

1 **Q. PLEASE SPECIFICALLY DESCRIBE THE COMPANIES’**
2 **ENGAGEMENT EFFORTS WITH FRONTLINE COMMUNITIES AND**
3 **FOCUS ON ENVIRONMENTAL JUSTICE CONSIDERATIONS.**

4 A. The Companies agree with the Commission that “[s]uccessful execution of the
5 Carbon Plan requires engagement by Duke on issues related to environmental
6 justice and with frontline communities.”⁷ As discussed in more detail in Chapter
7 NC, starting in 2022, the Companies organized meetings with interested
8 stakeholders on environmental justice issues, with a specific focus on low-
9 income and communities of color, to understand the issues that were important
10 to them. In response to input from the interested stakeholders, the Companies
11 developed regional advisory councils to address the need for and to guide local
12 engagement. The Companies also hosted more broadly focused statewide
13 environmental justice council meetings in June and July 2023. The Companies
14 will use feedback from these stakeholders to build engagement plans. These
15 engagement plans will incorporate demographic, socio-economic and existing
16 U.S. Environmental Protection Agency (“EPA”)-permitted facility data from
17 various third-party environmental justice tracking tools that help to identify
18 communities impacted from project activities, including the EPA
19 Environmental Justice Screen, Centers for Disease Control and Prevention
20 Social Vulnerability Index, the White House Council on Environmental Quality

⁷ Carbon Plan Order at 42.

1 Climate and Economic Justice Screening Tool and the U.S. Department of
2 Energy, Energy Justice Mapping Tool.

3 **Q. HOW HAVE THE COMPANIES ENGAGED WITH IMPACTED**
4 **COMMUNITIES AT RETIRING COAL SITES?**

5 A. Consistent with the 2022 Carbon Plan Order, the Companies are moving
6 forward with planning and regulatory approvals to construct DEP Roxboro
7 (“CC”) in Person County (1,360 MW) and DEC Marshall Combustion Turbines
8 (“CT”) in Catawba County (900 MW). The Companies plan to file pre- CPCN
9 application for the Person County Energy Complex contemporaneous with this
10 testimony and the Marshall CTs before year end 2023. The Companies have
11 engaged extensively with community leaders and the existing workforce. Initial
12 feedback has been very supportive of new planned investment at the sites.

13 Duke Energy also announced plans to initiate an Early Site Permit
14 Application for new advanced nuclear at Belews Creek Station in Stokes
15 County, NC. Similar to Person County, the Companies received positive
16 feedback from our initial outreach to community leaders but fully understand
17 that this is a multi-year evaluation of the site and will require us to engage
18 regularly with community leaders and plant neighbors to assist with any
19 questions and concerns they may have.

20 **IV. PLANNING IN THE CURRENT CHANGING ENERGY LANDSCAPE**

21 **Q. THE CPIRP HIGHLIGHTS HOW THE COMPANIES ARE PLANNING**
22 **TO PROGRESS THE CAROLINAS ENERGY TRANSITION IN THE**

1 **CURRENT “CHANGING ENERGY LANDSCAPE.” PLEASE**
2 **FURTHER ELABORATE ON THE CONCEPT.**

3 A. The “changing energy landscape” refers to the energy transition underway, in
4 North Carolina and also across the country, and recognizes recent developments
5 that are accelerating the transition, including state and federal policy, risk
6 mitigation, technology advancements, and consumer trends. The changing
7 energy landscape also highlights the new or increasing challenges to bringing
8 on sufficient, diverse generation resources to meet the transition including
9 significant projected load growth due to economic development, population
10 growth and transportation electrification, as well as inflation and supply chain
11 challenges that may be exacerbated by the global energy transition.

12 As more fully explained in Chapter 1 to the Plan and by the IRP and
13 Near-Term Actions Panel, in the brief time since development of the
14 Companies’ initial proposed Carbon Plan in early 2022, the energy landscape
15 has materially shifted and changed the planning assumptions informing this
16 year’s resource plan. The primary factors contributing to the changes from last
17 year’s plan are the increasing projected energy demand and higher levels of
18 resource adequacy needed to ensure that system reliability is maintained or
19 improved considering recent challenges and threats to the grid from extreme
20 weather and the increasing amount of dispatchable energy being retired in the
21 southeast region. Those drivers and additional drivers, including a changing
22 regulatory landscape, are described in more detail in Chapter 1.

1 **Q. PLEASE FURTHER DESCRIBE HOW THE INCREASED LOAD**
2 **FORECAST IMPACTS RESOURCE PLANNING SINCE THE**
3 **COMMISSION LAST CONSIDERED THE CARBON PLAN.**

4 A. As described in Appendix D (Electric Load Forecast) to the Plan and further
5 supported by the IRP and Near-Term Actions Panel, several developments have
6 led to new forecasted electricity demand projections that are significantly
7 higher than what was modeled in the initial proposed Carbon Plan. The
8 Companies are forecasting annual energy demand increases from previous
9 forecast cycles of 8% by 2030 and 11% by 2035—translating to 19 terawatt-
10 hours of energy and an increase in non-coincident winter peak of over three
11 gigawatts of capacity needs. The Carolinas region has seen significant
12 economic development wins, the migration of new residential customers and an
13 accelerating transition to electric vehicles. While these are all positive
14 developments, and Duke Energy values the opportunity to play an important
15 role in securing this growth and serving the increasing energy needs of the
16 Carolinas region, it also creates new and evolving challenges in planning for
17 unit retirements and executing the energy transition.

18 **Q. PLEASE DESCRIBE THE CURRENT BUSINESS CLIMATE IN THE**
19 **CAROLINAS.**

20 A. The Carolinas have seen truly unprecedented economic development growth
21 since the development of the initial proposed Carbon Plan, with North Carolina

1 rated as the top State to do business the last two years in a row.⁸ Companies
2 such as Wolfspeed, VinFast and Toyota have announced new manufacturing
3 plants in North Carolina. In addition to emerging EV-related manufacturing, the
4 Carolinas are experiencing the ongoing growth in energy needs to support
5 cloud-based and artificial intelligence computing services upon which many
6 customers and businesses depend.

7 Many of our customers also have corporate sustainability goals and
8 commitments that are an important consideration for the location of their
9 operations. To continue to meet those customers' goals, the Companies have
10 proposed the new Green Source Advantage Choice Program and the Clean
11 Energy Impact Program, improving on existing programs with stakeholder
12 input, including more capacity and the option to include energy storage to allow
13 customers to time align their energy usage with clean energy.⁹ The proposed
14 programs rely on the renewables selected as part of the initial 2022 Carbon Plan
15 and the 2023–2024 CPIRP to meet customer clean energy goals in the
16 Carolinas.

17 **Q. WHAT OTHER FACTORS ARE CONTRIBUTING TO INCREASED**
18 **LOAD FORECASTS AND RESOURCE NEEDS IN THIS CPIRP?**

⁸ With a world-class workforce and a booming economy, North Carolina repeats as America's Top State for Business in 2023, CNBC (July 11, 2023), *available at* <https://www.cnbc.com/2023/07/11/north-carolina-is-top-state-for-business-led-by-workforce-economy-.html>.

⁹ Petition of Duke Energy Progress, LLC, and Duke Energy Carolinas, LLC, Requesting Approval of Green Source Advantage Choice Program and Rider GSAC, Docket Nos. E-2, Sub 1314; E-7, Sub 1289 (Jan. 27, 2023); Petition of Duke Energy Progress, LLC, and Duke Energy Carolinas, LLC, Requesting Approval of Clean Energy Impact Program, Docket Nos. E-2, Sub 1315; E-7, Sub 1288 (Jan. 27, 2023).

1 A. In addition to load growth from economic development, the Companies have
2 also revised their load forecast due to anticipated adoption of electric vehicles
3 over the planning horizon. Electric vehicle adoption is growing and expected to
4 continue to grow due to federal and state incentives, automaker commitments
5 to increase EV sales and more vehicles coming available. Further discussion of
6 how the Companies developed the EV load forecast is discussed in Appendix
7 D and is sponsored by the IRP and Near-Term Actions Panel.

8 Extreme cold weather events and recent outage events during Winter
9 Storm Elliott in December 2022 placed a heightened focus on resource
10 adequacy and reliability across the region. For this Plan, the Companies
11 commissioned Astrapè Consulting to perform an updated analysis of the
12 Companies' physical reliability needs in the 2023 Resource Adequacy Study
13 (Attachment I). The testimony of the Resource Adequacy Panel and the
14 Reliability and Operational Resilience Panel support increasing the Companies'
15 joint planning reserve margin to 22% as a reasonable and necessary step in the
16 planning process to ensure sufficient energy and capacity is available to reliably
17 serve customers' needs at all times.

18 **Q. HOW ARE THE COMPANIES INCORPORATING THE IRA AND THE**
19 **IIJA INTO THE PLAN?**

20 A. Recent significant federal legislation, including IRA and the Infrastructure
21 Investment and Jobs Act of 2021 ("IIJA") are helping reshape the energy
22 landscape and incentivizing the buildout of clean energy resources in our region

1 and across the country. The Plan's modeling incorporates IRA tax credits for
2 solar, wind, nuclear, pumped storage hydro and hydrogen to help deliver these
3 technologies to customers at a lower cost, as described in Chapter 2.

4 Additionally, the Companies are pursuing federal funds under the IIJA
5 and have submitted applications to the Department of Energy ("DOE") that
6 support grid resilience, the development of a regional hydrogen hub in the
7 southeast, long duration energy storage and hydroelectric production incentives
8 that could be used at the Bad Creek pumped hydro station. The Companies will
9 also be exploring the potential to leverage federal loans in the near term
10 pursuant to the IRA for potential CPIRP investments.

11 Duke Energy Progress also partnered with the Department of
12 Environmental Quality's State Energy Office to submit an application for
13 funding under the IIJA for onshore transmission infrastructure investments that
14 will support offshore wind as well solar and potential new onshore wind
15 consistent with the Carbon Plan Order directive to pursue such funding.¹⁰ The
16 State Energy Office submitted the Application in May, 2023 and the Companies
17 anticipate a decision from the DOE by the end of the year. The Companies will
18 continue to pursue opportunities to apply for or partner with agencies to
19 leverage federal funding to reduce the costs of the energy transition for
20 customers.

¹⁰ Carbon Plan Order at 103 ("the Commission directs Duke to investigate and pursue any federal funding that is available, through the IIJA or the IRA or any subsequent legislation, for offshore wind facilities and associated infrastructure.").

Regarding federal energy efficiency efforts under the IRA, the Companies responded to a DOE Request for Information on March 3 regarding EE rebates stemming from the IRA in order to share ideas for making future programs as efficient and effective as possible. The Companies are taking proactive steps to identify opportunities for customers to make the most of this historic opportunity to support the clean energy economy by helping customers to invest in energy efficiency and will continue to offer collaboration to the State Energy Office as it develops its program designs. The State Energy Office is also applying for a \$400 million IRA grant through the Solar for All Competition. The Companies have been involved in conversations about how to more effectively leverage this grant to serve low-income households and disadvantaged communities in the State.

V. OVERVIEW OF DEVELOPMENT OF THE CPIRP AND NTAP

Q. PLEASE DESCRIBE THE CORE OBJECTIVES AND ANALYSIS THAT GUIDED THE COMPANIES' PLANNING FRAMEWORK AND RECOMMENDED PLAN FOR EXECUTION.

A. As further described by the IRP and Near-Term Actions Panel and detailed in the Plan, the Companies developed three core portfolios within three Energy Transition Pathways designed to achieve the Interim Target in 2030, 2033, and 2035, respectively, with all pathways designed to achieve carbon neutrality by 2050. All three Pathways show an increase in overall resource needs relative to the initial Carbon Plan to meet the more significant load growth as described

1 above and further detailed in the Plan and propose to replace the retiring coal
2 fleet with a diverse mix of solar, wind, advanced nuclear, hydrogen-capable
3 natural gas, and battery and pumped hydroelectric storage.

4 As explained in the CPIRP Chapter 3 and supported by the testimony of
5 the IRP and Near-Term Actions Panel, the Companies evaluated the three core
6 portfolios (P1 Base, P2 Base, and P3 Base) against the following planning
7 objectives to achieve an orderly energy transition: maintain or improve
8 reliability, compliance with laws and regulations, least cost planning and
9 affordability, increasingly clean resource mix, resource diversity and
10 accounting for executability and foreseeable conditions. Informed by robust
11 modeling and detailed comparative analysis, the Companies have determined
12 that the most reasonable, least cost, and least risk pathway aligns with
13 recommended Core Portfolio P3 Base. Accordingly, the Companies have
14 designed our updated NTAP, with the resources proposed to be “selected” and
15 approved by the Commission to be generally consistent with the resources
16 planned in that portfolio. As explained in Chapter 3 and Chapter NC and
17 supported by the IRP and Near-Term Actions Panel, Pathway 1 which achieves
18 compliance by 2030 is unattainable while Pathway 2 requires an aggressive and
19 ambitious timeline for resource additions that will incur excessive execution
20 risk and is not the least cost path to compliance.

21 The recommended pathway sets an ambitious path to meet the Interim
22 Target by 2035, an aggressive but reasonable pace of resource additions, and is

1 the least cost path to compliance. By planning for a 2035 Interim Target
2 compliance date, Pathway 3 provides an opportunity for advanced nuclear
3 resources to assist in reaching the Interim Target. The projected coal unit
4 retirement dates are similar between Pathways 2 and 3, with only Roxboro 3
5 and 4 differing by one year between the two pathways. Pathway 3 also keeps
6 the Companies squarely on the path towards achieving carbon neutrality by
7 2050, as further described in Chapter NC.

8 **Q. HOW DOES THE PLAN ENSURE THAT RELIABILITY IS**
9 **MAINTAINED OR IMPROVED?**

10 A. In its Carbon Plan Order, the Commission concluded that “ensuring system
11 reliability and compliance with mandatory reliability standards in the face of
12 the ongoing energy transition is a requirement of state law, is an obligation
13 uniquely held by Duke and overseen by this Commission, and is nonnegotiable
14 for the continued health and well-being of all North Carolinians.”¹¹ The
15 Companies agree with the Commission and thus a core objective of our
16 portfolio evaluation was to ensure that reliability is maintained or improved.

17 To ensure ongoing reliability, the Companies again performed a
18 reliability verification step in the CPIRP modeling process to ensure sufficient
19 resources are available to reliably serve system needs in all hours, as further
20 discussed by the IRP and Near-Term Actions Panel, Chapter 2, and Appendix C
21 (Quantitative Analysis) to the Plan. The Companies are also taking a “replace

¹¹ Carbon Plan Order at 56.

1 before retire” approach to execution planning that ensures reliable, dispatchable
2 capacity is in place and operational before aging generating capacity is retired
3 — this is particularly important in light of the growth and increased electric
4 demand in the Carolinas and new challenges and threats to reliability in the face
5 of extreme weather and increasing amounts of variable energy resources being
6 added to the system over the planning horizon. A more in-depth discussion of
7 the measures the Companies are taking to ensure reliability is maintained or
8 improved can be found in Appendix M (Reliability and Operational Resilience)
9 and the testimony of the Reliability and Operational Resilience Panel.

10 The Commission also directed in the Carbon Plan Order that the
11 Companies integrate transmission planning into resource planning to ensure
12 reliability is maintained or improved.¹² Notably, the resource additions of all
13 the Pathways will require extensive network upgrades, and at some point, new
14 greenfield transmission. The number of outages required to bring new resources
15 online and how transmission planning and project execution is correlated with
16 reliability of the grid is discussed in depth in Appendix L (Transmission
17 Planning and Grid Transformation) as supported by the testimony of the
18 Transmission and Interconnection Panel.

19 **Q. HOW IS THE RECOMMENDED PATHWAY AND PORTFOLIO**
20 **MEETING THE LEAST COST REQUIREMENTS OF BOTH HOUSE**
21 **BILL 951 AND THE CARBON PLAN ORDER?**

¹² Carbon Plan Order at 121.

1 A. Building on the initial proposed Carbon Plan, the Companies are expanding
2 energy efficiency and demand response options to continue to “shrink the
3 challenge” of the energy transition and offer customers tools to better manage
4 their electric energy usage and bills, while helping to meet load growth and
5 emissions reductions of the system. The Plan also leverages new investment
6 grants and tax credits resulting from major recent federal legislation to bring
7 down the costs of projects and resources.

8 The near-term actions associated with the recommended portfolio are
9 the most reasonable, least cost path to compliance with the Interim Target. In
10 evaluating the recommended portfolio, the Companies considered both
11 cumulative long-term costs expressed in present value terms (“PVRR”) and
12 forecasted customer bill impacts. The pace of the transition in each Pathway
13 plays a critical role in the immediate cost to consumers in the form of bill
14 impacts, with Pathway 1 requiring more resources sooner, impacting both the
15 cost of the resources and the rate at which rates would increase on average. As
16 described by the IRP and Near-Term Actions Panel and presented in Chapter 3
17 of the Plan, the Companies project that the PVRR for Pathway 2 to be
18 approximately \$4 billion greater by 2038 and \$5 billion greater by 2050 than
19 Pathway 3, in part due to addition of offshore wind and more standalone battery
20 storage in the early 2030s.

1 **Q. PLEASE FURTHER DESCRIBE THE COMPANIES' EFFORTS TO**
2 **ENSURE RELIABILITY, AFFORDABILITY AND CARBON**
3 **REDUCTIONS ARE ACHIEVED IN THE PROPOSED CPIRP.**

4 A. The Companies have developed over 30 portfolios as part of this 2023–2024
5 CPIRP to proactively address risks to system reliability and to prepare for the
6 various challenges ahead in meeting carbon reduction goals. In addition to the
7 3 Core Portfolios, the comprehensive analysis includes 13 Portfolio Variants,
8 10 Sensitivity Analysis Portfolios and 7 supplemental portfolios designed to
9 examine a host of factors such as changes in resource costs and availability, fuel
10 supply and cost, load, and date of achievement of the Interim Target.

11 The pace at which the transition is pursued directly affects the scope and
12 scale of required resource additions, the cost of the transition, and the execution
13 and reliability challenges associated with each Pathway. The Companies
14 recommend portfolio P3 Base, the Core Portfolio under Pathway 3, to mitigate
15 the above risks by taking a more measured pace to resource additions over the
16 next 10 years than assumed in Pathways 1 and 2 and allowing time for advanced
17 nuclear resources to contribute to meeting the Interim Target.

18 It should be noted that the recommended portfolio did not select
19 offshore wind to meet the Interim Target, but Pathway 3 does have several
20 variations in which offshore wind is selected in the early to mid-2030s. The
21 portfolio scenarios and sensitivities in which offshore wind is selected in the
22 2030s include load growing more than anticipated, lower grid edge and

1 demand-side program participation or delays in achieving in-service levels of
2 other resources. The Companies expect offshore wind will play a key role in
3 reaching carbon neutrality by 2050 and thus recommend the Commission
4 preserve optionality to select it as a resource in future CPIRP planning cycles.
5 Appendix I (Renewables and Energy Storage) as supported by the testimony of
6 the Long-lead Generation and Pumped Storage Hydro Panel discusses these
7 scenarios further and what a sooner in-service date than presented in P3 Base
8 would require with regard to regulatory actions and approvals in this and the
9 following CPIRP planning cycles.

10 VI. CONCLUSION

11 Q. PLEASE PROVIDE ANY CONCLUDING REMARKS.

12 A. Successful execution of the CPIRP will require prudent and intentional planning
13 and timely regulatory approvals to deliver the resource additions, retirements,
14 and system transformation needed to ensure that reliability is maintained or
15 improved while meeting the carbon emissions reductions goals of HB 951. The
16 proposed near-term actions presented in Bowman Exhibit 2 and Requests for
17 Relief presented in Bowman Exhibit 1 reflect all reasonable steps that the
18 Commission should approve at this time to support continued execution of the
19 CPIRP under N.C.G.S. § 62-110.9 and HB 951. Recognizing that resource
20 planning is an iterative process, the Commission will have further opportunity
21 to “check and adjust” as policies evolve, new technological developments

1 occur, and more refined information becomes available regarding the cost and
2 timelines required as the Companies execute the energy transition.

3 **Q. MS. BOWMAN, DOES THIS CONCLUDE YOUR PRE-FILED DIRECT**
4 **TESTIMONY?**

5 A. Yes.

**Verified Petition for Approval of 2023-2024 Carbon Plan and Integrated Resources
Plan of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC**

Requests for Relief

- (1) Affirm that the Companies' 2023-2024 CPIRP modeling is reasonable for planning purposes and presents a reasonable plan for achieving the State's authorized CO₂ emissions reductions targets in a manner consistent with the requirements of N.C.G.S. § 62-110.9 and prudent utility planning;
- (2) Approve near-term supply-side development and procurement activities identified above for 2024-2026 (over and above the resources selected and approved in the 2022 Carbon Plan Order¹) and take the following specific actions:
 - (a) Deem the following resources as being selected in the 2023 CPIRP, in all cases subject to the obligation to obtain a CPCN (where applicable) and require the Companies to keep the Commission apprised of material changes in assumed pricing or schedule:
 - (i) 2,700 to 3,150 MW of new controllable solar generation to be procured in RFPs conducted in 2025 and 2026 (subject to NCTPC approval of RZEP 2.0 projects), a substantial portion of which is assumed to be paired with storage;
 - (ii) 1,100 MW of battery storage (650 MW stand-alone storage, 450 MW storage paired with solar) to achieve commercial operation by 2031;
 - (iii) 1,200 MW of onshore wind to achieve commercial operation by 2033;
 - (iv) 900 MW of CTs to achieve commercial operation by 2032;
 - (v) 2,880 MW of CCs to achieve commercial operation by 2031; and
 - (vi) 1,700 MW pumped storage hydro at the Bad Creek II facility to be placed into service in 2033. (b) Approve the Companies' plans to continue development activities in 2024-2026 to support the future availability of SMRs to ensure that these breakthrough technologies are available options for the Companies' customers on the timelines identified in the Plan;
 - (b) Approve the Companies' plans to continue development activities in 2024-2026 to support the future availability of SMRs to ensure that these

¹ See Carbon Plan Order at 79 (authorizing the Companies to plan for approximately 1,200 MW of new CC and 800 MW of new CT resources); at 133 (authorizing procurement 2,350 MW of new solar resources) at 133 (authorizing development and procurement of 1,000 MW of stand-alone storage and 600 MW of paired storage).






breakthrough technologies are available options for the Companies' customers on the timelines identified in the Plan;

- (c) Make the following additional determinations with respect to the initial development activities for onshore wind, pumped storage hydro, and advanced nuclear as described in Chapter NC²:
- (i) Engaging in initial project development activities for these resources is a reasonable and prudent step in executing the updated Carbon Plan and necessary to enable execution of onshore wind and Bad Creek II as well as potential selection of SMRs in the future to be available on the timeline for achieving the Interim Target identified in the Plan;
 - (ii) The Companies are authorized to incur project development costs up to \$64.5 million for the development of three annual tranches of onshore wind through 2026 for purposes of achieving 1,200 MW in service by 2033;
 - (iii) The Companies are authorized to incur project development costs up to \$165 million for the development of pumped storage hydro from 2023 through 2026;
 - (iv) Pursuant to N.C.G.S. § 62-110.7, the Companies are authorized to incur project development costs up to \$75 million through 2024 plus an additional \$365 million through 2026 for the development of advanced nuclear resources;
 - (v) The Commission's approval of the Companies' request to incur project development costs constitutes reasonable assurance of cost recoverability in a future general rate case subject to the Commission's review of the reasonableness and prudence of specific costs incurred in such future proceeding; and
 - (vi) That in the event these long lead time resources are ultimately determined not to be necessary to achieve the energy transition and the CO2 emission reduction targets of HB 951, such project development costs will be recoverable through base rates over a period of time to be determined by the Commission at the appropriate time;
- (3) Approve proposed actions with respect to existing supply-side resources, including continued disciplined pursuit of SLRs and pursuing power uprate projects for the Companies' existing nuclear fleet as described in Appendix J as well as through the planned CC unit flexibility projects as described in Appendix K;

² See CPIRP Chapter NC, Table NC-2 (providing a reconciliation of 2022 Carbon Plan and 2023 CPIRP near-term development activities and requests for pre-approval).

- (4) Approve the Companies' updated schedule for planned coal retirements in the near- and intermediate term supported in Appendix F as reasonable for planning purposes;
- (5) Approve the Companies' plans to continue advancing Grid Edge and customer programs and engaging with stakeholders on updating the underlying determination of the utility system benefits in the Companies' approved EE/DSM Cost Recovery Mechanism;
- (6) Acknowledge the need for the RZEP 2.0 projects identified in Table L-7 of Appendix L; and
- (7) Grant such other and further relief as the Commission deems just and proper.

Bowman Exhibit 2: Chapter 4 (Execution Plan) Table 4-2

Resource	Proposed MW Amount, In-Service BOY		Activities Targeted for Completion Through 2023	Proposed Near-Term Actions 2024–2026
 Solar	6,000	2031	<ul style="list-style-type: none"> - 2022 Solar Procurement achieved 964.7 MW of new solar¹ - The in-flight 2023 procurement targeting 1,435 MW¹ of new solar (700 MW of which will be paired with 260 MW of storage). 	<ul style="list-style-type: none"> - Continue RZEP 1.0 projects and advance RZEP 2.0 projects.² - 2024: Procurement targeting 1,435 MW of solar and SPS (approximate 2028 in-service date). - 2025 and 2026: Procurements targeting approximately 2,700 MW to 3,150 MW of solar and dependent on RZEP 2.0 (approximate 2029-2030 in-service date).
 Battery Storage ³	2,700	2031	<ul style="list-style-type: none"> - Progressing development and interconnection of 1,000 MW⁴ of stand-alone battery storage. - 2023 Solar RFP targeting 260 MW SPS. 	<ul style="list-style-type: none"> - 2024 to 2026: Develop and study additional 650 MW stand-alone battery storage. - 2024 to 2026: Target procurement of 790 MW of SPS.
 Onshore Wind	1,200	2033	<ul style="list-style-type: none"> - Carolinas site screening evaluation. 	<ul style="list-style-type: none"> - Select development partner(s), perform site feasibility studies and begin activities associated with siting development for 300, 450 and 450 MW per year (for 1/2031, 1/2032 and 1/2033 in-service, respectively) of onshore wind projects.⁵ - Submit interconnection requests into 2025-2026 DISIS interconnection clusters.
 CT ⁶	1,700	2032	<ul style="list-style-type: none"> - Interconnection request, pre-CPCN for 2 CTs totaling 900 MW and identify sites and progress planning for additional CT capacity. 	<ul style="list-style-type: none"> - 2024: File CPCN for 2 Marshall Advanced CTs at 900 MW (BOY 2029 in-service), submit air permits, begin transmission build-out engineering/modifications - 2024: Evaluate siting options and submit Interconnection Study requests for 425 MW CT (BOY 2030 in-service) - 2025: File CPCN for 425 MW CT (BOY 2030 in-service) - 2026: Submit interconnection requests/GRR and CPCN for replacement 425 MW CT (BOY 2032 in-service)
 CC ⁶	4,080	2031	<ul style="list-style-type: none"> - Interconnection request, pre-CPCN for 1 CC totaling 1,360 MW. - Execute gas contracts for fuel supply. - Identify sites and progress planning for 2 additional CCs. 	<ul style="list-style-type: none"> - 2024: File CPCN for Person County Advanced CC1 at 1,360 MW (BOY 2029 in-service), submit air permits, begin transmission build-out engineering/ modifications. - 2024: Evaluate siting options and submit Interconnection Requests for 2 additional CCs (1,360 MW each; BOY 2030 & 2031 in-service). - 2025: File CPCNs for 2 CCs (1,360 MW each; BOY 2030 & 2031 in-service).

Resource	Proposed MW Amount, In-Service BOY		Activities Targeted for Completion Through 2023	Proposed Near-Term Actions 2024–2026
 Pumped Storage Hydro	1,700	2034 ⁷	<ul style="list-style-type: none"> - Entered 2022 interconnection queue. - Issued RFP for major equipment. - Prepared initial construction estimates. - Continued FERC license activities. 	<ul style="list-style-type: none"> - 2024: Sign Interconnection Agreement and begin transmission work, file SC Certificate of Environmental Compatibility and Public Convenience and Necessity (“CEPCN”), design major equipment. - 2025 and 2026: File NC Out of State CPCN, file final FERC application, prepare for construction.
 Advanced Nuclear	600	2035	<ul style="list-style-type: none"> - Evaluating advanced nuclear reactor technologies. - Developing Early Site Permit (“ESP”) for Site 1. 	<ul style="list-style-type: none"> - Site 1 – 2023 to 2026: Choose reactor technology, submit ESP, develop construction permit/license application, contract with reactor vendor, and order long-lead equipment. - Site 2 – 2025 to 2026: Develop and submit ESP, begin construction permit/license application.
 Offshore Wind	Evaluate potential resource need in Base Planning Period (2033 or later)		<ul style="list-style-type: none"> - Evaluated 3 WEAs off North Carolina coast. - Submit WEA evaluations. - Partnered with NC State Energy Office for submittal of Infrastructure Investment and Jobs Act (“IIJA”) funding application for offshore wind-enabling transmission. 	<ul style="list-style-type: none"> - Continue partnership with NC State Energy Office to pursue IIJA funding. - Actively monitor United States market and supply chain development to inform optionality. - Continue to evaluate potential earlier resource need (0 to 1,600 MW) and make recommendation on offshore wind RFP in 2025 or sooner based on the market conditions and need.

Note 1 : 2022 Solar Procurement quantity includes added MW from earlier competitive procurement of renewable energy (“CPRE”) procurements that were unawarded as of Q3 2022.

2023 Solar Procurement target includes some added volumes for terminated CPRE contracts and for 2022 Solar Procurement selected winners that declined to execute contracts.

Note 2 : RZEP 2.0 projects subject to local transmission planning process requirements. See Appendix L (Transmission System Planning and Grid Transformation).

Note 3 : Total Battery Storage amount includes a combination of stand-alone battery development and SPS amounts. Some amount of attrition is expected in development process. Annual target quantities, timing of in-service and ratio of stand-alone and SPS may be adjusted during development process.

Note 4 : Includes stand-alone storage resources currently in advanced development.

Note 5 : In order to achieve the target placed in service capacities of 300, 450, 450 MW, a multiple of each year’s target capacity will need to be sited and initial development executed. Not all sited projects are expected to be built; some projects may be terminated due to interconnection costs, permitting issues, Federal Aviation Administration (“FAA”) or military conflicts, etc. As such, the Companies would seek to site three to four times the targeted capacity.

Note 6 : The exact amounts, models, and configurations of gas-fired generation (e.g., simple cycle versus CC) chosen for Plan execution will depend on the specific needs of the system at the time of development — optimizing for multiple factors including but not limited to cost, efficiency, supplier specifications, site parameters and fuel supply. This may also include adjustments to new CT or CC project activity timing for optimization and assurance of timely commercial operation, particularly as it relates to enabling coal unit retirements.

Note 7 : Bad Creek II Pumped Storage Hydro is projected to come into service by mid-2033; for planning purposes, the modeling reflects this resource coming into all resource portfolios at beginning of year 2034.