

**STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH**

DOCKET NO. E-100, SUB 190

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of Duke Energy Progress, LLC, and Duke Energy Carolinas, LLC, 2023 Biennial Carbon Plan and Integrated Resource Plans)))))))	VERIFIED PETITION FOR APPROVAL OF 2023-2024 CARBON PLAN AND INTEGRATED RESOURCE PLANS OF DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC
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Pursuant to N.C.G.S. §§ 62-110.1(c) & 62-110.9, the North Carolina Utilities Commission's ("Commission") December 30, 2022 *Order Adopting Initial Carbon Plan and Providing Direction for Future Planning* (the "Carbon Plan Order"), and consistent with Proposed Rule R8-60A, Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP" and together with DEC, "the Companies" or "Duke Energy"), through counsel, hereby submit this Verified Petition for Approval ("Petition") of their 2023-2024 Carbon Plan and Integrated Resource Plans ("CPIRP") to the Commission.

In support of this Petition, the Companies respectfully show as follows:

I. General Information

1. DEC and DEP are engaged in the generation, transmission, distribution, and sale of electricity to the public for compensation. The Companies also sell electricity at wholesale to municipal, cooperative, and investor-owned electric utilities, and such wholesale sales are subject to the jurisdiction of the Federal Energy Regulatory Commission ("FERC"). DEC and DEP are public utilities under the laws of North Carolina and are subject to the jurisdiction of the Commission with respect to their operations in this State. The Companies are also authorized to transact business in the State of South

Carolina, and each is a public utility under the laws of that State. Accordingly, their operations are also subject to the jurisdiction of the Public Service Commission of South Carolina (“PSCSC”).

2. The Companies’ 2023 Carolinas Resource Plan being filed today constitutes the CPIRP and satisfies all requirements of Proposed Rule R8-60A. This CPIRP marks the Companies’ second Carbon Plan filing pursuant to Section I of Session Law 2021-165 (“HB 951” and codified at N.C.G.S. § 62-110.9) and reflects the further refinement and directives ordered by the Commission in its *Carbon Plan Order* as well as those contemplated in the Companies’ Proposed Rule R8-60A.

3. In light of the Companies’ dual-state utility operations and applicable triennial integrated resource planning (“IRP”) requirements in South Carolina, the 2023 Carolinas Resource Plan is also being filed with the PSCSC.¹ While the Carolinas Resource Plan presents an integrated plan to reliably serve all jurisdictions and customers, this Commission’s consideration of the CPIRP will proceed independently of the PSCSC’s statutory IRP review process.

4. The attorneys for the Companies, to whom all notice and other communications with respect to this Petition should be sent, are:

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¹ See S.C. Code Ann. § 58-37-40(A) (directing Companies, as South Carolina-regulated electric utilities, to prepare and submit an integrated resource plan every three years). By Directive Order 2022-594, the PSCSC directed the Companies to file their IRPs with the PSCSC on August 15, 2023.

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² Ms. Link will seek leave to appear *pro hac vice* in this proceeding and will file the necessary documentation pursuant to N.C.G.S. § 84-4.1.

II. Planning Requirements for the CPIRP Pursuant to N.C.G.S. §§ 62-110.1(c) & 62-110.9

5. In developing the CPIRP, the Companies must comply with North Carolina's IRP statute,³ the State's Carbon Plan requirements,⁴ and Commission rules and directives addressing both IRP and Carbon Plan requirements.⁵ More specifically, N.C.G.S. § 62-110.1(c) requires the Commission to “develop, publicize, and keep current an analysis of the long-range needs for expansion of facilities for the generation of electricity in North Carolina.”⁶ Section 62-110.9 directs the Commission to take all reasonable steps to achieve a seventy percent (70%) reduction in emissions of carbon dioxide (“CO₂”) emitted in the State from electric generating facilities owned and operated by electric public utilities from 2005 levels (the “Interim Target”) by the year 2030 and carbon neutrality by the year 2050.

6. At a high level, N.C.G.S. § 62-110.9 establishes three primary requirements, all of which must be satisfied in the Companies' proposed CPIRP and Commission-approved Carbon Plan to achieve the State's targeted CO₂ emissions reduction goals. First, the CPIRP must comply with current law and practice with respect to least-cost planning for generation.⁷ Second, any generation and resource changes adopted in the CPIRP must maintain or improve upon the adequacy and reliability of the

³ N.C.G.S. § 62-110.1(c).

⁴ *Id.* § 62-110.9.

⁵ As addressed in Attachment N (Cross Reference), the Companies' Carolinas Resource Plan complies with the provisions of their Proposed Rule R8-60A, which is pending Commission approval at the time of this filing, as well as all directives set forth in the Commission's December 30, 2022 *Carbon Plan Order*. See *generally* Docket No. E-100, Sub 191.

⁶ N.C.G.S. § 62-110.1(c).

⁷ *Id.* § 62-110.9.

existing grid.⁸ Finally, any new generation must be owned and recovered on a cost of service basis by the applicable electric public utility, except in the case of energy efficiency and demand-side management (“EE/DSM”) programs, for which existing law applies, and in the case of solar generation, which is allocated according to the percentage specified in N.C.G.S. § 62-110.9(2)(b).⁹

7. Section 62-110.9 further instructs that in developing the CPIRP, the Commission has the discretion to “determine optimal timing and generation and resource mix to achieve the least cost path to compliance.”¹⁰ In addition to this general discretion, N.C.G.S. § 62-110.9 also specifies that the Commission has discretion with respect to the Plan “in order to allow for implementation of solutions that would have a more significant and material impact on carbon reduction.”¹¹ Lastly, N.C.G.S. § 62-110.9 instructs that the Commission “shall not exceed the dates specified to achieve the authorized carbon reduction goals by more than two years, except in the event the Commission authorizes construction of a nuclear facility or wind energy facility that would require additional time for completion” or to “maintain the adequacy and reliability of the existing grid.”¹²

8. Consistent with the provisions of N.C.G.S. § 62-110.9 and the *Carbon Plan Order*, the CPIRP presents to the Commission the Companies’ initial proposed update to “review[] . . . and adjust[]” the Commission-approved Carbon Plan, presenting the next major steps in planning and executing the continued energy transition of the DEC and DEP

⁸ *Id.* § 62-110.9(1).

⁹ *Id.* § 62-110.9(2).

¹⁰ *Id.* § 62-110.9(1).

¹¹ *Id.* § 62-110.9(4).

¹² *Id.*

systems.¹³ The CPIRP also represents the Companies' current IRP analysis to plan for adequate, reliable generation and demand-side resources to meet the long-range needs of the system and to plan for probable future growth of electricity in the Carolinas.¹⁴ Accordingly, the CPIRP holistically presents the Companies' current long-range resource plan and most up-to-date execution plan to reliably transition the Companies' generating fleets, including the reasonable steps for review and approval by the Commission to achieve the Interim Target on the least cost path to carbon neutrality.

III. Duke Energy's Proposed Updated CPIRP (Carolinas Resource Plan)

A. Planning to Reliably Serve the Resource Needs of the Companies' Dual-State System

9. The Companies each operate as dual state utility systems serving both retail and wholesale customers across both North Carolina and South Carolina, and they are subject to regulatory oversight by both this Commission and the PSCSC. The *Carbon Plan Order* recognizes that the States and state regulators "have responsibility for resource adequacy, determining the generation mix, and siting of transmission, distribution, and generation facilities."¹⁵ This Commission has also previously recognized the continued importance of coordinated dual state resource planning as the Companies "for many generations have provided reliable, efficient, and affordable electricity to the residents of both states."¹⁶

¹³ *Carbon Plan Order* at 34 ("[t]he Commission interprets the provisions of N.C.G.S. § 62-110.9 to require that it review and adjust as necessary the Carbon Plan every two years.").

¹⁴ N.C.G.S. § 62-110.1(c); *see also* N.C.G.S. §62-2(3a).

¹⁵ *Carbon Plan Order* at 121, *citing, in part, Pac. Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n*, 461 U.S. 190, 205, 103 S. Ct. 1713, 75 L. Ed. 2d 752 (1983) ("Need for new power facilities, their economic feasibility, and rates and services, are areas that have been characteristically governed by the States.").

¹⁶ *Order Accepting Withdrawal of Petition for Joint Proceeding*, Docket Nos. E-2, Sub 1283 & E-7, Sub 1259 (Feb. 1, 2022).

10. The CPIRP is a single, unified quantitative resource planning analysis applicable to the Companies' dual state systems and also specifically designed to meet the planning objectives of N.C.G.S. § 62-110.9 for customers and communities in North Carolina as the Companies continue to reliably plan and execute the energy transition in accordance with North Carolina law. In addition to advancing the initial Carbon Plan approved by the Commission in 2022, the CPIRP builds on the foundation of decades of reasonable and prudent utility planning practices jointly overseen by the Commission and the PSCSC. For example, the States are aligned on achieving a single "least cost path" for North Carolina and "most reasonable and prudent" plan for South Carolina that identifies the supply-side and demand-side resources required to reliably serve customers' capacity and energy needs over the next 15-year planning horizon (2024-2038).¹⁷ Setting the executable plan for the next 15-year "Base Planning Period" meets both North Carolina and South Carolina long-term planning requirements, while also looking beyond 2038 to 2050 to demonstrate continued compliance with N.C.G.S. § 62-110.9. Accordingly, the Companies' CPIRP meets the electricity needs and resource planning requirements of both States.

11. Utilizing established and reasonably-aligned planning practices while recognizing each State's independent regulatory authority and oversight of the Companies' resource planning and operations, the proposed CPIRP assesses a range of portfolios that will facilitate continued modernization of the Companies' systems and achieve the targeted reductions of CO₂ emissions from the Companies' North Carolina-sited generating fleet

¹⁷ See S.C. Code Ann. § 58-37-40(C)(2) (directing PSCSC, in its discretion, to consider whether the utility's IRP appropriately balances seven factors, including affordability and least cost, power supply reliability, diversity of generation supply, amongst others, when determining whether the Companies' IRPs represent the most reasonable and prudent means of meeting the utility's capacity and energy needs).

through a prudent, orderly, and cost-effective energy system transition on the most reasonable, least cost path towards carbon neutrality.¹⁸

12. The CPIRP is structured similarly to the Companies' 2022 proposed Carbon Plan and additionally incorporates distinct chapters for North Carolina and South Carolina that are targeted to highlight and explain the ways in which the legal requirements and policy considerations of each state are satisfied by the Carolinas Resource Plan.¹⁹

B. Planning in a Rapidly Changing Energy Landscape

13. The CPIRP is based upon an updated "snapshot in time" that reflects numerous significant changes in the Carolinas energy landscape over past twelve to eighteen months and since the Companies developed and filed their initial proposed Carbon Plan in May 2022. These changes include, among other things, material increases to the Companies' load forecast and planning reserve margin, as well as changes to natural gas supply, technology costs, and resource availability assumptions—all of which were assessed and developed to reflect real world conditions and to plan for the future. Recent significant shifts in market conditions, reliability events impacting the Carolinas such as Winter Storm Elliot, and the rapidly growing energy demands of customers in the Carolinas have informed the Companies' assessment of the most reasonable, least cost plan to execute the energy transition.

14. As highlighted in Chapter 1 (Changing Energy Landscape), the next decade is a critical execution phase for the Companies' electric system, and the CPIRP must chart

¹⁸ *Carbon Plan Order* at 45 (recognizing that factors beyond achieving carbon emission reductions should necessarily inform the Companies planning and siting of new resources).

¹⁹ See CPIRP Appendix N (Cross Reference) identifies where the Carolinas Resource Plan addresses specific NCUC directives, requirements, and/or expectations set forth in the Companies' proposed NC Rule R8-60A and the 2022 *Carbon Plan Order*.

a course to implement a diverse set of resources sufficient to maintain or improve reliability in light of both the resources to be retired and the projected growth in load that must be served.²⁰ At the same time that load growth and reliability needs are increasing, the Companies are planning for an orderly transition out of coal-fired generation — including the orderly retirement and replacement of over 8,400 MW of coal capacity by the end of 2035 — to mitigate commodity price, transportation, and fuel security risks related to the electric utility industry’s continued exit from coal. As highlighted in the Executive Summary and described throughout the CPIRP, the cumulative impact of the changing energy landscape described above has resulted in a material increase in aggregate capacity resource needs through this Base Planning Period as compared to previous resource plans.

15. Other recent changes in the energy landscape include the passage of significant federal legislation, including the Inflation Reduction Act of 2022 (“IRA”) and the Infrastructure Investment and Jobs Act of 2021 (“IIJA”), new proposed environmental regulations, and a dynamic macro-economic and inflationary environment impacting supply chain and resource costs. Finally, the viability and timing of technology advancements along with growth in customers’ desire for more renewables and the ability to optimize energy usage, are informing planning assumptions, in addition to carefully balancing the operating characteristics of renewable energy and resources that are complementary to them.

16. In sum, these recent and rapidly-occurring changes to the energy landscape have informed the Companies’ CPIRP modeling and are shaping the most reasonable, least cost path to achieve the carbon reduction targets established in N.C.G.S. § 62-110.9 while

²⁰ See CPIRP Chapter 1 at 3.

maintaining or improving upon the reliability of the system. To meet increased demand, replace retiring resources, and continue to reliably serve customers in a least cost manner, the CPIRP demonstrates a need to accelerate the pace of execution for adding new capacity resources to the system, which is consistent with the “check and adjust” framework established by N.C.G.S. § 62-110.9.

C. Stakeholder Engagement to Develop CPIRP and Execute the CPIRP

17. In developing the CPIRP, the Companies took into account stakeholder feedback gathered as part of a coordinated North Carolina-South Carolina IRP stakeholder engagement process. Specifically, the Companies engaged with the Public Staff, technical representatives, and other interested stakeholders over a series of five pre-filing stakeholder meetings to discuss the costs, inputs, and assumptions the Companies used to model the CPIRP. The Companies considered the recommendations of all active stakeholders—including feedback received at live stakeholder meetings and written feedback—and incorporated much of it in shaping each of the portfolios included in the CPIRP.²¹

18. The Companies are also continuing to develop and execute targeted engagement plans to address the impacts of coal plant retirements on the communities they serve.²² As a result, the Companies’ stakeholder engagement plan includes targeted outreach to communities where the Companies have remaining coal facilities. Duke Energy is assisting these communities by identifying ways to mitigate the potential loss of tax base and employment due to expected coal plant retirements. In addition, Duke Energy plans to engage with communities directly impacted by large infrastructure projects,

²¹ See CPIRP Appendix A (Stakeholder Engagement).

²² See *Carbon Plan Order* at 130 (directing the Companies to continue to develop targeted engagement plans for impacted communities, to enact these plans in the near term and to report to the Commission on these plans and the ensuing engagement with stakeholders).

transmission lines and substations, and other new generation. The Companies' engagement with impacted communities includes customized strategies tailored to provide meaningful local engagement from those most impacted by a specific project.²³

D. CPIRP Pathways and Portfolios for Transitioning the Carolinas System

19. To meet the challenges and changes in the energy landscape, the Companies have developed a robust, executable CPIRP that meets the planning objectives of N.C.G.S. § 62-110.9, reflects the Companies' significant ongoing efforts to progress the near-term actions and Execution Plan activities approved in the *Carbon Plan Order*, and incorporates stakeholder feedback. The CPIRP evaluates and develops portfolios of resources that include "power generation, transmission and distribution, grid modernization, storage, energy efficiency measures, demand-side management, and the latest technological breakthroughs."²⁴ As the Companies highlighted in their initial proposed Carbon Plan, successfully executing on the continued energy transition in the Carolinas will require an all-of-the-above strategy to implement a diverse set of resources sufficient to maintain or improve reliability. To that end, the CPIRP is a robust, executable resource plan for the Carolinas that both prioritizes meeting the replacement resource needs of the system while also planning for the projected load growth the Companies must serve that has become substantially more well-defined over the past twelve to eighteen months.

20. As detailed in Chapter 2 (Methodology and Key Assumptions), the Companies' proposed CPIRP presents for the Commission's consideration three Energy Transition Pathways (achieving the Interim Target by 2030, 2033, or 2035) and three Core

²³ See CPIRP Chapter NC at 26-27 for additional details.

²⁴ N.C.G.S. § 110.9(1).

Portfolios within each Pathway along with 13 Variant Portfolios and 10 Sensitivity Portfolios to inform the prudent pace and least cost path for executing the energy transition. Each of the Pathways and Portfolios aggressively leverages demand-side and grid edge resources to shrink the challenge, requires significant near-term actions to enable the orderly retirement of the Companies' remaining coal units in North Carolina, and achieves the Interim Target in a reasonable timeframe on the least cost path to carbon neutrality. Likewise, each Pathway is designed to maintain or improve upon the reliability of the grid and to comply with mandatory North American Electric Reliability Corporation ("NERC") reliability standards.

21. Importantly, all three Energy Transition Pathways employ similar base assumptions, but require a different pace, scope and scale of resource additions to achieve the Interim Target. As described in Chapter 3 (Portfolios) and Chapter NC, at this snapshot in time, the Companies recommend Pathway 3 as the most reasonable, least cost, and least risk pathway to inform the near-term reasonable steps required to progress the reliable and orderly transition of the Carolinas system.²⁵ While still requiring an aggressive level of resource additions, Pathway 3 selects a balanced pace of new resource additions, including the addition of breakthrough advanced nuclear in the mid-2030s,²⁶ with lower execution risk.

²⁵ The limited purposes of "recommending" Portfolio 3 under the N.C.G.S. § 62-110.9 framework is to set a clear "reference portfolio" as that term is used in proposed Rule R8-60A for other longer-term resource planning purposes and uses beyond the CPIRP. As recognized in the *Carbon Plan Order*, N.C.G.S. § 62-110.9 does not require the Commission to pick a portfolio. Instead, the Commission is tasked with continuing to determine the reasonable steps required to execute the Carbon Plan and to achieve the Interim Target on the path to carbon neutrality. See *Carbon Plan Order* at 19, 25.

²⁶ As discussed in CPIRP Chapter 3, Chapter 4, and Chapter NC, Pathway 3 relies upon the addition of two advanced nuclear small modular reactors ("SMRs") that are planned to achieve commercial operation by the beginning of 2035 to achieve the Interim Target. These breakthrough nuclear technologies are not anticipated to be available for deployment by the Companies until the mid-2030s, and N.C.G.S. § 62-110.9 provides the

22. The Companies have included Pathway 1 and modeled a P1 Core Portfolio to assess the feasibility, cost, and risk of seeking to achieve the Interim Target by 2030. This analysis demonstrates that the recent significant load growth, increased resource adequacy needs and other recent changes to the Carolinas energy landscape have materially increased the magnitude of the energy transition challenge to the point where 2030 is no longer attainable.²⁷ As compared to Pathway 3, the Companies' experts have determined that Pathway 1 requires an infeasible level of resource additions and transmission upgrades to meet the Interim Target by 2030. Specifically, Pathway 1 would require the Companies to site, permit, construct, and interconnect by 2030 twice as many projects as Pathways 2 and 3 and nearly 28,000 MW of nameplate resources by 2033—the equivalent of interconnecting 64% of the megawatts on the Companies' current combined system over the next decade. As discussed in Chapter 3 and Chapter NC, as a result of the changing energy landscape and other factors, Pathway 1 is unattainable at this time and would potentially negatively impact the Companies' ability to maintain the reliability of the grid.²⁸

23. Pathway 2 would meet the Interim Target by 2033 but likewise requires an increased and concentrated level of major project development activity as compared to Pathway 3, with Core Portfolio P2 Base adding over 4,200 MW more than P3 Base through 2033. This increased and concentrated level of project development activity to accomplish Pathway 2—particularly executing the addition of 1,600 MW of offshore wind and accelerated battery energy storage additions totaling over 5,000 MW by 2033—would be

Commission discretion to adjust the timing of achieving the Interim Target where it authorizes construction of a nuclear facility or wind energy facility that would require additional time for completion. The Companies plan to seek Commission authorization to construct these SMRs in the intermediate term, beyond 2026. N.C.G.S. § 62-110.9(4).

²⁷ See CPIRP Chapter NC at 8-9.

²⁸ See *id.* at 11.

highly challenging considering siting, permitting, and construction needs for both the resources and related transmission. These challenges include, but are not limited to, constraints in global supply chains, local labor availability, and required regulatory approvals and permitting activities. Pathway 2 is also significantly more expensive to execute than Pathway 3 and would cost the Companies' customers an additional \$4 billion by 2038 and \$5 billion by 2050.

24. Pathway 3 achieves compliance with the Interim Target in 2035 at a lower cost and lower execution risk, while nevertheless requiring unprecedented project development activity. Pathway 3 also keeps the Companies squarely on the path towards achieving carbon neutrality by 2050.²⁹ Moreover, the carbon reduction trajectories of all Pathways converge in the late 2030s (Pathway 2) and early 2040s (Pathway 1), and all Pathways achieve carbon neutrality by 2050. For all of these reasons, the Companies believe Pathway 3 pursues all reasonable steps on the least cost path to achieving the Interim Target and carbon neutrality, and the Companies support pursuing near-term actions that align with Pathway 3 as the most reasonable, least cost, least risk plan to reliably transition the system and prudently plan for the needs of their customers at this time.

25. In sum, the CPIRP and the Companies' underlying modeling presents a reasonable plan that complies with current law and practice with respect to the least cost planning for generation and appropriately achieves the objectives and CO₂ emissions reduction targets in N.C.G.S. § 62-110.9.

²⁹ See *id.* at 9.

IV. Proposed New Near-Term Supply-Side Development and Procurement Activities for Selection in the CPIRP

26. The Commission’s *Carbon Plan Order* approved a series of near-term actions as the initial “reasonable steps” that the Companies were authorized to pursue to achieve the planning objectives of N.C.G.S. § 62-110.9.³⁰ Both N.C.G.S. § 62-110.9 and the *Carbon Plan Order* contemplate the CPIRP development as an iterative process that allows the plan to be re-evaluated at least every two years and “adjusted as necessary in the determination of the Commission and the electric public utilities.”³¹ The Companies developed their initial Carbon Plan to reflect this critical flexibility, asking the Commission to approve near-term actions that supported pursuit of the Companies’ then-proposed pathways and portfolios.





27. In this CPIRP update proceeding, the Companies have reviewed and adjusted the initial Carbon Plan and developed an updated Execution Plan based on Pathway 3 that extends the Companies’ proposed near-term actions through 2026, which aligns with the end of the next CPIRP planning cycle. Previously selected resources as well as incremental new supply-side resources are supported by the Companies’ modeling as necessary to meet demand growth while maintaining or improving reliability of grid in a least cost manner on path to achieving carbon reduction targets.

28. Specifically, the Companies are proposing and requesting Commission approval of the supply-side development and procurement activities through 2026 as set forth in Table NC-1: Reconciliation of 2022 Carbon Plan and 2023 CPIRP Proposal – New Supply-Side Selections, which is reproduced here:



³⁰ *Carbon Plan Order* at 19, 25.

³¹ N.C.G.S. § 62-110.9(1); *see also Carbon Plan Order* at 34 (acknowledging that the Commission must “review and adjust as necessary the Carbon Plan every two years[.]”).

Table NC-1: Reconciliation of 2022 Carbon Plan and 2023 CPIRP Proposal – New Supply-Side Selections³²

Resource MW amounts	2022 Selection	2023 CPIRP	Additional to 2022 CP	2023 NTAP Progress	CPIRP Proposed Near-Term Actions 2024–2026
 Solar	3,100	6,000 by 2031	2,700 to 3,150	<ul style="list-style-type: none"> - 2022 SP: 964.7¹ - 2023 SP/SPS: 1,435¹ - Continue RZEP 1.0 projects 	<ul style="list-style-type: none"> - Continue RZEP 1.0 projects and advance RZEP 2.0 projects.² - 2024 Procurement: 1435 - 2025–2026 Procurement: target 2,700 to 3,150
 Battery Storage ³	1,600	2,700 by 2031	1,100	<ul style="list-style-type: none"> - Stand-alone: progressing development on 1000⁴ - 2023 Solar RFP targeting 260 SPS 	<ul style="list-style-type: none"> - 2024 to 2026: Develop 650 stand-alone, target procurement of 790 of SPS (450 SPS incremental to 2022 Carbon Plan)
 Onshore Wind	0	1,200 by 2033	1,200	<ul style="list-style-type: none"> - Carolinas site screening evaluation 	<ul style="list-style-type: none"> - Site feasibility and development for Definitive Interconnection System Impact Study (“DISIS”) and 2031–2033 in-service, respectively⁵ - 300 for 2025 DISIS - 450 for 2026 DISIS - 450 for 2027 DISIS
 CT ⁶	800	1,700 by 2031	900	<ul style="list-style-type: none"> - Generator Replacement Request (“GRR”) - Pre-Certificate of Public Convenience and Need (“CPCN”) for 2 CT’s (2029) 	<ul style="list-style-type: none"> - 2024: CPCN for 2 CT’s (2029) - 2025: CPCN for 1 CT (2030) - 2026: CPCN for 1 CT (2032)

³² See CPIRP Chapter 4, Table 4-2: Supply-Side Near-Term Actions Plan 2023 to 2026 for additional detail on near-term actions.

Resource MW amounts	2022 Selection	2023 CPIRP	Additional to 2022 CP	2023 NTAP Progress	CPIRP Proposed Near-Term Actions 2024–2026
 CC ⁶	1,200	4,080 by 2032	2,880	<ul style="list-style-type: none"> - GRR - Pre-CPCN for 1 CC in-service beginning of year 2029 	<ul style="list-style-type: none"> - 2024: CPCN for 1 CC (2029) - 2025: CPCN for 2 CC’s (2030, 2031)
 Pumped Storage Hydro	0	1,700 by 2034 ⁷	1,700	<ul style="list-style-type: none"> - Entered 2022 queue - Issued major equipment RFP - Initial construction estimates - Continued Federal Energy Regulatory Commission (“FERC”) license activities 	<ul style="list-style-type: none"> - 2024: SC Certificate of Environmental Compatibility and Public Convenience and Necessity (“CECPCN”) - 2025 and 2026: File NC Out of State CPCN, file final FERC application

Note 1 : 2022 and 2023 Solar Procurements includes residual quantities from previous procurements.

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

Note 3 : Battery Storage amount includes stand-alone battery development and SPS amounts. Annual targets may be adjusted during development.

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

Note 5 : The exact amounts, models, configurations, and timing of CT’s and CC’s will depend on specific system needs and optimizing for execution.

Note 6 : To achieve in-service capacities for onshore wind, the Companies will target higher development quantities to account for assumed levels of project attrition.

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 BOY 2034.

29. The need for these near-term supply side resources presented in the Near-Term Action Plan (“NTAP”) is addressed in Chapter 3, and the Companies provide detailed execution plans in Chapter 4 to support the required near-term development and procurement activities to pursue this diverse set of resources requested to be selected by the Commission. Additional resource-specific detail is also provided across numerous appendices to the CPIRP.³³

30. The 2023 NTAP extends the Companies’ execution plans beyond the 2022 Carbon Plan planning period (which generally identified resources needed through 2030) and includes significant solar, battery energy storage, and new gas combustion turbine and combined cycle resources incremental to the resources selected and approved for development and procurement in the 2022 Carbon Plan. These incremental resources are targeted for commercial operation in 2030-2033. The NTAP also requests Commission selection and approval of 1,200 MW of onshore wind, planned to be developed in three tranches in 2024-2026, as well as the 1,700 MW Bad Creek II pumped storage hydro facility. As highlighted in Chapter 4, the Companies plan to seek regulatory approvals to construct Bad Creek II in 2024-2025 and to seek regulatory approvals for onshore wind projects in the intermediate term in the ordinary course of the development process.³⁴

31. Advanced nuclear SMRs required to achieve the Interim Target with targeted in-service dates in 2034-2035 are still in earlier stages of development, and the Companies plan to seek Commission authorization to construct these initial SMRs in the

³³ For additional detail, *see* CPIRP Chapter 4, Table 4-2 (Onshore Wind), Table 4-8 (Bad Creek II), and Table 4-12 (Advanced Nuclear). Appendix I (Renewables and Energy Storage) at I-3 (Bad Creek II) and I-4 (Onshore Wind) and Appendix J (Nuclear) at J-10 also describe the planned initial development activities and costs through 2026 in more detail.

³⁴ *See* CPIRP Chapter 4, Table 4-8.

intermediate term (i.e., beyond 2026). Accordingly, the Companies have not requested that the Commission select advanced nuclear SMRs in this first CPIRP update to the Carbon Plan. For the avoidance of doubt, however, all Pathways and Portfolios rely on adding breakthrough advanced nuclear SMRs as fundamental to the Companies' execution of the energy transition in the mid-2030s.³⁵

32. Offshore wind is not identified as needed under recommended Core Portfolio P3 Base through the end of the Base Planning Period in 2038. However, offshore wind is identified as needed for long-term carbon neutrality beyond 2038 and is identified in several Pathway 3 Portfolio Variants and Sensitivity Analysis Portfolios as needed by 2035. Thus, as planning and execution evolves in the near-term, offshore wind could become a future resource option for Pathway 3 in the Base Planning Period.³⁶ At this time, the 2023 NTAP and Execution Plan presents limited near-term planning and development activities that recognize the important potential role of this resource in the future and describes the Companies' plans to continue monitoring market developments and exploring the possibility of developing or procuring offshore wind resources in the Carolinas and maintaining its future optionality.³⁷

V. Request for Assurances of Future Recoverability of Significant Development Costs of Zero-Carbon Generation Additions

33. In adopting the initial Carbon Plan, the Commission recognized the significant commitments and investments that would be required by the Companies to develop major capital intensive and longer-lead time resources that are currently projected

³⁵ CPIRP Chapter NC, 5-6.

³⁶ *Id.* at 20.

³⁷ *See* CPIRP Chapter 4, Table 4-11.

to be needed to achieve the State’s HB 951 objectives.³⁸ To that end, the *Carbon Plan Order* determined that it was reasonable and within the Commission’s authority to pre-approve the Companies’ decision to incur initial project development costs for purposes of Carbon Plan execution and to provide “reasonable assurance of recoverability in a future cost recovery proceeding, even if the resource is ultimately not selected by the Commission for the Carbon Plan.”³⁹ The Commission specifically authorized such action to support initial development of advanced nuclear SMR resources pursuant to N.C.G.S. § 62-110.7(b) and exercised its general regulatory authority under the Public Utilities Act for other non-nuclear resources.⁴⁰ The Commission’s authorization of initial development costs for Bad Creek II and SMR development in the *Carbon Plan Order* extended through 2024, which was the end of the near-term period for the initial Carbon Plan.⁴¹

34. The CPIRP provides detailed updates regarding the Companies’ long lead-time resource development activities pursuant to the Commission’s authorizations and further identifies the additional development activities needed through 2026 to maintain timelines for select long lead-time resources (onshore wind, pumped storage hydro (Bad Creek II), and SMRs). Specifically, the Companies request the Commission now provide similar pre-approval for the Companies to incur the following increased project development costs to be incurred in 2024-2026: (1) up to \$64.5 million for the development of 1,200 MW of onshore wind planned to be in service by 2033;⁴² (2) up to

³⁸ *Carbon Plan Order* at 29.

³⁹ *Id.* at 29. The CPIRP also provides the Commission with updates on initial development activities and costs incurred since the *Carbon Plan Order* was issued.

⁴⁰ *Id.* at 96 (SMRs) and 39, 97 (Bad Creek II).

⁴¹ *Id.* at 96 (SMRs) and 39, 97 (Bad Creek II).

⁴² See CPIRP Appendix I, Table I-4.

\$165 million for the development of pumped storage hydro at Bad Creek II from 2023 through 2026;⁴³ and (3) up to \$75 million through 2024 plus an additional \$365 million⁴⁴ through 2026 for the development of advanced nuclear resources.⁴⁵ This development work is needed to ensure resources are available for the in-service dates identified in P3 Base and necessary to achieving the Interim Target.

VI. Near-Term Existing Supply-Side Activities

35. An important component of the Companies' Execution Plan (detailed in Chapter 4 of the CPIRP) is continuing ongoing efforts to optimize existing low carbon dispatchable and zero-carbon emitting baseload resources to provide the most value out of existing resources to customers and to optimize their contribution to achieving the Interim Target and progressing the energy transition. The Commission recognized the importance of pursuing all reasonable and cost-effective options to optimize the Companies' existing generating fleet in approving continuing the Companies' planning and execution of Subsequent License Renewals ("SLR") for the existing nuclear fleet as well as investments to enhance the flexibility of the existing natural gas fleet.⁴⁶

36. The *Carbon Plan Order* recognized that extending the operational life of the Companies' existing nuclear fleet is "foundational" to executing the Carbon Plan.⁴⁷ Accomplishing this objective requires the Companies to obtain federal regulatory approval

⁴³ See CPIRP Appendix I, Table I-3.

⁴⁴ This amount is inclusive of the \$35 million cap previously requested and authorized in the initial Carbon Plan.

⁴⁵ See CPIRP Attachment J, Tables J-9 and J-10. The Companies' request for cost recovery assurances as to new nuclear resources is made pursuant to N.C.G.S. § 62-110.7.

⁴⁶ *Carbon Plan Order* at 37, 67-68, 132 (Ordering Paragraphs 13-14).

⁴⁷ *Id.* at 37. See also Appendix J (Nuclear), Figure J-2 (depicting total carbon-free nuclear generation lost at the end of current operating licenses).

of 20-year SLRs as well as to pursue cost-effective power uprates, measurement uncertainty recapture projects, and 24-month fuel cycle extensions that will increase the zero-carbon baseload output of the Companies' nuclear fleet over the next decade.⁴⁸ The Companies have detailed planned execution activities in Chapter 4 and Appendix J, which include near-term investments through 2026 of approximately \$389.6 for power output expansion projects at the Companies' existing nuclear plants.⁴⁹

37. Similarly, as coal units are retired and the integration of renewable resources increases, the flexibility of dispatchable gas-fired resources will become an increasingly important resource for maintaining system reliability in a least cost manner. As referenced above, the Commission's *Carbon Plan Order* acknowledged this need and specifically directed the Companies to pursue expanding the flexibility of their existing natural gas fleet, targeting least cost projects that will maintain or improve upon the reliability of the system.⁵⁰ The Companies have identified targeted and cost-effective flexibility expansion projects at seven of their existing combined cycle facilities that will increase winter capacity by up to approximately 251 MW.⁵¹

VII. Planning for Orderly Coal Unit Retirements

38. The Commission's *Carbon Plan Order* recognized the magnitude of the challenge the Companies face to retire 8,400 MW of coal capacity by the end of 2035 and found that the Companies are taking reasonable steps to meet this challenge.⁵² The

⁴⁸ See CPIRP Chapter 4, Table 4-5; Appendix J at 6-8.

⁴⁹ See CPIRP Appendix J, Table J-2.

⁵⁰ *Carbon Plan Order* at 64.

⁵¹ See CPIRP Appendix K at 10.

⁵² *Carbon Plan Order* at 64.

Commission also emphasized the importance of maintaining operational flexibility and reliability in the Companies' coal retirement plans, while requiring the Companies to keep the Commission apprised of the timing and scheduled coal unit retirements and show substantial justification for any delays from the planned unit retirement schedule.

39. As a result of the substantial increase in load forecast and increased planning reserve margin since filing of the initial Carbon Plan and the resulting significant increase in capacity needs to ensure reliability of the system, the Companies are proposing limited adjustments to certain coal unit retirement dates, as identified in Chapter NC.⁵³ While the later coal unit retirement dates result in some coal capacity being online longer than initially projected in the initial Carbon Plan, the energy mix from coal will not necessarily increase as the Companies will continue to use coal units only on a limited basis at peak times to maintain system reliability while the Companies add replacement resources.⁵⁴

40. Appendix F contains the Companies' Coal Retirement Analysis, which provides a comprehensive analysis of the Companies' unit retirement strategy as well as risks and challenges as the Companies plan for an orderly exit from reliance on coal-fired generation. The Companies' proposal—which continues to plan for retirement of all remaining 8,400 MW of coal capacity by 2035—is the most reasonable and appropriate path to retire coal units at this point in time to enable an orderly “replace before retire” approach to the energy transition that ensures reliability is maintained. As part of the Carbon Plan update confirming that the Companies are progressing on the least cost path

⁵³ See CPIRP Chapter NC, Table NC-4 (presenting coal unit retirement schedule comparison to schedule approved in 2022 Carbon Plan).

⁵⁴ See CPIRP Appendix F at 8.

to achieving the Interim Target, the Companies are seeking Commission approval of the Companies' updated coal unit retirement schedule in this proceeding as reasonable for planning purposes. The Companies also commit to keep the Commission apprised of the timing of scheduled coal unit retirements occurring in the near-term and to update the Commission in the next CPIRP in 2025.

VIII. Advancing Grid Edge and Customer Programs

41. The *Carbon Plan Order* recognized the continued importance of expanding grid edge resources and customer programs as a key component of Companies' strategy to "shrink the challenge" of transitioning the electric systems to a cleaner energy future.⁵⁵ Since the *Carbon Plan Order*, the Companies have continued to actively pursue their Grid Edge and customer program efforts through EE/DSM programs, revisions to the EE/DSM Mechanism, certain rate designs, voltage control efforts, renewable energy programs, electric transportation programs, and behind-the-meter generation and storage by filing for approval of a number of new related initiatives and/or engaging with stakeholders on the same.⁵⁶ The Companies are requesting Commission approval of their plan to continue advancing their grid edge and customer programs and engaging with stakeholders on the underlying determination of the utility system benefits in approved EE/DSM Cost Recovery Mechanism. The Companies are also requesting that the Commission approve and find reasonable the Companies' use of 1% of eligible load annual utility energy efficiency savings in the CPIRP modeling.

⁵⁵ *Carbon Plan Order* at 103.

⁵⁶ See CPIRP Chapter 4, Table 4-16.

IX. Transmission System Planning

42. The *Carbon Plan Order* emphasized the importance of a coordinated transmission planning process to ensure that the initial Carbon Plan could be executed and that new generator interconnections would not negatively impact the adequacy and reliability of the existing grid in the Carolinas.⁵⁷ Since filing their 2022 Carbon Plan, the Companies have worked diligently to progress the ongoing transformation of the DEC and DEP transmission systems to support the energy transition, including continuing to be on or ahead of schedule for completing all fourteen (14) Red Zone Transmission Expansion Plan (“RZEP”) projects that the Commission acknowledged as needed to enable new solar and other resources required by the Carbon Plan.⁵⁸

43. In this CPIRP update, the Companies are seeking Commission acknowledgement of the need for a second phase of RZEP projects (“RZEP 2.0”) that will be reviewed and considered by the North Carolina Transmission Planning Collaborative (“NCTPC”) as part of 2024-2034 local transmission planning process.⁵⁹ RZEP 2.0 consists of three DEC and three DEP lines located in both North Carolina and South Carolina with projected in-service dates in approximately 2028 and 2029, that are expected to enable significant new solar resources in the late 2020s and early 2030s.⁶⁰ These projects will be necessary to support solar procurements targeting approximately up to 3,150 MW of solar and solar paired with storage in 2025 and 2026 to achieve commercial operation of such resources in 2029. Absent NCTPC approval in 2024-2025 enabling the Companies to

⁵⁷ *Carbon Plan Order* at 134 (Ordering Paragraph No. 37).

⁵⁸ *Id.* at 116 (“conclud[ing] that the fourteen 2022 RZEP projects are necessary to achieve the carbon dioxide emissions reduction mandates of N.C.G.S. § 62-110.9 in a least cost manner”).

⁵⁹ See CPIRP Appendix L, Table L-7.

⁶⁰ See *id.* at Figure L-2.

proactively plan and execute the RZEP 2.0 upgrades, the Execution Plan identifies that it will be more prudent to pursue a lower 2,700 MW solar procurement target in 2025-2026 (1,350 per year).⁶¹

44. The Carbon Plan Order also directed the Companies to provide the Commission with an update on plans for the NCTPC to adopt revisions to the local transmission planning process. Appendix L provides a comprehensive update on these efforts, which will increase transparency and opportunities for engagement and coordination with stakeholders.⁶²

X. Conclusion and Request for Relief

The Companies' CPIRP update provides a comprehensive and detailed IRP analysis over the long-term and a reasonable execution plan for the near-term that supports the Companies' continued energy transition in the current changing energy landscape. The CPIRP is designed to serve the Companies' dual-state systems and to achieve the State's carbon reduction goals established in N.C.G.S. § 62-110.9 in a balanced and reasonable manner and to ensure reliable electric service for all of the Companies' customers at affordable rates over the short and long term. Accordingly, DEC and DEP respectfully request that the Commission adopt the CPIPRP and take the following actions:

(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.

⁶¹ See CPIRP Chapter 4, Table 4-2.

⁶² See CPIRP Appendix L at 11-14.

(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 Order*⁶³) 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;

⁶³ 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).

(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 NC:⁶⁴

- (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;

⁶⁴ 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).

(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;

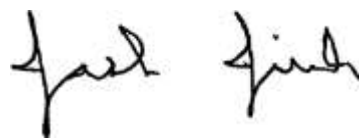
(4) Approve the Companies' updated schedule for planned coal retirements in the near- and intermediate term supported in Appendix F as reasonable for planning purposes;

(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.

Respectfully submitted, this 17th day of August, 2023.



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and Duke Energy Progress, LLC*

VERIFICATION

STATE OF NORTH CAROLINA)
) DOCKET NO. E-100 Sub 190
COUNTY OF WAKE)

The undersigned, Robert Mark Oliver, being first duly sworn, deposes and says that he is Vice President - Integrated System Planning; that he oversaw development of the foregoing Carbon Plan and Integrated Resource Plan of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC and knows the contents thereof; that the same are true of his own knowledge, except as to those matters stated on information and belief, and as to those matters, he believes them to be true.

Robert Mark Oliver
Robert Mark Oliver

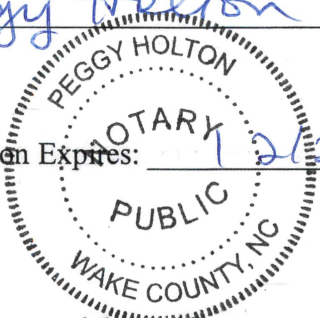
Sworn and subscribed before me

This 15th day of August 2023.

Peggy Holton
Notary Public

My Commission Expires: 8-22-2026

[SEAL]



I signed this notarial certificate on 8-15-23 according to the emergency video notarization requirements contained in G.S. 10B-25.

Notary Public location during video notarization: Wake County

Stated physical location of principal during video notarization: Mecklenburg County