STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-7, SUB 1264

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of Application of Duke Energy Carolinas, LLC for Approval of Renewable Energy and Energy Efficiency Portfolio Standard (REPS) Compliance Report and Cost Recovery Rider Pursuant to N.C. Gen. Stat. 62-133.8 and Commission Rule R8-67	**DIRECT TESTIMONY OF KIMBERLY A. PRESSON**

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Kimberly A. Presson, and my business address is 400 South Tryon Street, Charlotte, North Carolina.

Q. PLEASE STATE YOUR POSITION WITH DUKE ENERGY AND DESCRIBE YOUR CURRENT RESPONSIBILITIES.

A. In my capacity as Renewable Compliance Manager, I am responsible for the development and implementation of renewable energy compliance strategies for Duke Energy Carolinas, LLC ("Duke Energy Carolinas," "DEC" or "the Company"), Duke Energy Progress, LLC ("Duke Energy Progress" or "DEP") and Duke Energy Ohio, LLC. My responsibilities include compliance with North Carolina's Renewable Energy and Energy Efficiency Portfolio Standard ("REPS"), compliance with Ohio's Renewable Portfolio Standard and evaluation of renewable generation initiatives and customer programs that relate to renewable compliance.

Q. PLEASE BRIEFLY SUMMARIZE YOUR EDUCATIONAL BACKGROUND.

A. I received a Bachelor of Arts in Business Administration from Furman University.

Q. PLEASE DESCRIBE YOUR BUSINESS BACKGROUND AND EXPERIENCE.

A. I began my career with Duke Power Company (now known as Duke Energy Carolinas) in 1990, where I held various positions in the customer service and the finance organizations. I joined the Rates Department in 2019 and

moved to my current position as Renewable Compliance Manager in the Business Development and Compliance Department in 2021.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE NORTH CAROLINA UTILITIES COMMISSION?

A. No.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to describe Duke Energy Carolinas' activities and the costs it has incurred, or projects it will incur, in support of compliance with North Carolina's Renewable Energy and Energy Efficiency Portfolio Standard under N.C. Gen. Stat. ("G.S.") § 62-133.8 during the twelve months beginning on January 1, 2021 and ending on December 31, 2021 ("Test Period"), as well as during the twelve months beginning on September 1, 2022 and ending on August 31, 2023 ("Billing Period").

Q. PLEASE DESCRIBE THE EXHIBITS TO YOUR TESTIMONY.

A. My testimony includes seventeen exhibits. Presson Confidential Exhibit No. 1 is the Company's 2021 REPS Compliance Report. In its Motion for Extension of Time to File REPS Compliance Report filed on February 21, 2022, in Docket No. E-7, Sub 1264 ("Compliance Report Delay Motion"), the Company requested a delay in filing its compliance report for reasons detailed in the Motion, and proposed filing the compliance report within ten business days after issuance of a Commission order pursuant to the pending motion in Docket No. E-100, Sub 113 relating to the 2021 poultry and swine

waste requirement delay requested by various Electric Suppliers filed September 30, 2021 ("2021 Delay Request"). Presson Exhibit No. 1 filed with my direct testimony is left blank intentionally pursuant to the Commission's order ("*Compliance Report Delay Order*") dated February 22, 2022, granting the Company's request for a delay in filing its 2021 REPS Compliance Report. Presson Confidential Exhibit No. 2 provides actual and forecasted REPS compliance costs, by resource, that the Company has incurred during the Test Period and projects to incur during the Billing Period in support of compliance with REPS. Presson Confidential Exhibit No. 3 is a worksheet detailing the other incremental costs included in the DEC REPS filing, listing the labor costs by activity, as directed by the North Carolina Utilities Commission ("Commission") in its August 17, 2018 Order in Docket No. E-7, Sub 1162. Presson Exhibit Nos. 4-17 are the results of studies the costs of which the Company is recovering via the REPS Rider.

Q. WERE THESE EXHIBITS PREPARED BY YOU OR AT YOUR DIRECTION AND UNDER YOUR SUPERVISION?

A. Presson Confidential Exhibit Nos. 2 and 3 were prepared by me or under my supervision. Presson Exhibit Nos. 4-17 include the results of studies not prepared under my supervision; however, in my role at Duke Energy I am familiar with the studies.

Compliance with REPS Requirements

Q. WHAT ARE DUKE ENERGY CAROLINAS' REPS REQUIREMENTS UNDER G.S. § 62-133.8?

A. Pursuant to G.S. § 62-133.8,[1] as an electric power supplier, Duke Energy Carolinas is required to comply with the overall REPS requirement ("Total Requirement") by submitting for retirement a total volume of renewable energy certificates ("RECs") equivalent to the following percentages of its North Carolina retail sales in the prior year:

- Beginning in 2012, three percent (3%);
- In 2015, six percent (6%);
- In 2018, ten percent (10%); and
- In 2021 and thereafter, twelve point five percent (12.5%).

Furthermore, each electric power supplier must comply with the requirements of G.S. § 62-133.8 (d), (e), and (f) (individually referred to as the "Solar Set-Aside," "Swine Waste Set-Aside," and "Poultry Waste Set-Aside," respectively). That is, within the Total Requirement described above, each electric power supplier is to ensure that specific quantities of qualifying solar RECs, swine waste RECs, and poultry waste RECs are also submitted for retirement. The Company generally refers to its Total Requirement net of the three set-asides as its "General Requirement."

[1] In its *Order Clarifying Electric Power Suppliers' Annual REPS Requirements*, Docket No. E-100, Sub 113 (November 26, 2008), the Commission clarified that the calculation of these requirements for each year shall be based upon the electric utility's North Carolina retail sales for the prior year.

Specifically, each electric power supplier is to comply with the Solar Set-Aside by submitting for retirement a volume of qualifying solar RECs equivalent to the following percentages of its North Carolina retail sales in the prior year:

- Beginning in 2010, two-hundredths of one percent (0.02%);
- In 2012, seven-hundredths of one percent (0.07%);
- In 2015, fourteen-hundredths of one percent (0.14%); and
- In 2018 and thereafter, two-tenths of one percent (0.2%).

Each electric power supplier is also to comply with the Swine Waste Set-Aside by submitting for retirement a volume of qualifying swine waste RECs equivalent to its pro-rata share of total retail electric power sold in North Carolina multiplied by the statewide, aggregate Swine Waste Set-Aside Requirement.[2] Duke Energy Carolinas' Swine Waste Set-Aside Requirements, as modified by the Commission,[3,4] are as follows:

[2] In its *Order on Pro Rata Allocation of Aggregate Swine and Poultry Waste Set-Aside Requirements and Motion for Clarification* in Docket No. E-100, Sub 113 (March 31, 2010), the Commission approved the electric power suppliers' proposed pro-rata allocation of the statewide aggregate swine and poultry waste set-aside requirements, such that the aggregate requirements will be allocated among the electric power suppliers based on the ratio of each electric power supplier's prior year retail sales to the total statewide retail sales.

[3] In its *Order Modifying the Swine and Poultry Waste Set-Aside Requirements And Providing Other Relief* (December 16, 2019) and its *Errata Order* (February 13, 2020), Docket No. E-100, Sub 113, the Commission not only modified the 2019 Swine Waste Set-Aside Requirement for electric public utilities but also delayed by one year the scheduled increases to the requirement to 0.07% in 2020. Similarly, the Commission also modified the 2019 Poultry Waste Set-Aside Requirement and delayed by one year the scheduled increases in the requirement to 700,000 MWh in 2020.

[4] In its *Order Modifying the Swine Waste Set-Aside Requirements And Providing Other Relief* (December 30, 2020) in Docket No. E-100, Sub 113, the Commission modified the 2020 Swine Waste Set-Aside Requirement for electric membership corporations and municipalities, including those for which DEC performs REPS compliance services, to 0.00% and delayed by one year the scheduled increases to the requirement.

- In 2018, its pro-rata share of two-hundredths of one percent (0.02%) of the total retail electric power sold in North Carolina in the year prior;
- In 2019, its pro-rata share of four-hundredths of one percent (0.04%) of the total retail electric power sold in North Carolina in the year prior;
- In 2020, its pro-rata share of seven-hundredths of one percent (0.07%) of the total retail electric power sold in North Carolina in the year prior;
- In 2022, its pro-rata share of fourteen-hundredths of one percent (0.14%) of total retail electric power sold in North Carolina in the year prior; and
- In 2025 and thereafter, its pro-rata share of two-tenths of one percent (0.2%) of total retail electric power sold in North Carolina in the year prior.

Finally, each electric power supplier is also to submit for retirement a volume of qualifying poultry waste RECs equivalent to its pro-rata share of the aggregate state-wide Poultry Waste Set-Aside requirement. Duke Energy Carolinas' Poultry Waste Set-Aside Requirements, as modified by the Commission,[3] are as follows:

- Beginning in 2014, its pro-rata share of 170,000 megawatt-hours ("MWh");
- In 2018, its pro-rata share of 300,000 MWh;

- In 2019, its pro-rata share of 500,000 MWh;
- In 2020, its pro-rata share of 700,000 MWh; and
- In 2021 and thereafter, its pro-rata share of 900,000 MWh.

The requirements that are described in this testimony and accompanying exhibits reflect the aggregation of the REPS requirements of Duke Energy Carolinas' retail customers as well as those wholesale customers, specifically Blue Ridge Electric Membership Corporation, Rutherford Electric Membership Corporation, Town of Dallas, Town of Forest City and Town of Highlands (collectively "Wholesale"), for which the Company has been contracted to provide REPS compliance services.

Q. PLEASE SUMMARIZE DUKE ENERGY CAROLINAS' REPS REQUIREMENTS FOR THE TEST AND BILLING PERIODS FOR ITS RETAIL CUSTOMERS AND WHOLESALE CUSTOMERS FOR WHICH IT PROVIDES REPS COMPLIANCE SERVICES.

A. The Company's Total Requirement for compliance year 2021 is 7,191,323 RECs, or their equivalent. Pending the result of any Commission order modifying poultry waste and/or swine-waste set-aside requirements pursuant to the 2021 Delay Request, the Company made the following initial REC retirement selections to meet its current 2021 set-aside obligations, the sum of which are included in the Total Requirement stated above: 116,073 Solar Set-aside RECs, 338,974 Poultry Waste Set-Aside RECs, along with 32,047 SB 886 RECs (which count as 64,094 Poultry Waste Set-Aside RECs), and 40,628 Swine Waste Set-Aside RECs.

Pursuant to the *Compliance Report Delay Order*, the Company will postpone initiation of the actual retirement procedure in the North Carolina Renewable Energy Tracking System ("NC-RETS") to within ten business days after the Commission rules on the 2021 Delay Request, as 2021 compliance requirements for poultry waste and swine waste set-aside requirements, along with the remaining general REC obligation within the Total Requirement, could be affected by such order. Reversing the retirement process in NC-RETS is required before new modified retirements for DEC and its Wholesale customers can be initiated, and is administratively burdensome, as detailed in the Company's Compliance Report Delay Motion.

For the prospective Billing Period, which spans two calendar years, with different requirements in each year, the Company's estimated requirements are as follows[5]:

For compliance year 2022, the Company estimates that it will be required to submit for retirement 7,521,815 RECs to meet its Total Requirement. Within this total, the Company is also required to retire the following: 121,405 solar RECs, 84,984 swine waste RECs and 403,068 poultry waste RECs.

For compliance year 2023, the Company estimates that it will be required to submit for retirement 7,648,162 RECs to meet its Total

[5] The Company's projected requirements are based upon retail sales estimates and will be subject to change based upon actual prior-year North Carolina retail sales data. Additionally, the poultry waste set-aside requirement allocation is expected to be updated in 2022 for the 2022-2024 compliance periods per the December 16, 2019 Order in Docket No. E-100, Sub 113.

Requirement. Within this total, the Company estimates that it will be required to retire approximately 123,432 solar RECs, 86,403 swine waste RECs and 403,068 poultry waste RECs.

Q. HAS THE COMPANY COMPLIED WITH ITS GENERAL REQUIREMENT FOR 2021 FOR DEC RETAIL AND ITS WHOLESALE REPS CUSTOMERS?

A. The Company has identified for retirement 6,631,554 RECs required to meet its current 2021 General Requirement. An order issued in Docket No. E-100, Sub 113 pursuant to the 2021 Delay Request that modifies the poultry waste and/or swine waste requirements for 2021 could affect the number of RECs necessary to meet the 2021 General Requirement. In either instance, the Company will be able to meet its General Requirement for 2021. In accordance with the *Compliance Report Delay Order*, the Company will transfer the appropriate number of RECs from the NC-RETS Duke Energy Electric Power Supplier account to the Duke Energy Compliance Sub-Account and the Compliance Sub-Accounts of its Wholesale customers, within ten business days after the Commission issues an order pursuant to the 2021 Delay Request. Upon completion of this regulatory proceeding, the Commission will finalize retirement of the RECs.

Q. WILL THE COMPANY COMPLY WITH ITS GENERAL REQUIREMENT IN 2022?

A. Yes, the Company is in a position to comply with its General Requirement in 2022.

Q. WHAT ACTIONS HAS DUKE ENERGY CAROLINAS TAKEN DURING THE TEST PERIOD TO SATISFY ITS CURRENT AND FUTURE REPS REQUIREMENTS?

A. During the Test Period, Duke Energy Carolinas has continued to produce and procure RECs to satisfy its REPS requirements. Specifically, the Company has taken the following actions: (1) executed and continued negotiations for additional REC purchase agreements with renewable facilities; (2) solicited renewable energy proposals of various types; (3) continued operations of its solar and hydroelectric facilities; (4) enhanced and expanded energy efficiency programs that will generate savings that can be counted towards the Company's REPS requirement; (5) performed research studies, both directly and through strategic partnerships, to enhance the Company's ability to comply with its future REPS requirements; and (6) monitored the progress of projects selected in the first and second Tranches of the Competitive Procurement of Renewable Energy ("CPRE") Program of North Carolina House Bill 589 ("NC HB 589"), the RECs from which will be used to meet the Company's future REPS requirements.

Q. IS THE COMPANY ABLE TO USE RECS GENERATED FROM NET METERING FACILITIES TO SATISFY ITS FUTURE REPS REQUIREMENTS?

A. Yes. Under the current Net Metering for Renewable Energy Facilities Rider offered by DEC (Rider NM), a customer receiving electric service under a schedule other than a time-of-use schedule with demand rates ("NMNTD customer") shall provide any RECs to DEC at no cost. Per the Commission's June 5, 2018 *Order Approving Rider and Granting Waiver Request* ("*NMNTD Order*") in Docket Nos. E-2, Sub 1106 and E-7, Sub 1113, for NMNTD customers, DEC may use the PVWatts™ Solar Calculator developed by the National Renewable Energy Laboratory ("NREL") for estimating the generation from NMNTD customers' solar facilities, as permitted by Commission Rule R8-67(g)(2). Commission Rule R8-67(g)(2) allows the use of a scalable conversion factor for estimating annual generation from program participants. DEC shall then report the total amount of electricity produced by facilities under the Rider directly into NC-RETS in a separately identified generation project. DEC has complied with these requirements and reported generation from NMNTD customers to NC-RETS. The RECs from these facilities are currently in DEC's REC inventory and available for use for future compliance requirements.

Q. ARE THERE OTHER COMPLIANCE REQUIREMENTS IN THE NMNTD ORDER WITH WHICH DEC MUST COMPLY?

A. Yes. The *NMNTD Order* also requires that DEC shall provide NC-RETS monthly with a list of participating customers, including location and the kW capacity of their installations, to be made available on the NC-RETS

website. DEC has complied, and continues to comply, with this requirement.

Q. HOW WILL THE CPRE PROGRAM OF NC HB 589 IMPACT DEC'S COMPLIANCE WITH ITS GENERAL REQUIREMENT?

A. Under G.S. § 62-110.8(a), DEC and DEP are responsible for procuring renewable energy and capacity through a competitive procurement program with the purpose of adding renewable energy to the state's generation portfolio in a manner that allows DEC and DEP to continue to reliably and cost-effectively serve their customers' future energy needs. To meet the CPRE Program requirements, the Companies must issue requests for proposals to procure energy and capacity from renewable energy facilities in the aggregate amount of 2,660 MW (subject to adjustment in certain circumstances) reasonably allocated over a term of 45 months beginning on February 21, 2018, when the Commission approved the CPRE Program.

Renewable energy facilities eligible to participate in the CPRE solicitation(s) include those facilities that use renewable energy resources identified in G. S. § 62-133.8(a)(8), the REPS statute. The renewable energy facilities developed or acquired by the Companies, or the renewable energy procured from a third party through a power purchase agreement under the CPRE Program, must also deliver to the Companies the environmental and renewable attributes, or RECs, associated with the power. The first tranche of CPRE solicitations selected 10 projects for a total of 435 MW in the DEC service territory, and the second tranche selected 10 projects for a total of

589 MW in the DEC service territory. In December 2020, two DEC-owned projects from the first tranche began generating power and RECs. It is estimated that most of the remaining projects from the first tranche and one project from the second tranche will be operational by the end of the Billing Period. The NC retail allocated portion of the actual and estimated REC production from these projects during the test and billing periods can be found in Presson Exhibit No. 2. DEC plans to use the RECs acquired through the CPRE RFP solicitations for its future REPS compliance requirements and has therefore included the planned MW allocation and timeline in its REPS compliance planning process. Additional details regarding DEC's CPRE compliance activities for the current Test Period are being filed concurrently with this REPS filing and may be reviewed in Docket No. E-7, Sub 1262.

Q. HAS THE COMPANY COMPLIED WITH ITS SOLAR SET-ASIDE REQUIREMENT FOR 2021 FOR DEC RETAIL AND ITS WHOLESALE REPS CUSTOMERS?

A. The Company has identified for retirement 116,073 RECs required to meet its current 2021 Solar Set-Aside Requirement. As discussed in the General Requirement compliance section above, the Company will transfer the appropriate number of RECs from the NC-RETS Duke Energy Electric Power Supplier account to the Duke Energy Compliance Sub-Account and the Compliance Sub-Accounts of its Wholesale customers, within ten business days after the Commission issues an order pursuant to the 2021

Delay Request. Upon completion of this regulatory proceeding, the Commission will finalize retirement of the RECs.

Q. WILL THE COMPANY COMPLY WITH ITS SOLAR SET-ASIDE REQUIREMENT IN 2022?

A. Yes, the Company is in a position to comply with its Solar Set-Aside Requirement in 2022.

Q. PLEASE PROVIDE AN UPDATE ON THE COMPANY'S EFFORTS TO COMPLY WITH ITS SOLAR SET-ASIDE REQUIREMENT.

A. The Company is in a position to comply with its Solar Set-Aside Requirement in 2022 through a diverse and balanced portfolio of solar resources. The Company's efforts to comply with the Solar Set-Aside Requirement include REC generation and procurement from solar renewable energy facilities.

The Company previously constructed three DEC-owned solar photovoltaic ("PV") facilities, which will generate an estimated 140,000 RECs per year over the life of the projects. These facilities include the 55 MW Monroe Solar Facility located in Union County, the 15 MW Mocksville Solar Facility located in Davie County, and the 6 MW Woodleaf Solar Facility located in Rowan County. The Company also constructed two DEC-owned solar PV facilities as part of the first tranche of CPRE: the 25 MW Gaston Solar facility located in Gaston County, and the 69 MW Maiden Creek Solar facility located in Catawba County. Commercial operation was declared for the Maiden Creek facility on January 12, 2021.

Q. PLEASE DESCRIBE THE OPERATIONAL STATUS OF THE COMPANY'S PV DISTRIBUTED GENERATION ASSETS.

A. The Company's solar PV generation facilities were operational and generating power for the benefit of its customers during the test period. In 2021, the Company upgraded the data monitoring equipment at its non-residential sites and integrated the monitoring system into its operations center. In 2022, at the request of Kimberly Clark, due to a planned building expansion, the Company will be decommissioning the system located on their property. Panels which are in good working order will be used to replace broken panels at the Food Lion site.

Q. HAS THE COMPANY COMPLIED WITH ITS POULTRY WASTE SET-ASIDE REQUIREMENT FOR 2021 FOR DEC RETAIL AND ITS WHOLESALE REPS CUSTOMERS?

A. The Company has identified for retirement a combination of poultry waste RECs and SB 886 RECs to meet its current 2021 Poultry Waste Set-Aside Requirement of 403,068 RECs. An order issued in Docket No. E-100, Sub 113 pursuant to the 2021 Delay Request could modify poultry waste set-aside requirements for 2021. In either instance, the Company will be able to meet its Poultry Waste Set-Aside Requirement for 2021. In accordance with the *Compliance Report Delay Order*, the Company will transfer the appropriate number of RECs from the NC-RETS Duke Energy Electric Power Supplier account to the Duke Energy Compliance Sub-Account and the Compliance Sub-Accounts of its Wholesale customers, within ten

business days after the Commission issues an order pursuant to the 2021 Delay Request. Upon completion of this regulatory proceeding, the Commission will finalize retirement of the RECs.

Q. WILL THE COMPANY COMPLY WITH ITS POULTRY WASTE SET-ASIDE REQUIREMENT IN 2022?

A. The Company's ability to comply with its Poultry Waste Set-Aside Requirement in 2022 is dependent on the performance of current poultry waste-to-energy contracts, particularly achievement of projected delivery requirements and the ability of one new poultry waste-to-energy facility to reach its expected commercial operation date in 2022. To help meet future requirements of the poultry waste set-aside, several facilities are expected to ramp up production throughout 2022-2023, with two new facilities expected to come online in 2023. Additionally, one of the facilities that was previously generating poultry RECs for DEC is offline for repairs and is expected to be generating RECs again in at least 2023.

Q. WHAT ACTIONS HAS THE COMPANY TAKEN DURING THE TEST PERIOD TO PROCURE OR DEVELOP POULTRY WASTE-TO-ENERGY RESOURCES TO SATISFY ITS POULTRY WASTE SET-ASIDE REQUIREMENTS?

A. In the Test Period, the Company (1) continued direct negotiations for additional supplies of both in-state and out-of-state resources; (2) secured contracts for additional poultry waste-to-energy resources; (3) continued pursuit of poultry-derived directed biogas from facilities located in North

Carolina and directing such biogas to combined cycle plants for combustion and electric generation; (4) worked diligently to understand the technological, permitting, and operational risks associated with various methods of producing qualifying poultry RECs to aid developers in overcoming those risks; when those risks could not be overcome, the Company worked with developers via contract amendments to adjust for more realistic outcomes; (5) explored leveraging current bioenergy contracts by working with developers to add poultry waste to their fuel mix; (6) explored adding thermal capabilities to current poultry sites to bolster REC production; (7) utilized the Company's REC trader to search the broker market for out-of-state poultry RECs available in the market; and (8) funded a North Carolina biogas utilization study through RTI International with hopes for future growth of poultry-derived directed biogas project development. Additional information on the Company's compliance with the Poultry Waste Set-Aside requirement can be found in the Company's Joint Semiannual Progress Report, filed on December 1, 2021, in Docket No. E-100, Sub 113A.

The Company remains committed to satisfying its statutory requirements for the Poultry Waste Set-Aside and will continue to reasonably and prudently pursue procurement of these resources.

Q. HAS THE COMPANY COMPLIED WITH ITS SWINE WASTE SET-ASIDE REQUIREMENT FOR 2021 FOR DEC RETAIL AND ITS WHOLESALE REPS CUSTOMERS?

A. The Company has identified for retirement 40,628 RECs required to meet its current 2021 Swine Waste Set-Aside Requirement. An order issued in Docket No. E-100, Sub 113 pursuant to the 2021 Delay Request could modify swine waste set-aside requirements for 2021. In either instance, the Company will be able to meet its Swine Waste Set-Aside Requirement for 2021. In accordance with the *Compliance Report Delay Order*, the Company will transfer the appropriate number of RECs from the NC-RETS Duke Energy Electric Power Supplier account to the Duke Energy Compliance Sub-Account and the Compliance Sub-Accounts of its Wholesale customers, within ten business days after the Commission issues an order pursuant to the 2021 Delay Request. Upon completion of this regulatory proceeding, the Commission will finalize retirement of the RECs.

Q. WILL THE COMPANY COMPLY WITH ITS SWINE WASTE SET-ASIDE REQUIREMENT IN 2022?

A. Compliance with the swine waste set-aside for 2022 and beyond may be difficult to meet as the swine waste obligation increases. Swine waste-to-energy compliance challenges have been numerous and varied. Existing contracts have not reached contracted levels of production, and new contracts have failed to come online in the timeframe originally planned and have taken longer than expected to ramp up production. One new swine waste-to-energy project is under construction and is scheduled to come online in 2022, and two others are scheduled to come online in 2023. The

ability of these new facilities to come online and for all facilities to produce their full contracted RECs will determine the levels of compliance that DEC and DEP are able to meet in the near term.

Successfully developing additional swine waste-to-energy projects in North Carolina has been a slow and tedious process over the last few years due to several factors. First, the Companies understand that swine waste-to-energy projects have encountered difficulties due to issues including local opposition to siting of the facilities, the inability to secure firm and reliable sources of swine waste feedstock from waste producers in North Carolina, difficulties securing project financing and technological challenges encountered when ramping up production. Second, the outbreak of the COVID-19 pandemic adversely impacted swine farms and processing plants in North Carolina through staff shortages, personal protective equipment supply issues, and delivery challenges in 2020 and 2021. COVID-19 has also created supply shortages and price increases for equipment, building materials, etc. and has increased wait times on development of new facilities. Third, developers have communicated potential delays as they work through the regulatory process and other stakeholder concerns to their development plans. Fourth, in the course of the Companies' negotiations for swine-derived Renewable Natural Gas ("RNG"), developers are demanding higher prices based on competitiveness from California markets. There are two outstanding motions filed in Docket No. E-100, Sub 113 that are currently before the

NCUC: a Motion for Declaratory Relief, filed on December 7, 2020, and Joint Motion for Clarification and Request for Declaratory Ruling, filed on May 20, 2021. Both of these outstanding Motions affect the Companies' negotiations for swine waste-to-energy projects, and the parties are awaiting Orders from the Commission.

Q. WHAT ACTIONS HAS DUKE ENERGY CAROLINAS TAKEN DURING THE TEST PERIOD TO PROCURE OR DEVELOP SWINE WASTE-TO-ENERGY RESOURCES TO MEET ITS SWINE WASTE SET-ASIDE REQUIREMENTS?

A. In the Test Period, the Company (1) continued direct negotiations for additional supplies of both in-state and out-of-state resources; (2) secured contracts for additional swine waste-to-energy resources; (3) continued pursuit of swine-derived directed biogas from North Carolina facilities, working with Piedmont Natural Gas Company, Inc. to locate favorable biogas injection sites; (4) worked diligently to understand the technological, permitting, and operational risks associated with various methods of producing qualifying swine RECs to aid developers in overcoming those risks; when those risks could not be overcome, the Company worked with developers via contract amendments to adjust for outcomes that the developers believe are achievable based on new experience; (5) explored leveraging current bioenergy contracts by working with developers to add swine waste to their fuel mix; (6) utilized the Company's REC trader to search the broker market for out-of-state swine RECs available in the

market; (7) continued support of research through North Carolina State University associated with on-farm swine waste drying technology and mortality combustion possibilities as well as funding a North Carolina biogas utilization study through RTI International with hopes for future growth of swine-derived directed biogas project development; and (8) engaged the North Carolina Pork Council ("NCPC") in a project evaluation collaboration effort that will allow the Company and the NCPC to discuss project viability, as appropriate, with respect to the Company's obligations to keep certain sensitive commercial information confidential. Additional information on the Company's compliance with the Swine Waste Set-Aside requirement can be found in the Company's Joint Semiannual Progress Report, filed on December 1, 2021 in Docket No. E-100, Sub 113A.

The Company remains committed to satisfying its statutory requirements for the Swine Waste Set-Aside and will continue to reasonably and prudently pursue procurement of these resources.

Q. IS DUKE ENERGY CAROLINAS CONTINUING TO EXECUTE ADDITIONAL REC PURCHASE AGREEMENTS?

A. Yes. The Company continues to execute additional REC purchase agreements and maintains an open solicitation for proposals from developers of renewable energy resources.

Q. DID THE COMPANY SELL ANY RECS DURING THE TEST PERIOD?

A. No, the Company did not sell any RECs during the test period.

Q. DOES THE COMPANY HAVE IN ITS INVENTORY ANY RECS THAT IT CANNOT USE FOR ITS OWN REPS COMPLIANCE REQUIREMENTS?

A. Yes. DEC has RECs in its inventory that it cannot use for its own REPS compliance requirements. The RECs were generated by specific hydroelectric generating facilities owned by the Company, each of which has a generation capacity of 10 MW or less and was placed into service prior to January 1, 2007.

Q. PLEASE EXPLAIN WHY THE COMPANY CANNOT USE THESE RECS TO MEET ITS OWN COMPLIANCE REQUIREMENTS.

A. Under G.S. § 62-133.8(b)(2), an electric public utility, such as DEC, may meet its REPS compliance requirement through several methods, including by "generat[ing] electric power at a new renewable energy facility." The Commission accepted the registration of these DEC-owned hydroelectric facilities as renewable energy facilities, but not as *new* renewable energy facilities, in its July 31, 2009 *Order Accepting Registration of Renewable Energy Facilities* in Docket Nos. E-7, Subs 886, 887, 888, 900, 903 and 904 ("*June 31, 2009 Registration Order*") and its December 9, 2010 *Order Accepting Registration of Renewable Energy Facilities* in Docket Nos. E-7, Subs 942, 943, 945 and 946 (collectively, "*Registration Orders*"). In the *Registration Orders*, the Commission specifically cited its June 17, 2009 *Order on Public Staff's Motion for Clarification* in Docket No. E-100, Sub 113, where it concluded that these utility-owned hydroelectric facilities do

not meet the delivery requirement of G.S. § 62-133.8(a)(5)(c), which requires the delivery of electric power to an electric power supplier, such as DEC, by an entity other than the electric power supplier to qualify as a *new* renewable energy facility.

Q. WHAT HAS THE COMPANY PROPOSED TO DO WITH THE HYDROELECTRIC RECS THAT IT CANNOT USE FOR ITS OWN REPS COMPLIANCE?

A. In the REPS cost recovery proceeding in Docket No. E-7, Sub 1162, the Company proposed to exchange a portion of these hydroelectric RECs for RECs within the inventory of the North Carolina Electric Membership Corporation ("NCEMC"). Unlike DEC, NCEMC can use these hydroelectric RECs to comply with its REPS requirements because G.S. § 62-133.8(c)(2)(d) allows electric membership corporations and municipalities to meet their REPS requirements through the purchase of RECs derived from renewable, as opposed to new renewable, energy facilities. Additionally, the Company noted that the REC exchange would benefit DEC's customers because it would allow DEC to meet part of its general REPS requirements through the RECs exchanged with NCEMC at no cost to DEC's customers rather than through the purchase of additional RECs from new renewable energy facilities. NCEMC's customers are held harmless in the transaction as this exchange simply replaces RECs in NCEMC's inventory with different RECs that NCEMC will use to meet its General Requirement. The Public Staff of the North Carolina Utilities

Commission supported the Company's proposed REC transfers with NCEMC, and the Commission concluded that the proposed transfer was reasonable and served the public interest in its *Order Approving REPS and REPS EMF Riders and 2017 REPS Compliance Report*, issued on August 17, 2018 in Docket No. E-7, Sub 1162.

Q. HAS THE COMPANY EXCHANGED ANY OF THESE HYDROELECTRIC RECS WITH NCEMC?

A. Yes. The Company has executed contracts with NCEMC exchanging a portion of these hydroelectric RECs for an equal number of General Requirement RECs in NCEMC's inventory that DEC can use for REPS compliance.

Cost of REPS Compliance

Q. WHAT ARE THE COMPANY'S COSTS ASSOCIATED WITH REPS COMPLIANCE DURING THIS TEST PERIOD AND THE UPCOMING BILLING PERIOD?

A. Duke Energy Carolinas' costs associated with REPS compliance are reflected in Presson Confidential Exhibit No. 2 and are categorized by actual costs incurred during the Test Period and projected costs for the Billing Period.

Q. IN ADDITION TO RENEWABLE ENERGY AND REC COSTS, WHAT OTHER COSTS OF REPS COMPLIANCE DOES THE COMPANY SEEK TO RECOVER IN THIS PROCEEDING?

A. Presson Confidential Exhibit Nos. 2 and 3 identify "Other Incremental Costs," "Solar Rebate Program Costs," and "Research Costs" the Company incurred, and estimates it will incur, in association with REPS compliance.

Other Incremental Costs and Solar Rebate Program Costs

Q. PLEASE EXPLAIN THE OTHER INCREMENTAL COSTS INCLUDED FOR RECOVERY IN THIS PROCEEDING.

A. Other Incremental Costs include labor costs associated with REPS compliance activities and non-labor costs associated with administration of REPS compliance. Among the non-labor costs associated with REPS compliance are the Company's subscription to NC-RETS, and accounting and tracking tools related to RECs, reduced by agreed-upon liquidated damages paid by sellers for failure to meet contractual milestones, and amounts paid for administrative contractual amendments requested by sellers.

Q. PLEASE PROVIDE INFORMATION ON THE NC HB 589 (SL 2017-192) SOLAR REBATE PROGRAM ("SOLAR REBATE PROGRAM").

A. As required by G.S. § 62-155(f), DEC developed a Solar Rebate Program offering reasonable incentives to residential and non-residential customers for the installation of small customer owned or leased solar energy facilities participating in the Company's net metering tariff. The incentive is limited to 10 kilowatts alternating current ("kW-AC") for residential solar installations and 100 kW-AC for non-residential solar installations. The

program incentive shall be limited to 10,000 kW of installed capacity annually starting January 1, 2018 and continuing until December 31, 2022.

Consistent with the Commission's April 3, 2018 order and subsequent orders in Docket Nos. E-7, Sub 1166 and E-2, Sub 1167, the Solar Rebate Program launched on July 9, 2018. In every year since its launch, the Solar Rebate Program's annual participation limits for the residential and non-residential classes have been met, although the 2,500 kW of capacity limit for non-profit organizations has not been met.

On April 1, 2020, DEC filed its Solar Rebate Program Annual Report for 2019, which included: (1) information on problems encountered with the 2020 solar rebate application process due to a website malfunction, (2) the Company's commitment to technological fixes, and (3) proposed changes to the program to avoid a recurrence of the problems in future years, including a request to amend the program application windows for 2021 and 2022. The NCUC subsequently issued an *Order Allowing Comments on 2019 Annual Report*, through which parties could propose their own changes to the program for the Commission's consideration. Multiple parties filed comments and reply comments. On November 6, 2020, the NCUC issued its *Order Modifying Fourth Year of Solar Rebate Program and Requesting Additional Comments* ("*November 2020 Order*"), in which the Commission approved Duke Energy's recommendation that half of the available annual capacity each year be offered in January and half in July. Thus, the first window of the 2021 program opened on January

6 with incentive amounts remaining at the 2020 levels of $0.60 per watt for residential customer installations, $0.50 per watt for commercial customer installations, and $0.75 per watt for non-profit customers. On January 8, 2021, DEC filed a notice that the participation limit for the first window of 2021 for residential and non-residential customers under the Solar Rebate Program, exclusive of the non-profit participation set-aside, was reached quickly.

Also in its *November 2020 Order*, the Commission solicited comments recommending revised rebate amounts for residential, non-residential, and non-profit customers for consideration to be effective for the application window opening on July 7, 2021, with particular interest in the viability of a tiered system aimed at incentivizing smaller solar installations with a declining incentive structure up to 10 kW for residential customer installations and 100 kW for non-residential customer installations.

On March 3, 2021, the Companies filed an Application for Approval to Revise Solar Rebate Program in which they requested that the Commission:

(1) implement a lottery for the Solar Rebate Program, beginning with the July 2021 launch,

(2) eliminate the 90-day rule, such that customers who installed a system on or after October 6, 2020 would be eligible to apply for future rebates, and

(3) allow residential customers and non-residential customers under 20 kW 180 days from the rebate reservation award to install their systems, with the exception of non-profit systems.

On March 23, 2021, the Commission issued an *Order Modifying Solar Rebate Program and Allowing Comments* ("*March 2021 Order*") in which it reduced the solar rebate incentive to reflect the current reasonable cost of these solar installations to $0.40 per watt for residential installations and $0.30 per watt for non-residential installations. The incentive for non-profit customer installations remained at $0.75 per watt. Additionally, the Commission granted Duke Energy's request to implement a lottery for the solar rebate program beginning with the scheduled July 2021 period. The Commission did not approve Duke Energy's request to eliminate the 90-day rule or modify the installation period, but requested additional information and proposals regarding appropriate installation time periods for residential customers and small commercial (under 20kw non-residential) customers that are less than 180 days, in order to allow uninstalled capacity to be allocated to customers waitlisted during that enrollment period or to allow more capacity to be included in the following lottery.

On July 8, 2021, the Commission issued an *Order Modifying Reservation Install Period* for customers who receive a rebate reservation in the July and January application windows. Residential and small commercial customers who received a rebate reservation in the July 2021

application window had until December 15, 2021, to install their solar systems; if their systems were not installed by December 15, 2021, their application and rebate eligibility was cancelled and the resulting unused capacity was allocated to customers on the July 2021 waitlist. Likewise, residential and small commercial customers who receive a rebate reservation in the January 2022 application window have until June 15, 2022, to install their solar systems; if their systems are not installed by June 15, 2022, their application and rebate eligibility will be cancelled and the resulting unused capacity will be allocated to customers on the January 2022 waitlist.

The July 2021 enrollment period limits were reached for residential and non-residential customers after the random selection process following the close of the application period on July 14, 2021. Since the participation limit was not reached for non-profit customers, the Company continued to accept applications for non-profit installations. Additional details relating to the random selection process may be found in the Company's informational filing made August 27, 2021, as required by the *March 2021 Order*.

The January 2022 enrollment period began January 5, 2022. Participation caps for both residential and non-residential customers were met following the random selection process established in 2021. The Company continues to accept applications for non-profit customers and will

update the Company website if the participation limits for non-profit customers are reached.

Q. ARE COSTS RELATED TO THE NC HB 589 SOLAR REBATE PROGRAM INCLUDED FOR RECOVERY IN THIS FILING?

A. Yes. Pursuant to G.S. § 62-155(f), each public utility required to offer a solar rebate program "shall be authorized to recover all reasonable and prudent costs of incentives provided to customers and program administrative costs by amortizing the total program incentives distributed during a calendar year and administrative costs over a 20-year period, including a return component adjusted for income taxes at the utility's overall weighted average cost of capital established in its most recent general rate case, which shall be included in the costs recoverable by the public utility pursuant to G.S. 62-133.8(h)." G.S. § 62-133.8(h) provides for an electric power supplier's cost recovery and customer charges under the REPS statute; NC HB 589 (SL 2017-192) amended it by adding a provision to allow for the recovery of incremental costs incurred to "provide incentives to customers, including program costs, incurred pursuant to G.S. § 62-155(f)." Therefore, DEC has included for recovery in this filing both costs incurred during the EMF period, and projected to be incurred in the Billing Period, related to the implementation of the NC HB 589 Solar Rebate Program. As detailed on Presson Confidential Exhibit No. 3, these costs include the annual amortization of incentives paid to customers and program administration costs which includes labor, information technology,

and marketing costs. Projected incentive costs for the Billing Period are based on the currently-approved rebate amounts.

A residential customer who obtained a rebate reservation in the January 2022 application window must complete the installation of their solar system by June 15, 2022. A residential customer who obtains a rebate reservation in the July 2022 application window must complete the installation by December 15, 2022.

A non-residential customer with a project of 20kW or less who does not require an interconnection agreement and who obtained a rebate reservation in the January 2022 application window must complete the installation of their system by June 15, 2022. A non-residential customer with a project of 20kW or less who does not require an interconnection agreement and who obtains a rebate reservation in the July 2022 application window must complete the installation of their system by December 15, 2022.

A non-profit customer with a project that is 20kW or less, who obtained a rebate reservation in the January 2022 application window and who does not require an interconnection agreement must complete installation of their system within 365 days of the date Duke Energy issues the rebate reservation.

Non-residential or non-profit customers with a project size over 20 kW-AC, who obtained a rebate reservation prior to installation, must

complete installation no later than 365 days from the date of an executed interconnection agreement.

Therefore, rebate payments for a specific program year may continue into the next year, with payments likely continuing after the final program year.

Q. PLEASE PROVIDE DETAIL ON THE INTERNAL LABOR COSTS THAT ARE ASSOCIATED WITH REPS COMPLIANCE AND NC HB 589 (SL 2017-192) SOLAR REBATE PROGRAM ACTIVITIES THAT ARE INCLUDED IN DEC'S CURRENT APPLICATION FOR REPS COST RECOVERY.

A. DEC charges only the incremental cost of REPS compliance and the NC HB 589 (SL 2017-192) Solar Rebate Program to the REPS cost recovery rider. Consistent with that policy and DEC's practices in previous applications for cost recovery for REPS compliance, internal employees who work to comply with G.S. § 62-133.8 and G.S. § 62-155(f) charge only that portion of their labor to REPS. The departments/functions that charged labor to REPS during the Test Period are detailed in Presson Confidential Exhibit No. 3.

Q. HOW DO EMPLOYEES CHARGE THEIR REPS-RELATED AND NC HB 589 (SL2017-192) SOLAR REBATE PROGRAM-RELATED LABOR COSTS TO REPS?

A. Employees positively report their time, which means that each employee is required to submit a timesheet every two weeks in DEC's time reporting

system. The hours reported for the period are split according to the accounting entered in the time reporting system for that specific employee. The division of hours is updated for the reporting period as the nature of the employee's work changes.

To educate employees to account for their time properly, DEC annually provides instructions for charging time to REPS to affected employees and the management of the employee groups performing REPS work. Additionally, every year prior to filing for approval of the DEC REPS Compliance Report and Cost-Recovery Rider, the labor hours charged are carefully reviewed and confirmed.

Research Costs

With respect to Research activities during the Test Period and projected for the Billing Period, the Company has incurred or projects to incur costs associated with the support of various pilot projects and studies related to distributed energy technology and the Company's REPS compliance.

Q. THE COMMISSION'S *ORDER APPROVING REPS AND REPS EMF RIDERS AND 2012 REPS COMPLIANCE* REQUIRES DUKE ENERGY CAROLINAS TO FILE WITH ITS 2021 REPS RIDER APPLICATION STUDY RESULTS FOR ANY STUDIES THE COSTS OF WHICH IT HAS RECOVERED VIA THE REPS RIDER. IS THE COMPANY SUPPLYING SUCH STUDIES IN THIS FILING?

A. Yes. The Company's Research efforts are an integral part of its REPS Compliance efforts. The following summary outlines efforts undertaken by the Company in the test period and specifies the availability of applicable study results.

- Astrapé – Battery Storage Effective Load Carrying Capability ("ELCC") Study – In 2020, the Company contracted with Astrapé Consulting to analyze the capacity value of battery technology within the Company's system. The study results provide the capacity value for battery energy storage systems used in the Company's Integrated Resource Plans. Charges were incurred in 2021 to wrap up the study. The results of this project were previously provided in E-7, Sub 1246 Jennings Exhibit No. 4.
- Bring Your Own Battery Study – In 2021 the Company contracted Virtual Peaker, an aggregation technology vendor who can control and collect data from battery storage original equipment manufacturers ("OEMs"), to evaluate utilizing residential customer-owned batteries as a demand response resource. The Company plans to study the aggregation technology, battery discharge, customer usage patterns and the customer experiences that could inform a future pilot or program filing. The progress for this report can be found in Presson Exhibit No. 4.
- Center for Advanced Power Engineering Research ("CAPER") – Developing large Distributed Energy Resources ("DER") Protection

Guidelines and Settings for Mitigating System-wide Impacts across T&D Systems – In late 2021, the Company started the project with the North Carolina State University ("NCSU" or "NC State University"), the University of North Carolina at Charlotte ("UNCC"), and Clemson University ("Clemson") through CAPER. The project is to develop a strategy for evaluating protection device, recloser settings and control algorithms for Inverter-based Resources ("IBR") with high penetration levels of DER at both the distribution and transmission levels with an integrated simulation model. The project scope can be found in Presson Confidential Exhibit No. 5.

- Coalition for Renewable Natural Gas – The Company renewed its membership to the Coalition for Renewable Natural Gas in 2021 to add a valuable resource of knowledge and public policy advocation in this growing sector of potential animal waste supply. The Coalition for Renewable Natural Gas provides its members with exclusive whitepapers, support on model pipeline gas specifications and access to other members for discussions on current and future projects. The Company also provided funding through the Coalition for Renewable Natural Gas for additional studies including: an Economic Analysis of the US Renewable Natural Gas Industry, which is included as Presson Exhibit No. 6; a white paper on the sustainability profile of RNG, authored by Professors at Rutgers

University, which is included as Presson Confidential Exhibit No. 7; a study by Colorado State University of methane leakage from RNG processing facilities to promote improved practices, which is close to completion; and a literature review and scientific journal article on the benefits and challenges of RNG to be authored by researchers at Duke University and Stanford University, which is nearing publication.

- DC Meter Testing Project – In 2021 the Company worked with Open Energy Solutions, Accuenergy and Renewable Design Associates on a project to test the DEC energy meters and evaluate their functionality and accuracy along with software testing to allow communications to the Company's back-end metering systems. The results of this project can be found in Presson Exhibit No. 8.
- Distributed Generation ("DG") Cost of Service Study – In 2021 the Company completed the project with NC State University and Advanced Energy to determine the cost-of-service impacts of DG. This study focused on the Operations and Maintenance and planning costs the utility incurs due to the DG impact on the system and develops a methodology for their quantification. The study results were filed with the North Carolina Utilities Commission under Docket No. E-100, Sub 101 on June 30, 2021 (https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=85f553b4-2f26-48ea-841e-470b1358bb08).

- Duke University – Loyd Ray Farms – The Company partnered with Duke University to develop a pilot-scale, 65 kW swine waste-to-energy facility, which initiated operation and began producing renewable energy in 2011. DEC and the broader development industry gained valuable insight regarding the benefits and risks associated with swine-waste-to-energy projects through this effort. The Loyd Ray Farms research project came to the end of its 10-year contract life in 2021 and has now been decommissioned. Presson Confidential Exhibit No. 9 summarizes the project's operations and decommissioning in 2021.
- Electric Power Research Institute ("EPRI") – In 2021 the Company subscribed to the following EPRI programs, the costs of which were recovered via the REPS rider: Program 174 – Integration of Distributed Energy Resources ("DER"), and Program 94 – Energy Storage and Distributed Generation. The Company continued its support of one supplemental project under Program 174 – "Model-Based Analysis of DER Functions and Settings." EPRI designates such study results as proprietary or as trade secrets and licenses such results to EPRI members, including Duke Energy Carolinas. As such, the Company may not disclose the information publicly. Non-members may access these studies for a fee. Information regarding access to this information can be found at http://www.epri.com/Pages/Default.aspx.

- NC State University's Future Renewable Electric Energy Delivery and Management ("FREEDM") Systems Center – Duke Energy supports NC State University's FREEDM Center through annual membership dues. The FREEDM partnership provides Duke Energy with the ability to influence and focus research on materials, technology, and products that will enable the utility industry to transform the electric grid into a two-way power flow system supporting distributed generation.
- NC State University – Adopting DVAR to Mitigate PV Impacts on a Distribution System, Phases 1 and 2 – In late 2021, the Company kicked off phase 2 of the project with NCSU to assess the effectiveness of the American Superconductor Corporation Dynamic Volt-Amp Reactive Compensation Solution ("mini-DVAR") in mitigating various power quality issues on distribution circuits due to increasing penetration of PV. The results of phase 1 of the project were provided in E-7, Sub 1246 Jennings Confidential Exhibit No. 15. Phase 2 of the study focuses on the development of more dynamic dispatching schemes for the mini-DVAR such that the expected benefits are maximized. The project scope for phase 2 can be found in Presson Confidential Exhibit No. 10.
- NCSU – Feeder Anti-islanding Detection Using HIL Modeling and Simulation – In 2021 the Company completed the project with NCSU to evaluate the challenge from increasing penetration of PV

and installation of mini-DVAR to the islanding protection scheme. This project started in 2019 with the scope of using a Hardware-in-the-loop ("HIL") setup to simulate different fault conditions with the Schweitzer Engineering Laboratories ("SEL") relays at PV sites and different operating conditions. The project had been paused during 2020 due to COVID-related lab access restrictions. The final report for this project can be found in Presson Confidential Exhibit No. 11.

- NCSU – Swine Lagoon Sludge Research Study – The Animal and Poultry Waste Management Center ("APWMC") at NC State University – In 2021 the Company continued support of the various projects being undertaken by the APWMC. This work is centered around drying swine lagoon solids, bagged lagoon sludge and lagoon sludge mixed with agricultural wastes at a farm-based level to create a higher MMBtu fuel that can be safely and easily transported to a central plant for combustion. An update on the project can be found in Presson Confidential Exhibit No. 12.
- NREL – Carbon-Free Resource Integration Study – In 2021 the Company completed the project with NREL to conduct a study of the Carolinas' system to help us understand the operational impacts, benefits, and limitations of solar. The study also informs other fleet transformation analyses, including how different clean energy technologies can contribute to a carbon-free future. The study was conducted in two phases. Phase 1 was completed in 2019, and the

Phase 1 report was provided in E-7, Sub 1246 Jennings Exhibit No. 17. Phase 2 was completed in 2021. The Phase 2 draft report can be found in Presson Confidential Exhibit No. 13.

- Research Triangle Institute – Biogas Utilization in North Carolina – In 2021 the Company continued support of the Research Triangle Institute project for the NC Energy Policy Council to determine the potential bioenergy/biogas resources available in NC, and to identify the most beneficial and optimum utilization of resources to maximize economic, environmental and societal advantages. An overview of the project can be found in Presson Confidential Exhibit No. 14.
- Smart Electric Power Alliance ("SEPA") – The Company renewed its membership to the Smart Electric Power Alliance in 2021. SEPA provides its members with exclusive whitepapers and working group event opportunities on various topics including DER integration, DER management systems, energy efficiency and demand response, electric vehicle development, microgrid and grid resiliency. Please visit SEPA's website at https://sepapower.org/ for more information on SEPA.
- Southeast Wind Coalition ("SEWC") – The Company renewed its membership in the Southeast Wind Coalition in 2021. SEWC conducts research on land-based wind, offshore wind, and energy storage, which informs the Company of potential renewable

generation opportunities that may enable the Company to comply with REPS in a cost-effective manner. In addition, SEWC's work is to advance wind policies across the southeast by holding conferences, addressing prohibitive state policies related to wind deployment, and ensuring workforce development and educational outreach. Please visit SEWC's website at https://www.sewind.org/ for more information on SEWC.

- University of North Carolina at Charlotte ("UNCC") – Power Flow Analysis to Improve Integrated Volt/Var ("IVVC") and Energy Efficiency Programs – In late 2021 the Company contracted with UNCC to address the issue of inaccurate power flow analysis results in the current Distribution Management System ("DMS") when there are Distributed Energy Resources ("DER") on a distribution system. This research will directly benefit IVVC programs and enable utilities to operate IVVC more effectively on systems with high levels of DERs. The project scope can be found in Presson Exhibit No. 15.
- UNCC – Reliabililty Assessment for Utility PV Inverter System – In late 2021 the Company contracted with UNCC to conduct research on the Reliability Assessment for Utility PV Inverter Systems. The goal of this project is to develop a reliability assessment tool to support the development of safer and more reliable PV, quantitatively assess the PV system reliability based on

field data provided by Duke Energy, and provide recommendations for failure mechanism identification, predictive maintenance and lifetime extension strategy. The project scope can be found in Presson Exhibit No. 16.

- UNCC – Resilient Community Microgrids with Dynamic Reconfiguration to Serve Critical Loads in the Aftermath of Severe Events – In 2021 the Company supported UNCC in the research project awarded by the Department of Energy ("DOE") Office of Energy and Efficiency and Renewable Energy ("EERE") under DE-FOA-0002243. Duke Energy supports this project with the expectation that it address all topics of interest: (1) the study will recommend a methodology which specifies relay-protection elements and settings for utilization in island mode of operation; (2) the study will recommend methodologies for island black start sequences; and (3) a performance evaluation of the microgrid-control will be provided. This is a three-year project expected to be complete in April 2024. The progress for this project can be found in Presson Confidential Exhibit No. 17.

Q. ARE YOU SATISFIED THAT THE ACTUAL COSTS INCURRED IN THE TEST PERIOD HAVE BEEN, AND THAT THE PROJECTED COSTS OF THE BILLING PERIOD WILL BE, PRUDENTLY INCURRED?

A. Yes. Duke Energy Carolinas believes it has incurred and projects to incur all of these costs associated with REPS compliance in a prudent manner. The Company continues to exercise thorough and rigorous technical and economic analysis to evaluate all options for compliance with its REPS requirements. Duke Energy Carolinas has developed strong foundational market knowledge related to renewable resources. The Company continues to enhance and develop expertise in this field through the Company's various solicitations for renewable energy and the operation of its unsolicited bid process, its implementation of the Duke Energy North Carolina Solar PV Distributed Generation Program, its construction of DEC-owned utility-scale solar facilities, its participation in industry research, and daily interaction with developers of renewable energy facilities. As a result of these efforts, the Company has been able to identify, procure, and develop a diverse portfolio of renewable resources to meet its REPS requirements in a prudent, reasonable, and cost-effective manner.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.