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## Chapter NC Supplement: 2023–2024 Carbon Plan and Integrated Resource Plan Supplemental Planning Analysis

Duke Energy Carolinas, LLC’s (“DEC”) and Duke Energy Progress, LLC’s (“DEP”, and together with DEC, “Duke Energy” or “the Companies”) are filing this January 2024 supplemental update<sup>1</sup> to Chapter NC in the Companies’ 2023–2024 Carbon Plan and Integrated Resource Plan (“CPIRP”) Update. This update is intended to inform the North Carolina Utilities Commission (“NCUC” or “Commission”), customers and stakeholders how the Carolinas’ recent, unprecedented levels of economic development successes and resulting significant increases in the Companies’ load forecast since the initial Carolinas Resource Plan (the “Resource Plan” or the “Plan”) was filed in August 2023 drive the need for incremental resource additions to the Companies’ proposed near-term actions plan (“NTAP”) and updates to the longer-term resource plans. The strong and vibrant economic environment in North Carolina, fostered by decades of strong energy policy, is driving the need for even further accelerated and decisive execution activities in the near-term to serve customers and achieve the State’s energy policy goals.

Importantly, the Companies’ initial Plan in conjunction with the supplemental modeling and additional portfolio analysis being filed today<sup>2</sup> (“Supplemental Planning Analysis”) meets all Commission directives and requirements of Commission Rule R8-60A and addresses how the Companies are planning to reliably execute this critical phase of energy transition of their generation fleets toward achieving an interim target of 70% carbon dioxide emissions reductions (“Interim Target”) on the least-cost path to carbon neutrality by 2050.<sup>3</sup> As confirmed by the Commission in its January 17, 2024

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<sup>1</sup> This Chapter NC Supplement is intended to supplement and not replace the original Chapter NC filed as part of the August 2023 CPIRP.

<sup>2</sup> The Companies further outlined the scope of this supplemental analysis in the letter filed with the North Carolina Utilities Commission. See Duke Energy Carolinas, LLC’s and Duke Energy Progress, LLC’s Plans for Development of Supplemental Portfolio Analysis and Supporting Testimony and Request for Adjustment to Procedural Schedule, Docket No. E-100, Sub 190 (filed Dec. 18, 2023). The Updated Fall 2023 Load Forecast data was provided to intervenors in December 2023 through ongoing discovery.

<sup>3</sup> Capitalized terms not otherwise defined in this Chapter shall have the meaning ascribed to them in NCUC Rule R8-60A.

Order,<sup>4</sup> the Supplemental Planning Analysis does not supplant the initial filing but instead is intended to identify additional incremental resources needed to meet the increased load forecast.

Duke Energy supports Energy Transition Pathway 3 (“Pathway 3”) as the most reasonable, least-cost and least-risk plan to achieve the Interim Target by 2035, and to continue planning for all coal unit retirements by the end of 2035. In addition, the Companies have added additional procurement and development activities to the Execution Plan and proposed additional near-term actions based on Portfolio P3 Fall Base and request Commission support for the decisive actions needed to ensure the continued economic growth and vitality of the Carolinas.

## Overview and Key Takeaways from Supplemental Planning Analysis

As detailed in Section 2 (Methodology and Key Assumptions Updates), the Supplemental Planning Analysis principally relies upon the same methodological approach as the initial CPIRP and evaluates how the significant increase in the Updated 2023 Fall Load Forecast and other material developments since the initial Plan was prepared impact the pace, scope, and scale — as well as executability risks and other considerations — of planning under Pathway 3. Section 3 (Portfolio Additions and Analysis Results) addresses how the recent, significant changes to the Companies’ load forecast, inflationary pressures on resource costs and other factors are now impacting the executability, reliability and cost of an orderly exit from the Companies’ coal fleet by 2035. This section addresses the significant new supply-side resources required to reliably replace the Companies’ remaining 8,400 MW of coal generation while simultaneously meeting the growing energy needs of customers under Pathway 3. As addressed in Section 4 (Execution Plan Updates), for the current NTAP period 2024–2026, Duke Energy believes that continuing to plan for the Pathway 3 coal unit retirement schedule and executing on the significant additional resources identified in the NTAP as needed to reliably achieve the P3 Fall Base capacity additions represent the most reasonable, least-cost, and least-risk planning approach to reliably serve the Companies’ dual-state system at this time.

The initial Plan established the dynamic nature of the changing energy landscape and growing magnitude of the Carolinas energy transition challenge, in particular recognizing the impacts driven by the Carolinas’ economic development successes occurring at a scale and pace that is well beyond the Companies’ historical experience, the migration of new residential customers to the Carolinas, and the acceleration of transportation electrification.<sup>5</sup> The Supplemental Planning Analysis evaluates the further material increases in annual electricity demand reflected in the Updated 2023 Fall Load Forecast — now increasing 22% by 2030 and 25% by 2035 from 2022 planning cycles — driven by significant additional economic development activity occurring during 2023. The Supplemental Planning Analysis demonstrates this higher forecasted demand requires additional resources to maintain or improve grid reliability while meeting increased energy and capacity requirements. Table

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<sup>4</sup> Order Scheduling Public Hearings, Establishing Interventions, and Testimony Due Dates and Discovery Guidelines, Requiring Public Notice, and Providing Direction Regarding Duke’s Supplemental Modeling, Docket No. E-100, Sub 190 (Jan. 17, 2024) (“January 17 Order”).

<sup>5</sup> Carolinas Resource Plan, Executive Summary at 5-8, Chapter 1 (Planning for a Changing Energy Landscape) at 4-6.

SPA NC-1 below summarizes the key changes to the Companies' Updated 2023 Fall Load Forecast and other material developments between the initial Plan and this Supplemental Planning Analysis.

**Table SPA NC-1: Key Combined DEC and DEP Summary Load Forecast and Planning Results**

Load	August CPIRP	Supplemental Planning Analysis
<b>Net Load Forecast Through 2033</b>	2023 Spring Load Forecast <ul style="list-style-type: none"> <li>• Winter Peak: 35.5 GW</li> <li>• Annual Energy: 182 terawatt hours ("TWh")</li> <li>• 8 Large Site Development Projects, adjustments for 8.7 TWh</li> </ul>	Updated 2023 Fall Load Forecast <ul style="list-style-type: none"> <li>• Winter Peak: 37.6 GW</li> <li>• Annual Energy: 206 TWh</li> <li>• 35 Large Site Development Projects, adjustments for 24.7 TWh</li> </ul>
<b>Planning Results</b>	<b>P3 Base</b>	<b>P3 Fall Base</b>
<b>Incremental Resource Additions By January 1, 2035</b>	Total: 26.8 GW Nuclear and Offshore Wind <ul style="list-style-type: none"> <li>• Advanced Nuclear: 0.6 GW</li> <li>• Offshore Wind: none selected</li> </ul>	Total: 33.5 GW Nuclear and Offshore Wind <ul style="list-style-type: none"> <li>• Advanced Nuclear: 0.6 GW</li> <li>• Offshore Wind: 2.4 GW</li> </ul>
<b>Coal Retirements by EOY 2035</b>	8.4 GW	8.4 GW
<b>Bill Impact CAGR</b>	<ul style="list-style-type: none"> <li>• 2033 – 2.8%</li> <li>• 2038 – 2.6%</li> </ul>	<ul style="list-style-type: none"> <li>• 2033 – 4.1%</li> <li>• 2038 – 3.6%</li> </ul>

*Pathway 3 Continues to be the Recommended Pathway Toward Achieving the Interim Target While Maintaining and Improving Reliability*

As described in the Summary, the Companies affirm that Pathway 3 continues to represent the most reasonable, least-cost, and least-risk planning pathway towards achieving the Interim Target and recommends Portfolio P3 Fall Base as the Companies' reference portfolio for future planning purposes.<sup>6</sup> The significant increase in projected load and the resulting incremental resource needs in Portfolio P3 Fall Base underscore the need for decisive and timely action. Portfolio P3 Fall Base introduces almost 6.8 GW of additional resources beyond P3 Base through 2035, with the model selecting nearly the maximum amounts of all available renewable resources in P3 Fall Base (to achieve the Interim Target by 2035). To ensure reliability of the grid is maintained or improved, the Companies remain focused on executing Portfolio P3 Fall Base's resource additions and retirements under a "replace before retire" approach, and meeting grid reliability standards during project and outage management activities supporting Plan execution.

Consistent with the Commission's direction in the January 17 Order,<sup>7</sup> the Companies have also modeled a supplemental portfolio under Energy Transition Pathway 1 integrating the same Updated

<sup>6</sup> Rule R8-60(A)(d)(10).

<sup>7</sup> January 17 Order at 9 (Ordering Paragraph 11).

2023 Fall Load Forecast. The Companies also modeled a supplemental portfolio under Energy Transition Pathway 2 with the same load forecast updates. Setting aside the substantial execution challenges, the Companies do not believe the pace of investment required under P1 or P2 represents the most reasonable, least-cost, and least-risk pathway for customers.





*Portfolio P3 Fall Base Represents the Minimum Level of Execution Activity Required but Further Economic Development Success Would Necessitate Even More Decisive Actions*

With economic development success and the growing economies in the Carolinas amplifying the already profound impacts to energy landscape changes integrated into the CPIRP, making progress on all identified near-term actions is now even more urgent to ensure adequate resources to meet customers' future electricity needs. The Companies' updated NTAP represents a baseline level of actions needed to meet economic development projects incorporated into the Updated 2023 Fall Load Forecast. However, the Companies must also assess the potential for economic development trends to continue, which would result in load growth even greater than is reflected in the Updated 2023 Fall Load Forecast. The Companies' engagement with potential new customers has not stopped and there is continued interest in project sites in the Carolinas, including several recent inquiries at future potential sites for large loads that may exceed 500 MW. The Continued Economic Development load forecast detailed in Section 2 (Methodology and Key Assumptions Updates) assesses a scenario in which economic development successes continue, assuming an approximately 40% increase in economic development adjustments in 2033 relative to the Updated 2023 Fall Load Forecast. Under such a scenario, even more resource additions would be needed, and further, it would be necessary to consider potential deferral of select coal retirements and push out the target date for achieving the Interim Target.





## **Updated Near-Term Action Plan Informed by Energy Transition Pathway 3 and Recommended P3 Fall Base Portfolio**

Table SPA NC-2 below, from Section 4 (Execution Plan Updates) of the Supplemental Planning Analysis, provides a reconciliation between the initial Resource Plan's Chapter 4 (Execution Plan) Table 4-2: Supply-Side Near-Term Actions Plan 2023 to 2026 and NTAP adjustments and additions proposed through this Supplemental Planning Analysis based on the P3 Fall Base portfolio. In addition, Section 4 (Execution Plan Updates) of the Supplemental Planning Analysis includes adjusted tables with updated Near-Term and Intermediate-Term Execution Plan action items for specific technologies that replace the corresponding technologies' tables in the initial Plan's Chapter 4 (Execution Plan).

**Table SPA NC-2: Updated Proposed Near-Term Actions and Development Activities Informed by Supplemental Analysis<sup>8</sup>**

August NTAP Resource	August NTAP MW Amounts	Supplemental Incremental Resource MW Amounts	Total August NTAP + Supplemental Resource MW Amounts	Total August NTAP + Supplemental Proposed Near-Term Actions 2024–2026 and Development Activities
 Solar	6,000 by 2031	460 by 2031	6,460 by 2031	<ul style="list-style-type: none"> <li>- Continue RZEP 1.0 projects and advance RZEP 2.0 projects.<sup>1</sup></li> <li>- 2024: Procurement targeting 1,585 MW of solar and solar paired with battery energy storage (“SPS”) (approximate 2028 in-service date).</li> <li>- 2025–2026: Procurements targeting approximately 2,700 to 3,460 MW of solar and dependent on RZEP 2.0 (approximate 2029-2030 in-service date) and future RFP attrition of procured solar.</li> </ul>
 Battery Storage <sup>2</sup>	2,700 by 2031	175 MW of Standalone Storage now planned for Storage paired with Solar	2,700 by 2031	<ul style="list-style-type: none"> <li>- 2024 to 2026: Develop and study additional 475 MW of stand-alone battery storage incremental to 2022 NC Plan.</li> <li>- 2024 to 2026: Target procurement of 965 MW of SPS (625 MW of SPS incremental to 2022 NC Plan).</li> </ul>
 Onshore Wind	1,200 by 2033	-	1,200 by 2033	<ul style="list-style-type: none"> <li>- Select development partner(s), perform site feasibility studies and begin activities associated with siting and development for onshore wind projects.<sup>3</sup></li> <li>- Submit interconnection requests into 2025-2026 DISIS interconnection clusters.</li> </ul>
 CT <sup>4</sup>	1,700 by 2032	425 by 2031	2,125 by 2031	<ul style="list-style-type: none"> <li>- 2024: File Certificate of Public Convenience and Necessity (“CPCN”) for 2 Marshall Advanced CTs at 900 MW (BOY 2029 in-service), submit air permits, begin transmission build-out engineering/modifications.</li> <li>- 2024: Evaluate siting options and submit interconnection Study requests for 850 MW CT 3 &amp; 4 (BOY 2030 in-service).</li> <li>- 2025: File CPCN and air permit for 850 MW (CT 3 and 4) (BOY 2030 in-service).</li> <li>- 2025: Evaluate siting options and submit interconnection request/GRR for 425 MW CT 5 (BOY 2031 in-service).</li> <li>- 2026: File CPCN and air permit for 425 MW (CT 5) (2031 BOY in-service).</li> </ul>

<sup>8</sup> Consistent with Table SPA 4-1 in Section 4 (Execution Plan Updates) of the Supplemental Plan Analysis. See Chapter 4 (Execution Plan) and Table 4-2: Supply-Side Near-Term Actions Plan 2023 to 2026 for additional detail on near-term actions from initial Plan.

August NTAP Resource	August NTAP MW Amounts	Supplemental Incremental Resource MW Amounts	Total August NTAP + Supplemental Resource MW Amounts	Total August NTAP + Supplemental Proposed Near-Term Actions 2024–2026 and Development Activities
 CC <sup>4</sup>	4,080 by 2031	2,720 by 2033	6,800 by 2033	<ul style="list-style-type: none"> <li>- 2024: File CPCNs for Person County Advanced CC1 and CC2 (each at 1,360 MW) (BOY 2029 &amp; 2030 in-service, respectively); submit air permit, begin transmission build-out engineering/modifications.</li> <li>- 2024: Submit Interconnection Requests for 2 CCs (Person County Advanced CC2 and SC-located CC3; 1,360 MW each; BOY 2030 and 2031 in-service, respectively).</li> <li>- 2025: File SC Certificate of Environmental Compatibility and Public Convenience and Necessity (“CECPCN”) for CC3 (2031 in-service), submit air permit.</li> <li>- 2025: Evaluate siting options and submit Interconnection Requests and/or GRR for 2 additional CCs (CC4 and CC5; 1,360 MW each; BOY 2032 and 2033 in-service, respectively).</li> <li>- 2025: File CPCN and submit air permit for CC4 (2032 in-service).</li> <li>- 2026: File CPCN and submit air permit for CC5 (2033 in-service).</li> <li>- 2026: Begin transmission build-out engineering/modifications for CC4 &amp; CC5 (BOY 2032 and 2033 in-service, respectively).</li> </ul>
 Pumped Storage Hydro <sup>5,6</sup>	1,700 by 2034	134 by 2034	1,834 by 2034	<ul style="list-style-type: none"> <li>- 2025: Subject to necessary regulatory guidance and support, target SC CECPCN.</li> <li>- 2025 and 2026: File NC Out of State CPCN, file final FERC licensing application, prepare for construction.</li> </ul>
 Advanced Nuclear <sup>6</sup>	600 by 2035	-	600 by 2035	<ul style="list-style-type: none"> <li>- Site 1 – 2024 to 2026: Choose reactor technology, submit early site permit (“ESP”), develop construction permit/license application, contract with reactor vendor, and order long-lead equipment.</li> <li>- Site 2 – 2025 to 2026: Develop and submit ESP.</li> </ul>
 Offshore Wind <sup>6</sup>	-	2,400 by 2035	2,400 by 2035	<ul style="list-style-type: none"> <li>- Conduct Acquisition Request for Information (“ARFI”) with current Carolinas Wind Energy Area (off NC coast) lessees.</li> <li>- Conduct stakeholder engagement and outreach in connection with ARFI.</li> <li>- Report results of ARFI in next Carolinas Resource Plan filings.</li> <li>- Continue limited development of onshore transmission to support offshore wind.</li> </ul>

**Note 1:** RZEP 2.0 subject to local transmission planning process. See Carolinas Resource Plan Appendix L (Transmission System Planning and Grid Transformation).

**Note 2:** Battery Storage amount includes stand-alone battery development and SPS amounts. Annual targets may be adjusted during development.

**Note 3:** To achieve in-service capacities for onshore wind, the Companies will target higher development quantities to account for assumed levels of project attrition.

**Note 4:** The exact amounts, models, configurations and timing of CTs and CCs will depend on specific system needs and optimizing for execution.

**Note 5:** 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 portfolios at BOY 2034. Capacity was rounded up from 1,680 MW to 1,700 MW in initial Plan NTAP.

**Note 6:** The Companies note that with any long lead-time resource that results in a large, multi-year construction project, the recovery of the Companies’ financing costs during the construction period is important to ensure strong credit ratings to facilitate the lowest possible financing costs for customers. In addition, recovery of financing costs during construction lowers the overall cost that customers pay over the life of the investment. When financing costs are recovered during the construction period, non-financing project costs are still included in customer rates only after the related project is in operation and providing service to customers, unless otherwise determined by the Commissions.

### *Impacts of Dual-State Planning and the Location of Identified Generating Resources*

As the Companies progress execution of the CPIRP across their dual-state system, they will appropriately leverage the Companies' expansive service territories, varied terrain, and potential for economies of scale in determining optimal locations across both states, to site new generating facilities and other resources that maximize benefits for customers. The Companies' approach is fully consistent with the Commission's guidance in the Carbon Plan Order that "Duke must base ultimate siting of new resources optimally inside or outside of North Carolina on several factors — including, for example, the appropriateness of the site for the type of generation, access to fuel, ability to leverage existing infrastructure to reduce costs, and evaluation of community impacts."<sup>9</sup> For instance, the unique and critical operational benefits of pumped storage hydro and the expansion opportunity available at the Bad Creek location in South Carolina will benefit customers by allowing integration of renewables and providing important diversity to the shorter-duration of currently available lithium-ion battery storage systems. Similarly, the Companies will continue to assess optimal siting for new natural gas facilities. Between filing the initial Plan and this Supplemental Update, the Companies also have identified planned sites for a second combined cycle ("CC2") unit in DEP at the Person County Energy Complex and plans for siting the third CC unit ("CC3") at a location in South Carolina, in both cases leveraging the optimal sites for customers. The Companies have made these siting determinations as part of executing the most reasonable, least-cost plan to serve customers and to promote resource and locational diversity (including through diversified access to fuel supply). Accordingly, these siting determinations are now incorporated into the Execution Plan and have the inter-related effects of informing both carbon accounting compliance for North Carolina and the NTAP for both South Carolina and North Carolina. In light of the Companies' decision to site CC3 in South Carolina as part of the updated Execution Plan, the Companies have excluded the unit's emissions for purposes of accounting for emissions reductions from electric generating facilities in the state consistent with N.C.G.S. § 62-110.9 and the Commission's conclusions in its initial Carbon Plan Order.<sup>10</sup> Notwithstanding the Supplemental Planning Analysis' recognition that CC3 is planned to be sited in South Carolina and its emissions will not factor against achieving compliance with North Carolina's carbon emissions reduction targets, the Companies NTAP and execution continues to target longer-term system-wide carbon neutrality and the overall Execution Plan keeps them squarely on the path toward achieving system-wide carbon neutrality by 2050.

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<sup>9</sup> Order Adopting Initial Carbon Plan and Providing Direction for Future Planning, Docket No. E-100, Sub 179 at 45 (Dec. 30, 2022) ("Duke must base ultimate siting of new resources optimally inside or outside of North Carolina on several factors — including, for example, the appropriateness of the site for the type of generation, access to fuel, ability to leverage existing infrastructure to reduce costs, and evaluation of community impacts — and not whether the resources will generate any associated carbon dioxide emissions inside or outside of North Carolina.").

<sup>10</sup> N.C.G.S. § 62-110.9 (establishing goal of achieving carbon neutrality by measuring "CO<sub>2</sub> emitted in the State from electric generating facilities owned or operated by or on behalf of electric public utilities . . ."); Carbon Plan Order at 45 (recognizing that "the General Assembly intended for [HB 951's] emissions reduction requirements to include only carbon dioxide emitted in North Carolina").

### *Update on Parallel Review of Carolinas Resource Plan by the Public Service Commission of South Carolina*

The Companies are contemporaneously filing their Supplemental Planning Analysis with the Public Service Commission of South Carolina (“PSCSC”) to similarly inform the PSCSC’s ongoing review of the Carolinas Resource Plan. Under South Carolina’s IRP statute, the PSCSC must issue a final order approving, modifying, or denying the plan within 300 days of filing. To accommodate the PSCSC’s and the parties’ consideration of the Supplemental Planning Analysis, the PSCSC voted on January 25, 2024 to restart the 300-day statutory review period with the filing of the Supplemental Planning Analysis and rescheduled its planned evidentiary hearing on the Carolinas Resource Plan from April 8, 2024 to September 16, 2024. Pursuant to South Carolina’s IRP statute and new procedural schedule, the PSCSC must issue its final order by November 26, 2024.

### **Updated Requests to Commission**

The Companies’ CPIRP, as supplemented through the Supplemental Planning Analysis and updated NTAP and Execution Plan, provides comprehensive and detailed analysis supporting the continued energy transition that is balanced, reasonable, and executable. The Companies’ updated Execution Plan and NTAP continue to represent a balanced “all of the above” resource mix and prudently pursue a “replace before retire” approach that ensures reliability of the grid is maintained or improved by bringing equivalent levels of capacity and energy online as the Companies plan for 8,400 MW of coal unit retirements between now and the end of 2035. The additional near-term actions outlined in the Supplemental Planning Analysis incorporate and build upon the Execution Plan and NTAP presented in the initial Resource Plan and are needed to ensure reliable electric service for the Companies’ customers and support the significant and continuing robust economic development growth in the Carolinas region. Combined, these significant near-term execution actions presented in the initial CPIRP and Supplemental Planning Analysis constitute all reasonable steps on the most reasonable, least-cost, and least-risk path for the Carolinas to achieve the planning objectives established in N.C.G.S. § 62-110.9. Informed by the Supplemental Planning Analysis near-term action additions, the Companies have also provided updates to the proposed resources to be selected by the Commission and specific authorizations sought by the Companies as part of this CPIRP in the Companies’ initial August 2023 Petition. The updated requested authorizations continue to center on the steps to be taken by the Companies between now and the end of the next CPIRP in 2025–2026 and should be granted for the reasons explained in the CPIRP and further in the Supplemental Planning Analysis.