STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 179

In the Matter of:	)	**DIRECT TESTIMONY OF**
Duke Energy Progress, LLC, and	)	**RORY MCILMOIL AND**
Duke Energy Carolinas, LLC, 2022	)	**DR. YUNUS KINKHABWALA**
Biennial Integrated Resource Plans	)	**ON BEHALF OF**
and Carbon Plan	)	**APPALACHIAN VOICES**

TABLE OF CONTENTS

INTRODUCTION

Q: PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND CURRENT POSITION.

A: My name is Rory McIlmoil. My business address is 589 W. King Street, Boone, NC 28607. I am the Senior Energy Analyst at Appalachian Voices.

Q: WOULD YOU PLEASE ALSO INTRODUCE THE REST OF YOUR PANEL?

A: Yes. Also presenting with me today on behalf of Appalachian Voices is Dr. Yunus Kinkhabwala, with Physicians, Scientists, and Engineers for Healthy Energy (PSE Heathy Energy). Dr. Kinkhabwala will introduce himself.

Q: WHAT ARE YOUR PRIMARY RESPONSIBILITIES AS SENIOR ENERGY ANALYST AT APPALACHIAN VOICES?

A: In my role as Senior Energy Analyst, my responsibilities include researching energy and affordability policy models, analyzing the impact on low-income ratepayers and the environment of policies or rate structures my organization might support or oppose, and advocating for utility clean energy and low-income affordability programs and rate structures that equitably benefit families and local communities.

Q: PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A: I graduated from Furman University with a Bachelor of Science in Earth and Environmental Science and received a Master of Arts in Global Environmental Policy from American University's School of International Service. I previously served as the Energy Program Manager with Downstream Strategies, an environmental and energy consulting firm

based out of Morgantown, West Virginia, and joined Appalachian Voices in 2013 as the Energy Savings Program Manager, analyzing and advocating for equitable energy efficiency finance programs, rate structures and distributed solar policies through North Carolina's rural electric cooperatives.

I was promoted to Senior Energy Analyst in 2018 and have since focused my efforts on state energy policy. Appalachian Voices intervened in the 2019 Duke Energy Carolinas rate case, where I testified on the impact that the Companies' proposed rate increase at the time would have on energy cost burdens for low-income families. I have participated in the stakeholder process for the development of the North Carolina Clean Energy Plan and associated B-1 Working Group focused on Performance-Based Regulation, served as a leading project partner on the Energy Insecurity in the Southeast project led by the Nicholas Institute at Duke University, lobbied on House Bill 951 with a focus on impacts of the bill for low-income households, and over the past year have served as a co-leader of the sub-team tasked with assessing customer challenges related to affordability for the Low-Income Affordability Collaborative ("LIAC").

Q: HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE NORTH CAROLINA UTILITIES COMMISSION ("THE COMMISSION")?

A: Yes. As mentioned previously I served as an intervenor and expert witness representing Appalachian Voices and the Center for Biological Diversity in the Duke Energy Carolinas 2019 rate case.

Q: HAVE YOU PREVIOUSLY PROVIDED TESTIMONY OR COMMENT AS AN EXPERT BEFORE ANY OTHER REGULATORY BODIES OR FORUMS?

A: Yes. As a participant in the North Carolina Clean Energy Plan stakeholder process I submitted comments on behalf of Appalachian Voices on the draft Plan to the North Carolina Department of Environmental Quality.[1] I also on two occasions submitted comments on behalf of Appalachian Voices and partner organizations regarding the Commission's COVID disconnection moratorium and the Companies' disconnection and arrearage management policies in NCUC Docket M-100, Sub 158.[2,3] Again on behalf of Appalachian Voices, I produced and submitted comments on the Duke Energy Progress and Duke Energy Carolinas Integrated Resource Plan.[4] Finally, in conjunction with comments submitted by Appalachian Voices in this docket, I authored a report on *Addressing Low-Income Energy Affordability in the Carolina Carbon Plan.*[5]

Q: ARE YOU SPONSORING ANY EXHIBITS WITH YOUR DIRECT TESTIMONY?

A: No.

[1] Appalachian Voices. Comments on North Carolina's Clean Energy Plan. Submitted directly to the North Carolina Department of Environmental Quality via email and the online portal. September 9, 2019.
[2] Appalachian Voices, et al. Instituting a New Moratorium On Regulated Electric, Gas and Water Shutoffs to Protect Utility Customers and Public Health. NCUC Docket M-100 Sub 158. March 8, 2021.
[3] Appalachian Voices. Duke Energy Progress and Duke Energy Carolinas Joint Response, and Extension of the Limited Residential Disconnection Moratorium. NCUC Docket M-100, Sub 158. June 15, 2021.
[4] Appalachian Voices Comments on Duke Energy 2020 IRP. NCUC Docket E-100, Sub 165. May 27, 2021.
[5] Appalachian Voices Comments on Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's 2022 Proposed Carbon Plan. NCUC Docket E-100, Sub 179. June 15, 2022.

Q: DR. KINKHABWALA, PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND CURRENT POSITION.

A: My name is Dr. Yunus Kinkhabwala. I am a clean energy scientist with Physicians, Scientists, and Engineers for Healthy Energy (PSE). My business address is: 1440 Broadway, Suite 750 Oakland, California 94612. PSE is a non-profit energy science and policy research institute that brings together experts in public health, science, and engineering to conduct and publish research on clean energy, energy and environment, and environmental public health, and to translate that research to a broad range of stakeholders.

Q: WHAT ARE YOUR PRIMARY RESPONSIBILITIES AS A CLEAN ENERGY SCIENTIST WITH PSE HEALTHY ENERGY?

A: My work focuses on the public health and economic impacts of clean energy transitions and how such impacts are distributed among populations. In my work with PSE, I have developed datasets from publicly available resources to represent household spending on energy and used such data to guide policies that were published in 2022, *Pathways to Energy Affordability in Colorado*, a report authored at the request of the Colorado Energy Office. Additionally, I have developed energy systems models supporting the development of a virtual power plant using grid edge resources for the purpose of replacing a peaker power plant situated in a historically disadvantaged community in Los Angeles. These models account for hourly benefits of investments in efficiency and both utility and behind-the-grid solar and storage. Furthermore, for the state of California's Strategic Growth

Council I have developed models to optimize the strategic siting of combined solar and storage resilience hubs which entails estimating the economic benefits of these distributed resources based on climate and building properties.

Q: PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A: I have a Bachelor of Science degree in physics from the University of Illinois and received my PhD in Applied Physics from Cornell University as a National Science Foundation (NSF) Graduate Research Fellowship Program fellow where I developed predictive models of complex systems which led to methods to forecast small area demographic changes.

Q: HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE NORTH CAROLINA UTILITIES COMMISSION ("THE COMMISSION")?

A: No.

Q: HAVE YOU PREVIOUSLY PROVIDED TESTIMONY OR COMMENT AS AN EXPERT BEFORE ANY OTHER REGULATORY BODIES OR FORUMS?

A: Yes. Together with PSE scientists, Dr. Elena Krieger, and Dr. Patrick Murphy, I reviewed and prepared comments on Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's 2022 Proposed Carbon Plan, filed on July 15, 2022 in this docket.

Q: ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A: I am testifying on behalf of Appalachian Voices.

Q: ARE YOU SPONSORING ANY EXHIBITS WITH YOUR DIRECT TESTIMONY?

A: No.

Q: MR. MCILMOIL, HOW IS THE AFFORDABILTY PANEL'S TESTIMONY ORGANIZED?

A: Our testimony focuses on three particular topics as identified by Commission for hearing in its *Order Scheduling Expert Witness Hearing, Requiring Filing of Testimony, and Establishing Discovery Guidelines* entered on July 29, 2022. Those topics are: **Cost**, with focus on affordability; **Near Term Procurement**, with focus on resource alternatives to gas plant expansion; and **EE/DSM/Grid Edge**, with emphasis on how targeting investment in these programs for low-income residential customers is a cost-effective way to control energy capacity demand while bridging the affordability gap for all customers.

Q: WHAT IS THE PURPOSE OF THE PANEL TESTIMONY IN THIS PROCEEDING?

A: The purpose of the first part of our testimony is to describe why affordability must be a central objective of the Carbon Plan. We will lay out for the Commission the scale and depth to which North Carolina households served by Duke Energy Carolinas and Duke Energy Progress already struggle to afford their electric bills and describe how that challenge has been worsening and will be exacerbated by the Carbon Plan, unless the Commission and the Companies actively work to include necessary analytics and mitigative investments as part of the plan. The next portion of our testimony briefly addresses alternative resources, including utility scale solar, offshore wind, and energy storage, that should be prioritized in lieu of

expanding natural gas plants to reduce the cost of decarbonization and mitigate impacts to communities surrounding those plants and the environment. Finally, we will address how investments in energy efficiency and other grid edge resources targeted toward low-income households is a cost-effective method to lower energy demand while bridging the affordability gap for all customers. Our testimony concludes with recommendations to the Commission regarding how to effectively address and enhance affordability in the final Carbon Plan and recommended resource modeling that would avoid further build-out of natural gas plants.

TOPIC: COST: Least Cost and Rate Impacts for Customers

AFFORDABILITY MUST BE A CENTRAL OBJECTIVE OF THE CARBON PLAN

Q: THE COMPANIES DESCRIBE AFFORDABILITY AS ONE OF ITS FOUR CORE OBJECTIVES FOR THE CARBON PLAN. HOW WOULD YOU DESCRIBE CURRENT AFFORDABILITY CHALLENGES FOR COMPANIES' RESIDENTIAL CUSTOMERS?

A: The Companies' own data indicates that more than 980,000 residential households, representing nearly one-third (32%) of the total residential customer base served in North Carolina, qualify as low-income per federal poverty guidelines (less than 200% of the Federal Poverty Level, or "FPL").[6]

Q: HOW DOES HOUSEHOLD INCOME RELATE TO ENERGY AFFORDABILITY?

[6] DE Response to Appalachian Voices DR 1-17.

While qualifying as low-income serves as a foundational condition placing households at risk of experiencing affordability challenges, income level alone is not a direct predictor, but there is a correlation. I used the Companies' analytics produced for the Low-Income Affordability Collaborative (LIAC) to estimate that 231,165 low-income households (24% of all low-income households[7]) currently find themselves in an arrearage situation in which they (1) were behind on paying their average/regular bill amount for six or more months or (2) were behind by twice the amount (or more) of their average bill for two or more months, thus meeting the Companies' stringent definition of "arrears struggling" households.

Q: DOES THE COMPANIES' DEFINITION OF "ARREARS STRUGGLING HOUSEHOLDS" ADEQUATELY CAPTURE AFFORDABILITY CHALLENGES THAT LOW-INCOME CUSTOMERS FACE?

A: No. The Companies' definition of "arrears struggling" is extremely stringent. It does not capture low-income customers that may spend three to five months of the year – which may represent winter or summer months when their bills are the highest – being unable to afford their bill at the time it is due. As such, the number of low-income customers captured by the Companies' "arrears struggling" definition serves as a minimum representation of the population of low-income households that struggle to afford their monthly electric bill.

[7] See Joint N.C. Low-Income Affordability Collaborative Q. Progress Rep. at Appendix F, N.C. Util. Comm'n Docket E-7 Subs 1213, 1214, 1187 and E-2 Subs 1219, 1193 (Apr. 25, 2022), https://starw1.ncuc.gov/NCUC/ViewFile.aspx?Id=ae12f626-823d-4ae7-86c5bc4e49aa4208 ("Revised LIAC Customer Analytics") [hereinafter Joint N.C. Low-Income Affordability Collaborative].

Q: IS IT ONLY LOW-INCOME CUSTOMERS THAT FACE AFFORDABILITY CHALLENGES?

A: No. The Companies' analytics show that another 13% of non-low-income households also met the arrears definition, amounting to more than 277,000 households that are not low-income but that are still vulnerable to unaffordable electric bills and at risk of being disconnected for non-payment. Adding that value to the number of "arrears struggling" low-income households results in a total of more than a half-million households currently qualifying as "arrears struggling," representing nearly one-sixth of all households served by the Companies in North Carolina.

As of May 2022, the most recent month for which data has been published and the month when the Companies filed their proposed Carbon Plan, nearly 575,000 households, or 18.4% of the reported residential customer base at that time, were more than 30 days in arrears. Those customers owed a total of more than $213 million, for an average of $371 per customer in arrears[8], or more than three times the average monthly bill for residential customers of Duke Energy Progress and more than 2.5 times the average monthly bill for residential customers of Duke Energy Carolinas in 2020.[9]

Q: HAVE AFFORDABILITY CONDITIONS IMPROVED SINCE PRIOR TO AND DURING THE COVID-19 PANDEMIC?

[8] NCUC COVID -19 State of Emergency Util. Reporting Data Through May 2022, N.C. Util. Comm'n Docket M-100 Sub 158 (July 1, 2022).
[9] US Department of Energy, Energy Information Administration. Form EIA-861. File Sales_Ult_Cust_2020.xlsx.

A: No. Conditions are worse. While data is not publicly available for pre-pandemic monthly arrearages, the Companies reported that nearly 499,000 total residential customers were 30-days in arrears in May 2020 – the first month for which such data was reported – owing approximately $116.7 million ($234 per customer in arrears).[10] By May 2021, the number of residential customers in arrears had declined by 8%, but the total amount of arrears had increased by nearly the same amount. From May 2021 to May 2022, the number of customers in arrears increased by 26%, while total arrears jumped by 79%, to $213 million, resulting in a 35% increase in the average amount owed. In fact, the three highest values for total arrears for the Companies' residential customers since the beginning of mandatory monthly reporting in April 2020 have occurred in the past three months of reporting: $222.3 million in March 2022, $226.4 million in April and $213.4 million in May. Additionally, both the number of customers in arrears and total arrears have been steadily increasing, overall, since January 2021, when the Companies reported a total of 429,672 residential customers in arrears and $105.7 million in total arrears.[11]

In sum, affordability challenges experienced by the Companies' residential customer base in North Carolina are worse than they have been since the start of the COVID-19 pandemic and are continuing to worsen.

[10] Exec. Order 124 Monthly Data for May, 2020 Rep. to the Governor, N.C. Util. Comm'n Docket M-100 Sub 158 (June 18, 2022).
[11] NCUC COVID -19 State of Emergency Util. Reporting Data Through May 2022, N.C. Util. Comm'n Docket M-100 Sub 158 (July 1, 2022).

Thus, as the Commission develops and the Companies embark on implementing a Carolinas Carbon Plan, affordability challenges must be addressed as a core part of the plan, not as an afterthought. Otherwise, existing affordability challenges and impacts are likely to worsen as more residential customers become vulnerable to falling into arrears and potentially being disconnected for non-payment.

Q: WHAT IS THE PRIMARY DRIVER OF AFFORDABILITY CHALLENGES FOR THE COMPANIES' LOW-INCOME AND OTHERWISE VULNERABLE CUSTOMERS?

A: Energy Inefficiency. As an active stakeholder in the LIAC process, I represented Appalachian Voices as a co-lead of Sub-team A, which was tasked with assessing customer challenges as they relate to affordability. In that role I served as a primary author of the assessment report, distilling the results of the analytics into a summary report that was presented to the broader LIAC stakeholder group. The Companies acknowledged that these factors were likely due to energy-inefficient building stock, heating and cooling systems and appliances, concluding that the findings "strongly suggest that improving a household's energy efficiency through air sealing, insulation, and energy efficient heating systems could substantially reduce a household's likelihood of experiencing a [disconnection for non-payment]."[12]

[12] See Joint N.C. Low-Income Affordability Collaborative at Appendix F.

Q: DO THE COMPANIES' LOW-INCOME PROGRAMS COUPLED WITH OTHER PUBLICLY AVAILABLE RESOURCES SUFFICIENTLY ADDRESS THOSE AFFORDABILITY CHALLENGES?

A: No. If the Companies' programs, and the state Weatherization Assistance Program, Low-Income Energy Assistance Program or Crisis Assistance Program (LIEAP/CIP) sufficiently addressed low-income affordability challenges, the current affordability gaps outlined above would not likely exist at the scale and breadth that they do today. For instance, the Companies' analytics for the LIAC showed just 2% of its residential customer base (7.5% of its low-income customer base) received LIEAP/CIP assistance for paying their electric bills during the March 2019 through February 2020 analytical period.[13] Statewide, less than 4,000 households received weatherization assistance funding, in 2021.[14]

Additionally, according to the LIAC Final Report, less than 0.1% of program-eligible customers have participated in the Duke Energy Carolinas Weatherization Program and Equipment Replacement Program, and the impact of the program for those that have participated is a reduction in the estimated electric energy burden of only 1% or less. The Companies also report that the Neighborhood Energy Savers Program has reached 7.8% and 10% of Duke Energy Carolinas and Duke Energy Progress' program eligible customers, respectively. While that is a laudable achievement, the

[13] *Id.*
[14] North Carolina Weatherization Assistance Program. https://www.benefits.gov/benefit/1873. Accessed August 31, 2022.

nature of the program – in that it provides only education, energy assessments, and direct install measures rather than high-impact energy efficiency upgrades and improvements – limits the impact it has on the estimated electric energy burden for participating customers to a 0.4% burden reduction or less. Similar shortfalls characterize the Helping Home Fund, which serves less than 1,000 eligible households each year, and the Share the Light program, which serves only 5,000 households each year.[15]

While the Companies' existing programs are critical and provide tangible affordability and health-related benefits to its vulnerable customers, they serve only a small segment of the low-income customer base and have minimal impact on alleviating affordability challenges, reducing energy cost burdens or addressing peak winter and summer usage and demand in low-income households. And while there have been significant increases in funding for state weatherization and bill assistance programs during the COVID-19 pandemic, it still has not been enough to meet the scale and depth of need that exists.

Q: HOW WILL IMPLEMENTATION OF THE PROPOSED CARBON PLAN AFFECT EXISTING AFFORDABILITY CHALLENGES FOR LOW-INCOME AND OTHERWISE VULNERABLE CUSTOMERS?

A: Appalachian Voices submitted testimony and analysis in the Duke Energy Carolinas (DEC) 2019 rate case projecting how DEC's proposed rate

[15] Joint North Carolina Low-Income Affordability Collaborative Quarterly Progress Report. Docket Nos. E-7, Subs 1213, 1214 and 1187 and E-2, Subs 1219 and 1193. At 19-30.

increase would impact low-income customers in terms of increased energy burdens.[16] As of 2019, the average household energy burden for the 332,000 low-income households (less than 150% FPL) served by DEC exceeded the 6% affordability threshold, while 141,000 of those households experienced a "severe" energy burden exceeding 10.9%.[17]

DEC's estimate of customer bill impacts in the initial rate case filing estimated an increase of $8.06 per month, which approximates the $8 estimated monthly impact of DEC residential customers in 2030 resulting from Portfolio 1 in the proposed Carbon Plan. Using the bill impact value from DEC's rate case filing, we calculated that such an increase would have resulted in more than 57,000 low-income households (17% of all low-income households) moving into the "severe" energy burden category.[18]

As a proxy for the 2030 expected impact on energy burdens for low-income DEC households as a result of the Carbon Plan, this impact from an arguably modest increase in monthly bills should not be underestimated. The Companies' LIAC analytics illustrate how energy burdens exceeding the 6% threshold impact increase the likelihood that a household will meet the definition of "arrears struggling" and/or be disconnected for non-payment. For the definition of arrears, the analytics showed that compared

[16] See N.C. Util. Comm'n Docket E-7 Sub 1214.
[17] APPLIED PUB. POL'Y RSCH. INST. FOR STUDY AND EVALUATION, LIHEAP ENERGY BURDEN EVALUATION STUDY 12 (July 2005), https://www.acf.hhs.gov/sites/default/files/documents/ocs/comm_liheap_energyburdenstudy_apprise.pdf.
[18] Direct Test. Of Rory McIlmoil for Ctr. Biological and Appalachian Voices, N.C. Util. Comm'n Docket E-7 Sub 1214 (Feb. 18, 2020).

to a 6% energy burden a household with a 10% energy burden is 36% more likely to meet the arrears definition, while a 12% burden level renders a household 52% more likely to meet the definition. For disconnections, the relative likelihoods are 8% and 10%, respectively.[19]

Without clearly targeted and sufficiently funded low-income energy efficiency and distributed energy programs, combined with increased bill assistance or discounted rate programs for low-income customers, the Carolinas Carbon Plan as proposed will only serve to exacerbate existing affordability challenges. The increase in costs for households already struggling to afford their bills projected by the Companies for each of the four proposed Carbon Plan portfolios will only make it harder for those households to afford future bills. As a result, the impacts associated with affordability challenges -- namely disconnections for non-payment -- can be expected to increase as well.

In the statistical analysis portion of the LIAC analytics the Companies report a "disconnected for non-pay" population of approximately 186,000 households that experienced a disconnection during the 12-months prior to the pandemic. This represents approximately 8% of the Companies' total residential customer base and nearly half (47%) of the population of "arrears struggling" customers from which the disconnection sub-population was taken.[20] That is a significant number of households that experienced a loss

[19] See Joint N.C. Low-Income Affordability Collaborative at Appendix F.
[20] See Joint N.C. Low-Income Affordability Collaborative at Appendix F.

of electricity service because they could not afford to pay their bill. Again, this impact is likely only to grow if the Companies' proposed plan is approved and implemented without the inclusion of targeted investments that enhance affordability through energy efficiency, distributed energy resources, and bill assistance or other affordability programs.

THE PROPOSED CARBON PLAN LACKS ANY ATTEMPT TO MITIGATE AFFORDABILITY IMPACTS

Q: HOW DO THE COMPANIES APPROACH AFFORDABILITY IN THE PROPOSED CARBON PLAN AND SUPPORTING TESTIMONY, AND IS THAT APPROACH SUFFICIENT?

A: The Companies list "affordability" as one of four core objectives of the Carbon Plan, but then they refuse to define what they mean by affordability, either generally or in the context of the Carbon Plan. Instead, the Companies inappropriately conflate the terms "least cost" and "affordability" in its proposed plan and testimony. While related, these terms are not the same. "Least cost" does not mean "affordable," it merely means "less costly than the alternative."

Despite the fact that electric bills are unaffordable for hundreds of thousands of their residential customers, as detailed previously, the Companies continuously work to construct the perception that they already provide "affordable service," "affordable electricity" and "affordable rates." This construct is belied by the Companies' own analytics that show nearly

430,000 of its customers were in arrears in January of 2021 with those numbers steadily climbing to 575,000 customers as of May 2022.

For example, in its proposed plan and testimony, the Companies repeatedly claim affordable service as a hallmark.

> *"The Companies intend to take a multipronged approach to maintaining affordable and reliable service while also meeting CO2 emissions reduction targets."*[21] …
>
> *"The Companies are committed to the continued provision of affordable electricity for residents, businesses, industries, and communities in the Carolinas."*[22]
>
> *"Under the oversight of the Commission and the PSCSC, the Companies' current system is reliable, flexible, affordable and increasingly clean. Customers have benefitted from the Companies' diverse fleet of generation… providing reliable and affordable electricity that has contributed to the State's economic prosperity…"*[23]
>
> *"The Companies understand the critical importance of maintaining affordable and competitive rates, and we are focused on continuing to achieve efficiencies across the business to maintain our affordable rates."*[24]

While the Companies' four proposed portfolios may represent the "least cost" (e.g., "less costly") pathway relative to other options (in the

[21] DUKE ENERGY, CAROLINAS CARBON PLAN Appendix E at 9 (May 16, 2022) (emphasis added) [hereinafter CAROLINAS CARBON PLAN].
[22] *Id.* at 20.
[23] DIRECT TESTIMONY OF KENDAL C. BOWMAN FOR DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC. Docket E-100, Sub 179. At 9.
[24] *Id.* at 18.

Companies' opinion), all four portfolios result in an increase in customer bills, and none would be "affordable" for the substantial number of residential customers already struggling to afford their current electric bills. The Companies' approach is not sufficient.

Q: CAN YOU PROVIDE EXAMPLES OF HOW THE PROPOSED PLAN FALLS SHORT IN DEALING WITH AFFORDABILITY?

A: The Companies' approach to and perception of "affordability" should have evolved as a result of the LIAC process but appears to not have changed. The Companies mention "cost" and "affordability" together, but only present "cost" impacts, and nothing for "affordability" impacts. The Companies provide no definition of, or metrics related to, affordability, no reference to "affordability" definitions or affordability challenges identified and discussed throughout the LIAC process, and no analysis of impacts resulting from affordability challenges such as arrearages, disconnections or other impacts that may result from the implementation of any of the four carbon plan portfolios.

In fact, when Appalachian Voices requested the Companies to "[p]rovide any datasets, analysis, modeling, documentation, etc. Duke used or produced to determine how the estimated cost of each of the four portfolios will impact arrearages and disconnections for residential customers, particularly low-income customers," the Companies responded that "[t]he question seeks information that is outside of the scope of the Carbon Plan proceeding," and again reverted back to conflating "least cost"

with affordability.[25] As arrearages and disconnections directly represent the outcomes of affordability challenges faced by Duke Energy's customers, however, the admission that the Companies consider such an analysis to be "outside the scope of" the Carbon Plan underscores their lack of commitment to addressing actual affordability concerns.

Finally, the Companies' perception that their affordability objective is a matter of presenting a "least cost" plan for reducing carbon emissions rather than of addressing existing and potential affordability challenges and impacts experienced by hundreds of thousands of households they serve is reflected in the exclusion from the Carbon Plan of any investments or programs that would reduce costs for residential customers or, at a minimum, offset future costs projected to result from the Carbon Plan.

Q: DO THE COMPANIES HAVE THE DATA AND TOOLS AVAILABLE TO MODEL THE IMPACTS OF THEIR PROPOSED CARBON PLAN PORTFOLIOS ON LOW- AND MODERATE-INCOME AFFORDABILITY CHALLENGES?

A: Yes, but they have chosen not to use those tools in their carbon planning process. During the initial discovery process, Appalachian Voices asked the Companies to provide details on "how Duke incorporated data and analysis from/of the detailed customer usage and demographics dataset produced by Duke and Acxiom for purposes of the [LIAC] for the purpose of analyzing the impact of the four carbon plan portfolios on customers of

[25] DE Response to Appalachian Voices DR. 1-7.

different income levels, housing tenure, housing type, race, age, region (urban vs. rural) and other customer segments analyzed for the LIAC." The Companies responded that "[a]t the time the Carbon Plan was being developed, the analytics and data pipelines used for the [LIAC] were still a work in progress. Because of this overlap in the timing, LIAC analytic results were not specifically included in the Carbon Plan. However, as stated in the Carbon Plan, the Companies are committed to use the findings from the LIAC going forward to expand the Companies' programs and support customers."[26]

The actual timeline of events belies this response. Duke Energy and Acxiom produced the initial version of the noted analytics in September 2021, with refinements and additions being performed for new versions provided to the LIAC in October, November, and December 2021, with the final version (including new statistical analysis) being provided in March 2022. The Companies submitted their proposed Carbon Plan on May 16, 2022.

In other words, the datasets for incorporating a deep analysis of potential affordability impacts on residential customers that would result under the four proposed Carbon Plan portfolios were available as early as September of 2021, while even the final version was available for six weeks prior to the Companies' submission of the Plan.

[26] DE Response to Appalachian Voices DR. 1-10.

Q: DO THE COMPANIES PROPOSE, AS AN INTEGRAL PART OF THE CARBON PLAN, ANY PROGRAMS OR INVESTMENTS TARGETED AT ADDRESSING LOW-INCOME AND OTHERWISE VULNERABLE CUSTOMER AFFORDABILITY CHALLENGES?

A: No. Despite the Companies' purported inclusion of affordability as a core Carbon Plan objective, the Companies neither propose nor incorporate any programs or investments in the Carbon Plan that directly target low-income and/or otherwise vulnerable customers. Instead, the Companies punt that responsibility to future years and other proceedings, stating, for instance, that "…[t]o ensure we are helping customers most in need now and in the future, we are taking steps with the input of the [LIAC] to advance new proposals that will help our residential customers that may be struggling to pay their bills."[27]

The Companies note future programs and other low-income approaches the Companies might or plan to request and adopt, including the potential expansion of income qualification for low-income energy efficiency programs to 300% of FPL, on-tariff energy efficiency financing, pursuing Commission approval of an Energy Burden Reduction Pilot program, and expanding the existing Neighborhood Energy Saver program.[28] While most of these potential programs and changes would benefit low-income households and address, to varied extents, customer affordability challenges and impacts, none were integrated directly into the

[27] *Id.* at 20.
[28] CAROLINAS CARBON PLAN, Appendix E at 9-10.

Carbon Plan, and none are being requested by the Companies as critical near-term development activities.

Q: HOW COULD OR SHOULD THE COMPANIES HAVE INCORPORATED TARGETED AFFORDABILITY PROGRAMS FOR LOW-INCOME AND OTHERWISE VULNERABLE CUSTOMERS IN THEIR PROPOSED CARBON PLAN?

A: If the Companies are genuinely committed to affordability as a core objective in the Carbon Plan they must go beyond a strict "least cost" approach and directly incorporate programs and investments that directly address affordability challenges and impacts for low-income and otherwise vulnerable households. This would include expanded bill assistance, low-income rate designs, and arrearage management programs that alleviate existing challenges customers face with affording their electric bills. It would include proactive and aggressive long-term investments in energy efficiency and demand-side management to reduce household and system costs related to winter and summer peak energy usage resulting from energy-inefficient buildings (insulation, air sealing, etc.), heating and cooling systems and appliances, particularly for low-income households.[29] It would involve expanding distributed solar options to include customer-owned and

[29] In fact, Appendix E of the CAROLINAS CARBON PLAN (at 28) argues for having included targeted low-income demand reduction programs, noting that "Within residential populations, the need exists to address low-income demand [given that] lower-income customers tend to contribute more [to demand] during peak. About a third of customers participating in residential [demand reduction] programs today (that are mainly summer programs) earn less than 200% of the poverty line."

community-based or shared solar programs that are accessible and targeted to low-income and otherwise economically vulnerable households.

Q: WOULD INVESTMENTS TO ADDRESS AFFORDABILTY CHALLENGES HAVE ANY IMPACT ON CAPACITY NEEDS, OR OTHER SYSTEM-WIDE COSTS?

A: Yes. Such investments not only enhance affordability and reduce the long-term need for funding bill assistance programs, but also contribute to decarbonization, improved grid reliability and resiliency, and reduce or avoid the need for new gas capacity and new transmission infrastructure, all of which lower costs for customers.

Q: ARE THERE OTHER STEPS THE COMMISSION AND COMPANIES CAN TAKE TO ENHANCE AFFORDABILITY IN THE CARBON PLAN?

A: Yes. A true commitment to affordability in the Carbon Plan requires modeling the potential for a regional competitive wholesale market and use of performance-based regulation and appropriate performance incentive mechanisms to enhance affordability, reliability, and carbon reductions compared to the currently proposed Carbon Plan.

Q: DO YOU AGREE WITH THE COMPANIES' REQUEST THAT THE COMMISSION AFFIRM IN ITS CARBON PLAN ORDER THAT EXPANDED LOW-INCOME PROGRAMS SHOULD BE CONSIDERED AND APPROVED IN A SEPARATE DOCKET? PLEASE EXPLAIN.

A: No, for reasons already detailed in my testimony and further explained below. First, if the Companies can propose and request approval of short-term development activities for resources that may not be constructed for several years, they can similarly request that the Commission provide

conditional approval for the inclusion of low-income energy efficiency and distributed energy programs and investments that contribute to the mandated decarbonization goal and enhance affordability for customers. However, the Companies intentionally elected not to do so.

Second, if affordability is a "core objective" of the Carbon Plan, then the Companies should be required to incorporate affordability investments – particularly those that can contribute to decarbonization – as an integral part of the Carbon Plan.

Q: DO YOU AGREE WITH THE COMPANIES' PROPOSAL TO EXPAND THE DEFINITION OF INCOME QUALIFIED ELIGIBLE CUSTOMERS TO 300% OF FEDERAL POVERTY GUIDELINES? PLEASE EXPLAIN.

A: No. While we recognize that a substantial number of customers falling above the generally applied 200% of FPL threshold experience affordability challenges, we do not agree that the definition of income-qualified eligible customers should be expanded to 300% of FPL. As explained previously in my testimony, existing Company and public programs are starkly underfunded and reach only an extremely small portion of the low-income households (as currently defined - less than 200% FPL) in need of assistance. The shortfall in funding and population of households receiving assistance or participating in existing energy efficiency and bill assistance programs must be addressed first before any proposal to expand the eligibility definition is considered. Otherwise, if the population of eligible households expands, existing resources may be spread even thinner,

reducing the per-household benefit, and/or reducing the ability of the households that struggle the most with affordability challenges to access the programs. If the Companies directly incorporate proposals and investments aimed at enhancing affordability into the Carbon Plan with its request to expand low-income program eligibility, our response might be different. They intentionally neglected to do so.

TOPIC: NEAR TERM PROCUREMENT

ALTERNATE RESOURCES TO GAS PLANTS: BENEFITS OF GRID EDGE RESOURCES

Q: DR. KINKHABWALA, PSE PREPARED A REPORT, "*REVIEW AND COMMENT ON THE DUKE ENERGY PROPOSED CARBON PLAN FOR THE CAROLINAS*," THAT WAS FILED WITH COMMENTS SUBMITTED ON BEHALF OF APPALACHIAN VOICES, IS THAT CORRECT?

A: Yes. I collaborated with Dr. Krieger and Dr. Murphy in the preparation of that report.

Q: DID THAT REPORT IDENTIFY ALTERNATIVES TO THE PROPOSED EXPANDED USE OF GAS PLANTS?

A: Yes. The proposed Plan includes 2.4 gigawatts (GW) of new gas combined cycle facilities and 0.8-1.1 GW of new gas combustion turbines. These plants would provide an estimated 14,700 GWh and 70 GWh of electricity in 2030, respectively. However, the Companies did not fully consider the potential of utility-scale solar, offshore wind, energy storage, or grid-edge alternatives to these investments. The Plan put unnecessary constraints on the timing and capacity of alternative resource deployment, including

onshore and offshore wind, distributed energy resources, and energy efficiency. Enabling the EnCompass model to actively select these resources when cost-competitive would enable a fair comparison of their ability to meet energy and capacity needs. The proposed peaking gas combustion plants could likely be replaced with utility-scale energy storage, as has been occurring nationwide; additional peak needs could be met with offshore wind deployed earlier than proposed, energy efficiency, demand response, and distributed storage. As discussed more fully in our report submitted as comments on behalf of Appalachian Voices, energy needs could likely be met with a combination of demand-side efficiency savings and expanded offshore wind and solar (utility-scale and distributed).

TOPIC: EE/DSM/GRID EDGE

Q: DO YOU HAVE CONCERNS RELATING TO THE COMPANIES' TREATMENT OF GRID EDGE RESOURCES?

A: Yes. The Plan underutilizes grid edge resources including energy storage, solar, demand response, and energy efficiency by not enabling these resources to compete with utility-scale investments in the EnCompass modeling runs and capping their rollout at very low levels. These resources have the potential to not only obviate the need for new gas plant investments but can help reduce health-damaging air pollutant and greenhouse gas emissions, provide resilience, and add to grid flexibility.

Q: CAN YOU PLEASE EXPLAIN WHAT THE VALUE IS, TO THE GRID AND TO CUSTOMERS, OF GRID-EDGE RESOURCES, SUCH AS ENERGY EFFICIENCY AND DISTRIBUTED GENERATION AND STORAGE?

A: Grid-edge resources hold a wide range of potential benefits for both the electric grid and for customers. Energy efficiency investments, such as weatherization and efficient appliances, reduce customer energy use and bills, while simultaneously offsetting the need to build utility-scale generation resources and subsequently mitigating the costs that get passed on to customers. Weatherization can also help keep homes cool in summer and warm in winter, protecting vulnerable populations from the cold and from heat stroke. Distributed solar resources, inclusive of both behind-the-meter and community solar systems, can provide consistent bills and savings for adopters while similarly offsetting the need for utility-scale generation. Energy storage systems can help provide demand management, integrate renewable energy resources, and provide resilience in the case of emergencies.

All of these resources, if they displace fossil fuel generation, hold the potential to reduce utility-scale greenhouse gas and health-damaging air pollutant emissions. Additional grid edge resources include, but are not limited to, vehicle-to-grid systems and smart appliances that can participate in demand response. These resources collectively hold the potential to provide flexibility, and may provide location-specific grid benefits such as deferral of distribution system investments and reduction in peak demand.

Q: THE COMPANIES MAINTAIN THAT THE FIRST PILLAR OF ENERGY TRANSITION AND THE CARBON PLAN IS TO "SHRINK THE CHALLENGE" BY REDUCING ENERGY REQUIREMENTS AND LOAD PATTERNS THROUGH GRID EDGE PROGRAMS. WHAT ROLE DOES ENERGY EFFICIENCY INVESTMENT PLAY IN REDUCING DEMAND, PARTICULARLY AS RELATES TO LOW-INCOME HOUSEHOLDS?

A: Energy efficiency, as Duke notes, can help reduce the challenge of meeting electricity demand requirements. As such, it behooves Duke to expand its energy efficiency targets. As detailed in our report, we estimated that if Duke achieved efficiency levels equal 1% of retail sales per year (which Duke Energy Carolina has achieved historically[30]), inclusive of non-behavioral investments with multi-year measure lifespans, that Duke would save an additional 4,700 GWh and reduce demand by 800 MW by 2030. Achieving 2% savings per year would provide 14,300 GWh of energy savings and 2,500 MW of demand reductions beyond Duke's current proposal. Such investments would greatly reduce the need to build new gas plants. For example, as detailed in our report for Appalachian Voices in this matter, using our simulated portfolio of household energy use, we estimated that investing in energy efficiency and other grid edge resources for just the households with energy cost burdens greater than 6% would reduce energy cost burdens for 90% of these households to less than the 6% threshold with a blend of on-bill financing. Simultaneously, the investments could

[30] Bradley-Wright, F., H. Pohnan, & M. Shober (2022). "Energy Efficiency in the Southeast: Fourth Annual Report." Southern Alliance for Clean Energy." Available at: https://cleanenergy.org/wp-content/uploads/Energy-Efficiency-in-the-Southeast-Fourth-Annual-Report.pdf

annually save 2,800 GWh in electricity use in the Companies' North Carolina service area alone, which represents approximately 25% of the total electricity use of these households. This proportion agrees with estimates from the US Department of Energy[31].

DUKE CARBON PLAN ENERGY EFFICIENCY TARGETS

Q: THE COMPANIES DESCRIBE THEIR PROPOSED ENERGY EFFICIENCY TARGET OF 1% OF ELIGIBLE RETAIL SALES AS "AGGRESSIVE." DO YOU AGREE?

A: No. The proposed energy efficiency targets in the Carbon Plan are not aggressive. The Companies target savings of 1% of eligible load per year, but only about two-thirds of their combined load is eligible. As other parties have testified,[32] this goal represents a lower percentage of retail sales than Duke has achieved historically. The Companies claim that efficiency levels cannot expand beyond current targets because they depend entirely on "customer preferences,"[33] but Duke's own programs and energy efficiency savings demonstrate that programmatic investments in energy efficiency can lead to demand reductions. It is unclear why Duke credits customer preference over its own energy efficiency programs. Efficiency programs across the country have effectively achieved significantly higher savings

[31] US DOE. EnergySavers Tips on Saving Money & Energy at Home. Available at: https://www.energy.gov/sites/prod/files/energy_savers.pdf

[32] JOINT COMMENTS OF THE NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION, SOUTHERN ALLIANCE FOR CLEAN ENERGY, SIERRA CLUB, AND NATURAL RESOURCES DEFENSE COUNCIL, DOCKET NO. E-100, SUB 179 p. 24. July 15, 2022. Available at: https://starw1.ncuc.gov/NCUC/ViewFile.aspx?Id=c6afa7f2-ac61-439c-b406-98b42e4ca04e

[33] DIRECT TESTIMONY OF LON HUBER AND TIM DUFF FOR DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC. P. 18 L. 6. DOCKET NO. E-100, SUB 179. August 19, 2022.

than the Companies' goals: many states achieve nearly 2% or more of retail sales per year.[34]

The Companies argue that they should not be beholden to targets based on retail sales because some customers are permitted to opt out of efficiency programs. However, this approach not only fails to consider that these customers could be a potentially low-cost valuable resource, but also that other factors, such as funding from the recently passed Inflation Reduction Act, could contribute to the adoption of energy efficiency measures for all customers. Moreover, there are large segments of eligible customers who have significant energy efficiency potential that has not been realized. For example, current efficiency savings for low-income households -- who comprise one-third of the Companies' customers – are negligible.[35] The expansion of targeted programs for these households would enable greater overall savings in addition to a reduction in energy cost burdens for those who need it most. Finally, the Companies rely significantly on behavioral interventions for which they ascribe a single year of savings. The expansion of investments in weatherization, appliances, and other non-behavioral measures with multi-year measure lifetimes

[34] Berg, W., E. Cooper, and M. DiMascio. 2022. State Energy Efficiency Scorecard: 2021 Progress Report. Washington, DC: ACEEE. Available at: aceee.org/research-report/u2201.
[35] Bradley-Wright, F., H. Pohnan, & M. Shober (2022). "Energy Efficiency in the Southeast: Fourth Annual Report." Southern Alliance for Clean Energy." Available at: https://cleanenergy.org/wp-content/uploads/Energy-Efficiency-in-the-Southeast-Fourth-Annual-Report.pdf

should increase the Companies' potential annual electricity and demand savings.

Q: THE COMPANIES CONTEND THAT ENERGY EFFICIENCY TARGETS BASED ON RETAIL SALES IS NOT AN ACCURATE OR ILLUSTRATIVE COMPARISON BETWEEN STATES. DO YOU AGREE?

A: We believe that using retail sales is a valid comparison, and so does Duke in some contexts — they use retail sales for comparison to other utilities in their comments.[36] Duke provides a comparison of what it suggests would be equivalent retail savings if other states saved the same average residential kWh as Duke would at a 1% savings rate.[37] The Table provided is confusing and misleading. Duke has very high residential usage (in kWh) compared to nearly all the other states shown, suggesting that houses in Duke territory likely have very high energy use intensity and probably have more low-hanging fruit in terms of energy efficiency investments than the comparison states. Many of the comparison states, such as California, Massachusetts, and Vermont, have achieved roughly 2% energy efficiency for many years in a row, meaning the cheapest measures have likely been implemented and efficiency savings should be harder in these states, yet savings remain high. However, even following Duke's logic (namely, that it is harder for Duke to achieve 1% savings in terms of retail sales because the total kWh reductions required would be higher), this Table demonstrates

[36] DIRECT TESTIMONY OF LON HUBER AND TIM DUFF FOR DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC. P. 11 Fig. 1. DOCKET NO. E-100, SUB 179. August 19, 2022.
[37] DIRECT TESTIMONY OF LON HUBER AND TIM DUFF FOR DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC. P. 27 Table 2. DOCKET NO. E-100, SUB 179. August 19, 2022.

that such savings should be possible. The "equivalent" savings for Massachusetts are given as 1.73% — but it achieved 2.34% of retail sales in 2021[38] (these savings are for all sectors, not just residential). The equivalent savings for Vermont are supposedly 1.84%, but Vermont achieved 1.97% of retail sales in 2021. Meanwhile, Duke is targeting 1% of *eligible* load — a lower value than 1% of retail sales. Higher targets are clearly achievable. We believe a comparison to percentage of retail sales is valid because states that have implemented historic efficiency measures are inherently going to see lower kWh of annual savings in each incremental year because the easiest measures get implemented first.

Q: DO YOU CONSIDER THE DEPLOYMENT RATES OF OTHER GRID EDGE RESOURCES TO BE ADEQUATE?

A: No. The Companies do not adequately address the potential expansion of distributed energy resources, such as rooftop solar or demand response. Their modeling software does not enable demand response, energy efficiency, nor many other resources, to be selected as a resource that can offset the need for new gas power plants. These resources could potentially be significantly cheaper than the utility-scale resources the Companies propose, but grid edge resources are not allowed to effectively compete in the model. We agree with the Attorney General's Office[39] that efficiency

[38] Berg, W., E. Cooper, and M. DiMascio. 2022. State Energy Efficiency Scorecard: 2021 Progress Report. Washington, DC: ACEEE. Available at: aceee.org/research-report/u2201.
[39] COMMENTS OF THE ATTORNEY GENERAL'S OFFICE, DOCKET NO. E-100, SUB 179. July 15, 2022. Available at: https://starw1.ncuc.gov/NCUC/ViewFile.aspx?Id=fa173cb9-6ed8-4a84-a474-546cf27e3ad3

should be a selectable resource, alongside other grid-edge resources. Even if not included here, the Companies should include a more aggressive efficiency scenario (e.g., 2% savings in retail sales per year) and include grid edge resources as a selectable resource in all future Carbon Plan iterations. Furthermore, the extension of tax credits and proposed allocation of billions of dollars in financing and rebates for household-level clean energy adoption, including for efficiency measures and rooftop solar, within the 2022 Inflation Reduction Act suggests that the Companies' modeling is likely an underestimate of future clean energy adoption rates.

ENERGY COST BURDENS AND AFFORDABILITY

Q: HOW WOULD YOU CHARACTERIZE THE AFFORDABILITY AND ENERGY COST BURDEN CHALLENGES OF CUSTOMERS IN DUKE'S NORTH CAROLINA TERRITORY?

A: Nearly all households with incomes less than the FPL experience undue financial burden without bill assistance, using the standard definition of "high" energy cost burdens being those greater than 6% of gross household income. Over half of households in Duke Energy's North Carolina territory earning between one and two times the federal poverty level (100-200% FPL) also have energy cost burdens over 6%. In terms of bill assistance alone, it would cost over $600 million annually to pay down all these bills to the 6% threshold, a sum far in excess of the current amount available. However, through targeted use of grid edge resources such as efficiency, demand response, and community solar alongside financing strategies, this

annual sum could be reduced by up to 95% if all low-income households participated. Moreover, such investments typically pay for themselves, as described above. These resources also, as noted previously, can contribute to achieving carbon targets and reducing the emissions of health-damaging air pollutants from fossil fuel combustion. Such investments, therefore, are clearly of great value and should be pursued with great urgency to reap the financial benefits as soon as possible. Each year without implementation of available energy efficiency upgrades is a year of increased financial burden on low-income customers and a wasted opportunity for decarbonization and air pollutant emissions reductions. Given the limited amount of progress that has been made thus far for low-income households,[40] there remains great potential for future savings.

Q: HOW DOES THE COMPANIES' PROPOSED CARBON PLAN AFFECT AFFORDABILITY AND ENERGY COST BURDENS?

A: The proposed Carbon Plan holds direct and indirect implications for affordability. Although rates are determined separately, utility-scale investments and fossil fuel costs are passed on to customers. As such, unnecessary capital investments may exacerbate affordability challenges, and escalating natural gas prices pose a risk to customers. Meanwhile, direct investments in energy efficiency can reduce customer bills. If the

[40] Bradley-Wright, F., H. Pohnan, & M. Shober (2022). "Energy Efficiency in the Southeast: Fourth Annual Report." Southern Alliance for Clean Energy." Available at: https://cleanenergy.org/wp-content/uploads/Energy-Efficiency-in-the-Southeast-Fourth-Annual-Report.pdf

Companies expanded their energy efficiency targets and incorporated affordability metrics as recommended by LIAC, more households would be able to reduce their energy bills without leaving behind the neediest households. As noted above, historically, low-income efficiency savings have been negligible. The Companies in their response comments suggested the need to expand their low-income efficiency programs.[41] Such investments could be bolstered by funding from the Inflation Reduction Act. While the Companies assert that low-income efficiency programs are not cost-effective,[42] we suggest that ascribing a value to non-energy societal benefits, such as a reduction in energy cost burdens and emission reductions, may indeed show that these investments are cost-effective on a societal level.

The Companies also suggest that relying on demand reduction through energy efficiency investments is "risky" because customer preference may limit adoption, but we assert that the proposed alternative — namely, investments in expanded gas infrastructure — is riskier due to the potential for stranded assets and the reliance on fossil fuels whose volatile prices may be passed on to customers. Similarly, the proposed investment in small modular nuclear reactors, an entirely unproven resource, is significantly riskier than any energy efficiency investments.

[41] DIRECT TESTIMONY OF LON HUBER AND TIM DUFF FOR DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC. P. 31 L. 21. DOCKET NO. E-100, SUB 179. August 19, 2022.
[42] DIRECT TESTIMONY OF LON HUBER AND TIM DUFF FOR DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC. P. 32 L. 7. DOCKET NO. E-100, SUB 179. August 19, 2022.

The Companies also propose expanding eligible "low-income" populations from those earning under 200% FPL to those earning under 300% FPL. While I agree with other testimony[43] that such changes in definition should be made in collaboration with the LIAC, I also note that any increase in the number of eligible customers should be associated with an increase in available funding, and funding targeted at those households earning under 200% FPL should not be reduced but rather should be increased. Furthermore, we estimate that around 75% of households with incomes less than 200% FPL have energy cost burdens greater than 6%, while the cost burden for households between 200% and 300% FPL is only 5%. The definition of low-income households as less than 200% FPL is a reasonable cutoff for households that experience undue financial burden and for whom the financial benefits of lower energy bills will be most impactful. Any program targeted specifically at households in the 200-300% FPL range should be on top of existing investment and go above and beyond the investments for households earning 200% FPL and should not replace those existing investments.

Q: HOW COULD MODIFICATIONS TO THE COMPANIES' PROPOSED CARBON PLAN HELP IMPROVE AFFORDABILITY?

[43] JOINT COMMENTS OF THE NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION, SOUTHERN ALLIANCE FOR CLEAN ENERGY, SIERRA CLUB, AND NATURAL RESOURCES DEFENSE COUNCIL, DOCKET NO. E-100, SUB 179 p. 24. July 15, 2022. Available at: https://starw1.ncuc.gov/NCUC/ViewFile.aspx?Id=c6afa7f2-ac61-439c-b406-98b42e4ca04e

A: Setting more ambitious targets for savings from grid edge resources will benefit all customers. Investments in these resources have been shown to have wide ranging benefits including added grid resilience, peak shaving, and reduced transmission costs. Furthermore, separate targets should be set specifically for low-income households. These households have historically seen the least savings from Duke's programs and are also the households that would benefit the most from efficiency and affordability investments. Bill savings for these households would result in societal benefits that extend beyond the already substantial benefits that arise from reduced carbon emissions and capacity. The roughly 900,000 households that are energy burdened would see an average annual savings of $650 per year. Until affordability is appropriately incorporated into planning alongside grid edge resources, however, this large financial boon to low-income homes will remain largely ignored as most current programs serve miniscule fractions of these households.

RECOMMENDATIONS FOR THE COMMISSION

Q: WHAT ARE THE PANEL'S RECOMMENDATIONS TO THE COMMISSION CONCERNING AFFORDABILITY?

A: Decarbonizing the grid through a transition to clean, renewable energy resources; battery storage; and substantial investments in energy efficiency and demand-side management is critical for North Carolina. That transition must proceed rapidly to confront the worst impacts of climate change and protect public health. However, it is abundantly clear that the

implementation of any of the Companies' four Carbon Plan portfolios will exacerbate both the challenges and impacts low-income households already experience due to the unaffordability of their electric and total energy bills. As such, any plan which guides the energy transition must, as a core and integrated objective of the plan, directly address existing and future energy affordability challenges and impacts for North Carolina households, especially low-income and otherwise vulnerable households. Doing so can and will contribute to the achievement of both the state's decarbonization goals as well as the improvement of the economic and public health of North Carolina's residents.

To that end, as it develops the final Carbon Plan for this biennial period, we request that the Commission:

1. Require that the Companies define and develop metrics for assessing "affordability" in a manner that describes actual experiences and impacts faced by its residential customers. We therefore recommend that the Commission require the Companies adopt the definition of affordability codified by the California Public Utilities Commission and proposed by the LIAC Sub-team B, as "the degree to which a representative household is able to pay for an essential utility service charge, given its socioeconomic status."

2. Require that the final Carbon Plan incorporate substantial investments in, and model the affordability and carbon reduction benefits of, customer bill assistance and arrearage management programs (such as

those proposed through the LIAC), low-income weatherization and other energy efficiency investments, and low-income distributed energy and demand reduction investments. The Commission should require the analysis to include impacts on low-income customer bills (specifically, average actual bills, not just average bills for a certain quantity of electricity consumption, to ensure that efficiency benefits are reflected), electricity cost burdens, arrearages, disconnections for non-payment, and carbon emissions via the avoidance of the "need" to build new methane gas generation.

3. Reject the Companies' proposal to expand the definition of income-qualified eligible customers for low-income assistance and energy efficiency programs to 300% of Federal Poverty Guidelines.

4. Require the Companies to model as a sensitivity analysis how a regional competitive wholesale market and legislatively approved performance-based regulation would impact resource selection and portfolio costs for the Carbon Plan, and by extension, carbon emissions and customer affordability.

Q: WHAT ARE THE PANEL'S RECOMMENDATIONS TO THE COMMISSION CONCERNING RESOURCE INVESTMENTS?

A: We recommend that that the Commission disallow the build-out of new gas power infrastructure, which risks passing on volatile gas costs and stranded asset costs to customers. Instead, we recommend that the Commission require Duke to enable energy efficiency, offshore wind, utility-scale

storage, distributed solar and storage, demand response, and other alternative utility-scale and grid-edge resources to compete within the EnCompass model rather than be capped at arbitrarily low deployment rates.

Q: DOES THIS CONCLUDE THE PANEL'S TESTIMONY?

A: Yes.