

**STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH**

DOCKET NO. E-100, SUB 179

In the Matter of
Duke Energy Progress, LLC, and Duke)
Energy Carolinas, LLC, 2022 Biennial)
Integrated Resource Plans and Carbon)
Plan)

**TECH CUSTOMERS' COMMENTS
ON PROPOSED CARBON PLAN**

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Apple Inc., Google LLC, and Meta Platforms, Inc. (the “Tech Customers”), through counsel, hereby respectfully submit these Comments regarding the Carbon Plan filed by Duke Energy Carolinas, LLC (“DEC”) and Duke Energy Progress, LLC (“DEP”) (together, “the Companies” or “Duke”).

INTRODUCTION

North Carolina’s carbon reduction goals are clear, and laudable, but the least-cost pathway is far from certain. Duke’s proposed Carbon Plan is a constructive start of the conversation, but the portfolios identified by Duke are unlikely to result in compliance with the mandated carbon reduction goals given that each of proposed portfolios is ultimately reliant on technological improvements that may or may not occur.

The Tech Customers support North Carolina’s ambitious carbon goals as set forth in Session Law 2021-165, and each company has set its own ambitious carbon goals for the operation of its business. To help the Commission navigate the complexities of this resource planning exercise, the Tech Customers engaged the consulting firm Gabel Associates to (i) conduct a technical review of Duke’s proposed Carbon Plan, and (ii) propose revisions as needed to optimize the chances of achieving the goals set forth in Session Law 2021-165 and support the interests of ratepayers.¹ The results of this review are incorporated into a report (the “Gabel Report”) which is being submitted separately with these Comments.

The Gabel Report demonstrates that, after adjusting various inputs relied upon by Duke, a Preferred Carbon Plan portfolio can be developed that is less costly, results in

¹ This technical review was supported by the consulting firm Strategen, which provided modeling services using the EnCompass software used by Duke in support of its proposed plan.

reduced emissions, and de-risks customers by minimizing exposure to coal- and gas-fired generation resources.

Informed by the Gabel Report, the Tech Customers' recommendations fall within three broad themes.

1. **The Commission should avoid selecting unproven or aging technologies.** In the long run, some investments in energy resources will prove successful, while others will lead to regrets such as unexpected or stranded costs, technology obsolescence, or investments that do not lead to used-and-useful assets. As the Gabel Report shows, the Commission should—and can—select near-term, proven generation assets and avoid committing to unproven technologies, such as small modular reactors or running natural gas facilities exclusively on green hydrogen, or resources that could quickly become obsolete (including new gas resources).
2. **The Carbon Plan can be significantly improved in a manner that will result in reduced cost to ratepayers, more rapid decarbonization of the energy grid, and greater benefits to utility customers.** The Gabel Report identifies two alternative approaches that result in a least-cost plan with less risk to ratepayers. Duke should employ lower-cost and less risky options in the near term (i.e., options that quickly increase renewable generation on the grid and promote energy efficiency), including strategies such as increased use of power purchases, greater emphasis on energy efficiency, new and innovative customer programs, and enhanced behind-the-meter generation.² The Company's analysis should also account for the cost-allocation complexities caused by its dual-jurisdiction operations.
3. **This is not the correct proceeding for consideration of Duke's requests for regulatory commitments regarding cost recovery.** The Commission should decline Duke's invitation for pre-approval of the costs associated with its "initial development activities" for offshore wind, small modular reactors, and pumped storage at Bad Creek II *in this proceeding*. The preordained cost recovery of such expenditures is not appropriately resolved in the context of this planning exercise and should be addressed in future proceedings in accordance with the Commission's established procedures.

The Tech Customers support North Carolina's commitment to reducing and eliminating carbon emissions, and applaud the State in its clean-energy leadership role. These comments are respectfully submitted for the Commission's consideration as it

² N.C. Session Law 2021-165, § 1(2).

fulfills the General Assembly’s mandate of charting North Carolina’s least-cost pathway to carbon-neutral emissions.

COMMENTS

I. KEY OBSERVATIONS AND CONCLUSIONS CONCERNING DUKE’S PROPOSED CARBON PLAN.

Duke’s proposed Carbon Plan is a complex, multi-faceted plan, supported by modeling performed by Duke and subject to extensive inter-party discovery. Following are key summary observations concerning the proposed plan.

(1) Duke’s proposed long-term plan is dependent on future technological breakthroughs.

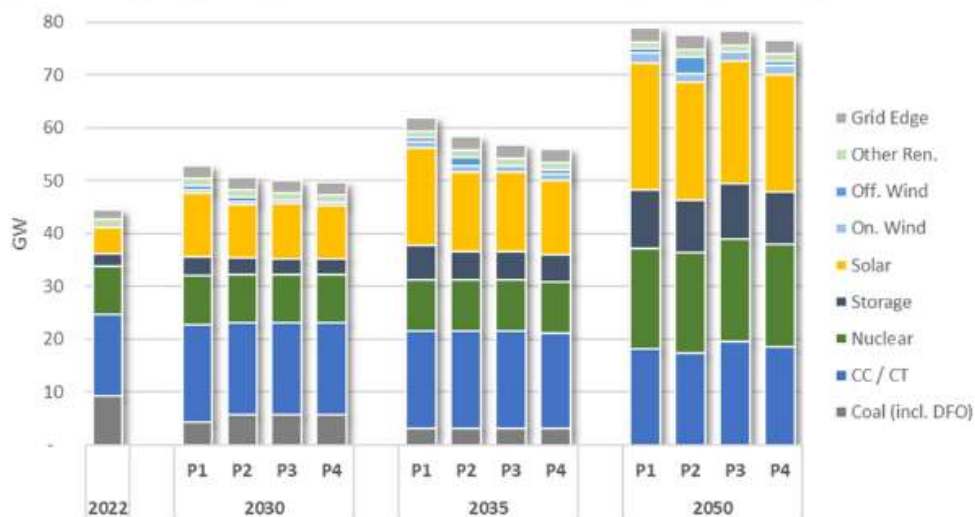
Session Law 2021-165 charges the Commission with “[d]evelop[ing] a plan . . . to achieve the authorized reduction goals” of 70% reduction of carbon emissions by 2030 and carbon neutrality by 2025.³ The Companies, however, have proposed a long-term plan that relies on technologies that are not yet deployed (like advanced nuclear and hydrogen) or otherwise not yet available in North Carolina (like offshore wind), thereby making the plan’s success in meeting the carbon goals entirely dependent on the assumption that technologies which are not yet available at commercial scale will be available on a “least-cost” basis within the planning horizon.

Duke’s proposed Carbon Plan is four modest variations on a single pathway forward, each reliant on new and unproven technologies. Rather than explore alternative solutions for achieving carbon neutrality, the four Portfolios converge on essentially the same generation stack by 2050, as illustrated by Duke’s Figure 3-4⁴:

³ N.C. Session Law 2021-165, § 1(1).

⁴ Duke Carbon Plan, Figure 3-4, Ch.3, at 5; *see also id.*, Ch. 3, at 4 (“[A]ll four resource mixes, in terms of both capacity and energy, largely converge by the time that [2050 carbon-neutrality] goal is reached.”).

Figure 3-4: Capacity Mix by Portfolio, Combined Carolinas System (GW basis)



As is clear from Figure 3-4, each of Duke’s modeled portfolios pull nearly 25% of their generation capacity from CCs/CTs (to be converted to hydrogen) and a near-doubling of nuclear capacity from advanced nuclear generation—with both resources being dependent on future technological evolution and market development.

Duke characterizes the uniformity in its Portfolios as an “‘all-of-the-above’ approach to the energy transition”—i.e., that its plan is utilizing all available technologies to avoid over dependence on any one particular generation method.⁵ However, this label masks the plan’s failure to analyze divergent carbon-reduction pathways. And while the Tech Customers agree that it would be premature to *commit* to one technology at this time, it would be prudent to *analyze* the different pathways offered by the various technologies.

To be clear, the Tech Customers are optimistic about the prospect of newly emergent carbon-free technologies and the role they might play in the future, but these

⁵ Duke Carbon Plan, Exec. Summ., at 3.

technologies are in the development stage.⁶ The development of these technologies may or may not result in resources that are used and useful to ratepayers, which is the talisman for the Commission's regulatory endorsement.

(2) *Duke's proposed Carbon Plan focuses on maximum utility ownership and control of generation assets, and omits important least-cost alternatives.*

The Carbon Plan is intended to be transformative in nature—reflective of a commitment to renewable energy and a departure from carbon-emitting technologies. North Carolina's green energy transformation will require the consideration of new methods and practices. Duke's proposed plan misses opportunities for more efficient approaches to integrating renewable resources due to its focus on the Companies' ownership and control of generation assets. For example, Duke fails to consider: (a) how market participation might better facilitate the on-boarding of renewable energy;⁷ (b) how power purchase arrangements could contribute to increased planning flexibility and reduce costs; (c) how customers—particularly large industrial users—can most effectively contribute through self-supply and other demand reduction approaches; and (d) how residential customers can be empowered to be more efficient energy users. The failure to take full advantage of these opportunities—in favor of self-owned generation—undermines the flexibility and integrity of the plan.

Consideration of alternative market structures (such as regional transmission organizations) and third party power purchase arrangements that results in a lower-cost

⁶ See Gabel Report, at 4, 14, 29. Note that these resources were not selected in modeling supporting the Gabel Report.

⁷ See Duke Response to Tech Customers DR 2-4 (responding to question as to whether Duke has modeled potential customer savings by joining PJM or participating in and RTO by referring to Carbon Plan, Appendix B, p. 13) (Exhibit 1).

solution for ratepayers is mandated by Session Law 2021-165. As discussed more fully in Section IV *infra*, nothing in North Carolina law—including Session Law 2021-165—precludes off-system purchases or similar considerations that result in a over-all benefits to ratepayers.⁸ To the contrary, the law and practice of least-cost planning requires the consideration of non-utility owned power.

The consideration of third-party power is not only a critical component of the “least-cost” inquiry, it is a practical necessity here. Indeed, the Commission has instructed the Companies to, among other things, “[r]efine import capability studies specifically for capacity purchase from PJM” and “[c]ontinue to assess costs, risks, and reliability aspects of off-system purchases.”⁹ Power purchased from third-party owned resources can advance least-cost planning by sourcing less costly energy and capacity and by helping to defray the need to make investments that entail unacceptable risk. Here, such purchase may help delay the need for immediate investments in uncertain resources like natural gas, small modular reactors, and offshore wind.¹⁰

⁸ In its data responses, Duke points to the resource ownership provisions of HB 951 in support of its refusal to model third party purchases. See Duke Response to Tech Customers DR 2-9 (“[t]he Carbon Plan modeling for the four portfolios *reflects the ownership requirements specified in HB 951*, including the purchase of the allocated amounts of solar renewable energy from third parties.”) (Exhibit 2) (emphasis added).

⁹ See, e.g., *Order Accepting Integrated Resource Plans, REPS and CPRE Program Plans With Conditions and Providing Further Direction for Future Planning*, Docket No. E-100, Sub 165 (Nov. 19, 2021), at 15.

¹⁰ The Companies concede the risks associated with these resources. Duke does not know how it will secure sufficient natural gas in the future, Duke Carbon Plan, Appx. N; advanced nuclear will remain commercially untested until the end of this decade at the earliest, *id.*, Appx. L, at 5; offshore wind has never been tested to survive Category 4 or 5 hurricanes, *id.*, Appx. J, at 9; and green hydrogen is still being “studie[d]” as a “potential breakthrough technology.” *id.*, Appx. E, at 43.

- (3) *Duke's proposed Carbon Plan employs the questionable assumption that a portion of any costs associated with new generation will be assigned to South Carolina ratepayers.*

While Duke has styled its plan as the “Carolinas Carbon Plan,” the Carbon Plan is a product of North Carolina legislation. South Carolina has yet to adopt carbon goals similar to those adopted by the North Carolina General Assembly.

Duke’s plan, as modeled, assumes that South Carolina ratepayers will share in the costs of all the resources selected as part of North Carolina’s Carbon Plan. Certainly, the Tech Customers hope that South Carolina ratepayers will share the costs of investments that benefit them, consistent with the historical treatment of such investments. But there is no guarantee that the SCPSC will make South Carolina ratepayers pay for new resources built to achieve North Carolina’s carbon-reduction targets. The uncertainty of whether both states will share the cost of a new resource impairs the Commission’s ability to select the least-cost resources to achieve the Carbon Plan.

Duke’s filings repeatedly reference its dual-state operations,¹¹ yet its Carbon Plan does not expressly analyze the risks associated with uncertainties surrounding whether South Carolina ratepayers will share in the costs incurred as a result of this plan. Given the magnitude of the costs in issue, considerations of cost recovery may dictate whether a particular resource is least cost and should be evaluated in the context of the Carbon Plan.

- (4) *Duke requests Commission approval of reimbursement for a new off-shore wind project, but fails to demonstrate that such generation would be a least-cost resource.*

Although Duke’s proposed Carbon Plan does not evaluate whether Duke’s ownership of an offshore wind generation would be a least-cost resource, Duke appears to

¹¹ See, e.g., Duke Carbon Plan, Ch. 1, at 1–2, 6–8; *id.*, Ch. 4, at 39.

be requesting that the Commission pre-approve its reimbursement for a new offshore wind lease and related costs associated with the development of that asset. But such a request is premature in the context of this planning exercise.

The Companies' Carbon Plan highlights that three of the portfolios modeled by Duke select offshore wind as a generation resource.¹² At the same time, Duke notes that its unregulated affiliate, Duke Energy Renewables Wind, LLC, was selected as the provisional winner of the Carolina Long Bay lease,¹³ and Duke asks the Commission for approval of the costs for securing an offshore wind lease.¹⁴ The Carbon Plan creates the impression that Duke modeled its construction and operation of wind generation at the Carolina Long Bay lease location and concluded that such utility-owned offshore-wind generation was a least-cost resource—thus supporting its request to have ratepayers reimburse Duke for its new lease. This, however, is not the case.

The costs associated with the acquisition of the Carolina Long Bay lease and associated turbine construction have not been presented to the Commission. In fact, Duke provided no data in its filings about the costs associated with the potential Carolina Long Bay wind farm. In addition, the Carolina Long Bay lease and resulting facilities were not modeled by Duke. To be clear, Duke's modeling did *not* select the Carolina Long Bay lease as a least-cost resource in 2030; the Companies' modeling selected a generic block of third-

¹² See Duke Carbon Plan, Ch. 3, Table 3-3 (P1 selects 800 MW by 2030; P2 selects 800 MW by 2030 and an additional 800 MW by 2035; and P4 selects 800 MW by 2035). It should be noted that, based on data responses received to date, the Tech Customers not able confirm that each tranche of generic offshore wind was, in fact, economically selected under Duke's model.

¹³ Duke Carbon Plan, Ch. 4, at 19.

¹⁴ Duke Carbon Plan, Ch 4, at 6.

party offshore wind.¹⁵ Nevertheless, the Companies are asking the Commission to approve the development activities—including securing a lease¹⁶—associated with Duke’s ownership and operation of offshore wind.

The Tech Customers support offshore wind. But it is far from clear that utility ownership of offshore wind represents a least-cost alternative for North Carolina ratepayers in the near term. Indeed, the modeling included in the Gabel Report did not select offshore wind as a least-cost generation resource.

Consideration of the experiences of Duke’s neighboring state, Virginia, is instructive. There, Dominion Energy is building an offshore wind facility projected to cost nearly \$9.8 billion in capital costs.¹⁷ The Virginia SCC staff has expressed concerns that total customer benefits from the project could result in a \$1.6 billion loss, and modeling from the Virginia Department of Energy suggests that expansion of solar would be cheaper than offshore wind.¹⁸ Applicable offshore wind and energy storage targets could exceed the least-cost strategy by \$250 million per year by 2035, and \$450 million by 2040.¹⁹ Here, these concerns are compounded by the uncertainty concerning whether the SCPSC would support cost recovery from South Carolina ratepayers of Duke’s offshore wind investment.

¹⁵ Duke Response to Tech Customers DR 2-7(a) (Exhibit 3); *see also* Duke Carbon Plan, App. J, at 6 (“Note that achieving the January 1, 2030, in-service date would require partnering on an offshore project that has already advanced beyond the leasing stage.”).

¹⁶ Duke Carbon Plan, Ch. 4, at 6.

¹⁷ *See* Iulia Gheorghiu, “Virginia SCC staff questions Dominion Energy’s offshore wind cost assumptions,” utilitydive.com (Apr. 12, 2022) (*available at* <https://www.utilitydive.com/news/virginia-scc-staff-questions-dominion-energys-offshore-wind-cost-assumptio/621959/?%202022-04-12%20Utility%20Dive%20Newsletter%20%5Bissue:41032%5D>).

¹⁸ *Id.*

¹⁹ *Id.* *See also* Sarah Rankin, “Ratepayer advocates seek protections in offshore wind case,” APnews.com (May 17, 2022) (*available at* https://apnews.com/article/government-and-politics-environment-virginia-63faa299a5c8b6b4f61ac55dac2ea527?utm_medium=email) (quoting Walmart representative: “Let’s be honest — this is a \$9.65B construction project where we will be digging 176 holes in the middle of the ocean. There are risks.”).

In response to data requests on this topic, Duke stated that it had not “formally assessed” a scenario where the SCPSC does not permit cost recovery.²⁰

For these reasons, the Commission should ensure that its orders in this proceeding are not taken to endorse actions which have not squarely and fully been presented before the Commission for decision based on a complete record and full analysis.

(5) *The cost assumptions and manual constraints chosen by Duke limit the utility of its cost modeling.*

Duke’s use of the EnCompass model to help evaluate the impacts from various planning decisions was appropriate, but its reliance on inaccurate cost assumptions and numerous manual, forced selections limit the utility of the model.

As discussed in the Gabel Report, Duke’s modeling used estimated costs for a CT and CC generation facilities that were significantly below publicly available benchmarks.²¹ Conversely, the Companies’ model incorrectly assumed solar would be markedly more expensive than estimates from NREL and EIA.²² The result is that Duke’s modeling unduly favored gas resources as a least-cost option compared to solar resources.

In addition, although capacity expansion models like EnCompass are intended to endogenously select resources, Duke hardcoded several asset selections into its modeling, including:

- *Bad Creek II*: The Companies dictated that the model must select 1,600 MW of pumped storage at Bad Creek II.²³
- *Solar limitations*: The Companies capped the selection of solar at 1,800 MW per year for P1 and 1,350 MW per P2, P3, and P4.²⁴

²⁰ See Duke Response to Tech Customers DR 2-7 (Exhibit 3).

²¹ Gabel Report, at 8, 21.

²² Gabel Report, at 21.

²³ Duke Carbon Plan, Appx. E, at 13, 27 (“Bad Creek PH II was prescribed into all portfolios.”).

²⁴ Duke Carbon Plan, Appx. E, Tables E-31 & E-31.

- *Small Modular Reactors (“SMR”)*: Duke forced at least 900 MW of SMR resources into each of its portfolios due to “resource insufficiencies to meet the zero CO2 emissions constraint and energy requirements in 2050.”²⁵
- *Battery limitations*: The Companies limited the model to selecting two specific battery configurations and ultimately made adjustments outside the model to replace 35% of new battery capacity with combustion turbines.²⁶
- *Offshore wind*: For Duke’s P2 and P4, the Companies forced the model to select 800 MW of offshore wind.²⁷
- *Battery-CT Optimization*: After the model selected its generation stack, the Companies removed battery capacity and replaced it with anywhere from 376 MW to 1,127 MW of natural gas plants, depending on the portfolio.²⁸

Notably, the Companies restrain—and even remove—solar and battery storage from the model, while forcing natural gas, offshore wind, and pumped storage into the model. The Gabel Report discusses how the correction of some of Duke’s modeling assumptions results in a reliable portfolio that addresses some of the execution challenges and mitigates risks associated with investment in new fossil fuel generation. In doing so, the modeling as detailed in the Gabel Report, also resulted in a cost savings of approximately \$3 billion compared to Duke’s Portfolio 1.²⁹

²⁵ Duke Carbon Plan, Appx. E, at 61; *see* Duke Response to Public Staff DR 9-7 (Exhibit 4).

²⁶ Duke Carbon Plan, Appx. E; Gabel Report, at 53.

²⁷ Duke Response to Public Staff DR 3-11 (Exhibit 5).

²⁸ Duke Response to Public Staff DR PS 3-11.

²⁹ Tech Customers’ preferred alternative model had a NPVRR of \$108.8 billion compared to Duke’s P1 model (at corrected price assumptions) having a NPVRR of \$111.8 billion. *See* Gabel Report, at 55.

II. RECOMMENDATIONS FOR IMPROVEMENTS TO CARBON PLAN.

A. The Commission Should Select Only Near-Term Resources That Are Not Dependent On Technological Developments to Achieve Carbon Neutral Results.

Duke asks the Commission to “select” the following resources as part of North Carolina’s inaugural Carbon Plan: 3,100 MW of solar generation; 1,600 MW of battery storage; 600 MW of onshore wind; 800 MW of Combustion Turbine plants; and 1,200 MW of Combined Cycle plants.³⁰ With so much uncertainty clouding the pathway to carbon reductions, the Commission should be cautious in the selection of any near-term generation assets which are not immediately deployable on a carbon-free basis.

Some of these energy resources present greater risk than others. Solar generation and battery storage, for example, have been proven at commercial scale and have no risk of becoming obsolete because of fuel-price escalation or carbon emission constraints. In addition, although not considered by the Companies, Duke can acquire capacity and energy from third parties. Purchasing capacity, for instance, could satisfy North Carolina’s near-term resource needs while leaving the Companies with flexibility to invest in long-term investments based on future developments.

In contrast, investments in natural gas plants carry significant risks of obsolescence. Should natural gas prices persist at record levels, these gas plants could become uneconomic to operate compared to other generation resources. In addition, with the estimated lifespan of at least 35 years,³¹ natural gas plants built in the early 2030s will survive well past the carbon-neutral deadline of 2050. Yet, if Duke’s assumptions

³⁰ Duke Carbon Plan, Ch. 4, at 5 (Table 4-1).

³¹ Duke Response to AGO DR 3-27 (Exhibit 6).

regarding green hydrogen are not fulfilled, these assets will become obsolete in 2050 and *spend nearly half of their useful lives dormant.*

As explained in the Gabel Report, Duke does not need to make investments in gas plants in the near term. The Companies point to their modeling to support their request for immediate investments in 800 MW of combustion turbines and 1,200 MW of combined-cycle generation. The Tech Customers' Preferred Portfolio, however, models in the near term only two new combustion turbines totaling 376 MW and no new combined cycle generation.³² Either way, the Gabel Report shows that Duke can rely on solar and storage to avoid the immediate need for investments in gas plants while technology evolves and markets mature.³³

B. The Commission Should Resist the Companies' Assertion That the Commission's Selection of a Particular Generation Asset in This Proceeding Should Be Controlling in a CPCN Proceeding.

The Commission should also be cautious of making a selection of any resource (including natural gas plants) in a manner that would foreclose fully investigating the investment in a subsequent CPCN proceeding. In its Carbon Plan filing, Duke claims that the Commission can revisit any decision to select a gas plant in a subsequent CPCN proceeding:

[T]he Companies are requesting the Commission to 'select' a defined amount of such resources, and have proposed substantial near-term development and procurement activities consistent with such defined amounts. *The Commission will have further opportunity to assess such projects through future CPCNs, or through other regulatory processes as deemed necessary.*"³⁴

³² Gabel Report, at 51.

³³ Gabel Report, at 51 (Figure 29).

³⁴ Duke Carbon Plan, Ch. 4, at 6 (emphasis added).

However, in a data response, Duke revealed its position that “to the extent the Commission selects a resource as part of an approved Carbon Plan, the Commission’s Carbon Plan ruling *should be controlling in a CPCN proceeding* absent a material change in facts and circumstances from Carbon Plan assumptions.”³⁵

The Carbon Plan proceeding lacks the same scrutiny of a CPCN proceeding. Commission Rules R8-61 and R8-62 require a CPCN application to include detailed site information, justifications for the project, agency approvals, construction dates, the utility’s most-recent IRP, environmental concerns, and alternatives considered—among other various pieces of information.³⁶ Duke’s Carbon Plan filing is devoid of most of this critical information. Therefore, the Commission’s “selection” of an asset should not preordain the approval of Duke’s CPCN application for the asset.

C. The Gabel Report Offers Specific Adjustments to Improve the Proposed Carbon Plan.

Duke’s proposed Carbon Plan is overly reliant across each of the modeled portfolios on unproven technology. As a result, the Companies fail to offer North Carolinians confidence that they will achieve the mandated carbon-reduction targets, or demonstrate that they are pursuing the “*least-cost path*” to such reductions.³⁷

The Gabel Report solves for these shortcomings by offering meaningful and achievable improvements to the Companies’ Carbon Plan, which fall within four buckets:

- **Customer mobilization.** The Companies need not carry the carbon-reduction burden alone. They collectively have some 3,700,000 customers in North Carolina, *many of whom are eager to reduce carbon emissions*. The Carbon Plan should establish more self-sourced renewable options—including renewable programs for large customers—and facilitate behind-the-meter renewable deployment.

³⁵ Duke Response to PS DR 11-2 (emphasis added) (Exhibit 7).

³⁶ See Commission Rules R8-61(a), (b); R8-62(c).

³⁷ N.C. Session Law 2021-165, § 1(1) (emphasis added).

- **Reallocation of transmission interconnection resources.** Any pathway to a clean grid will require investments in new transmission. Such investments can be reduced, through the use of existing transmission. Sites of retired generation should not be reserved for future gas plants, but should be eligible for solar and storage. Renewable generation can be sited to take advantage of the often unused transmission capacity assigned to peaking generation assets.
- **Power purchases.** Duke did not consider a general strategy of purchasing power in its modeling.³⁸ Not only is purchased power potentially less expensive than constructing new generation, purchased power also delays—and possibly avoids—the risks associated with building costly generation assets. With so much uncertainty clouding the pathway to carbon reduction, the cost savings and flexibility of purchased power should be a central pillar to the Carbon Plan.
- **Energy Efficiency.** The best way to reduce carbon emissions and limit costs is to reduce demand. The analysis shown in the Gabel Report indicates that there is more to be gained by additional emphasis on energy efficiency efforts.

Collectively, the improvements in the Gabel Report result in a resource plan that achieves similar carbon reductions as Duke’s Portfolio 1.³⁹ The Tech Customers’ Preferred Portfolio generation portfolio consists of more solar deployment and less reliance on natural gas plants and unproven advanced nuclear, while providing adequate capacity to meet North Carolina’s expected growth in energy demand⁴⁰ and a cost savings of over \$3 billion in net present value of revenue requirements (“NPVRR”) as compared to Duke’s Portfolio 1.⁴¹

III. DUKE’S REQUEST FOR APPROVAL OF PROJECT DEVELOPMENT COSTS AND DEFERRAL ACCOUNTING IS INAPPROPRIATE FOR THIS PROCEEDING.

Although this is not a cost recovery proceeding, the Companies are asking for the Commission to approve the recovery of costs related to their “initial development

³⁸ See Duke Response to Tech Customers DR 2-9 (Exhibit 2).

³⁹ Gabel Report, at 50–51.

⁴⁰ Gabel Report, at 51-52 (compare Figure 29 and Figure 30).

⁴¹ Tech Customers’ Preferred Portfolio model had a NPVRR of \$111.8 billion compared to Duke’s P1 model (at corrected price assumptions) having a NPVRR of \$108.8 billion. See Gabel Report, at 55.

activities” for small modular reactors, pumped storage, and offshore wind. There is no statutory basis for the preordained recovery of these costs. These costs also do not warrant deferral accounting.

The Companies provide minimal detail about the costs associated with these “initial development activities.”⁴² Nonetheless, Duke asks the Commission to (1) find that engaging in unspecified “initial project development activities” is “reasonable and prudent”;⁴³ (2) authorize deferral accounting for the development costs;⁴⁴ and (3) declare that, should the project ultimately be rejected, the development costs will nevertheless be recoverable.

Duke argues that its three-pronged request for preordained recovery and deferral accounting of its future development activities is “consistent with N.C. Gen. Stat. § 62-110.7[.]”⁴⁵ Duke’s request for cost approval goes well beyond the narrow scope of approval authorized in Section 62-110.7. First, Section 62-110.7 authorizes the recovery of project development costs for “a potential nuclear electric generating facility”⁴⁶—it does not authorize recovery of offshore-wind and pumped-storage development costs. Second, while Section 62-110.7 provides for the deferral accounting of development costs for *successful nuclear* projects, it does not provide for a return on costs for *cancelled* projects.⁴⁷

⁴² Duke Carbon Plan, Ch. 4, at 6.

⁴³ Duke Verified Petition for Approval of Carbon Plan, at 15.

⁴⁴ Duke Verified Petition for Approval of Carbon Plan, at 15.

⁴⁵ Duke Carbon Plan, Ch. 4, at 7.

⁴⁶ N.C. Gen. Stat. § 62-110.7(a), (b).

⁴⁷ The Commission held such in 2018, when it rejected Duke’s request for a return on the unamortized balance of the costs for the failed Lee Nuclear project. Order Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction, *In the Matter of Application of Duke Energy Carolinas, LLC, for Adjustment of Rates and Charges Applicable to Electric Utility Service in North Carolina*, Docket No. E-7, Sub 1146 (June 22, 2018), at 152 (“It should be noted that while N.C. Gen. Stat. § 62-110.7(c) provides for rate base treatment of project development costs and therefore includes a return, N.C. Gen. Stat. § 62-110.7(d), applicable to cancelled projects, only requires amortization of the costs and does not mention,

Third, Section 62-110.7 requires the utility to provide “such information and documentation as is necessary” to “demonstrate by a preponderance of the evidence” that it is prudent to incur the development costs.⁴⁸ The Companies offer only their proposed Carbon Plan, which, as explained above, does not establish the prudence of near-term SMR, offshore wind, and pumped-storage projects.

Duke also has not satisfied the test for deferral accounting. Succinctly stated, deferral accounting is warranted only if “the costs proposed for deferral are extraordinary in type and extraordinary in magnitude,”⁴⁹ with primary attention paid to whether the costs are extraordinary in nature.⁵⁰

Costs are extraordinary in type when they are “unanticipated, unplanned, beyond the control of the utility, and of an infrequent, non-recurring nature.”⁵¹ The development costs are none of the above. Prior to the Carbon Plan legislation, Duke had already *voluntarily adopted* its own carbon-reduction goals, including targets similar to the statutory objectives,⁵² and identified each project at issue—SMR, offshore wind, and pumped storage—as a potential resource in their 2020 IRP filings.⁵³ Thus, the projects are

and certainly does not mandate, a return.”). Notably, the Commission has never allowed a utility to earn a return on the unamortized balance of development costs of an abandoned nuclear plant. *Id.* at 160–61.

⁴⁸ N.C. Gen. Stat. § 62-110.7(b).

⁴⁹ Order Accepting Stipulations, Granting Partial Rate Increase, and Requiring Customer Notice, *In the Matter of Application by Duke Energy Carolinas, LLC, for Adjustment of Rates and Charges Applicable to Electric Utility Service in North Carolina*, Docket No. E-7, Sub 1214 (March 31, 2020), 138.

⁵⁰ Order Approving Amended Schedule NS and Denying Deferral Accounting, Docket No. E-22, Sub 517 (Mar. 29, 2016) at 11.

⁵¹ Carolina Water at 42.

⁵² In the Companies’ 2020 IRPs, Duke asserted that “[a]ll portfolios keep Duke on a trajectory to meet its near-term *enterprise* carbon-reduction goal of at least 50% by 2030 and long-term goal of net-zero by 2050.” Duke Energy Carolinas Integrated Resource Plan 2020 Biennial Report, Docket No. E-100, Sub 165 (Sept. 1, 2020), at 6 (emphasis added); *see also* Duke Energy Progress Integrated Resource Plan 2020 Biennial Report, Docket No. E-100, Sub 165 (Sept. 1, 2020), at 6 (same).

⁵³ In 2020, the Companies stated that their proposed portfolios “explore the most economic and earliest practicable paths for coal retirement; acceleration of renewable technologies including solar, onshore and *offshore wind*; greater integration of battery and *pumped-hydro energy storage*; expanded energy

routine resource-planning activities that Duke was already undertaking before Session Law 2021-165.

Costs are extraordinary in magnitude if they “will have a significant impact on the level of company earnings and the company’s ability to achieve its currently authorized rate of return on common equity.”⁵⁴ Duke has not provided evidence that, absent deferral, these development costs will have a material impact on its financial condition. In fact, Duke has provided *no evidence* to the Commission of any financial impact because the Carbon Plan does not disclose the expected development costs.

IV. DUKE’S EXCLUSION OF MARKET AND THIRD-PARTY SOLUTIONS IS INCONSISTENT WITH LEAST-COST PLANNING.

Duke’s proposed Carbon Plan reflects the preference to build new generation rather than purchase power from energy suppliers or otherwise participate in the market. This approach is likely to result in greater costs to consumers (as addressed above), and the omission of purchased power as an alternative to new-build generation is contrary to the expectations of Session Law 2021-165.

A. Session Law 2021-165 Requires Selection of the “Least Cost Path,” Not the “Least Cost *Utility-Owned Assets*.”

The General Assembly has clearly and consistently instructed the Commission to select the least-cost options to achieve the state’s carbon-reduction goals.

Four times the General Assembly reiterated the least-cost requirement of the Carbon Plan. First, the statute commands the Commission to develop a plan “*to achieve*

efficiency and demand response and deployment of new zero-emitting load following resources (ZELFRs) *such as small modular reactors (SMRs)*. Duke Energy Carolinas Integrated Resource Plan 2020 Biennial Report, Docket No. E-100, Sub 165 (Sept. 1, 2020), at 11 (emphasis added); *see also* Duke Energy Progress Integrated Resource Plan 2020 Biennial Report, Docket No. E-100, Sub 165 (Sept. 1, 2020), at 11 (same).

⁵⁴ Carolina Water at 43.

the least cost path consistent with this section to achieve compliance with the authorized carbon reduction goals (the “Carbon Plan”).”⁵⁵ Second, in developing the Carbon Plan, the Commission shall “[c]omply with current law and practice with respect to the least cost planning for generation, pursuant to G.S. 62-2(a)(3a)” in achieving the reduction goals and determination the necessary resources.⁵⁶ Third, to the extent the Commission selects new solar resources, it must do so “in adherence with *least cost requirements*.”⁵⁷ Finally, the Commission shall also “[r]etain discretion to determine optimal timing and generation and resource-mix *to achieve the least cost path to compliance* with the authorized carbon reduction goals[.]”⁵⁸

The repetitiveness of the command emphasizes the importance of selecting the least-cost resources available, regardless of owner. Indeed, Section (1)(2) directs the Commission to select the “least cost path”—not the least-cost *assets owned by the utility*. Likewise, Section (1)(4) speaks of the Commission having “*discretion to determine the optimal . . . generation and resource-mix to achieve the least cost path to compliance*”—not the discretion to determine the optimal generation and resource-mix *of utility-owned assets to achieve the least cost path*.⁵⁹

One might argue that the language in Section 1(2) requiring “[a]ny new generation facilities or other resources selected by the Commission . . . shall be owned and recovered by the applicable electric public utility” is a mandate that Duke own all resources selected.

⁵⁵ N.C. Session Law 2021-165, § 1(1) (emphasis added).

⁵⁶ N.C. Session Law 2021-165, § 1(1) (emphasis added).

⁵⁷ N.C. Session Law 2021-165, § 1(2)(b) (emphasis added).

⁵⁸ N.C. Session Law 2021-165, § 1(4) (emphasis added).

⁵⁹ It appears that the Companies themselves propose a Carbon Plan that selects the third-party-owned resources in importing of 600 MW of onshore wind, *see* Gabel Report, at 18, as well as generic 800 MW blocks of offshore wind prior to any expected completion of Duke’s offshore wind project. *See* Duke Response to Tech Customers DR 2-7(a) (Exhibit 3); *see also* Duke Carbon Plan, App. J, at 6.

However, such a reading is contrary to the Commission’s obligation to choose the least-cost path to compliance, because the Commission be forced to select more-expensive utility-owned assets despite the availability of less-expensive purchases of third-party power. Indeed, Section (3) empowers the Commission with “*discretion* to determine the *optimal . . . generation and resource-mix* to achieve the *least cost path* to compliance.” An obligation to always pick company-owned generation, even if it is more expensive than purchased power, would eviscerate the Commission’s discretion to achieve the least-cost path.

B. The Current Law and Practice of Least-Cost Planning Requires Consideration of Purchased Power.

The General Assembly defined the least-cost path as “[c]ompl[iance] with current law and practice with respect to the least cost planning for generation, pursuant to G.S. 62-2(a)(3a).” The current law is set forth in the General Statutes and the Commission’s rules, both of which require the consideration of purchased power as part of the least-cost analysis. Thus, it is not surprising that the Commission’s practice has also required utilities to consider purchased power as an alternative to building new generation.

1. The law includes Chapter 62’s and the Commission’s Rules dictates on least-cost planning.

Section 62-2(a)(3a) codifies North Carolina’s commitment to least-cost energy planning. The North Carolina Court of Appeals has recognized that prior to the adoption of Section 62-2(a)(3a), the “general practice [for resource planning] was to focus strictly on ‘supply-side’ considerations in analyzing the long-range needs for electricity in North Carolina,” such as “building new electricity generating units *or by purchasing power from*

other utilities.”⁶⁰ Thus, even before the codification of least-cost planning, resource planning was understood to include non-utility-owned resources such as power purchases.

In addition to Section 62-2(a)(3a), the CPCN process in Section 62-110.1 requires the Commission to analyze “the long-range needs for expansion of [generation] facilities” so as “to achieve maximum efficiencies” for ratepayers.⁶¹ As part of its analysis, the Commission must consider not only “generating plants” but also “arrangements for pooling power” and “other arrangements with other utilities and energy suppliers.”⁶²

Moreover, the Commission’s regulations are the equivalent of statutory laws.⁶³ Rule R8-60 requires public utilities to present an integrated resource plan (“IRP”) that is “at a minimum . . . a comprehensive analysis of *all resource options*” that will provide service “*at least cost* over the planning period.”⁶⁴ Importantly, the Rule then identifies specific topics that the utility must assess, the *first of which is purchasing power.*⁶⁵ Later, Rule R8-60(g) requires that “[t]he utility *shall analyze potential resource options and combinations of resource options . . . including, but not limited to, the risks associated with wholesale markets.*”⁶⁶ Rule R8-60 also enumerates the contents of a utility’s IRP report,

⁶⁰ *State ex rel. Utils. Comm’n v. N.C. Elec. Membership Corp.*, 105 N.C. App. 136, 139, 412 S.E.2d 166, 167 (1992).

⁶¹ N.C. Gen. Stat. § 62-110.1(c).

⁶² *Id.*

⁶³ *See, e.g., Taylor v. Superior Motor Co.*, 227 N.C. 365, 367, 42 S.E.2d 460, 461 (1947) (“[P]roper regulations authorized under the Act have the binding effect of law”); *see also, e.g., In re Declaratory Ruling by N. Carolina Com’r of Ins. Regarding 11 N.C.A.C. 12.0319*, 134 N.C. App. 22, 30, 517 S.E.2d 134, 140 (1999) (“Where an agency has the authority to act, its rules and regulations have the binding effect of statutes and may accordingly alter the common law.”).

⁶⁴ N.C.U.C. Rule R8-60(c)(2) (emphases added).

⁶⁵ N.C.U.C. Rule R8-60(d) (“Purchased Power. – As part of its integrated resource planning process, each utility shall assess on an on-going basis the potential benefits of soliciting proposals from wholesale suppliers and power marketers to supply it with needed capacity.”)

⁶⁶ N.C.U.C. Rule R8-60(g) (emphases added).

which must include a discussion of the utility's wholesale contracts for the purchase (and sale) of power.⁶⁷

2. The current practice of least-cost planning includes an assessment of whether purchased power is an alternative to building new generation.

In the last two decades, the Commission has instructed utilities, as part of the least-cost planning exercise, to consider purchased power as an alternative to construction of new generation. This instruction has come in various forms.

In 2007, DEC asked the Commission for a CPCN to build 1600 MW of coal generation.⁶⁸ As part of its analysis, the Commission referenced its obligation under Section 62-110.1 to consider, among other factors, “pooling” and “purchases.”⁶⁹ The Commission issued a CPCN for only 800 MW, rejecting DEC's claim that an additional 800MW was necessary to maintain adequate reserve margins. The Commission remarked that “there are many options besides a second Cliffside unit for making up the difference and regaining the desired reserve margin *Other options include purchases* (Hager testified that Duke is always looking for purchase opportunities)[.]”⁷⁰

In 2009, CP&L requested a CPCN for two combustion turbines.⁷¹ In the CPCN order, the Commission noted that “the Public Staff testified that it believes that utilities regulated by the Commission *should make every effort to look to the wholesale market as*

⁶⁷ See N.C.U.C. Rule R8-60(i)(4).

⁶⁸ See *Application of Duke Energy Carolinas, LLC, for Approval for an Electric Generation Certificate of Public Convenience and Necessity to Construct Two 800-MW State-Of-the-Art Coal Units for Cliffside Project*, Order Granting Certificate of Public Convenience and Necessity with Conditions, Docket No. E-7, Sub 790 (N.C.U.C. Mar 21, 2007).

⁶⁹ *Id.* at 10.

⁷⁰ *Id.* at 16 (emphasis added).

⁷¹ *Application by CP&L Co. for a CPCN to Construct Approximately 800 MW of Combustion Turbine Capacity in Rowan County, NC, and Approximately 800 MW of Combustion Turbine Capacity in Richmond County, NC*, Order Granting Certificates, Docket No. E-2, Sub 733 (N.C.U.C. Nov. 2, 1999).

*a possible source of capacity and energy to serve their customers.”*⁷² The Commission ruled that it “fully supports and concurs in the Public Staff’s concern that the electric utilities of this State *must properly assess the capabilities of the wholesale market when making resource additions* The Commission is of the opinion . . . *that utilities regulated by the Commission should make every effort to do so for possible sources of capacity and energy to serve their retail customers.* Therefore, the Commission concludes that *CP&L should fully consider the wholesale market for future generation resource additions[.]*”⁷³

In 2012, as part of the Duke-Progress merger, Duke agreed to Regulatory Condition 3.5, which obligates the Companies to “pursue *least cost* integrated resource planning” and “determine the appropriate self-built *or purchased power resources* to be used to provide future generating capacity and energy . . . on the basis of the benefits and costs of such siting and resources[.]”⁷⁴ In light of the plain language of Regulatory Condition No. 3.5, Duke is obligated to pursue least-cost resource planning, which includes consideration of purchased power.

⁷² *Id.* (emphasis added).

⁷³ *Id.* at 8 (emphasis added).

⁷⁴ *Order Approving Merger Subject to Regulatory Conditions and Cost of Conduct*, Docket Nos. E-2, Sub 998, E-7, Sub 986 (N.C.U.C. June 29, 2012), *as amended by Order Approving Merger Subject to Regulatory Conditions and Code of Conduct*, Docket Nos. E-2, Sub 1095, E-7, Sub 110, G-9, Sub 682 (N.C.U.C. Sept. 29, 2016). Regulatory Condition 3.5 reads in its entirety: “Least Cost Integrated Resource Planning and Resource Adequacy. DEC and PEC shall each retain the obligation to pursue least cost integrated resource planning for their respective Retail Native Load Customers and remain responsible for their own resource adequacy subject to Commission oversight in accordance with North Carolina law. DEC and PEC shall determine the appropriate self-built or purchased power resources to be used to provide future generating capacity and energy to their respective Retail Native Load Customers, including the siting considered appropriate for such resources, on the basis of the benefits and costs of such siting and resources to those Retail Native Load Customers.

V. THE TECH CUSTOMERS' REQUESTS FOR RELIEF.

Due to the technological uncertainties discussed above, coupled with the uncertainties surrounding South Carolina's willingness to support cost recovery for jurisdiction-specific investments,⁷⁵ Duke's Verified Petition for Approval of Carbon Plan focuses on near-term decisions. This focus is appropriate, but several of Duke's proposals are either premature, not supported by the evidence, or not reflective of a least-cost solution that will promote achieving North Carolina's carbon goals.

The Commission should enter an order requiring Duke to revise its modeling consistent with the law and the recommendations set forth in the Gabel Report. Upon receipt of the revised plan, the Commission will be in a position to approve a Carbon Plan which is better targeted to achieving the mandated carbon reduction targets on a least-cost basis. The revised plan, at a minimum, should incorporate:

- Additional enhancements to demand-side programs and energy efficiency as addressed in the Gabel Report.
- Improvements to Duke's transmission planning, including (1) development of a coordinated, portfolio-based transmission plan with the NCTPC, (2) study of the costs and benefits of joining a competitive wholesale market like PJM, (3) use of the existing sites and the Generator Replacement Request process to accelerate renewable resource deployment, and (4) use of Surplus Interconnection Service to deploy clean energy and storage at the sites of its existing thermal generators.

The Commission should also expressly reject Duke's contention that a Carbon Plan "selection" of a resource preordains the outcome of a future CPCN proceeding for such a

⁷⁵ *E.g.*, Ch. 1, at 2 ("The Companies also affirm that subsequent regulatory processes will be needed in South Carolina . . . , along with continued engagement with South Carolina stakeholders, in order to ensure continued dual-state alignment."); at 8 ("The Companies . . . are committed to continuing to work to achieve continued alignment through a future South Carolina IRP. . . . [T]he Companies are hopeful that the PSCSC will ultimately similarly find the continued energy transition to be in the public interest under South Carolina law."). *See also* Duke Response to WalMart DR 1-7 ("[T]he Companies expect to have more clarity in the 2024 Carbon Plan proceeding regarding the extent of state alignment") (Exhibit 8).

resource and it should make clear that any approval of short-term development actions does not constitute a commitment of the Commission regarding cost recovery.

IDENTIFICATION OF ISSUES FOR CONSIDERATION
AT EXPERT WITNESS HEARING

As directed by the Commission in its Order Establishing Additional Procedures and Requiring Issues Report issued April 1, 2022, the Tech Customers identify the following issues that may necessitate consideration at an expert witness hearing to be convened at the direction of the Commission:

- (1) Planning, optimization, and cost of intrastate and interstate transmission;
- (2) Whether Duke Energy should immediately start the construction of new natural-gas plants;
- (3) The availability and prices of power sold by third-party energy suppliers;
- (4) Whether Duke's proposed Carbon Plan is the least-cost pathway;
- (5) Whether the Companies have accurately accounted for the price volatility and supply risk of natural gas.

The Tech Customers reserve the right to amend or supplement this list based on input from and discussions with other stakeholders.

CONCLUSION

The Tech Customers respectfully submit these Comments for the Commission's consideration as it fulfills the General Assembly's mandate of charting North Carolina's least-cost pathway to carbon-neutral electricity.

Respectfully submitted, this 15th day of July, 2022.

/s/ Marcus W. Trathen

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Counsel for Tech Customers

Certificate of Service

I hereby certify that a copy of the foregoing TECH CUSTOMERS' COMMENTS ON PROPOSED CARBON PLAN AND ACCOMPANYING REPORT OF GABEL ASSOCIATES, INC. have been served this day upon all parties of record in this proceeding, or their legal counsel, by electronic mail.

This the 15th day of July, 2022.

BROOKS, PIERCE, MCLENDON,
HUMPHREY & LEONARD, LLP

/s/ Craig D. Schauer
Craig D. Schauer

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

REQUEST:

Has Duke Energy modeled (either directly or through third parties) potential savings that could accrue to customers by joining PJM or otherwise establishing an RTO (other than SEEM)? If so, provide a copy of the modeling.

RESPONSE:

Please see the Carbon Plan, Appendix B, page 13.

Responder: Glen Allen Snider, Managing Director, IRP & Analytics

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

REQUEST:

As a component of the Carbon Plan planning:

- a. Did Duke Energy evaluate or model the possibility of entering into PPAs (or other similar contractual arrangements) for the purchase of renewable energy and/or capacity? If so, please provide the analysis. If not, please state why the Company did not conduct such an analysis.
- b. Did Duke Energy evaluate or model the possibility of purchasing renewal energy facilities for third party owners or contracts? If so, please provide the analysis. If not, please state why the Company did not conduct such an analysis.

RESPONSE:

The Carbon Plan modeling for the four portfolios reflects the ownership requirements specified in HB 951, including the purchase of the allocated amounts of solar renewable energy from third parties. Chapter 4 of the Carbon Plan (Execution Plan) provides an overview of the Companies' general procurement approach, which includes plans for the potential of purchasing renewable energy facilities from third parties. In the near term, the 2022 solar procurement contemplates both the purchase of renewable energy from third parties as well as the purchase of renewable energy facilities from third parties.

Responder: Matthew Kalembe, Director, DET Planning & Forecasting

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

REQUEST:

Please reference pages 4-10 of Appendix J and Duke Energy Renewables Wind, LLC's selection as provisional winner of the Carolina Long Bay OCS-A 0546 lease area. The general facility to be constructed pursuant to this lease is referred to as the "Duke OSW Facility."

- a. Please confirm that the 800 MW blocks of OffShore Wind selected in Portfolios 1-4 (to the extent OffShore Wind is selected in any particular portfolio) is unrelated to any potential wind generated from the Duke OSW Facility.
- b. Provide the Company's best estimate of the total costs to be incurred in connection with the construction of the Duke OSW Facility broken down into various components of cost.
- c. How does Duke Energy propose to recover costs associated with construction of the Duke OSW Facility? In particular, does Duke Energy propose to include such costs in North Carolina ratebase and, if so, what is the mechanism by which Duke Energy would propose to utilize to include such costs incurred by its affiliated entity in ratebase.
- d. Provide a timeline for the completion of construction of the Duke OSW Facility.
- e. How will the Duke OSW Facility project be impacted if the South Carolina Public Service Commission does not permit cost recovery?
- f. What approval, if any, is Duke Energy seeking from the Commission in this proceeding with respect to the Duke OSW Facility (including any costs related to the Duke OSW Facility)?

RESPONSE:

- a. The offshore wind block selected in the Carbon Plan modeling is a generic offshore wind block and not a site-specific selection.

Responder: Clift Pompee, Managing Director, Generation Technology

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b. As explained in the Companies' response to 2-4(a), the offshore wind block selected in the Carbon Plan modeling is a generic offshore wind block and not a site-specific selection.

The following estimates for the Carolina Long Bay offshore wind facility are conceptual and subject to further development. These estimates are based on industry data and indicative pricing from one original equipment manager, adjusted for the year in which some of these expenses would occur. These projections could change over time due to a variety of circumstances. The estimates are also based on a 1,600 MW project in Carolina Long Bay with an In-Service date of 2032.

Lease Cost and Annual Rent Payment to BOEM - \$157M
Development Expenses (including engineering) - \$280M
Radial Transmission (from point of insertion to substation, incl. DC/AC converter station) - \$1,890M
Construction Expenses (incl. turbine procurement) - \$4,830M
Total: \$7,157M

Network Transmission (from substation to load-center) - \$995M

Total: \$8,152M

Responder: Adam R. Reichenbach, Lead Engineer

c. In this Carbon Plan, the Companies are not requesting that the Commission select offshore wind. Instead, the Companies have requested Commission approval to incur development costs in connection with offshore wind. To the extent that the Commission selects offshore wind as part of the Carbon Plan in the future, the related costs would be recovered through traditional cost-of-service based rates.

Responder (part c.): Clift Pompee, Managing Director, Generation Technology

d. As explained in the Companies' response to 2-4(a), the offshore wind block selected in the Carbon Plan modeling is a generic offshore wind block and not a site-specific selection.

The tentative timeline for the Carolina Long Bay offshore wind facility, based on BOEM regulations and industry experience, is as follows:

Site Assessment Plant (SAP) Development: Jul 2022 - Jun 2023
BOEM Review/Approval of SAP: Jun 2023 - Dec 2023

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Site Assessment Activities: Jan 2024 - Jan 2026
Construction & Operations Plan (COP) Development: Jan 2024 - Jul 2026
Permitting/COP Environmental Review/Approval: Jul 2026 - Jul 2029
Construction: Aug 2029 - Aug 2032

Responder: Adam R. Reichenbach, Lead Engineer

e. The Companies have not formally assessed a scenario in which the PSCSC does not permit cost recovery of any offshore wind facility selected by the Commission as part of the Carbon Plan. As explained in the Carbon Plan, the Companies intend to seek continued alignment between the states. To the extent that alignment cannot be achieved, it will be necessary for each state to separately plan to serve its respective retail load. In such an extreme scenario, the Companies believe that, if the Commission selected offshore wind facility as part of the Carbon Plan, this carbon-free resource would likely be needed serve NC retail load and would therefore continue to be part of the least-cost path to HB 951's CO₂ emissions reductions targets. In any event, as explained in the Carbon Plan, the Companies expect to have more clarity in the 2024 Carbon Plan proceeding regarding the extent of state alignment, at which point the Commission can determine whether to select offshore wind based on the then applicable regulatory framework.

f. The Companies have requested Commission approval to proceed with offshore wind development activities, as described in the Executive Summary and Chapter 4 (Execution Plan). Securing a lease is one of the development activities identified in Chapter 4 (*see e.g.*, Table 4-9).

Responder (parts e. and f.): Clift Pompee, Managing Director, Generation Technology

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

REQUEST:

Table E-55 states that between 900 and 1,100 MW of resources were added in 2050 to address “resource insufficiencies to meet the zero CO₂ emissions constraint and energy requirements in 2050.” Please respond to the following questions.

- a. Does this step represent the implementation of the “ENS Fix”, as described in the EnCompass Scenario Index file? If not, please identify which step this process is associated with.
- b. What types of resources were added and, if applicable, what are their fuels?
- c. Each final model output file includes two types of Contract:Purchase resources named “Fut Purc 1” and “Fut Purc 2”. However, in all four Portfolios, the model adds 10,000 MW of each resource in 2049 and 2050 (based on a review of the output files named in question 1). Please reconcile the data presented in Table E-55 with the model output data.

RESPONSE:

- a. Yes, this step represents the implementation of the "ENS Fix".
- b. Firm capacity in the form of small modular nuclear reactors was added to reduce the amount of non-firm economy purchases that would be required from a carbon constrained energy market represented by “Fut Purc 1” and “Fut Purc 2”.
- c. “Fut Purc 1” and “Fut Purc 2” represent the non-firm energy market that was used to achieve zero CO₂ emissions in 2049 and 2050.

The Companies added 10,000 MW of this resource but did not include it in Table E-55 because it is non-firm capacity from outside the Companies' service territory.

Responder: Gerald W. Morgan, Lead Engineer

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

REQUEST:

Please provide a list of all resources that were forced into the model in each year (i.e., not economically selected). This response should also describe why the particular resource was forced in and provide justification and support for the amount and timing of the resource.

RESPONSE:

Provided in “PS DR 3-11.xlsx” is a table of all resources by year that were not economically selected by the capacity expansion model, but included in the final Carbon Plan portfolios. Some of these resources were forecasted into the portfolio, meaning their inclusion is based on projects that are under development and planned to be interconnected. The rest were not economically selected by the capacity expansion model, but later validated to be appropriate for inclusion either economically validated or necessary to maintain reliability of the system. The basis for inclusion will be described for each resource or resource group below.



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sx

This file does not show existing resources, such as the current fleet, including Lincoln 17 (which is not yet under DEC control), or planned capacity uprates, such as nuclear uprates, which are prescribed into the model as well. It also does not include resources economically selected by the capacity expansion model.

This file presents data on a beginning of year basis, meaning resources are available to the system by Jan 1 of year listed, for the full year capacity and energy requirements.

Solar – Incremental forecasted solar represents projects in various stages of the interconnection process including HB 589 Green Source Advantage (“GSA”) and Competitive Procurement of Renewable Energy (“CPRE”) Tranches 1 and 2 projects. The Carbon Plan modeling also anticipates that current uncontracted projects under CPRE Tranche 3 would be connected prior to 2026, and the remaining uncontracted HB 589 GSA solar would connect throughout the remainder of the decade. The incrementally forecasted solar assumed in the Carbon Plan is included in Table E-27 in Appendix E.

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These resources are represented in the attached file as “Forecasted Standalone Solar” and “Forecasted Solar paired with Storage.”

Battery – The battery projects represent mid- and late-stage development projects with various storage capacity durations deployed through 2027. Near-term deployments in development are important for finding cost-effective and reliable solutions to meet Duke Energy’s customers’ energy needs. The forecasted batteries in the Carbon Plan represents a limited amount of grid-connected battery storage projects that will allow for a more complete evaluation of potential benefits to the distribution, transmission, and generation system, while also providing actual operation and maintenance cost impacts of batteries deployed at a significant scale.

These resources are represented in the attached file as “Forecasted Standalone 1-2 Hr Batteries” and “Forecasted Standalone 4+ Hr Batteries.”

Offshore Wind – The second 800 MW block of offshore wind put into service for the start of 2032 was prescribed into Portfolio 2. This resource was prescribed to represent the timeline necessary for integrating a total 1600 MW of offshore wind in meeting the interim CO2 emission reductions target to show the tradeoffs of delaying the achievement of the target to integrate the additional block of offshore wind.

The same 800 MW block of offshore wind for the start of 2032 was prescribed into Portfolio 4. This was done to show the tradeoffs of diversifying the resources used to achieve the CO2 emissions reductions target.

These resources are represented in the attached file as “Portfolio Prescribed Offshore Wind.”

Bad Creek Powerhouse II – Bad Creek PH II was prescribed into all portfolios in the capacity expansion step. As discussed in Appendix E, the capacity expansion model alone is not sufficient for evaluating energy storage resources. For this reason, the Companies included the resource in all portfolios and performed a separate comparative economic analysis for Bad Creek PH II utilizing the production cost model to validate inclusion in the modeling was economic against other long-duration storage options. More discussion on this analysis is included in the Portfolio Verification section of Appendix E. The Companies will continue to evaluate the value of long-duration storage on the system and its ability to provide significant power capacity in addition to facilitating reliable retirement of coal capacity.

This resource is represented in the attached file as “Economically Validated PS.”

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Battery-CT Optimization Replacements – As described in Appendix E the capacity expansion model may over value short duration energy storage. To evaluate the preliminary economic selection of these resources, the Companies performed analysis in the detailed production cost model to see if CT capacity was a more economic selection. This process proved a portion of the batteries selected were economically replaced with CTs and these replacement CT resources were included in the final portfolios.

These resources are represented in the attached file as “CT-Battery Economic Replacement.”

Reliability CTs – Portfolio LOLE and Resource Adequacy Validation step of the modeling verified portfolios' in maintaining the 0.1 LOLE reliability standard in 2030 and 2035. For Portfolio 1 through Portfolio 4, no additional capacity was identified to maintain the portfolios resource adequacy. For the alternate fuel supply sensitivity, these portfolios were also tested in this validation step identifying a limited number of resources were needed to maintain the reliability standard. The attach file only provides the final Carbon Plan portfolios and does not address sensitivity analyses.

These resources would have been represented in the attached file as “Reliability CT.”

Portfolio Reliability and CO2 Reduction Requirement Resources for 2050 – These resources were added at the very end of the planning horizon to address insufficiency of resources identified by the capacity expansion model in meeting energy requirements in the production cost model at the end of the planning horizon consistent with the Companies' reliability and CO2 emissions target requirements. The resources were modeled as nuclear SMRs, but could represent a non-CO2 emitting, dispatchable resource or otherwise adjusting load to meet energy and CO2 requirements of the system in 2050. These resources were added in between 2047 and 2049 to meet these requirements.

These resources are represented in the attached file as “Reliability and CO2 Reduction SMR.”

Responder: Michael Quinto, Lead Engineer – Carolinas IRP and Analytics

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

REQUEST:

Please explain why all of the natural gas resources assume a 35-year book life. Specifically, please explain how this is a reasonable assumption based on the statutory requirements of H951.

RESPONSE:

All natural gas resources (CCs and CTs) have 35-year book lives in the Carbon plan modeling because the design and usefulness of the resources is projected to last 35 years. This is a reasonable assumption, congruent with the statutory requirements of HB 951, because these new CC and CT resources, are either assumed to be built to operate exclusively on hydrogen, or to undergo conversion of the resources to be capable of operating exclusively on hydrogen by 2050, therefore meeting the modeling constraint of zero-CO₂ emissions and continuing to operate on the system through its book life. To account for the cost for conversion or built as 100% hydrogen capable, the Companies include a cost premium or conversion cost, as applicable, to allow the units to operate on hydrogen by 2050.

Responder: Michael T. Quinto, Lead Engineer, Carolinas IRP and Analytics

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

REQUEST:

On page 15 of its Verified Petition for Approval of Carbon Plan, and on page 28 of the Executive Summary, Duke requests that the Commission “[a]ffirm that the Companies’ Carbon Plan modeling is reasonable for planning purposes and presents a reasonable plan for achieving HB 951’s authorized CO2 emissions reductions targets in a manner consistent with HB 951’s requirements and prudent utility planning.” Please explain what Duke believes would be the consequences of Commission approval of Duke’s proposed Carolinas Carbon Plan. Specifically:

- a. How would approval of the proposed Carolinas Carbon Plan impact proceedings for CPCNs and CECPCNs necessary for resources identified in the plan (including, but not limited to, the determination of need for the project);
- b. How would approval of the proposed Carolinas Carbon Plan impact the determination of whether costs for a project are “reasonable and prudent” in a general rate case; and
- c. How would approval of the proposed Carolinas Carbon Plan impact applications for review of project development costs under NCGS 62-110.7 or other authority?

RESPONSE:

a. The Companies object to this request on the grounds that it calls for legal analysis and the impressions of counsel that are protected by the attorney-client privilege and, furthermore, seeks information regarding applicable law and potential Commission precedent that is publicly available. Without waiving the foregoing objections and reserving the Companies’ right to modify its legal position in the future, the Companies state that to the extent the Commission selects a resource as part of an approved Carbon Plan, the Commission’s Carbon Plan ruling should be controlling in a CPCN proceeding absent a material change in facts and circumstances from Carbon Plan assumptions. See the Companies’ comments in Docket No. E-100, Sub 178 for further details regarding the appropriateness of utilizing Carbon Plan determinations to inform future CPCN proceedings.

b. The Companies object to this request on the grounds that it calls for legal analysis and the impressions of counsel that are protected by the attorney-client privilege and, furthermore, seeks information regarding applicable law and potential Commission precedent that is publicly available. Without waiving the foregoing objections and reserving the Companies’ right to modify its legal position in the future, HB 951, Section 1 directs the Commission to take all reasonable

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steps to achieve the authorized CO₂ emissions reductions goals and requires that any new generation facilities or other resources selected by the Commission in order to achieve the authorized reduction goals shall be owned and recovered on a cost of service basis, excepting the required allocation for solar and solar-plus-storage resources. To the extent the Commission selects a resource as part of an approved Carbon Plan, it is both necessary and reasonable and prudent for the Companies to proceed with developing and/or procuring such resource, including by incurring costs which should be recoverable on a cost of service basis in a future proceeding (and in the case of new generating resources, the Commission will have a further opportunity to approve through any necessary CPCN proceeding). All activities of the Companies will be assessed in future rate cases to confirm the prudence of the Companies' execution.

c. The Companies object to this request on the grounds that it calls for legal analysis and the impressions of counsel that are protected by the attorney-client privilege and, furthermore, seeks information regarding applicable law and potential Commission precedent that is publicly available. Without waiving the foregoing objections and reserving the Companies' right to modify its legal position in the future, the Companies' request in this proceeding for approval of certain development costs (including development costs for SMRs) is functionally the same as Commission pre-authorization to incur project development costs under N.C. Gen. Stat. 62-110.7 (and the Commission is free to deem such approval for SMR development costs as occurring under N.C. Gen. Stat. 62-110.7). The Companies believe a Commission determination on this issue is appropriate at this time, which would obviate a need for any subsequent application under N.C. Gen. Stat. 62-110.7.

As identified in the Carbon Plan Executive Summary and further addressed in Chapter 4 (Execution Plan), at page 6-7, the Companies are requesting the Commission make the following three findings with respect to project development activities and associated costs relating to new nuclear and other proposed near-term development activities for long-lead-time new supply side resources:

- (1) engaging in initial project development activities for these resources is a reasonable and prudent step in executing the Carbon Plan to enable potential selection of these generating facilities in the future;
- (2) to the extent not already authorized under applicable accounting rules, that the Companies are authorized to defer associated project development costs for recovery in a future rate case (including a return on the unamortized balance at the applicable Company's then authorized, net-of-tax, weighted average cost of capital), subject to the Commission's review of the reasonableness and prudence of specific costs incurred in such future proceeding; and

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- (3) that in the event such 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.

See also the Companies' response to PSDR 7-6.

Responder: Glen Allen Snider, Managing Director, IRP & Analytics

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

REQUEST:

Please reference the Carbon Plan, Executive Summary, page 4, where in the Companies discuss the potential for "ultimate separation of the utilities" between South Carolina and North Carolina.

- a. Please confirm that the capacity factors calculated in Attachment III (Duke Energy Carolinas and Duke Energy Progress Effective Load Carrying Capability (ELCC) Study) are based on the average capacity factors for resources sited in North Carolina.
- b. If the answer to 7(a) is no, have the Companies performed any analysis of the capacity factors for renewable resources cited solely in North Carolina?
- c. Have the Companies performed any estimate of the increased costs to customers if there is an "ultimate separate of the utilities"? If so, please provide that analysis, including a description of the types of costs the Companies would expect to incur and the amount of such costs, if known.
- d. Please confirm that the Carbon Plan proposed by the Companies seeks to achieve the carbon reduction goals on a system-wide basis, i.e., including the Companies' South Carolina territories.
- e. If the answer to 7(d) is yes, describe all impacts the "ultimate separation of the utilities" would have on the Companies' Carbon Plan proposals.

RESPONSE:

- a. The Capacity Factors are based on average capacity factors across DEP and DEC separately. Since DEC and DEP each include both North Carolina and South Carolina within their respective jurisdictions, the solar capacity factors in both DEC and DEP are averages of sites across North Carolina and South Carolina.
- b. The Companies have not performed analysis of the capacity factors for renewable resources cited solely in North Carolina.

Responder (parts a and b): Matthew Kalemba, Director, DET Planning & Forecasting

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c. The Companies object to this request to the extent it seeks analysis that is subject to the attorney/client and attorney work product privileges. Notwithstanding and without waiving this objection, separation of the utilities, if ultimately deemed necessary, would require consideration of multiple different scenarios and potential options. Legacy assets, new resource plans and ownership, credit and financing impacts, along with required changes to operational functions and enabling infrastructure changes would need to be studied in detail and would be subject to regulatory review and approval from the NCUC, PSCSC and FERC.

Responder: Kendal C. Bowman, Vice President, State and Federal Regulatory Legal Support

d. Yes, the Companies' proposed Carbon Plan seeks to achieve the carbon reduction goals based on continued operation of a dual-state system. Please refer to the Executive Summary page 8, which states, "First and foremost, the Companies are committed to system-wide CO2 emissions reductions, targeting carbon neutrality for their entire system by 2050." Page 8 of the Executive Summary provides further details regarding modeling assumptions and siting of new resources.

Responder: Nathan Gagnon, Principal Planning Analyst

e. As explained in the Carbon Plan (see Executive Summary and Chapter 1), the Companies intend to seek continued alignment between the states. To the extent that continued alignment cannot be achieved, it will be necessary for each state to separately plan to serve its respective retail load. However, the Companies believe that the proposed near-term actions are reasonable and appropriate even in an extreme scenario involving separate state planning. In any event, as explained in the Carbon Plan, the Companies expect to have more clarity in the 2024 Carbon Plan proceeding regarding the extent of state alignment, which can then inform further modification of the Carbon Plan. See also the Companies' response to 1-7(c).

Responder: Kendal C. Bowman, Vice President, State and Federal Regulatory Legal Support