

**BEFORE THE NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. E-2, SUB 1300**

In the Matter of:	)	NORTH CAROLINA
Duke Energy Progress, LLC’s	)	SUSTAINABLE ENERGY
Request to Initiate Technical	)	ASSOCIATION, NORTH
Conference Regarding the Projected	)	CAROLINA JUSTICE CENTER,
Transmission and Distribution	)	NORTH CAROLINA HOUSING
Projects to be Included in a	)	COALITION, SOUTHERN
Performance-Based Regulation	)	ALLIANCE FOR CLEAN
Application	)	ENERGY, AND NATURAL
	)	RESOURCES DEFENSE
	)	COUNCIL’S JOINT COMMENTS
	)	ON DUKE ENERGY PROGRESS,
	)	LLC’S TRANSMISSION AND
	)	DISTRIBUTION INFORMATION
	)	FILING

Pursuant to the North Carolina Utilities Commission’s (Commission) June 15, 2022 *Order Scheduling Technical Conference and Setting Procedures for Technical Conference*, the North Carolina Sustainable Energy Association (NCSEA), North Carolina Justice Center (NC Justice Center), North Carolina Housing Coalition (NC Housing Coalition), Southern Alliance for Clean Energy (SACE), and Natural Resources Defense Council (NRDC) (collectively, the Intervenor) provide the following comments on Duke Energy Progress, LLC’s (DEP or the Company) Transmission and Distribution Information Filing (T&D Filing) submitted July 15, 2022.

I. TRANSMISSION

The Intervenor jointly retained Jay Caspary, Vice President of Grid Strategies LLC, to review the transmission related components of DEP’s T&D Filing. Mr. Caspary’s analysis is attached to this filing as **Exhibit A**. DEP’s proposed transmission projects will

require a significant amount of careful vetting, much more than is possible without discovery, and much more than can be achieved within the brief period following DEP's release of its proposed spending on transmission and distribution. Notwithstanding these limitations, Mr. Caspary recommends that the Commission should consider whether additional transmission investments would accelerate the integration of DEP's system with that of Duke Energy Carolinas, LLC (DEC). Second, Mr. Caspary notes certain discrepancies between the T&D Filing and the Red Zone Transmission Expansion Plan (RZEP) included in DEP and DEC's proposed Carbon Plan.¹ Third, Mr. Caspary recommends that the Commission consider whether "rightsizing" DEP's proposed transmission investments at this time would prevent future, larger costs. Fourth, Mr. Caspary recommends that the Commission investigate various Grid Enhancing Technologies (GETs). Finally, Mr. Caspary recommends that the Commission consider DEP's proposed transmission investments in light of current, ongoing proceedings before the Federal Energy Regulatory Commission, which suggest that utilities such as DEP should investigate various GETs in their transmission planning processes.

II. DISTRIBUTION

DEP's proposed distribution projects will require a significant amount of careful vetting, much more than is possible without discovery, and much more than can be achieved within the brief period following DEP's release of its proposed spending on transmission and distribution. Nevertheless, the Commission should be very skeptical of some of DEP's distribution proposals, several of which appear to be similar to widely

¹ *Verified Petition for Approval of Carbon Plan*, Docket No. E-100, Sub 179 (May 16, 2022).

criticized elements of Duke Energy's previous Power/Forward (2017) and Grid Improvement Plan (GIP, 2019) proposals.

The Intervenors were among the parties that reached a partial settlement with DEP in its most recent general rate case on a more limited scope of GIP distribution projects than the Company initially proposed.² Following the Public Staff's similar settlement on these issues,³ this diverse group of parties agreed to support deferral accounting treatment for the following distribution-related aspects of GIP:

- Self-Optimized Grid
- Conversion Voltage Regulation⁴ & Power Electronics for Volt/VAR Control
- Integrated System and Operations Planning (ISOP)
- Distribution Automation
- Distributed Energy Resources (DER) Dispatch Tool

In its Order approving deferral accounting treatment for the scaled-down package of GIP programs, the Commission decided that it would limit the amount of costs that would be allowed deferral accounting treatment to \$400 million.⁵

In its prospective three-year distribution planning, some of those same or related programs are slated to continue, while some would disappear:

² *Agreement and Stipulation of Settlement between DEP and NCSEA, NC Justice Center, NC Housing Coalition, SACE, and NRDC*, Docket No. E-2, Sub 1219 (July 23, 2020).

³ *Second Agreement and Stipulation of Partial Settlement between DEP and the Public Staff*, Docket No. E-2, Sub 1219 (July 31, 2020).

⁴ Initially proposed as Integrated Volt/VAR Control.

⁵ *Order Accepting Stipulations, Granting Partial Rate Increase, and Requiring Customer Notice*, Docket No. E-2, Sub 1219, at 141 (April 16, 2021).

Program (\$M)	2023-24	2024-25	2025-26	Total
Self-Optimizing Grid	\$74.40	\$58.00	\$83.20	\$215.60
Voltage Regulation & Management	\$77.80	\$59.00	\$67.90	\$204.70
ISOP	\$0.00	\$0.00	\$0.00	\$0.00
Distribution Automation	\$26.30	\$12.70	\$12.30	\$51.30
DER Dispatch Tool	\$0.00	\$0.00	\$0.00	\$0.00
Subtotal - Distribution Projects related to programs in GIP Settlement (\$M)				\$471.60

Notably: (1) the amounts that DEP is planning to spend on Voltage Regulation and Management are orders of magnitude greater than its previously planned spending on conservation voltage regulation (\$5 million/year in 2021 and 2022 when it initially proposed Integrated Volt/VAR Control); and (2) there is no longer planned spending in the ISOP or DER Dispatch Tool categories. In addition, the spending on these modernization programs is dwarfed by DEP's planned spending on more traditional distribution grid spending, such as tree removal, various distribution hardening and resilience projects, targeted undergrounding (TUG), and equipment retrofits. All told, these distribution plans would cost ratepayers \$1.353 billion dollars over the next three years. Intervenors also question DEP's insistence that grid maintenance programs like TUG or hardening and resilience of laterals "encourage DERs" or "encourage beneficial electrification" as claimed for all of DEP's planned distribution spending programs.

About \$188 million is planned for distribution-related spending in categories that appear to come from Power/Forward and GIP, though it is hard to say at this stage how much overlap remains from Duke's previous grid spending plans: TUG (\$103.9 million), Long-Duration Interruption (\$2.7 million), and Equipment Retrofit (\$83.4 million). Duke's prior TUG plans have received consistent criticism, including from the Intervenors'

witness Dennis Stephens in DEP's most recent rate case.⁶ Even though Witness Stephens ultimately agreed that deferral accounting treatment of the distribution-related investments from the stipulation was appropriate, his critique of DEP's TUG plans remains relevant. Witness Stephens recommended the Commission reject DEP's \$114.5 million TUG program because the reliability improvements were not guaranteed, noting that reliability improvements from reduced vegetation contact and weather can be lost to service interruptions caused by flooding or improper digging. He also testified to the increased difficulty in locating underground faults (when compared to overhead line faults) and the increased cost and difficulty of making repairs to underground lines. Witness Stephens also determined that the high costs for undergrounding were not justified, citing a Lawrence Berkeley National Laboratory report that found the benefit-to-cost ratio of undergrounding is 0.3 to 1, meaning that the costs exceed benefits by a factor of more than three.⁷ He also found fault with the supposed benefits DEP identified, which he found to be inflated and accrued overwhelmingly to commercial customers.

DEP's own materials show that even under its own calculations, at least one of its distribution proposals is not cost-effective. For example, the Distribution Hardening and Resilience: Public Interference program would deliver half as much benefit as the program would cost. The Intervenors ask the Commission to scrutinize DEP's cost-benefit calculations and consider carefully the values attributed to reducing momentary power outages and question whether distribution-related costs, which fall disproportionately on residential ratepayers, can be justified by supposed economic benefits to other classes of

⁶ Direct Testimony of Dennis Stephens on behalf of NC Justice Center, NC Housing Coalition, SACE, NRDC, & NCSEA, Docket No. E-2, Sub 1219, at pp. 28-38 (Apr. 13, 2020).

⁷ *Id.*, at p. 30 (citing Larsen P., *A Method to Estimate the Costs and Benefits of Undergrounding Electricity Transmission and Distribution Lines*, Lawrence Berkeley National Laboratory (October 2016)).

ratepayers. Given costs that can be expected to comply with the Carbon Plan, it will be all the more important to prioritize those distribution grid projects that are most essential for maintaining affordable, reliable service while meaningfully helping to integrate distributed energy resources.

III. CONCLUSION

The Intervenors respectfully request that the Commission take these comments into consideration in its deliberations about DEP's T&D Filing.

Respectfully submitted, this the 25th day of July, 2022.

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CERTIFICATE OF SERVICE

I hereby certify that all persons on the docket service list have been served true and accurate copies of the foregoing filing by hand delivery, first class mail deposited in the U.S. mail, postage pre-paid, or by email transmission with the party's consent.

This the 25th day of July, 2022.

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)	AND NATURAL RESOURCES
)	DEFENSE COUNCIL'S JOINT
)	COMMENTS ON DUKE ENERGY
)	PROGRESS, LLC'S
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EXHIBIT A

**Feedback on Transmission Projects in
Duke's Proposed 2022 DEP MYRP**

Jay Caspary

Vice President

Grid Strategies LLC



The transmission projects listed in Duke Energy Progress, LLC's (DEP) Multi-Year Rate Plan (2022 DEP MYRP) Transmission and Distribution (T&D) Technical Conference Presentation Materials primarily address the near term reliability requirements driven by known and committed load or resource additions. While it is good that Duke has identified the benefits of these projects, the details behind the benefit calculations should be shared to secure stakeholder support if prioritization is necessary. The North Carolina Utilities Commission (NCUC) should consider additional transmission upgrades that would accelerate the effective integration, consolidated operations, and joint dispatch of Duke Energy Carolinas, LLC (DEC) and DEP resources (DEC and DEP, collectively, Duke) for inclusion in an approved spending plan for the 2022 DEP MYRP. New and upgraded transmission infrastructure should be "rightsized" in anticipation of future needs.¹

Electric power transmission is a critical component of the bulk power system whose value is too frequently discounted. A coordinated and collaboratively planned transmission network is a tremendous asset that can enable efficient and effective decisions regarding future supply options. Transmission enables and defines markets. The lack of robust transmission capability can be very costly in terms of limiting supply choices. In addition, it limits flexibility that such robust capability provides for system operations to accommodate necessary rebuilds to replace aging infrastructure as transmission lines approach the end of life. The insurance value of robust transmission can be significant during extreme weather or cybersecurity events.

Robust transmission expansion provides operational benefits which are not captured with traditional planning models and tools. Traditional planning models reflect all lines in service, normalized load patterns, and units dispatched at maximum generating capabilities which create unrealistic models of the future. These "pristine" models—that

¹ In transmission planning, "rightsizing" generally refers to upsizing to a higher voltage class, multiple circuits, or higher capacity equipment when it comes to the bulk power system given the large economies of scale.

are overly optimistic in terms of facility availabilities—are typically the basis for long-term reliability and economic transmission expansion planning simulations. Reliability and economics are inseparable when it comes to the value proposition of prudent transmission expansion planning. A transmission expansion project needed for reliability, based on existing reliability standards, provides economic benefits that support grid operations. Conversely, economic upgrades in the near term will also provide reliability benefits that are difficult to quantify since operating conditions rarely mirror planned scenarios. The benefits associated with the flexibility and optionality provided by a strong electric transmission network are significant and will not be realized if incremental least cost planning is performed with limited planning horizons, particularly if those do not align with corporate, institutional, state, and municipal commitments to decarbonize their electric power supply resources by a date certain, as is the case following enactment of S.L. 2021-165 (H 951).

Transparency in Planning

Transparency is critical for long range transmission expansion planning to be effective. Terminology needs to be used consistently for transmission expansion projects. Terms such as “Reconductor,” “Upgrade,” and “Rebuild” are used to describe projects which increase capabilities of existing assets and must be standardized across all processes. For example, the four upgrades shown on slide 35 from the North Carolina Transmission Planning Collaborative’s June 27, 2022 Transmission Advisory Group (TAG) meeting, appear to be complete rebuilds, rather than simply reconductoring which is noted in the “Upgrade” column.² More importantly, in DEP Exhibit TC-9C, the “Cape Fear – West End 230kV line – Conductor Upgrade” project appears to actually be a “rebuild” based on the cost as well as the fact that Duke previously identified this project as a “rebuild” in a table for Red Zone Transmission Expansion Plan (RZEP) projects.³ The TAG’s list of identified RZEP projects includes upgrades to both the 115 and 230kV lines between Robinson Plant – Rockingham substations. While Exhibit TC-9C lists most of the RZEP projects that are designed to facilitate solar project integration, it does not include the Robinson Plant – Rockingham 115kV upgrade. While those upgrades appear to be the product of incremental, traditional planning decisions, a more optimal long-term solution could be identified to improve system performance and lower consumer costs for increasing system capability and lowering losses in that corridor.

System Consolidation

Planning decisions regarding long range transmission expansion need to take full advantage of existing assets and corridors. Duke’s electric power systems in the Carolinas have an opportunity to capture benefits for both DEC and DEP customers with effective planning and strategic decisions regarding the upcoming replacement of aging

² North Carolina Transmission Planning Collaborative, TAG Meeting Webinar (June 27, 2022), available at http://www.nctpc.org/nctpc/document/TAG/2022-06-27/M_Mat/TAG_Meeting_Presentation_for_06-27_2022_FINAL.pdf.

³ Duke’s Proposed Carbon Plan, Appendix P, Table P-3, Docket No. E-100, Sub 179 (May 16, 2022).

assets in, around and between the two systems. None of the projects proposed for inclusion in the 2022 DEP MYRP appear to improve the integration of the DEC and DEP systems. Duke has noted that there is no available import capability from DEC to DEP.⁴ Transmission expansion upgrades need to be identified and vetted which could accelerate the effective integration, consolidated operations and joint dispatch of DEC and DEP.

Asset replacement has become a major issue as it now drives capital budgets for transmission projects in most, if not all, utilities. The Duke electric power systems in the Carolinas have an opportunity to capture benefits for both DEC and DEP customers with effective planning and strategic decisions regarding the upcoming replacement of aging assets in, around, and between the two systems. Planning for infrastructure must have a long-term focus and incorporate reasonable assumptions regarding the remaining life of transmission lines, particularly those in critical corridors. Transmission planning to address future needs must take advantage of asset management information to better inform investment decisions.

Rightsizing

Planning should not just incorporate asset management decisions as an input into its studies, but rather those efforts need to work together in a proactive, holistic manner to identify opportunities for “rightsizing” aging assets that can defer or displace traditional transmission expansion needs from conservative planning assessments done in isolation. A particular focus on critical corridors is warranted to ensure that transmission expansion plans are not short-sighted, focusing only on local needs, but also support the long-term needs for a decarbonized grid in and around Duke’s system in the Carolinas. Based on DEP’s T&D filing, it is unclear whether the planning has been done to capture all the available benefits from transmission expansion.

Duke’s proposed Carbon Plan includes the status of the initial set of RZEP upgrades that Duke believes need to be resolved as soon as possible.⁵ These upgrades seem to be a reasonable start to provide some certainty for renewable energy developers to submit competitive proposals so that Duke can achieve the decarbonization requirements of H 951. Renewable energy developers who face interconnection cost risks will charge a higher price for their offerings, especially those offering high quality generation resources in relatively weak portions of the bulk power system. These higher generation prices can be mitigated via proactive transmission planning. Although Duke is proposing to incorporate RZEP projects “into the Local Transmission Plan by mid-year 2022,”⁶ and they represent an important first step towards resolving constraints, it is critically important to note that these upgrades only address immediate needs and do not address long term needs. It is important to understand which of these RZEP should be candidates for “rightsizing” and how much incremental capacity at what incremental

⁴ Duke’s Proposed Carbon Plan, Appendix P, p. 16, Docket No. E-100, Sub 179 (May 16, 2022).

⁵ Duke’s Proposed Carbon Plan, Appendix P, Table P-3, Docket No. E-100, Sub 179 (May 16, 2022).

⁶ Duke’s Proposed Carbon Plan, Appendix P, p. 13, Docket No. E-100, Sub 179 (May 16, 2022).

cost can be expected to result in order to construct a transmission system necessary to meet North Carolina’s long-term decarbonization requirements in a least-cost manner. The ability to “rightsized” key facilities will depend upon many factors including the size of existing rights-of-way as well as the potential consideration of transmission designs to increase power densities. The existing 230kV facilities from Robinson Plant – Rockingham – West End – Cape Fear, especially given the parallel Robinson Plant – Rockingham 115kV line that also is projected to overload, transverse the high-quality solar zones and appear to be an excellent candidate for “rightsizing” now to avoid future, larger expenses.

Advanced Technologies

Major transmission projects can show tremendous economies of scale that need to be captured, as appropriate. For example, when constructing transmission structures, small incremental costs can allow the structure to support a second circuit or even higher voltage that may ultimately be necessary in the long term. The NCUC’s approved spending plan for the 2022 DEP MYRP should consider the advantages of advanced transmission technologies, which are proven and are being used more regularly by other utilities to maximize the value of assets.

In addition to rightsizing and future-proofing select lines in key corridors, DEP needs to give serious consideration of the effective deployment of Grid-Enhancing Technologies (GETs) or Advanced Conductors (defined below) to facilitate grid decarbonization efforts. Duke should evaluate the merits of deploying GETs, such as Dynamic Line Ratings, Advanced Power Flow Controls or Topology Optimization, to address project system overloads and congestion and/or accelerate the integration of renewable resources in advance of planned transmission expansion projects. In addition, Advanced Conductors should be considered for future reconductors, as well as uprates of existing lines to higher operating temperatures to address known clearance issues.

Grid Enhancing Technologies

GETs can also enhance the value of, and provide operational flexibility to complement, major transmission expansion projects too. For example, lower voltage facilities tend to limit the value of major backbone projects in operations that may not even be considered in planning efforts. This is especially true given outages to replace/rebuild aging facilities that create congestion for existing and proposed resources. GETs can be deployed and redeployed as the grid evolves to manage system flows and congestion. GETs can even become part of permanent solutions too, as appropriate. RZEP identifies the need to rebuild both the 115kV and 230kV circuits between Robinson Plant and Rockingham as shown on slides 29-30 of the latest TAG presentation.⁷ Duke and the NCUC should consider non-traditional solutions not only because they are likely to lead to a least-cost path to the H 951 carbon-reduction targets in the near term, but also

⁷ North Carolina Transmission Planning Collaborative, TAG Meeting Webinar (June 27, 2022), available at http://www.nctpc.org/nctpc/document/TAG/2022-06-27/M_Mat/TAG_Meeting_Presentation_for_06-27_2022_FINAL.pdf.

provide benefits in addressing longer term needs and leveraging those facilities in that key corridor.

Federal Energy Regulatory Commission consideration of GETs

The Federal Energy Regulatory Commission (FERC) Notice of Proposed Rulemaking (NOPR) on **Building for a Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection**⁸ in Docket No. RM21-17 issued April 21, 2022, has important implications for optimal system planning. As proposed, the NOPR will require 20-year holistic planning studies which are proactive, scenario-based and consider low-frequency, high-impact events such as extreme weather events. To that end, the NCUC should direct Duke to engage in the Southeast Regional Transmission Planning process to identify more efficient, cost-effective regional transmission solutions to facilitate meeting the Carbon Plan targets. In addition, to improve the planning process, the NOPR as proposed will require the incorporation of Dynamic Line Ratings (DLR) and Power Flow Controllers into planning processes to leverage proven technology and maximize the utilization of existing transmission assets without sacrificing reliability. While the use of DLR can improve operational efficiencies, allowing grid operators to better manage congestion and minimize curtailments of non-dispatchable renewable resources, it will take time to deploy sensors and collect data to update parameters used in static normal and emergency ratings to reflect actual and expected ambient conditions for long range planning studies.

In the NOPR on **Improvements to Generator Interconnection Procedures and Agreements**⁹ in Docket No. RM22-14 released June 16, 2022, FERC is proposing that Transmission Service Providers evaluate Alternative Transmission Technologies. FERC expects that GETs be considered to facilitate the timely integration of new resources stuck in existing generator-interconnection queues. GETs are advanced transmission technologies such as dynamic line ratings, advanced power flow controllers, and topology optimization that leverages sensors and algorithms to better manage flows and congestion of the bulk power system. GETs can also include “Storage as Transmission” that may be a preferred solution as part of an optimal portfolio of transmission expansion projects. GETs can be installed and redeployed to better manage congestion while providing a quick payback to consumers. Duke needs to make changes to existing processes to incorporate non-traditional solutions such as system reconfiguration alternatives and other GETs.

Advanced Conductors

⁸ *Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection*, Federal Energy Regulatory Commission Docket No. RM21-17-000 (April 21, 2022), available at <https://www.ferc.gov/media/rm21-17-000>.

⁹ *Improvements to Generator Interconnection Procedures and Agreements*, Federal Energy Regulatory Commission Docket No. RM22-14-000 (June 16, 2022), available at <https://www.ferc.gov/media/rm22-14-000>.

In addition to “rightsizing” upgrades to address long term needs to support decarbonization requirements, DEP needs to give serious consideration to the use of advanced conductors to increase the capability of existing lines without upgrading existing structures, if appropriate. Regarding “reconductoring” projects, DEP needs to give serious consideration to the use of high temperature, low sag composite core conductors (Advanced Conductors), such as Aluminum Conductor Composite Core (ACCC) or Total Solution (TS) Conductor, as an alternative to traditional Aluminum Conductor Steel Reinforced (ACSR). While reconductoring with Advanced Conductors has a cost premium, the ability to leverage existing towers can greatly accelerate renewable project integrations as reported in **Advanced Conductors on Existing Transmission Corridors to Accelerate Low Cost Decarbonization**.¹⁰ In some cases, existing structures, not just conductors, need replacement. In such a case, a rebuild using Advanced Conductors needs to be considered since that design can be expected to result in fewer and shorter structures that can more than offset the cost premium associated with the conductor choice. Advanced Conductors provide greater efficiency, lower line losses, and higher loadability to help with extreme weather and resilience events, which are notable benefits that may not be considered as part of conductor selection.

Further Opportunity

As a result of the Bipartisan Infrastructure Law¹¹, significant resources are now available to Duke and others to support future grid developments. Further, on July 6, 2022, the U.S. Department of Energy (DOE) released the first \$2.3 billion Formula Grant under the Building a Better Grid Initiative. It’s good to see that the NCUC has opened Docket No. M-100, Sub 164. Duke needs to work with DOE and other partners to fully capitalize on these resources and optimize their benefits to its customers. For example, Duke should consider the deployment of new Advanced Conductors with a certified installer as part of a DOE project to leverage existing structures, improve grid efficiency by lowering losses, and gaining critical operating experience with designs which deploy fiber optics in the composite core to ensure proper handling and installation of new Advanced Conductors. DOE resources may be available to support non-traditional transmission expansion solutions which would provide long-term benefits to Duke and its customers.

Certain projects proposed by DEP—like the RZEP projects between Robinson Plant and Cape Fear—are in a critical corridor and are appropriate and necessary. But the NCUC should direct Duke to do more proactive transmission planning to “rightsized” and “future proof” the transmission grid to support long-term needs and decarbonization goals in a least-cost manner.

¹⁰ *Advanced Conductors on Existing Transmission Corridors to Accelerate Low Cost Decarbonization*, Jay Caspary and Jesse Schneider (March 2022), available at <https://gridprogress.files.wordpress.com/2022/03/advanced-conductors-on-existing-transmission-corridors-to-accelerate-low-cost-decarbonization.pdf>.

¹¹ Infrastructure Investment and Jobs Act, H.R. 3684, 117th Cong. (2021).