ATTACHMENT B

DUKE ENERGY'S UNREASONABLE, IMPRUDENT CARBON PLAN: HIGH BILLS AND MORE BOONDOGGLES PROPOSED FOR DUKE RATEPAYERS

NCUC Docket No. E-100, Sub. 179

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I. Qualifications

I have been an energy, consumer, and environmental advocate for more than 30 years. I have spent 20 years' lobbying various public policy matters, including energy and utility issues, at the Indiana General Assembly and before the Indiana Utility Regulatory Commission. My educational background includes a Bachelor of Arts in History and German and Master of Arts in Teaching German from Indiana University. The past 24 years of my work have focused directly on energy and utilities advocacy on behalf of citizen and ratepayer groups.

As Director of Utility and Energy Programs at the Citizens Action Coalition of Indiana from 1998 to 2004, my responsibilities included negotiating with utility companies, participating in rulemaking, coordinating with expert witnesses and attorneys before the Indiana Utility Regulatory Commission, and testifying periodically as a policy witness. From 2004 to 2011, I served as Executive Director of the organization.

From 2011 through the fall of 2017, I was the Senior Energy Policy Advisor at the Civil Society Institute, or CSI, based in Newton, Mass. For CSI, I conducted national energy market research, crafted the organization's energy policy, tracked power sector technological and policy developments for organizational partners, attended conferences on power sector and water-related issues, and worked with consultants on CSI-commissioned reports.

From fall of 2017 to present, I have served as the Senior Energy Policy Advisor for the Environmental Working Group, a national nonprofit organization whose mission is to use research to empower citizens to make informed and healthy choices and promote a healthy environment. In this capacity, I have assisted with developing the organization's energy policy; co-authored reports on Duke Energy and trends in technological developments, such as green hydrogen and prospects for the clean energy workforce; written numerous blogs on energy technology trends and policy and regulatory developments (including on rate structure); and drafted comments for the net metering proceedings in California. A copy of my CV is attached as **Exhibit 1**.

II. Purpose of the Report

The purpose of this report is to examine Duke Energy's Carbon Plan for North Carolina. The report finds:

1. Duke's Carbon Plan is not an actual least cost proposal; rather, it seeks to redefine least cost in the context of its preferred business plan.
2. Duke downplays both the availability of currently-available, cost-effective clean technologies and measures and the development of new and/or improved renewable and energy-efficient technologies to justify waiting—perhaps indefinitely—for "new" nuclear technology.
3. Duke attributes minimal gains achievable from energy efficiency efforts and appears to have no plans to create a more expansive energy efficiency program, despite widespread implementation and demonstrated success of more ambitious energy efficiency plans from other major US utilities.
4. Duke seeks a blank check, payable by ratepayers, to experiment with nuclear and other technologies, with no guarantees that said nuclear units will be available or necessary. Further, Duke proposes that ratepayers assume the risks of these unproven technologies rather than stockholders, though stockholders are the proper risk-bearing party.

5. Duke's plan does not consider electric system resiliency that, if approved, would impose excess costs on ratepayers and on North Carolina's economy well into the future.
6. With this current proposal, Duke is maneuvering to cement its business plan as state policy, limiting the Commission's future authority to initiate any substantial changes.
7. The Commission must reject Duke's Carbon Plan in its entirety and dictate terms to Duke that will ensure an affordable, clean, and resilient electric system for its residential and business ratepayers.

III. Summary

On November 16, 2021, the Commission issued *Order Requiring Carbon Plan and Establishing Procedural Deadlines* pursuant to HB 951 (S.L. 2021-165). On May 16, 2022, Duke Energy filed its North Carolina Carbon Plan on behalf of Duke Energy Progress (DEP) and Duke Energy Carolinas (DEC)[1] and its Verified Petition for Approval of Carbon Plan.[2]

EWG strongly urges the Commission to seek out input on other approaches to Duke's proposed Carbon Plan. The structure of HB 951 does not lend itself well to significant changes once the proposed Plan is adopted, and it is disputable whether the Commission has sole discretion to alter the Carbon Plan once it is approved. In light of this rigidity, Duke's aim is to lock in a proposal that emphasizes development of additional natural gas and nuclear capacity by gaining a Commission determination that natural gas and nuclear options are least-cost, reasonable, and prudent. At the same time, Duke seeks up-front approval for cost recovery at a future date for investing in the development of nuclear power and other technologies.

Preparatory development and procurement costs for potential technologies that may or may not be deployed later on should be the domain of stockholder, not ratepayer, risk. This is particularly true for a technology as troublesome as nuclear

[1] *See* Duke Energy, CAROLINAS CARBON PLAN (May 16, 2022) [hereinafter Carolinas Carbon Plan].
[2] *See* Duke Energy Company & Duke Energy Progress Verified Petition for Approval of Carbon Plan, Docket No. E-100 Sub 179 (N.C.U.C. May 16, 2022).

power, which has been a financial disaster from its inception. With Duke's preferred small modular nuclear strategy marred with cost overruns and delays even in the design phase, Duke's plan to implement small modular nuclear is projected to be as disastrous as previous iterations of nuclear development.

In light of nuclear power's high costs and uncertain returns, it is difficult to understand why mature, cost-effective power generation methods like distributed solar, battery storage, and on- and offshore wind, as well as energy efficiency measures, continue to play such a minor role in Duke's arsenal of power generation. Despite market developments to the contrary, Duke continues to hang its hat on much more expensive natural gas and nuclear power—sources whose availability remains in question even as distant as a decade from now.

In addition, Duke continues to underestimate the impacts of climate change on system resiliency. There is no real discussion or emphasis on the distributed electric grid paradigm, which case studies and actual results from states friendly to distributed solar, such as Massachusetts, consistently show to be more cost-effective and resilient than Duke's central-system preference.

In sum, Duke's policy positions are not reasonable, prudent, or even tenable. Duke's plan for energy generation prioritizes implementation of its expensive and technologically uncertain business plan over the realities of future climate conditions, relying on adoption of the Plan in its "entirety" to define its plans for nuclear and natural gas as least-cost despite abundant data to the contrary. Further, Duke's plan does so regardless of costs to ratepayers and of clear market signals that suggest the wisdom of pursuing solar and wind alternatives.

IV. With this current proposal, Duke could cement its business plan as state policy, limiting the Commission's authority going forward to initiate any substantial changes.

EWG fears that adoption of Duke's proposed plan could severely restrict the Commission's ability to make necessary changes to the Carbon Plan in the future. With approval of Duke's Carbon Plan, the Commission may be presenting itself with a pre-approved fait accompli regarding future construction plans and ratemaking and kneecapping its ability to take future decisive action.

Duke repeatedly states, without justification, that its Carbon Plan is "reasonable" and "prudent," assertions that EWG strongly disputes.[3] Through a series of "least cost" portfolios throughout the Plan and in attachments, Duke emphasizes its history of "reasonable and prudent utility planning practices and decisions,"[4] highlighting its "dual state approach to least-cost planning"[5] and utilization of "well-established planning principles."[6] Next it ties the Carbon Plan to a "prudent, orderly, and cost-effective energy system transition."[7] Duke then describes how its Plan is "reasonable and prudent"[8] in the context of the national energy transition and the "momentum across the country for clean energy."[9]

This discussion leads to the following crucial statement:

> Given all these factors, the Carbon Plan represents prudent long-term electric resource planning that *complies with current law and practice* with *respect to least-cost planning* for generation and allows the Companies to further advance the energy transition that is already underway.[10]

This language refers directly to HB 951. It also makes the conclusory case that Duke's proposed business plan is least-cost, pointing to statutory language in G.S. 62-2(a)(3a) that requires least-cost planning, presenting a least-cost rubric in Chapter 3, *Portfolios*:

> The Companies' two pathways and four portfolios *utilize least-cost planning* to accomplish this all-of-the-above energy transition strategy as presented in Figure 3-1 (each portfolio as of the beginning of the year in which the 70% interim target is reached) and Figure 3-2 (all portfolios as of the beginning of 2035).[11]

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[3] *See generally* CAROLINAS CARBON PLAN, *supra* note 1.
[4] *Id*. at 1.
[5] *Id*.
[6] *Id*.
[7] *Id*.
[8] *Id*.
[9] *Id*.
[10] *Id*. at 2 (emphasis added).
[11] CAROLINAS CARBON PLAN, *supra* note 1, at Chapter 3 at 2 (emphasis added).

Most egregiously, however, Duke asks the North Carolina Utilities Commission to adopt "*in its entirety*," a Plan "which includes both a defined set of near-term procurement and development activities and four primary portfolios that allow for flexibility over time"[12] (emphasis added). It then clarifies its request, seeking recognition and specific findings that all portfolios presented are "reasonable and prudent utility planning" in the context of HB 951:

> "[T]he companies believe the Commission should approve the proposed near-term activities and further affirm that the Companies' Carbon Plan modeling *across all portfolios* 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."[13]

Approving Duke's requested language risks severely limiting the Commission's role going forward. If the current iteration of the proposed Carbon Plan is approved, DEC and DEP could become co-decisionmakers with the Commission. Once the Plan is approved, according to Section 1(1) of HB 951, "The Carbon Plan shall be reviewed every two years and may be adjusted as necessary in the determination of the Commission *and* the electric public utilities."[14] The operative term "and" creates the requirement that future alterations to the Plan be approved by the Companies *as well as* the Commission, hamstringing the Commission's ability to make case-by-case, reasonable, and prudent determinations or to alter the Carbon Plan as may be necessary to achieve carbon neutrality by the target date. Further, while Section 1(4) provides that the Commission will "retain discretion to determine optimal timing and generation and resource-mix to achieve the least cost path to compliance with the authorized carbon reduction goals,"[15] the argument is circular if the Commission has already noted its approval of Duke's plan in its "entirety" as requested in Section 1(2), giving Duke leverage in pursuing its expensive natural gas- and nuclear-dominated power strategy regardless of actual costs.

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[12] *Id.* at 27.
[13] *Id*.
[14] 2021-165 N.C. Sess. Law 1 (emphasis added).
[15] *Id.* at 2.

V. The Commission should address several additional considerations regarding Duke's proposed Carbon Plan.

The Proposed Carbon Plan is inadequate in critical ways.

First, rather than rely on significant buildout of proven, cost-effective and investment-rich wind and solar technologies, Duke's Plan relies heavily on uncertain, speculative nuclear efforts that have not progressed beyond the design stage despite decades of development.

Essential Utility-Scale Resources are Marginalized in the Plan

ONSHORE AND OFFSHORE WIND

Duke has consistently avoided development of wind power.[16] North Carolina has approximately 200 megawatts of installed wind capacity,[17] representing about 0.4% of the state's net power generation.[18] The potential for much more wind capacity in the state has long gone unrecognized, with Duke apparently uninterested in developing more. For example, while Duke has forecasted only 1,200 megawatts of onshore wind power in its Carbon Plan by 2035,[19] it is estimated that an additional 80,000 megawatts of technical wind generation potential has remained unexploited over the past decade.[20] The US had its best year ever for capacity additions in 2020, during the pandemic, and capacity factors have only increased, making North Carolina an outlier in wind development relative to the nation as a whole.[21]

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[16] *See, e.g.*, Grant Smith, *Public Energy Enemy No. 1* (ENV'T WORKING GRP. Apr. 16, 2019), https://www.ewg.org/research/public-energy-enemy-no-1.

[17] *U.S. Installed and Potential Wind Power Capacity and Generation*, OFF. OF ENERGY EFFICIENCY AND RENEWABLE ENERGY, (U.S. DEP'T OF ENERGY, 2022), https://windexchange.energy.gov/maps-data/321.

[18] *Electricity Data Browser*, ENERGY INFO. ADMIN. (2021), https://www.eia.gov/electricity/data/browser/#/topic/0?agg=2,0,1&fuel=vtvv&geo=00000004&sec=g&linechart=ELEC.GEN.ALL-NC-99.A&columnchart=ELEC.GEN.ALL-NC-99.A&map=ELEC.GEN.ALL-NC-99.A&freq=A&ctype=linechart&ltype=pin&rtype=s&pin=&rse=0&maptype=0 (showing that state net generation was about 131 million MWhs in 2021).

[19] CAROLINAS CARBON PLAN, *supra* note 1, at 3.

[20] *U.S. Installed and Potential Wind Power Capacity and Generation*, *supra* note 17.

[21] Lora Kolodny, *The U.S. Added More New Energy Capacity From Wind Than Any Other Source Last Year*, CNBC (Aug. 31, 2021), https://www.cnbc.com/2021/08/31/us-added-most-new-energy-capacity-from-wind-in-2020.html.

Offshore wind also has strong development prospects. Global analytics firm IHS Markit has estimated that the US could see $100 billion in offshore wind investment by 2030.[22] And the offshore wind technical potential off the coast of North Carolina is substantial. According to a 2016 analysis by the National Renewable Energy Laboratory ("NREL"), North Carolina ranks second among Atlantic coast states for technical offshore wind potential.[23] Although Duke foresees up to 1,600 megawatts by 2035 in its Plan,[24] the Governor, in a recent executive order, has called for 2,800 megawatts of offshore wind by 2030 and 8,000 by 2040.[25] The net technical potential is more than 30,000 megawatts out to 14 miles from the coast.[26]

A 2021 analysis conducted by the North Carolina Department of Commerce, with data from NREL and economic development impact modeling, assesses the economic impact of a 2,800-megawatt windfarm nearly 30 miles from the coast.[27] If the state were to build out the local supply chain for offshore wind, the project would generate about 20,000 construction and supply chain jobs during construction and about 1,500 ongoing jobs once construction is complete.[28]

The Department of Commerce points to an analysis by BVG Associates which projects that the US offshore wind industry will be valued at $140 billion by 2035, with installed capacity of 140,000 megawatts.[29] Whether this level of capacity is installed or not, the IHS Markit analysis describes a mature industry that will thrive within the next decade.

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[22] Andrei Utkin, *U.S. Offshore Wind to Grow Rapidly, But Likely Fall Short of 2030 Target: IHS Markit*, S&P GLOBAL (July 28, 2021), https://cleanenergynews.ihsmarkit.com/research-analysis/us-offshore-wind-to-grow-rapidly-but-likely-fall-short-of-2030.html.

[23] WALT MUSIAL ET AL., 2016 OFFSHORE WIND ENERGY RESOURCE ASSESSMENT FOR THE UNITED STATES (Nat'l Renewable Energy Lab'y, Sept. 2016), https://www.nrel.gov/docs/fy16osti/66599.pdf.

[24] CAROLINAS CARBON PLAN, *supra* note 1, at 3.

[25] N.C. Exec. Order No. 218 (June 9, 2021).

[26] MUSIAL ET AL., *supra* note 23, AT 68.

[27] JOHN HARDIN ET AL., OFFSHORE WIND: GENERATING ECONOMIC BENEFITS FOR NORTH CAROLINA 2 (N.C. Dep't of Com., 2021), https://files.nc.gov/nccommerce/documents/files/NC-Offshore-Wind-Energy-Project_Economic-Impact-Analysis-2.8-GW.pdf.

[28] *Id*. at 6.

[29] *Id*. at 2.

The International Energy Agency further notes that offshore wind "grew 30% per year from 2010 to 2018, benefiting from rapid technology improvements,"[30] and that US offshore wind is estimated to have an average capacity factor of 40 to 55 percent.[31]

As a cost comparison, the NuScale nuclear modular unit was estimated recently at double the cost of the company by UAMPS (Utah Associated Municipal Power Systems, the municipal power authority hopes to partner with at the end of the decade in pilot project), at $8,500 per kilowatt.[32] In contrast, the North Carolina Department of Commerce estimated the cost of the offshore wind project in its analysis to be $716 per kilowatt.[33]

GREEN HYDROGEN

EWG conducted an analysis of the hydrogen market last year. The emerging consensus among market analysts was that green hydrogen will be regionally competitive with gray hydrogen (derived from natural gas) by the end of the decade, and more broadly competitive by the early to mid-2030s.[34]

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[30] INT'L ENERGY AGENCY, OFFSHORE WIND OUTLOOK 2019: WORLD ENERGY OUTLOOK SPECIAL REPORT 11 (Nov. 2019), at 11. https://www.iea.org/reports/offshore-wind-outlook-2019.

[31] *Id*. at 49.

[32] M.V. RAMANA., EYES WIDE SHUT: PROBLEMS WITH THE UTAH ASSOCIATED MUNICIPAL POWER SYSTEMS PROPOSAL TO CONSTRUCT NUSCALE SMALL MODULAR NUCLEAR REACTORS 13 (Or. Physicians for Soc. Resp., Sept. 2020). https://d3n8a8pro7vhmx.cloudfront.net/oregonpsrorg/pages/1625/attachments/original/1598897964/EyesWideShutReport_Final-30August2020.pdf?1598897964\ (according to EWG's expert witnesses, this figure has climbed to more than $11,000 per kilowatt).

[33] JOHN HARDIN ET AL., *supra* note 27, at 7.

[34] *See, e.g.*, *HIS Markit: Production of Carbon-Free "Green" Hydrogen Could be Cost-Competitive by 2030*, GREEN CAR CONG. (July 16, 2020), https://www.greencarcongress.com/2020/07/20200716-ihs.html and "'Green' hydrogen to outcompete 'blue' everywhere by 2030." (Bloomberg NEF, May 5, 2021); *'Green' Hydrogen to Outcompete 'Blue' Everywhere by 2030*, BLOOMBERG NEF (May 5, 2021), https://about.bnef.com/blog/green-hydrogen-to-outcompete-blue-everywhere-by-2030/ and "Green hydrogen will be cost competitive with grey H2 by 2030 – without carbon price." Recharge (Apr. 27, 2021). ; Leigh Collins, *Green Hydrogen Will be Cost-Competitive With Grey H2 by 2030—Without a Carbon Price*, (RECHARGE Apr. 27, 2021), https://www.rechargenews.com/energy-transition/green-hydrogen-will-be-cost-competitive-with-grey-h2-by-2030-without-a-carbon-price/2-1-1001867; HYDROGEN INSIGHTS: A PERSPECTIVE ON HYDROGEN INVESTMENT, MARKET DEVELOPMENT AND COST COMPETITIVENESS, (Hydrogen Counsel, Feb. 2021), https://hydrogencouncil.com/wp-content/uploads/2021/02/Hydrogen-Insights-2021.pdf.

Demonstrations and larger projects across the globe reflect green hydrogen's strong prospects.[35] Even oil firms announced nearly $100 billion in green hydrogen investment last month.[36] As Daniel Roberts, leader of the Energy Technologies Research Program at Australia's CSIRO science agency, recently told Al Jazeera, "Every six months, Siemens and other companies are announcing an electrolyser that is cheaper and bigger. It is remarkable how quickly things are changing from no green hydrogen to massive investments."[37]

The North American market is projected to be that second-largest region for green hydrogen market development, reaching more than a projected $7 billion by 2030, according to research firm Technovia.[38] The North American electrolyzer market is projected to "account for 37 percent" of the growth of the global electrolyzer through 2025, with the US expected to emerge as a dominant player.[39]

Distributed energy resources are marginalized in the Plan

ENERGY EFFICIENCY RESOURCE POTENTIAL IS FAR GREATER THAN DUKE'S CURRENT ESTIMATES

Buildings are responsible for 40 percent of all energy use and 76 percent of electricity use in the US.[40] The retrofit market is substantial: a recent report projects the global retrofit market will grow almost to $60 billion by 2030, with North America

[35] Ian Neubauer, Governments, *Firms Make on Green Hydrogen as Climate Fix*, ALJAZEERA (June 22, 2022), https://www.aljazeera.com/economy/2022/6/22/governments-firms-bet-on-green-hydrogen-as-climate-fix.

[36] Mathis Will et al., *Oil Firms Bet on Green Hydrogen as Future of Energy; Plan to Invest Billions*, BLOOMBERG (June 20, 2022), https://www.business-standard.com/article/international/oil-firms-bet-on-green-hydrogen-as-future-of-energy-plan-to-invest-billion-122062000245_1.html.

[37] Neubauer, *supra* note 35.

[38] *Green Hydrogen Market Size is Projected to Reach USD 72 Billion by 2030, Growing at a CAGR of 55%: Straits Research*, YAHOO (June 29, 2022), https://www.yahoo.com/now/green-hydrogen-market-size-projected-140000521.html.

[39] *Hydrogen Electrolyzer Market to Grow by USD 87.36 Mn: 37% of the Growth to Originate in North America: Technovia*, PR NEWSWIRE (Apr. 8, 2022), https://www.prnewswire.com/news-releases/hydrogen-electrolyzers-market-size-to-grow-by-usd-87-36-mn-37-of-the-growth-to-originate-from-north-america-technavio-301520131.html.

[40] *See Quadrennial Review: An Assessment of Energy Technologies and Research Opportunities (Chapter 5: Increasing Efficiency of Building Systems and Technologies*) (U.S. Dep't of Energy, Sept. 2015), https://www.energy.gov/sites/prod/files/2017/03/f34/qtr-2015-chapter5.pdf.

experiencing the fastest expansion.[41] Similarly, a 2015 Department of Energy study concluded that buildings could reduce energy consumption by 20 percent through existing energy efficiency technologies and by 35 percent with emerging efficiency technologies, such as high-efficiency heat pumps, for which North Carolina has huge potential.[42]

A 2017 NREL report analyzed the economic potential of various efficiency measures for single-family homes for each state, including North Carolina. By replacing durable goods when they wear out, turnover would take 15 to 30 years, and would save North Carolinians large sums in avoided energy consumption costs.[43] For example, replacing electric furnaces, which fuel home heating in just over half of the homes in the state,[44] with high-efficiency heat pumps would save $800 million annually, or $966 per household. Replacing all durable home appliances would save North Carolinians $2.1 billion annually.[45]

Yet, in its proposed Plan, Duke claims that reducing energy demand by merely 1% is an "ambitious target."[46] However, Duke has achieved nearly this level of reductions already. The 2020 Utilities Energy Efficiency Report Card by the American Council for an Energy Efficient Economy (ACEEE) shows Duke Energy Carolinas at .99 percent of sales and Duke Energy Programs at 0.76 percent of sales.[47] Utilities from other states demonstrate that far greater reductions can be made through energy efficiency. The average sales reduction among the top 10 rated programs exceeds more than 2 percent of sales.[48] The Commission should send Duke back to the drawing board to evaluate more realistic energy efficiency goals.

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[41] *Energy Retrofit Systems Market Size Worth US $2.0.6 billion by 2030*, GLOB. NEWSWIRE (May 30, 2022), https://www.globenewswire.com/en/news-release/2022/05/30/2452778/0/en/Energy-Retrofit-Systems-Market-Size-to-Worth-US-206-6-BN-by-2030.html.

[42] *Quadrennial Review*, *supra* note 40, at 1.

[43] Wilson, Eric, Christensen, Craig, Horowitz, Scott, Robertson, Joseph, Maguire, Jeff, *Energy Efficiency Potential in the U.S. Single-Family Housing Stock*, Nat'l Renewable Energy Lab'y (December 2017) (NREL/TP 5500-68670), https://www.nrel.gov/docs/fy18osti/68670.pdf.

[44] 2021 Home Energy Affordability Gap. Fisher, Sheehan & Colton. http://www.homeenergyaffordabilitygap.com/03a_affordabilityData.html.

[45] North Carolina Energy Efficiency Potential (NREL, 2017), https://resstock.nrel.gov/factsheets/NC.

[46] *Carolinas Carbon Plan*. Appendix G at 5.

[47] GRACE RELF ET AL., 2020 UTILITY ENERGY EFFICIENCY SCORECARD 26 (Am. Council for Energy-Efficient Econ., Feb. 2020), https://www.aceee.org/sites/default/files/pdfs/u2004%20rev_0.pdf.

[48] *Id*. at 26.

DISTRIBUTED SOLAR + STORAGE: AN UNTAPPED RESOURCE FOR NORTH CAROLINA

In his comments addressing Duke's 2020 Integrated Resource Plan, utility expert Bill Powers notes that North Carolina, as of his 2021 comments, had only 200 megawatts of installed behind-the-meter (distributed) solar.[49] But the potential for further development is substantial.

In 2016, NREL calculated the solar capacity potential for small and large buildings for each state. Combined, this figure had the potential to generate almost 35 percent of North Carolina's power generation needs.[50] This calculation does not include community solar projects that are not generally deployed on rooftops. Costs for solar installation and storage have dropped significantly since the 2016 report and distributed solar is now economically feasible on a large scale. Yet Duke largely ignores this potential. Although there is discussion of a "self-optimizing grid" to accommodate more distributed resources, behind-the-meter solar and storage does not rise to a significant enough level to warrant depiction in the Carbon Plan's portfolio tables.

As with positive trends in utility-scale solar and wind deployment in the US, the residential solar and storage market is strong, and growing stronger. A July 2021 Berkeley Lab report shows that one-third of storage capacity installed through 2020 was behind-the-meter, with more than half that amount "paired with solar."[51] That pace will continue to accelerate, according to Wood Mackenzie, increasing to nearly 24 percent of distributed solar systems from 3 percent in 2019.[52]

A recent analysis by Technavio projects that the US residential solar market will increase nearly 10 percent each year through 2025 and see $6 billion in increased

[49] Bill Powers, Review of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's 2020 Integrated Resource Plan, NCUC Docket No. E-100, Sub 165 at. 29.
[50] PETER GAGNON ET AL., ROOFTOP SOLAR PHOTOVOLTAIC TECHNICAL POTENTIAL IN THE UNITED STATES: A DETAILED ASSESSMENT 26, 32 (Nat'l Renewable Energy Lab'y Jan. 2016), https://www.nrel.gov/docs/fy16osti/65298.pdf.
[51] GALEN BARBOSE ET AL., BEHIND-THE-METER STORAGE+STORAGE: MARKET DATA AND TRENDS 6 (Berkeley Nat'l Lab'y, July 2021), https://eta-publications.lbl.gov/sites/default/files/btm_solarstorage_trends_final.pdf.
[52] Solar+Storage, Solar Energy Industries Association, https://www.seia.org/initiatives/solar-plus-storage.

growth and investment.[53] In keeping with this trend, residential, community and commercial energy storage saw record growth in the latter part of 2021.[54]

Globally, one analysis expects North America to remain a dominant player in a residential energy storage market that is projected to be valued at nearly $18 billion by 2024, from $6.3 billion in 2019.[55]

This spring, NREL released a report that showed that close to 100 percent of US solar installations through 2021 were in the residential sector, representing 23 percent of all "installed US capacity."[56] NREL also reports that there were about 2,000 community solar projects in 40 states by the close of last year.[57]

VEHICLE-TO-GRID TECHNOLOGY OFFERS YET ANOTHER VIABLE AND GROWING DISTRIBUTED ENERGY RESOURCE

Technovia projects the US vehicle-to-grid market to grow by more than $5 billion by 2025.[58] The growing US electric vehicle ("EV") market can contribute to electric grid reliability and resiliency, but also requires coordination of this significant battery storage opportunity with the electric grid to achieve maximum energy gains.

The US EV market is growing rapidly. Sales of electric cars doubled from 2020 to 2021, according to S&P Global,[59] and are expected to reach nearly 5 million by 2030. By 2026, due to declines in battery prices and other market factors, EVs will be "more

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[53] *Residential Solar Market in the US: 9.68% Y-O-Y Growth Rate in 2021: Market Size, Share & Trends Analysis by Technology and Segment Forecasts, 2021-2025*, PR NEWSWIRE (Jan. 17, 2022), https://www.prnewswire.com/news-releases/residential-solar-market-in-the-us-9-68-y-o-y-growth-rate-in-2021--market-size-share--trends-analysis-report-by-technology-and-segment-forecasts-2021---2025--301460503.html.

[54] *US Battery Storage Doubles in a Single Year*, WOOD MACKENZIE (Mar. 24, 2022), https://www.woodmac.com/news/opinion/us-battery-storage-deployment-doubles-in-a-single-year/.

[55] *Residential Energy Storage Market by Power Rating (3–6 kW & 6–10 kW), Connectivity (On-Grid & Off-Grid), Technology (Lead–Acid & Lithium-Ion), Ownership (Customer, Utility, & Third-Party), Operation (Standalone & Solar), Region - Global Forecast to 2024*, MARKETS & MARKETS (2019). https://www.marketsandmarkets.com/Market-Reports/residential-energy-storage-market-153284325.html.

[56] NAT'L RENEWABLE ENERGY LAB'Y, SPRING 2022 SOLAR INDUSTRY UPDATE 32 (Apr. 26, 2022), https://www.nrel.gov/docs/fy22osti/82854.pdf.

[57] *Id*. at 38.

[58] *Vehicle to Grid Market: North America to Occupy 33% Market Share|Power Electronics Segment to be Significant for Revenue Generation*, PR NEWSWIRE (June 20, 2022), https://www.prnewswire.com/news-releases/vehicle-to-grid-market-north-america-to-occupy-33-market-sharepower-electronics-segment-to-be-significant-for-revenue-generationtechnavio-301570807.html.

[59] "Surging EV sales hitting high lithium prices, supply chain constraints: experts." S&P Global (Apr. 22, 2022). https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/042222-surging-ev-sales-hitting-high-lithium-prices-supply-chain-constraints-experts.

broadly cost-competitive with internal combustion vehicles without subsidy."[60] By 2030, S&P Global expects 32 million fully electric and hybrid vehicles in the US, compared to just over 2 million in 2021, with an assortment of nearly 300 different electric vehicle models for consumers to choose from.[61] Anticipating market trends, in 2021, the auto industry announced an investment of more than $500 billion in EVs and batteries in the next 5 to 10 years, a $200 billion increase of announced investment from a few years ago.[62] Recent volatility in fossil fuel prices has driven demand for EVs even higher since these projections.

Importantly, Bloomberg recently announced that the US EV market has reached a tipping point and that sales will accelerate at a quicker pace than previously expected.[63] North Carolina is poised to be a leader in electric vehicle sales in the Southeast. As sales dropped during the COVID pandemic nationwide, they increased 5 percent in the state, reports EV HUB.[64] By year-end 2020, more than 23,000 EVs had been sold in North Carolina, nearly a quarter of those sold in 2020.[65] By the beginning of this year, sales had increase to 32,000 vehicles, according to Plug-In NC, and nearly 2,000 public charging stations of various types installed.[66] EV HUB projects 80,000 EVs on the road in North Carolina by 2025.[67] The increasing concentration of electric vehicles in the state means there is substantial opportunity for efficiency gains through vehicle to grid energy.

DEMAND RESPONSE (DR) CAN PROVIDE MULTIPLE TO BENEFITS TO THE NORTH CAROLINA ELECTRIC SYSTEM

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[60] *Id.*
[61] "Daily Update: June 3, 2022." S&P Global (June 3, 2022). https://www.spglobal.com/en/research-insights/articles/daily-update-june-3-2022.
[62] "Exclusive: Global carmakers now target $515 billion for EVs, batteries." Reuters (Nov. 20, 2021). https://www.reuters.com/business/autos-transportation/exclusive-global-carmakers-now-target-515-billion-evs-batteries-2021-11-10/.
[63] Steve Hanley, *Bloomberg Says US has Hit Electric Car Tipping Point*, CLEANTECHNICA (July 14, 2022), https://cleantechnica.com/2022/07/13/bloomberg-says-us-has-hit-electric-car-tipping-point/.
[64] Conner Smith, *North Carolina Emerging as an EV Leader in the Southeast*, EV HUB (Feb. 22, 2021), https://www.atlasevhub.com/weekly_digest/north-carolina-emerging-as-an-ev-leader-in-the-southeast/.
[65] *Id.*
[66] *2021 Annual Report*, PLUG-IN N.C. (Jan. 2022), https://pluginnc.com/wp-content/uploads/2022/01/Annual-Report-2021.pdf.
[67] Hanley, *supra* note 63.

Building out customer-owned solar and storage, vehicle-to-grid infrastructure, and enhancing energy efficiency as well as smart devices would substantially enhance the demand response resource in the state. The US Demand Response Management Systems (DRMS) market estimated to be valued at about $3 billion and constitutes nearly 65% of the global market.[68]

The US is just scratching the surface of DR capability. The Brattle Group analyzed the nation's DR potential in 2019 and found that demand response was, by far, the largest DER resource.[69] The research group observed that "consumer technologies [will] drive the DR transition."[70] These, per Brattle, include behind-the-meter storage, smart meters, electric vehicles, and smart appliances.[71]

Brattle estimated about 59,000 megawatts of installed capacity in 2019, representing 6.7% of peak demand from the largest utilities.[72] By 2030, Brattle finds that, with the correct policies, installed capacity could be increased to nearly 200,000 megawatts, 20 percent of peak demand,[73] a three-fold increase, and provide more than $16 billion in electric system savings.[74] These savings are primarily derived from avoided generation capacity (57%), "based on avoided cost of natural gas-fired combustion turbine." Other savings are derived from avoided energy costs (29%) followed by avoided transmission and distribution cost (12%) and benefits from providing ancillary services (2%).[75]

The analysts at Brattle Group estimated the 2017 demand response capability for North Carolina to be 3 to 6 percent of system peak.[76]

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[68] *Global Demand Response Management Systems Market (DRMS) to Reach $10.1 Billion by 2026*, GLOBE NEWSWIRE (Mar. 29, 2022), https://www.globenewswire.com/news-release/2022/03/29/2411906/0/en/Global-Demand-Response-Management-Systems-DRMS-Market-to-Reach-10-1-Billion-by-2026.html.

[69] RYAN HLEDIK ET AL., THE NATIONAL POTENTIAL FOR LOAD FLEXIBILITY: VALUE AND MARKET POTENTIAL THROUGH 2030 4 (June 2019), https://www.brattle.com/wp-content/uploads/2021/05/16639_national_potential_for_load_flexibility_-_final.pdf.

[70] *Id*. at 9.

[71] *Id*. at 9.

[72] *Id*. at 18.

[73] *Id*. at 18.

[74] *Id*. at 20.

[75] *Id*. at 20.

[76] *Id*. at 5.

Stockholders, not ratepayers, should bear development activity costs

EWG cautions the Commission with respect to preapproval of development activities for any supply-side resource.

First, as noted previously in this report, the Plan does not give due consideration to technologies and local power production for which there is a plethora of experience, declining costs, and substantial and ongoing market support. Finding Duke's proposed levels of procurement just and reasonable, as Duke requests, is akin to approving the Carbon Plan in its "entirety," as Duke's language urges throughout the Plan documents.

N.C. Gen. Stat. § 62-110.7 ensures project development cost review requiring the utility to provide documentation to support each decision for capital expenditures for new project development costs pertains only to nuclear facilities, resulting in a gaping loophole whereby other new project development may evade Commission review if Duke's proposed Carbon Plan is approved.[77]

Unproven nuclear technology is not a viable path to carbon neutrality where there is vast experience with non-nuclear technology development and procurement nationwide of resources such as solar, batteries, pumped storage, and offshore and onshore wind generation. Many safety, environmental, and especially financial risks accompany the development of new and unproven nuclear energy technologies like small modular reactors. It should not be the responsibility of ratepayers to shoulder these risks up front. Duke should be competent enough to accomplish development and procurement of these resources without a ratepayer crutch.

With respect to new nuclear units, N.C. Gen. Stat. § 62-110.7(b) states:

> The Commission shall approve the public utility's decision to incur project development costs if the public utility demonstrates by a preponderance of evidence that the decision to incur project development costs is reasonable and prudent…[78]

As EWG's other expert witnesses in this proceeding, Arjun Makhijani and M.V. Ramana, have shown, these so-called advanced nuclear designs have been previously

[77] N.C. Gen. Stat. § 62-110.7.
[78] N.C. Gen. Stat. § 62-110.7(b).

tried, and have failed. Worse, the design furthest along in the NRC approval process continues to be marred by safety issues, delays, and cost overruns. There is nothing reasonable or prudent about incurring costs of technologies that will be exceedingly difficult, if not impossible, to deploy as a least-cost resource when cleaner, cheaper, and more resilient non-carbon emitting resources are available that can provide reliable service and are compatible with variable resources.

Moreover, Duke's request for development activity costs for new nuclear capacity is premature and attempts to sidestep the necessary analysis and demonstration of reasonableness that would ordinarily be required. According to Duke's own reports, early site permitting alone is expected to cost "$50 million to $75 million." Duke references Table 3 of the Executive Summary, which includes early site permitting, beginning "development activities," and conducting a "feasibility study for 1,700 MW."[79]

In Table 4-7, Duke lists the tasks to be completed leading up to filing for a Certificate of Public Convenience and Necessity ("CPCN") for new nuclear units. These include organizing "nuclear development staff," performing "an alternative nuclear site study," performing "new nuclear reactor due diligence review."[80] These costs could amount to a few hundred million dollars – passed on to ratepayers – for technologies that have never been developed beyond speculative diagrams.

Approval of this Plan by the Commission risks bypassing an important provision in North Carolina General Statutes Chapter 62. Public Utilities § 62-110.1(e):

> A certificate for the construction of a coal or nuclear facility *shall be granted only if the applicant demonstrates and the Commission finds that energy efficiency measures; demand-side management; renewable energy resource generation; combined heat and power generation; or any combination thereof, would not establish or maintain a more cost-effective and reliable generation system* and that the construction and operation of the facility is in the public interest.[81]

Duke has failed to demonstrate that a combination of distributed resources and utility-scale renewables cannot provide the same service at lower cost than the

[79] CAROLINAS CARBON PLAN, *supra* note 1, at 23.
[80] *Id.* Chapter 4 at 23.
[81] N.C. Gen. Stat. § 62-110.1(e).

proposed nuclear units. Instead, Duke has only asserted, without evidence, that "new advanced nuclear plants, such as small modular reactors ("SMRs") and advanced reactors will be critical to achieving carbon neutrality by 2050 as required by HB 951**,**"[82] supporting a technology that, given market trends, may never be deployed. However, Duke wants ratepayers to assume its business risk for development costs whether it goes forward with new nuclear units or not.[83]

VI. The distributed energy resource grid paradigm is necessary for resiliency of the electric system resiliency.

Distributed energy resources ("DERs") can greatly improve energy resiliency and reduce system costs.

In an opinion piece for The Hill, Jeff Schlegelmilch, Director of the National Center for Disaster Preparedness at Columbia University, and Daniel Kushner, manager of Smart Grid Programs at Commonwealth Edison, wrote:

> Today's grid must build on work to integrate increasing levels of distributed energy resources like rooftop solar and energy storage that feed into it from the neighborhoods they serve. But much of this distributed generation is variable and dependent on weather conditions. To harness these resources (solar, storage and other resources), the grid needs equally important, but less visible critical investments in smarter and more decentralized distribution systems that can provide the *flexibility needed to ensure the reliability, power quality and resilience on which customers depend*.[84]

NREL is working with a consortium of industry and research groups globally to develop the "grid-forming inverter" that will allow for greater integration of distributed

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[82] CAROLINAS CARBON PLAN*, supra* note 1, at 18 (emphasis added).
[83] *Id*. at 29.
[84] Jeff Schlegelmilch & Daniel Kushner, *The Electrical Grid of the Future Must be Built Around Community Need*, THE HILL (Jan. 25, 2022), https://thehill.com/opinion/energy-environment/591233-the-electrical-grid-of-the-future-must-be-built-around-community/ https://thehill.com/opinion/energy-environment/591233-the-electrical-grid-of-the-future-must-be-built-around-community/ (emphasis added).25, 2022), https://thehill.com/opinion/energy-environment/591233-the-electrical-grid-of-the-future-must-be-built-around-community/ https://thehill.com/opinion/energy-environment/591233-the-electrical-grid-of-the-future-must-be-built-around-community/ (emphasis added).

resources into the electric system.[85] NREL asserts that "many outages may be avoided altogether by configuring local resources into rugged microgrids."[86]

A more expansive approach would be developing virtual power plants (VPPs) on a broad scale. VPPs are already operating in several states and can provide many services, such as ancillary services in demand response programs. Another attribute is improved electric system resiliency: as the US Department of Energy explains, "VPPs not only open the grid to a whole new utility-scale, behind-the-meter supply, but also coordinate disparate DERs into holistic, demand-flexible resources."[87]

A recent analysis predicts that VPPs' share of the global energy market is poised to increase to more than $6.5 billion by 2028, from less than a billion last year.[88] "North America is expected to have a substantial market share because of the huge number of VPP projects sanctioned in the United States and Canada," say the analysts.[89]

VPPs aggregate thousands of dispersed, decentralized rooftop and community solar and storage facilities and operate them as a single power plant with a web-based control system. These include:

- The capacity to keep homes and businesses powered during natural disasters
- Enhancing electric system resiliency
- Financial benefits to all customers
- Deferred expensive local distribution system upgrades.[90]

Resiliency of the electric grid should be a critical aspect of utility planning. As a senior contributor to Forbes observed, "The good news is that the trend worldwide is to

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[85] Renewables Become a Leader in Grid Resilience, Nat'l Regulatory Energy Lab'y (June 1, 2022). https://www.nrel.gov/news/program/2022/renewables-become-leader-in-grid-resilience.html.

[86] *Id.*

[87] *Introducing VPPieces: bite-sized blogs about Virtual Power Plants*, U.S. DEP'T OF ENERGY (May 12, 2022), https://www.energy.gov/lpo/articles/introducing-vppieces-bite-sized-blogs-about-virtual-power-plants.

[88] "Virtual Power Plant Market Size, Share & COVID-19 Impact Analysis, By Technology (Demand Response, Distributed Generation, and Mixed Asset), and by End-user (Industrial, Commercial, and Residential), and Regional Forecast, 2021-2028." Fortune Business Insights (2021). https://www.fortunebusinessinsights.com/industry-reports/virtual-power-plant-market-101669.

[89] *Id*.

[90] Grant Smith, *Using Virtual Power Plants to Spur Energy Equity, Grid Stability and Fight the Climate Crisis*, ENV'T WORKING GRP. (Aug. 5, 2021), https://www.ewg.org/news-insights/news/2021/08/using-virtual-power-plants-spur-energy-equity-grid-stability-and-fight.

make it easier for smaller distributed assets to get the same regulatory treatment as power plants."[91]

In fact, with respect to energy policy, North Carolina law requires equal valuation of distributed and utility-scale resources:

> "(3a) To assure that resources necessary to meet future growth through the provision of adequate, reliable utility service include use of the *entire spectrum of demand-side options*, including but not limited to conservation, load management and efficiency programs, as *additional sources of energy supply and/or energy demand reductions*."[92]

Ensuring that distributed energy resources are properly integrated into the electric system is a necessity for North Carolina.

According to a recent analysis by the Associated Press, "Power outages from severe weather have doubled over the past two decades," a phenomenon the report attributes to climate change.[93] Moreover, the report goes on to state that in 40 states, such outages persist for longer. This surge in outages has become especially pronounced within the last 5 years, according to AP,[94] signaling a new normal. A report from PEW Environmental Trusts found that blackouts were already costing businesses $150 billion annually as far back as 2015.[95]

North and South Carolina are particularly susceptible to climate change impacts. In 2018 alone, three hurricanes plundered the Carolinas, costing Duke Energy nearly $800 million in repairs, about 70 percent of which Duke earmarked for recovery from ratepayers.[96]

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[91] Silverstein, Ken, "How 'Virtual Power Plants' will change the future of electricity." Forbes (July 22, 2020). https://www.forbes.com/sites/kensilverstein/2020/07/22/virtual-power-plants-are-one-of-the-top-innovations-of-the-decade/?sh=2a84519a6d7a.

[92] N.C. Gen. Stat. § 62-2(a)3(a) (emphasis added).

[93] "Storms batter aging power grid as climate disasters spread." AP (Apr. 5, 2022). https://apnews.com/article/wildfires-storms-science-business-health-7a0fb8c998c1d56759989dda62292379.

[94] *Id*.

[95] *America's Electric Grid: Growing Cleaner, Cheaper and Stronger*, PEW CHARITABLE TRUSTS (Oct. 27, 2015), https://www.pewtrusts.org/en/research-and-analysis/reports/2015/10/americas-electric-grid-growing-cleaner-cheaper-and-stronger.

[96] John Downey, *How These Three Costly Could Impact Duke Energy Customers in the Carolinas*, CHARLOTTE BUS. J. (Dec. 24, 2018), https://www.bizjournals.com/charlotte/news/2018/12/24/how-these-three-costly-storms-that-recently-hit.html.

The U.S. electric power system experiences multiple stressors as a result of climate change. Storms and flooding can result in power plants being shut down. Droughts and excessive heat can reduce water availability for use in a power plant by reducing the available supply or by making the intake water from streams, lakes, or even the ocean too warm to cool the plant. These circumstances can force power plants offline or curtail their output. These concerns apply throughout the Southeast, according to a 2021 U.S. Government Accountability Office report.[97] Electric system resiliency measures, such as a much-needed emphasis on distributed resources, will also play an increasingly important role because thermoelectric power plants—including water-cooled coal, nuclear, and natural gas power plants—are particularly vulnerable to climate change.

DERs also reduce electric system costs. Utility planning models that allow for coordination and optimization of these resources must be used to achieve the proper mix of DER and utility-scale resources.[98]

A national study conducted in 2020 analyzed the optimal use of local (decentralized) solar plus storage and utility-scale renewables and storage. The study shows that as local generation and storage increase, so too do the savings. With aggressive clean energy targets but still without considering externalities, the model shows an even greater savings, reaching nearly $400 billion by 2050, compared to business as usual. It also builds in improvements in storage technology over time.[99]

A study conducted for Illinois with the same modeling in 2021 demonstrates similar results. Retail rates decreased by 43 percent, and cumulative savings by 2050 would be more than $3 billion.[100] Similar modeling yields customer savings approaching $800 annually by 2050 for customers in Michigan.[101]

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[97] U.S. GOV'T ACCOUNTABILITY OFF., ELECTRIC GRID RESILIENCY: CLIMATE CHANGE IS EXPECTED TO HAVE FAR-REACHING EFFECTS AND DOE AND FERC SHOULD TAKE ACTIONS 18 (Mar. 2021), https://www.gao.gov/assets/gao-21-346.pdf.

[98] See VIBRANT CLEAN ENERGY, WHAT LOCAL SOLAR FOR ALL COSTS LESS: A NEW ROADMAP FOR THE LOWEST COST GRID (Dec. 2020), https://static1.squarespace.com/static/5f4637895cfc8d77860d0dbc/t/5fd39999439c7c5ec221499b/1607702942515/Local+Solar+Roadmap+White+Paper+as+PPT+FINAL.pdf.

[99] *Id*. at 20.

[100] LOCAL SOLAR FOR ALL, WHY SOLAR FOR ALL COSTS LESS: A VISION FOR A CLEAN, EQUITABLE, LOW-COST AND RESILIENT GRID FOR ILLINOIS 4 (2022),

The Department of Energy agrees, "DERs can provide energy at a lower price than what the grid typically offers. They do so more cleanly while offering consumers greater resilience during adverse grid events…DERs are also more widely available and cost-effective than ever."[102]

In this context, Duke agrees that DERs and utility-scale resources should be on equal footing, except that SMRs are not demand-side resources and the benefits of actual clean DERs are far more myriad than nuclear power: "Achieving the aggressive level of demand-side program growth assumed in the Carbon Plan will require changes to current cost/benefit processes to reflect their value on par with the cost of carbon-free supply-side alternatives such as wind, solar paired with storage or SMRs."[103]

The problem is that Duke wants de facto approval of its Carbon Plan prior to conducting such an analysis. As Duke has proposed, "after the conclusion of this proceeding, the Companies will proceed to propose appropriate changes to the derivation of utility system benefits as defined in the Companies' approved EE/DSM Cost Recovery Mechanism."[104]

This neither makes sense nor serves North Carolina residents. In a recent analysis, Berkeley National Lab found that optimizing distributed and utility-scale resources creates the proper balance between them:

> "In general, the share of grid-only nodes is close to zero for all scenarios where DERs are available, regardless of the value of any of the key variables analyzed in the sensitivity runs… The actual decision point is not whether to supply a given node (such as a substation or transformer on the distribution system) from centralized or decentralized resources, but

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https://static1.squarespace.com/static/5f4637895cfc8d77860d0dbc/t/6099e71481ffa26b8bc05cdd/1620698906052/Illinois+Local+Solar+Roadmap+Short+v3.p.

[101] William Driscoll, *3GW Distributed Solar and 2.1GW of Distributed Storage in Michigan by 2035, Under a Low-Cost Scenario,* PV MAG. (2022), https://pv-magazine-usa.com/2022/03/08/3gw-distributed-solar-and-2-1gw-distributed-storage-in-michigan-by-2035-under-a-low-cost-scenario/.

[102] *Introducing VPPieces: bite-sized blogs about Virtual Power Plants*, U.S. DEP'T OF ENERGY (May 12, 2022), https://www.energy.gov/lpo/articles/introducing-vppieces-bite-sized-blogs-about-virtual-power-plants.

[103] CAROLINAS CARBON PLAN*, supra* note 1, at 25.

[104] *Id*.

> the relative balance of the capacity of centralized and decentralized modes of supply, including the distribution and transmission grids."[105]

EWG urges the Commission to adopt modeling that will optimize both distributed resources and utility-scale resources that also honestly seek to achieve the least cost system and resources, as a prerequisite to achieving a reasonable, prudent, and least cost carbon plan.

VII. Conclusion

This report concludes that the Commission should reject Duke's Carbon Plan in its entirety as a result of its many inadequacies and omissions. As currently formulated, the Plan is simply an extension of Duke's business plan that the company has pursued for the better part of a decade, a plan built largely on Duke's preference for utility-scale natural gas and nuclear capacity.[106] Approval would severely limit the Commission's discretion in the future and would, in our estimation, establish Duke's Plan as prudent, reasonable, and least cost without justification, essentially ending the debate on how Duke's North Carolina electric system should evolve.

Although Duke urges altering the parameters for cost-benefit analyses regarding demand side resources, the company will seek those changes only after its Plan is adopted. This is too little, too late. A new model that would optimize DERs and utility-scale renewable additions should be adopted and applied *prior* to adoption of a Carbon Plan. Here, Duke is setting up a situation similar to the net metering proceeding, wherein the company is urging approval of its proposal prior to conducting a proper cost-benefit analysis.

Duke's modeling completely marginalizes distributed solar and storage, energy efficiency, vehicle-to-grid, and demand response as well as utility-scale onshore and offshore wind. Duke is ignoring market trends with respect to mature or developing technologies that have high investor interest and to which billions of dollars are flowing

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[105] Berkeley National Lab, *Distributed Resources Shift Paradigms on Power System Design, Planning, and Operation: An Application of the GAP Model*, at 14 (2009).
[106] Smith, *supra* note 16, at 3. ("Why Duke, America's Biggest energy Company is also the Worst for our Environment.").

in favor of more natural gas capacity and nuclear designs that are still on paper and that may never be deployed but in a few demonstration projects.

Duke also takes no responsibility for its decisions in the Plan. Approval would shift the company's entire business risk to ratepayers—from development, to procurement, to implementation. Cost recovery is guaranteed even in the face of failing to bring its preferred resources, particularly nuclear, online that could saddle ratepayers with well over hundred million dollars.

Finally, the concept of resiliency must become a salient feature of utility planning in North Carolina, as continuing damage from climate-related impacts is inevitable.

Grant Smith

EXHIBIT 1

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Energy, consumer and environmental advocate for 30 years with 20 years lobbying experience at the Indiana General Assembly. Management experience and experience before the Indiana Utility Regulatory Commission, with sound analytical, research, writing, and communication skills.

Professional Experience

ENVIRONMENTAL WORKING GROUP, Indianapolis, IN

Senior Energy Policy Director, August 2017 - Present

- • Lead EWG's energy policy
- • Co-author reports concerning Duke Energy and other utilities across the country, jobs in the renewables and energy efficiency sectors, hydrogen technology, energy and water
- • Highlight trends in technological development in the energy sector
- • Author blogs/articles on energy technology trends, policy, and regulatory developments on topics such as utility rate structures, energy subsidies, renewable power, nuclear and coal-fired power, alternative utility models, natural gas-fired power

CIVIL SOCIETY INSTITUTE, Newton, MA

Senior Energy Policy Advisor, June 2011 – August 2017

- • Conducted research and drafted white paper and topic briefs on various issues, including energy policy and the energy transition, the utility sector assault on customer-owned solar, uranium mining, nuclear power, water policy and energy and agriculture impacts on water resources, frack sand mining, energy market trends
- • Participated in press conferences
- • Worked with local organizations with respect to power sector and water related issues
- • Tracked power sector technological and policy developments for organizational partners
- • Attended conferences with respect to power sector and water related issues
- • Worked with consultants on reports on energy transition commissioned by Civil Society Institute

CITIZENS ACTION COALITION OF INDIANA, Indianapolis, IN

Executive Director, Citizens Action Coalition of Indiana (CACI), 2004 – 2011

- • Performed all responsibilities for managing an organization including budgeting, staff mentoring program, prioritizing campaigns, overseeing canvas management staff, and public speaking on behalf of CACI

- • Raised funds and assisted with foundation proposals to support CACI's energy work
- • Worked with attorneys and expert witnesses before the Indiana Utility Regulatory Commission (IURC)

Director of Utility and Energy Programs, CACI, 1998-2004

- • Lead lobbyist in charge of bill analysis, drafting, negotiation, memos
- • Drafted position papers/memos on topics such as net metering, natural gas-fired "peaker" plants during the initial gas-fired power plant expansion, telecommunications, and biomass-fired power plants
- • Lead organizer focused on the gas-fired power plant issue working with local ad hoc citizens groups
- • Organized, scheduled, participated in press conferences to promote CACI's energy advocacy
- • Contributed to the organization's newsletter on energy topics
- • Public speaking advocating for CACI policy issues
- • Participated in negotiations with utilities and regulators

Environmental Coordinator, CACI, 1986-1998

- • Similar duties as above

Assistant Instructor in German, Indiana University, 1983-1985

- • Taught beginning and intermediate German

Appointments

- • Endowment Board member, Citizens Action Coalition of Indiana, 2016
- • Present: Board Chair, Citizens Action Coalition of Indiana, 2014 - Present
- • Legislative Chair, Hoosier Chapter Sierra Club executive committee, 2012 - 2018
- • Citizens Action Coalition Education Fund Board, 2011 - Present
- • Board Member, Hoosier Environmental Council, 2001 - 2004
- • Appointed by the Governor to the Indiana Pollution Prevention Board, 1992 - 1994
- • Appointed by the Governor to the Clean Manufacturing Advisory Committee, 1997 - 1998
- • Appointed by President Pro Tem of the Indiana Senate to the Air Sub-Committee of the Environmental Quality Service Council of the Indiana General Assembly, 1997
- • Governor's Pollution Prevention Awards committee (various times with

respect to awards for manufacturers in reducing toxics usage and energy efficiency)

Awards/Recognition

- • Recognition for Service from CAC's Board of Directors, 2011
- • Proclamation As Honorary Indiana State Representative, 2011
- • Recognition from Citizens Action Coalition for longtime service and dedication to the cause of economic and social justice, 2000
- • Recognition from the Clean Manufacturing Technology and Safe Materials Institute (CMTI) located at Purdue University, the Indiana Department of

Environmental Management's Office of Pollution Prevention and Technical Assistance and the Clean Manufacturing Board for assistance provided to the Institute in its efforts, 1999 41

- • Recognition from CMTI for participation on the Pollution Prevention

Measurement Method (3P2M) Work Group, 1995

- • Recognition for service as a member of the Clean Manufacturing Technology Board, 1995
- • Hoosier Environmental Council's Excellence in Advocacy Award for the design and successful lobbying effort with respect to the passage of the state's clean manufacturing program, 1990

Published Article

Grant Smith, "Indiana's Voluntary Approach to Pollution Prevention." Pollution Prevention Review, Spring 1997

Education

INDIANA UNIVERSITY, Bloomington, IN

- • Master of Arts in Teaching German, 1985
- • Max Kade Fellow, 1982
- • Bachelor of Arts in German and History, 1980
- • University of Hamburg, West Germany, 1978 – 1981

Addition Skills

Bilingual: German and English

VERIFICATION

I, Grant Smith, pursuant to the Commission's *Order Establishing Additional Procedures and Requiring Issues Report* entered on April 1, 2022 in the above-referenced docket, hereby verify that the contents of the foregoing Report are true to the best of my knowledge and belief, except as to those matters stated on information and belief, and as to those matters, I believe them to be true.

This the 14th day of July, 2022.

Grant Smith

Sworn to and subscribed before me this the 14 day of July, 2022.

Notary Public

10/29/2024
My commission expires:

NOTARY PUBLIC SEAL STATE OF INDIANA

Sean T. Hillier
Notary Public - State of Indiana
Commission Number: 0691714
My Commission Expires: 10/29/2024