

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-7, SUB 1283

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
FOR DUKE ENERGY
CAROLINAS, LLC**

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Kimberly A. Presson, and my business address is 526 South
3 Church Street, Charlotte, North Carolina.

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

6 A. In my capacity as Renewable Compliance Manager, I am responsible for the
7 development and implementation of renewable energy compliance strategies
8 for Duke Energy Carolinas, LLC (“Duke Energy Carolinas,” “DEC” or “the
9 Company”), Duke Energy Progress, LLC (“Duke Energy Progress” or
10 “DEP”) and Duke Energy Ohio, LLC. My responsibilities include
11 compliance with North Carolina’s Renewable Energy and Energy
12 Efficiency Portfolio Standard (“REPS”), compliance with Ohio’s
13 Renewable Portfolio Standard and evaluation of renewable generation
14 initiatives and customer programs that relate to renewable compliance.

15 **Q. PLEASE BRIEFLY SUMMARIZE YOUR EDUCATIONAL**
16 **BACKGROUND.**

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

19 **Q. PLEASE DESCRIBE YOUR BUSINESS BACKGROUND AND**
20 **EXPERIENCE.**

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

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

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

5 A. Yes, I most recently provided testimony in Docket No. E-2, Sub 1293 on
6 DEP's 2021 REPS compliance report and application for approval of its
7 REPS cost recovery rider.

8 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

9 A. The purpose of my testimony is to describe Duke Energy Carolinas'
10 activities and the costs it has incurred, or projects it will incur, in support of
11 compliance with North Carolina's Renewable Energy and Energy
12 Efficiency Portfolio Standard under N.C. Gen. Stat. ("G.S.") § 62-133.8
13 during the twelve months beginning on January 1, 2022 and ending on
14 December 31, 2022 ("Test Period"), as well as during the twelve months
15 beginning on September 1, 2023 and ending on August 31, 2024 ("Billing
16 Period").

17 **Q. PLEASE DESCRIBE THE EXHIBITS TO YOUR TESTIMONY.**

18 A. My testimony includes seventeen exhibits. Presson Confidential Exhibit
19 No. 1 is the Company's 2022 REPS Compliance Report. Presson
20 Confidential Exhibit No. 2 provides actual and forecasted REPS compliance
21 costs, by resource, that the Company incurred during the Test Period and
22 projects to incur during the Billing Period in support of compliance with
23 REPS. Presson Confidential Exhibit No. 3 is a worksheet detailing the other

1 incremental costs included in the DEC REPS filing and lists the labor costs
2 by activity as directed by the North Carolina Utilities Commission
3 (“Commission”) in its August 17, 2018 Order in Docket No. E-7, Sub 1162.
4 Confidential Presson Exhibit No. 4 provides information on DEC’s
5 Renewable Energy Certificate (“REC”) sales made to another North
6 Carolina electric power supplier for the purpose of meeting the aggregate
7 poultry compliance requirement for the 2022 compliance year. Presson
8 Exhibit Nos. 5-17 are the results of studies the costs of which the Company
9 is recovering via the REPS Rider.

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

12 A. Presson Confidential Exhibit Nos. 1-4 were prepared by me or under my
13 supervision. Presson Exhibit Nos. 5-17 include status reports and results of
14 studies not prepared under my supervision; however, in my role at Duke
15 Energy I am familiar with the studies.

16 **Compliance with REPS Requirements**

17 **Q. WHAT ARE DUKE ENERGY CAROLINAS’ REPS**
18 **REQUIREMENTS UNDER G.S. § 62-133.8?**

19 A. Pursuant to G.S. § 62-133.8,¹ as an electric power supplier, Duke Energy
20 Carolinas is required to comply with the overall REPS requirement (“Total
21 Requirement”) by submitting for retirement a total quantity of renewable

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.

1 energy certificates equivalent to the following percentages of its North
2 Carolina retail sales in the prior year:

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

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

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

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

22 Each electric power supplier is also to comply with the Swine Waste
23 Set-Aside by submitting for retirement qualifying swine waste RECs

1 equivalent to its pro-rata share of total retail electric power sold in North
2 Carolina multiplied by the statewide, aggregate Swine Waste Set-Aside
3 Requirement.² Duke Energy Carolinas' Swine Waste Set-Aside
4 Requirements, as modified by the Commission,³ are as follows:

- 5 ▪ In 2018, its pro-rata share of two-hundredths of one percent (0.02%)
6 of the total retail electric power sold in North Carolina in the year
7 prior;
- 8 ▪ In 2019, its pro-rata share of four-hundredths of one percent (0.04%)
9 of the total retail electric power sold in North Carolina in the year
10 prior;
- 11 ▪ In 2020, its pro-rata share of seven-hundredths of one percent
12 (0.07%) of the total retail electric power sold in North Carolina in
13 the year prior;
- 14 ▪ In 2022, its pro-rata share of five-hundredths of one percent (0.05%)
15 of total retail electric power sold in North Carolina in the year prior;
- 16 ▪ In 2023, its pro-rata share of fourteen-hundredths of one percent
17 (0.14%) of total retail electric power sold in North Carolina in the
18 year prior; and

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 The Swine and Poultry Set-Aside Requirements were modified in the Commission's December 20, 2022, *Order Ruling on Motion for Clarification and Request for Declaratory Ruling Regarding Cost Cap, Modifying Swine Waste and Poultry Waste Set-Aside Requirements, and Providing Other Relief*.

- 1 ▪ In 2024 and thereafter, its pro-rata share of two-tenths of one percent
2 (0.2%) of total retail electric power sold in North Carolina in the
3 year prior.

4 Finally, each electric power supplier is also to submit for retirement
5 qualifying poultry waste RECs equivalent to its pro-rata share of the
6 aggregate state-wide Poultry Waste Set-Aside requirement. Duke Energy
7 Carolinas' Poultry Waste Set-Aside Requirements, as modified by the
8 Commission,⁴ are as follows:

- 9 ▪ Beginning in 2014, its pro-rata share of 170,000 megawatt-hours
10 ("MWh");
11 ▪ In 2018, its pro-rata share of 300,000 MWh;
12 ▪ In 2019, its pro-rata share of 500,000 MWh;
13 ▪ In 2020, its pro-rata share of 700,000 MWh;
14 ▪ In 2021, its pro-rata share of 300,000 MWh;
15 ▪ In 2022, its pro-rata share of 700,000 MWh; and
16 ▪ In 2023 and thereafter, its pro-rata share of 900,000 MWh.

17 The requirements described in this testimony and accompanying
18 exhibits reflect the aggregation of the REPS requirements of Duke Energy
19 Carolinas' retail customers as well as those wholesale customers,
20 specifically Blue Ridge Electric Membership Corporation, Rutherford
21 Electric Membership Corporation, the Town of Dallas, the Town of Forest

⁴ Id.

1 City, and the Town of Highlands (collectively “Wholesale”), for which the
2 Company has been contracted to provide REPS compliance services.

3 **Q. WHAT WERE THE COMPANY’S NORTH CAROLINA RETAIL**
4 **SALES FOR CALENDAR YEAR 2021, THE YEAR ON WHICH THE**
5 **COMPLIANCE REQUIREMENTS FOR 2022 ARE BASED?**

6 A. Duke Energy Carolinas’ North Carolina retail sales for calendar year 2021
7 were 58,068,068 MWhs. This includes an additional 106 MWhs that were
8 not reported in NC-RETS due to minor revenue reporting system issues the
9 Company experienced and later corrected. North Carolina retail sales for
10 DEC’s Wholesale REPS customers were 2,633,163 MWhs.

11 **Q. PLEASE SUMMARIZE DUKE ENERGY CAROLINAS’ REPS**
12 **REQUIREMENTS FOR THE TEST AND BILLING PERIODS FOR**
13 **ITS RETAIL CUSTOMERS AND WHOLESALE CUSTOMERS**
14 **FOR WHICH IT PROVIDES REPS COMPLIANCE SERVICES.**

15 A. The Company’s Total Requirement for compliance year 2022 is 7,521,828
16 RECs. The Company submitted for retirement the following RECs, the sum
17 of which are included in the Total Requirement stated above: 121,406 Solar
18 Set-Aside RECs, 29,035 Swine Waste Set-Aside RECs and 176,426
19 Poultry Waste Set-Aside RECs, along with 69,000 SB 886 RECs (which
20 count as 138,000 Poultry Waste Set-Aside RECs) for the equivalent of
21 314,426 Poultry Waste Set-Aside RECs .

1 For the prospective Billing Period, which spans two calendar years,
2 with different requirements in each year, the Company's estimated
3 requirements are as follows⁵:

4 For compliance year 2023, the Company estimates that it will be
5 required to submit for retirement 7,649,211 RECs to meet its Total
6 Requirement. Within this total, the Company is also required to retire the
7 following: 123,457 solar RECs, 84,554 swine waste RECs and 404,259
8 poultry waste RECs.

9 For compliance year 2024, the Company estimates that it will be
10 required to submit for retirement 7,852,438 RECs to meet its Total
11 Requirement. Within this total, the Company estimates that it will be
12 required to retire approximately 126,711 solar RECs, 123,235 swine waste
13 RECs and 404,259 poultry waste RECs.

14 **Q. HAS THE COMPANY COMPLIED WITH ITS GENERAL**
15 **REQUIREMENT FOR 2022 FOR DEC RETAIL AND ITS**
16 **WHOLESALE REPS CUSTOMERS?**

17 **A.** Yes, the Company met its 2022 general requirement of 7,056,961 RECs.
18 Specifically, the RECs to be used for 2022 compliance have been
19 transferred from the NC-RETS Duke Energy Electric Power Supplier
20 account to the Duke Energy Compliance Sub-Account and the Compliance
21 Sub-Accounts of its Wholesale customers. Upon completion of this

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.

1 regulatory proceeding, the Commission will finalize retirement of the
2 RECs.

3 **Q. WILL THE COMPANY COMPLY WITH ITS GENERAL**
4 **REQUIREMENT IN 2023?**

5 A. Yes, the Company is in a position to comply with its General Requirement
6 in 2023.

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

10 A. During the Test Period, Duke Energy Carolinas continued to produce and
11 procure RECs to satisfy its REPS requirements. Specifically, the Company
12 took the following actions: (1) executed and continued negotiations for
13 additional REC purchase agreements with renewable facilities; (2) solicited
14 renewable energy proposals of various types; (3) continued operations of its
15 solar and hydroelectric facilities; (4) enhanced and expanded energy
16 efficiency programs generating savings that can be counted towards the
17 Company's REPS requirement; (5) performed research studies, both
18 directly and through strategic partnerships, to enhance the Company's
19 ability to comply with its future REPS requirements; (6) monitored the
20 development of projects selected in the Competitive Procurement of
21 Renewable Energy ("CPRE") Program of North Carolina House Bill 589
22 (SL 2017-192) ("NC HB 589"), the RECs from which will be used to meet
23 the Company's future REPS requirements; and (7) monitored the progress

1 of the 2022 Solar Procurement as directed by Session Law 2021-165, the
2 RECs from which will also be used to meet the Company's future REPS
3 requirements.

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

7 A. Yes. Under the current Net Metering for Renewable Energy Facilities Rider
8 offered by DEC (Rider NM), a customer receiving electric service under a
9 schedule other than a time-of-use schedule with demand rates ("NMNTD
10 customer") shall provide any RECs to DEC at no cost. Per the
11 Commission's June 5, 2018 *Order Approving Rider and Granting Waiver*
12 *Request* ("NMNTD Order") in Docket Nos. E-2, Sub 1106 and E-7, Sub
13 1113, for NMNTD customers, DEC may use the PVWattsTM Solar
14 Calculator developed by the National Renewable Energy Laboratory
15 ("NREL") for estimating the generation from NMNTD customers' solar
16 facilities, as permitted by Commission Rule R8-67(g)(2). Commission Rule
17 R8-67(g)(2) allows the use of a scalable conversion factor for estimating
18 annual generation from program participants. DEC shall then report the
19 total amount of electricity produced by facilities under the Rider directly
20 into NC-RETS in a separately identified generation project. DEC has
21 complied with these requirements and reported generation from NMNTD
22 customers to NC-RETS. The RECs from these facilities are currently in

1 DEC's REC inventory and available for use for future compliance
2 requirements.

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

5 A. Yes. The *NMNTD Order* also requires that DEC provide a monthly report
6 to NC-RETS listing participating customers and their location as well as the
7 kW capacity of their installations. The report will be made available on the
8 NC-RETS website. DEC has complied, and continues to comply, with this
9 requirement.

10 **Q. HOW DOES THE CPRE PROGRAM OF NC HB 589 (SL 2017-192)**
11 **IMPACT DEC'S COMPLIANCE WITH ITS GENERAL**
12 **REQUIREMENT?**

13 A. Under G.S. § 62-110.8(a), DEC and DEP are responsible for procuring
14 renewable energy and capacity through a competitive procurement program
15 with the purpose of adding 2,660 MW of renewable energy to the state's
16 generation portfolio in a manner that allows DEC and DEP to continue to
17 reliably and cost-effectively serve their customers' future energy needs. To
18 meet the CPRE Program requirements, the Companies issued requests for
19 proposals to procure energy and capacity beginning on February 21, 2018.
20 The Companies solicited bids in three procurement windows, the last of
21 which closed on February 3, 2022. After the CPRE Tranche 3 bid window
22 closed, the CPRE Program was ultimately left with a 441 MW shortfall. The
23 Companies filed a petition in both the CPRE Program dockets and the 2022

1 Solar Procurement Proceeding and received the Commission's approval to
2 procure the remaining MWs through the 2022 Solar Procurement process.

3 Renewable energy facilities eligible to participate in the CPRE
4 solicitation(s) include those facilities that use renewable energy resources
5 identified in G. S. § 62-133.8(a)(8), the REPS statute. The renewable energy
6 facilities developed or acquired by the Companies, or the renewable energy
7 procured from a third party through a power purchase agreement under the
8 CPRE Program and in the 2022 Solar Procurement, must also deliver to the
9 Companies the environmental and renewable attributes, or RECs,
10 associated with the power. The NC retail allocated portion of the actual and
11 estimated REC production from these projects during the Test and Billing
12 Periods can be found in Presson Exhibit No. 2. Additional details regarding
13 DEC's CPRE compliance activities for the current Test Period are being
14 filed concurrently with this REPS filing and may be reviewed in Docket No.
15 E-7, Sub 1281.

16 **Q. HAS THE COMPANY COMPLIED WITH ITS SOLAR SET-ASIDE**
17 **REQUIREMENT FOR 2022 FOR DEC RETAIL AND ITS**
18 **WHOLESALE REPS CUSTOMERS?**

19 A. Yes, the Company met its 2022 Solar Set-Aside Requirement of 121,406
20 solar RECs. Specifically, the RECs to be used for 2022 compliance have
21 been transferred from the NC-RETS Duke Energy Electric Power Supplier
22 account to the Duke Energy Compliance Sub-Account and the Compliance
23 Sub-Accounts of its Wholesale customers. Upon completion of this

1 regulatory proceeding, the Commission will finalize retirement of the
2 RECs.

3 **Q. WILL THE COMPANY COMPLY WITH ITS SOLAR SET-ASIDE**
4 **REQUIREMENT IN 2023?**

5 A. Yes, the Company is in a position to comply with its Solar Set-Aside
6 Requirement in 2023.

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

9 A. The Company is in a position to comply with its Solar Set-Aside
10 Requirement in 2023 through a diverse and balanced portfolio of solar
11 resources. The Company's efforts to comply with the Solar Set-Aside
12 Requirement include REC procurement from solar renewable energy
13 facilities and generation from DEC-owned solar photovoltaic ("PV")
14 systems. The Company has constructed the following five utility-scale solar
15 PV facilities in North Carolina:

- 16 • the 55 MW Monroe Solar Facility which was placed in service
17 in March 2017;
- 18 • the 15 MW Mocksville Solar Facility which was placed in
19 service in December 2016;
- 20 • the 6 MW Woodleaf Solar Facility which was placed in service
21 December 2018;
- 22 • the 69 MW Maiden Creek Solar Facility which was placed in
23 service in December 2020 as a part of the CPRE Program; and

- 1 • the 25 MW Gaston Solar Facility which was also placed in
2 service in December 2020 as a part of the CPRE Program.

3 **Q. PLEASE DESCRIBE THE OPERATIONAL STATUS OF THE**
4 **COMPANY'S PV DISTRIBUTED GENERATION ASSETS**
5 **INSTALLED IN 2010 AND 2011.**

6 A. The Company's solar PV distributed generation facilities have provided
7 valuable learning experiences for the Company over the past twelve years.
8 Most of the systems were operational and generating power for the benefit
9 of customers during the Test Period. In December of 2022, in accordance
10 with the terms of the lease agreements between DEC and each PV system
11 host, the Company began removing rooftop panels at one of the commercial
12 sites so leaks could be repaired. Another site has requested removal
13 beginning in April 2023 to facilitate scheduled roof replacement. Due to
14 safety concerns, new building and electrical code requirements, the age of
15 the systems and lifetime of existing components, the Company is evaluating
16 whether to reinstall or replace the aging systems or to explore other options
17 as the rooftop systems are removed.

18 **Q. HAS THE COMPANY COMPLIED WITH ITS POULTRY WASTE**
19 **SET-ASIDE REQUIREMENT FOR 2022 FOR DEC RETAIL AND**
20 **ITS WHOLESALE REPS CUSTOMERS?**

21 A. Yes, the Company met its 2022 Poultry Waste Set-Aside requirement of
22 314,426 RECs. The Company submitted for retirement 176,426 poultry
23 RECs and 69,000 SB 886 RECs (which count as 138,000 Poultry Waste

1 Set-Aside RECs) to meet its 2022 Poultry Waste Set-Aside Requirement of
2 314,426 RECs. Specifically, the RECs to be used for 2022 compliance have
3 been transferred from the NC-RETS Duke Energy Electric Power Supplier
4 account to the Duke Energy Compliance Sub-Account and the Compliance
5 Sub-Accounts of its Wholesale customers. Upon completion of this
6 regulatory proceeding, the Commission will finalize retirement of the
7 RECs.

8 **Q. WILL THE COMPANY COMPLY WITH ITS POULTRY WASTE**
9 **SET-ASIDE REQUIREMENT IN 2023?**

10 A. Yes, the Company expects to comply with its Poultry Waste Set-Aside
11 Requirement in 2023. Compliance beyond 2023 is dependent on the
12 performance of current poultry waste-to-energy contracts. Achievement of
13 projected delivery requirements of those poultry waste-to-energy facilities
14 currently operating and the ability of four new facilities to reach expected
15 commercial operation dates in 2023 and 2024 will impact the Company's
16 ability to meet future requirements of the poultry waste set-aside.

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

21 A. In the Test Period, the Company (1) continued direct negotiations for
22 additional supplies of both in-state and out-of-state resources; (2) secured
23 contracts for additional poultry waste-to-energy resources; (3) continued

1 pursuit of poultry-derived directed biogas from facilities located in North
2 Carolina and directing such biogas to combined cycle plants for combustion
3 and electric generation; (4) worked diligently to understand the
4 technological, permitting, and operational risks associated with various
5 methods of producing qualifying poultry RECs to aid developers in
6 overcoming those risks; when those risks could not be overcome, the
7 Company worked with developers via contract amendments to adjust for
8 more realistic outcomes; (5) explored adding thermal capabilities to current
9 poultry sites to bolster REC production; (6) monitored and evaluated out-
10 of-state poultry REC opportunities when available; and (7) funded a North
11 Carolina biogas utilization study through RTI International with hopes for
12 future growth of poultry-derived directed biogas project development.
13 Additional information on the Company's compliance with the Poultry
14 Waste Set-Aside requirement can be found in the Company's Joint
15 Semiannual Progress Report, filed on December 1, 2022, in Docket No. E-
16 100, Sub 113A.

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

20 **Q. HAS THE COMPANY COMPLIED WITH ITS SWINE WASTE**
21 **SET-ASIDE REQUIREMENT FOR 2022 FOR DEC RETAIL AND**
22 **ITS WHOLESALE REPS CUSTOMERS?**

1 A. Yes, the Company met its 2022 Swine Waste Set-Aside Requirement of
2 29,035 RECs. Specifically, the RECs to be used for 2022 compliance have
3 been transferred from the NC-RETS Duke Energy Electric Power Supplier
4 account to the Duke Energy Compliance Sub-Account and the Compliance
5 Sub-Accounts of its Wholesale customers. Upon completion of this
6 regulatory proceeding, the Commission will finalize retirement of the
7 RECs.

8 **Q. WILL THE COMPANY COMPLY WITH ITS SWINE WASTE SET-**
9 **ASIDE REQUIREMENT IN 2023?**

10 A. Compliance with the swine waste set-aside for 2023 and beyond may be
11 difficult to meet as the swine waste obligation increases. Swine waste-to-
12 energy compliance challenges have been numerous and varied. Existing
13 contracts have not reached contracted levels of production, and new
14 contracts have failed to come online in the timeframe originally planned and
15 have taken longer than expected to ramp up production. Three new swine
16 waste-to-energy projects are under construction and scheduled to come
17 online in 2023. The ability of these new facilities to come online and for all
18 facilities to produce their full contracted RECs will determine the levels of
19 compliance that DEC and DEP are able to meet in the near term.

20 Successfully developing swine waste-to-energy projects in North
21 Carolina has been a slow and tedious process due to several factors. The
22 Companies understand that swine waste-to-energy projects have
23 encountered difficulties due to issues including local opposition to siting of

1 the facilities, the inability to secure firm and reliable sources of swine waste
2 feedstock from waste producers, difficulties securing project financing,
3 technological challenges encountered when ramping up production and
4 issues with lower-than-expected production due to revised industry
5 expectations, farm waste management and biosecurity practices.
6 Additionally, the outbreak of the COVID-19 pandemic adversely impacted
7 swine farms and processing plants in North Carolina through staff
8 shortages, personal protective equipment supply issues, and delivery
9 challenges. COVID-19, together with the war in Ukraine, have created or
10 exacerbated global supply chain disruptions, affecting prices and
11 availability of equipment and building materials. Disruptions in work flows
12 due to COVID-19 have led to depleted inventories, and market price
13 volatility for certain materials (e.g. stainless steel, rebar) has caused
14 reluctance by suppliers to carry inventories, in turn creating shortages for
15 those materials and goods. All of these factors together have caused
16 shipment delays and thus increased wait times on completion of new
17 facilities. Developers have also communicated potential delays as they work
18 through the regulatory process, interconnections with local utilities for out-
19 of-state projects, environmental regulations and other stakeholder concerns
20 affecting their development plans.

21 The pandemic and other factors notwithstanding, several new swine
22 projects are scheduled to come online over the next few years. The
23 Company remains actively engaged in monitoring existing facilities and

1 facilities that are under construction, providing assistance where possible to
2 help projects be successful. The Company continues to seek additional
3 resources and makes every reasonable effort to comply with the swine waste
4 set-aside requirement.

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

9 A. In the Test Period, the Company (1) continued direct negotiations for
10 additional supplies of both in-state and out-of-state resources; (2) secured
11 contracts for additional swine waste-to-energy resources; (3) continued
12 pursuit of swine-derived directed biogas from North Carolina facilities,
13 working with Piedmont Natural Gas Company, Inc. to locate favorable
14 biogas injection sites; (4) worked diligently to understand the technological,
15 permitting, and operational risks associated with various methods of
16 producing qualifying swine RECs to aid developers in overcoming those
17 risks; when those risks could not be overcome, the Company worked with
18 developers via contract amendments to adjust for outcomes that the
19 developers believe are achievable based on new experience; (5) explored
20 leveraging current bioenergy contracts by working with developers to add
21 swine waste to their fuel mix; (6) monitored and evaluated out-of-state
22 swine REC opportunities when available; (7) continued support of research
23 through North Carolina State University associated with on-farm swine

1 waste drying and combustion technologies as well as funding a North
2 Carolina biogas utilization study through RTI International with hopes for
3 future growth of swine-derived directed biogas project development; and
4 (8) engaged the North Carolina Pork Council (“NCPC”) in a project
5 evaluation collaboration effort that will allow the Company and the NCPC
6 to discuss project viability, as appropriate, with respect to the Company’s
7 obligations to keep certain sensitive commercial information confidential.
8 Additional information on the Company’s compliance with the Swine
9 Waste Set-Aside requirement can be found in the Company’s Joint
10 Semiannual Progress Report, filed on December 1, 2022, in Docket No. E-
11 100, Sub 113A.

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

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

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

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

22 A. Yes, the Company sold poultry RECs to another electric power supplier in
23 North Carolina during the Test Period to enable that power supplier to

1 comply with its Poultry Waste Set-Aside requirement. The REC sale did
2 not negatively impact the Company's compliance portfolio, and the sale
3 proceeds were credited back to the Company's retail and Wholesale REPS
4 customers.

5 **Q. HAS THE COMPANY COMPLIED WITH THE COMMISSION'S**
6 **MAY 2014 ORDER IN DOCKET NO. E-100, SUB 113 PERTAINING**
7 **TO ACCOUNTING FOR REC SALES?**

8 A. Yes. As required by the May 2014 Order, please see Presson Confidential
9 Exhibit No. 4 for information on the Company's REC sales.

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

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

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

20 A. Under G.S. § 62-133.8(b)(2), an electric public utility, such as DEC, may
21 meet its REPS compliance requirement through several methods, including
22 by "generat[ing] electric power at a new renewable energy facility." The
23 Commission accepted the registration of these DEC-owned hydroelectric

1 facilities as renewable energy facilities, but not as *new* renewable energy
2 facilities, in its July 31, 2009 *Order Accepting Registration of Renewable*
3 *Energy Facilities* in Docket Nos. E-7, Subs 886, 887, 888, 900, 903 and 904
4 (“*June 31, 2009 Registration Order*”) and its December 9, 2010 *Order*
5 *Accepting Registration of Renewable Energy Facilities* in Docket Nos. E-7,
6 Subs 942, 943, 945 and 946 (collectively, “*Registration Orders*”). In the
7 *Registration Orders*, the Commission specifically cited its June 17, 2009
8 *Order on Public Staff’s Motion for Clarification* in Docket No. E-100, Sub
9 113, where it concluded that these utility-owned hydroelectric facilities do
10 not meet the delivery requirement of G.S. § 62-133.8(a)(5)(c), which
11 requires the delivery of electric power to an electric power supplier, such as
12 DEC, by an entity other than the electric power supplier to qualify as a *new*
13 renewable energy facility.

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

17 A. In the REPS cost recovery proceeding in Docket No. E-7, Sub 1162, the
18 Company proposed to exchange a portion of these hydroelectric RECs for
19 RECs within the inventory of the North Carolina Electric Membership
20 Corporation (“NCEMC”). Unlike DEC, NCEMC can use these
21 hydroelectric RECs to comply with its REPS requirements because G.S. §
22 62-133.8(c)(2)(d) allows electric membership corporations and
23 municipalities to meet their REPS requirements through the purchase of

1 RECs derived from renewable, as opposed to new renewable, energy
2 facilities. Additionally, the Company noted that the REC exchange would
3 benefit DEC's customers because it would allow DEC to meet part of its
4 general REPS requirements through the RECs exchanged with NCEMC at
5 no cost to DEC's customers rather than through the purchase of additional
6 RECs from new renewable energy facilities. NCEMC's customers are held
7 harmless in the transaction as this exchange simply replaces RECs in
8 NCEMC's inventory with different RECs that NCEMC will use to meet its
9 General Requirement. The Public Staff of the North Carolina Utilities
10 Commission supported the Company's proposed REC transfers with
11 NCEMC, and the Commission concluded that the proposed transfer was
12 reasonable and served the public interest in its *Order Approving REPS and*
13 *REPS EMF Riders and 2017 REPS Compliance Report*, issued on August
14 17, 2018, in Docket No. E-7, Sub 1162.

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

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

21 **Cost of REPS Compliance**

1 **Q. WHAT ARE THE COMPANY’S COSTS ASSOCIATED WITH REPS**
2 **COMPLIANCE DURING THIS TEST PERIOD AND THE**
3 **UPCOMING BILLING PERIOD?**

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

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

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

14 **Other Incremental Costs and Solar Rebate Program Costs**

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

17 A. Other Incremental Costs include labor costs associated with REPS
18 compliance activities and non-labor costs associated with administration of
19 REPS compliance. Among the non-labor costs associated with REPS
20 compliance are the Company’s subscription to NC-RETS, and accounting
21 and tracking tools related to RECs, reduced by agreed-upon liquidated
22 damages paid by sellers for failure to meet contractual milestones, and

1 amounts paid for administrative contractual amendments requested by
2 sellers.

3 **Q. PLEASE PROVIDE INFORMATION ON THE NC HB 589 (SL 2017-**
4 **192) SOLAR REBATE PROGRAM (“SOLAR REBATE**
5 **PROGRAM”).**

6 A. As required by G.S. § 62-155(f), DEC developed a Solar Rebate Program
7 offering incentives to residential, non-residential, and non-profit customers
8 in North Carolina for the installation of small customer owned or leased
9 solar energy facilities participating in the Company’s net metering tariff.
10 The goal of the Solar Rebate Program is to provide an economic incentive
11 for customers to adopt solar power by reducing the upfront costs of
12 installing solar equipment. The incentive is limited to 10 kilowatts
13 alternating current (“kW-AC”) for residential solar installations and 100
14 kW-AC for non-residential solar installations. The program incentive is
15 limited to 10,000 kW of installed capacity annually. The program began
16 January 1, 2018, and continued until December 31, 2022, with limits for
17 each participant class. At the end of 2022, 1,079 kW of unsubscribed
18 capacity remained. This was made available to any participant meeting the
19 solar rebate rider requirements when the 2023 rollover allocation process
20 began on January 11, 2023. Solar Rebate Program participation caps for all
21 customer types and application periods were met following the close of the
22 random selection period on January 18, 2023. The waitlist established

1 during the January 2023 random selection process will remain until all
2 customers with rebate reservations are paid.

3 Additional information regarding the status of the solar rebate
4 program, including the Company's most recent Joint Biannual Solar Rebate
5 Program Report, may be found in Docket Nos. E-7, Sub 1166 and E-2, Sub
6 1167.

7 **Q. ARE COSTS RELATED TO THE NC HB 589 (SL 2017-192) SOLAR**
8 **REBATE PROGRAM INCLUDED FOR RECOVERY IN THIS**
9 **FILING?**

10 A. Yes. Pursuant to G.S. § 62-155(f), each public utility required to offer a
11 solar rebate program "shall be authorized to recover all reasonable and
12 prudent costs of incentives provided to customers and program
13 administrative costs by amortizing the total program incentives distributed
14 during a calendar year and administrative costs over a 20-year period,
15 including a return component adjusted for income taxes at the utility's
16 overall weighted average cost of capital established in its most recent
17 general rate case, which shall be included in the costs recoverable by the
18 public utility pursuant to G.S. 62-133.8(h)." G.S. § 62-133.8(h) provides for
19 an electric power supplier's cost recovery and customer charges under the
20 REPS statute; NC HB 589 (SL 2017-192) amended it by adding a provision
21 to allow for the recovery of incremental costs incurred to "provide
22 incentives to customers, including program costs, incurred pursuant to G.S.
23 § 62-155(f)." Therefore, DEC has included for recovery in this filing both

1 costs incurred during the Test Period, and projected to be incurred in the
2 Billing Period, related to the implementation of the NC HB 589 Solar
3 Rebate Program. As detailed on Presson Confidential Exhibit No. 3, these
4 costs include the annual amortization of incentives paid to customers
5 program administration costs including labor, information technology, and
6 marketing costs offset by early termination fees assessed to customers who
7 received a rebate check but failed to maintain participation in the Net
8 Metering Rider. Projected incentive costs for the Billing Period are based
9 on the currently approved rebate amounts: \$0.40 per watt for residential
10 installations, \$0.30 per watt for non-residential installations and \$0.75 per
11 watt for non-profit installations.

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

17 A. DEC charges only the incremental cost of REPS compliance and the NC
18 HB 589 (SL 2017-192) Solar Rebate Program to the REPS cost recovery
19 rider. Consistent with that policy and DEC's practices in previous
20 applications for cost recovery for REPS compliance, internal employees
21 who work to comply with G.S. § 62-133.8 and G.S. § 62-155(f) charge only
22 that portion of their labor to REPS. The departments/functions that charged

1 labor to REPS during the Test Period are detailed in Presson Confidential
2 Exhibit No. 3.

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

6 A. Employees positively report their time, which means that each employee is
7 required to submit a timesheet every two weeks in DEC's time reporting
8 system. The hours reported for the period are split according to the
9 accounting entered in the time reporting system for that specific employee.
10 The division of hours is updated for the reporting period as the nature of the
11 employee's work changes.

12 To educate employees to account for their time properly, DEC
13 provides instructions for charging time to REPS to affected employees and
14 the management of the employee groups performing REPS work.
15 Additionally, each year prior to filing for approval of the DEC REPS
16 Compliance Report and Cost Recovery Rider, the labor hours charged to
17 REPS are carefully reviewed and confirmed for accuracy.

18 **Research Costs**

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

1 **Q. THE COMMISSION’S *ORDER APPROVING REPS AND REPS EMF***
2 ***RIDERS AND 2012 REPS COMPLIANCE* REQUIRES DUKE**
3 **ENERGY CAROLINAS TO FILE WITH ITS 2022 REPS RIDER**
4 **APPLICATION STUDY RESULTS FOR ANY STUDIES THE**
5 **COSTS OF WHICH IT HAS RECOVERED VIA THE REPS RIDER.**
6 **IS THE COMPANY SUPPLYING SUCH STUDIES IN THIS**
7 **FILING?**

8 **A.** Yes. The Company’s Research efforts are an integral part of its REPS
9 Compliance efforts. The following summary outlines efforts undertaken by
10 the Company in the Test Period and specifies the availability of applicable
11 study results.

12 • Adopting DVAR to Mitigate PV Impacts on a Distribution System,
13 Phase 2 – In late 2021, the Company kicked off a second phase of
14 the project with North Carolina State University (“NC State
15 University” or “NCSU”) to assess the effectiveness of the American
16 Superconductor Corporation Dynamic Volt-Amp Reactive
17 Compensation Solution (“mini-DVAR”) in mitigating various
18 power quality issues on distribution circuits due to increasing
19 penetration of PV. Phase 2 of the study focuses on the development
20 of more dynamic dispatching schemes for the mini-DVAR such that
21 the expected benefits are maximized. Phase 2 is expected to be
22 complete the second quarter of 2023; no charges were incurred in
23 the Test Period for the study.

- 1 • American Clean Power Association – The American Clean Power
2 Association is the leading federation of renewable energy
3 companies working to advance clean energy as an affordable and
4 reliable power source in America. The Company’s 2022
5 membership provided access to leading lawmakers and other
6 stakeholders for the purpose of advocating on issues related to the
7 renewable energy supply chain, trade disagreements, tax credits and
8 more. The trade association also provided safety, environmental
9 education, conferences, and proprietary industry data.
- 10 • Biogas Utilization in North Carolina – In 2022 the Company
11 continued support of the RTI International (“RTI”) project for the
12 NC Energy Policy Council to determine the potential
13 bioenergy/biogas resources available in NC, and to identify the most
14 beneficial and optimum utilization of resources to maximize
15 economic, environmental, and societal advantages. Phase 1 of the
16 study is now complete and has been posted on the RTI website. The
17 results of this study can also be found in Presson Exhibit No. 5.
18 Phase 2 of the study is underway, a portion of which extends the
19 scope of Phase 1 to include other sources of organic waste, primarily
20 landfills and wastewater treatment plants. An additional portion of
21 Phase 2 will produce a state-based landscape analysis of
22 decarbonization in the natural gas sector with a focus on renewable
23 natural gas and the potential for hydrogen. The analysis will include

1 review of current general statutes, rules, and policies as well as
2 policy options to consider for adoption in North Carolina. The
3 potential value of new legislations including the Inflation Reduction
4 Act and the Infrastructure Investment and Jobs Act will be
5 considered. These analyses will be carried out in conjunction with,
6 and incorporate feedback from, engagement with stakeholders
7 including environmental justice and frontline communities. These
8 activities are estimated to be completed by the end of 2023.

- 9 • Bring Your Own Battery Study – In 2022 the Company continued
10 its Bring Your Own Battery study in partnership with Virtual
11 Peaker, an aggregation technology vendor who can control and
12 collect data from battery storage original equipment manufacturers.
13 The study evaluates the use of residential customer-owned batteries
14 as a demand response resource. The Company is studying the
15 aggregation technology, battery discharge, customer usage patterns
16 and customer experiences that could inform a future pilot or
17 program filing. The progress for this report can be found in Presson
18 Exhibit No. 6.
- 19 • Coalition for Renewable Natural Gas – The Company renewed its
20 membership to the Coalition for Renewable Natural Gas in 2022 to
21 add a valuable resource of knowledge and public policy advocacy
22 in this growing sector of potential animal waste supply. The
23 Coalition for Renewable Natural Gas provides its members with

1 exclusive whitepapers, support on model pipeline gas specifications
2 and access to other members for discussions on current and future
3 projects. The Company also provided funding through the Coalition
4 for Renewable Natural Gas for additional studies including an
5 updated Economic Analysis of the US Renewable Natural Gas
6 Industry, which is included as Presson Exhibit No. 7, and a study by
7 Colorado State University of methane leakage from renewable
8 natural gas processing facilities to promote improved practices,
9 which is close to completion.

- 10 • Developing Large Distributed Energy Resources (“DER”) Protection Guidelines and Settings for Mitigating System-wide
11 Impacts across T&D Systems – In late 2021, the Company started
12 the project with the North Carolina State University, the University
13 of North Carolina at Charlotte (“UNCC”), and Clemson University
14 (“Clemson”) through the Center for Advanced Power Engineering
15 Research (“CAPER”). The project investigates the ability to develop
16 a strategy for evaluating protection device, recloser settings and
17 control algorithms for Inverter-based Resources with high
18 penetration levels of DER at both the distribution and transmission
19 levels with an integrated simulation model. There were no charges
20 incurred in 2022 for this ongoing CAPER project. A status update
21 on the project can be found in Presson Exhibit No. 8.
22

- 1 • Duke University – Loyd Ray Farms – The Company partnered with
2 Duke University to develop a pilot-scale, 65 kW swine waste-to-
3 energy facility, which initiated operation and began producing
4 renewable energy in 2011. DEC and the broader development
5 industry gained valuable insight regarding the benefits and risks
6 associated with swine-waste-to-energy projects through this effort.
7 The Loyd Ray Farms research project came to the end of its 10-year
8 contract life in 2021 and has now been decommissioned. Charges
9 incurred in 2022 represent Duke Energy’s final expenses for the
10 2021 calendar year. A summary of the project’s operations and
11 decommissioning were previously provided in Docket No. E-7, Sub
12 1264 Presson Confidential Exhibit No. 9.
- 13 • Effective Load Carrying Capability (“ELCC”) Study – During 2021
14 and 2022 the Company contracted Astrapé Consulting, LLC to
15 analyze the capacity value of solar, battery storage and wind within
16 each system. ELCC studies are considered an industry best practice
17 across the country to best determine the capacity contributions of
18 increasing renewables on electric systems. Average seasonal
19 capacity values are used for reserve margin calculation purposes and
20 seasonal marginal values can be used for expansion planning. Both
21 DEC and DEP are winter planning due to winter peak loads and the
22 amount of solar on the systems. Because of this, the study results
23 provide the winter capacity value for solar, storage and wind which

1 are used in the both the Company's Carbon Plan and its Integrated
2 Resource Plans. The results of this study can be found in Presson
3 Exhibit No. 9.

- 4 • Electric Power Research Institute ("EPRI") – In 2022 the Company
5 subscribed to the following EPRI programs, the costs of which were
6 recovered via the REPS rider: Program 174 – DER Integration, and
7 Program 94 – Energy Storage and Distributed Generation. The
8 Company continued its support of one supplemental project under
9 Program 174 – "Model-Based Analysis of DER Functions and
10 Settings." EPRI designates such study results as proprietary or as
11 trade secrets and licenses such results to EPRI members, including
12 Duke Energy Carolinas. As such, the Company may not disclose the
13 information publicly. Non-members may access these studies for a
14 fee. Information regarding access to this information can be found
15 at <http://www.epri.com/Pages/Default.aspx>.
- 16 • Grid Resiliency – In 2022 the Company contracted with Open
17 Energy Solutions, Inc ("OES") to develop a framework and related
18 perspectives on the value of grid resiliency for Duke Energy. OES
19 will test a range of analytical methods for valuing the resilience
20 benefits of distributed energy resources. The project will also focus
21 on example algorithms for grid resilience value levers using
22 available public research and Duke Energy System data. The
23 project's scope can be found in Presson Confidential Exhibit No. 10.

- 1 • Low Energy Drying of Swine Sludge for Fuel and Fertilizer
2 Research Study – In 2022 the Company continued support of the
3 various projects being undertaken by the Animal and Poultry Waste
4 Management Center at NCSU. This work is centered around drying
5 swine lagoon solids, bagged lagoon sludge and lagoon sludge mixed
6 with agricultural wastes at a farm-based level to create a higher
7 MMBtu fuel that can be safely and easily transported to a central
8 plant for combustion. An update on the project can be found in
9 Presson Confidential Exhibit No. 11.
- 10 • Monitoring and Operational Assessment of DER Reactive Power
11 Control – EPRI – In 2022 the Company contracted with EPRI to
12 continue the evaluation of the software-based controls of advanced
13 inverters according to the IEEE 1547-2018 standard. Projects in the
14 Smart Inverter Pilot established in the “Joint Notice of
15 Interconnection Settlement and Petition for Limited Waiver” filed
16 with the Commission in Docket No. E-100, Sub 101 on September
17 3, 2020, are being commissioned and operating on the Company’s
18 distribution system. Monitoring and assessing each project’s
19 performance is important. This study will collect operational data,
20 assess the delivery of the systems’ active and reactive power
21 compared to the Standard, identify any undesirable impact to the
22 feeder system, examine adverse interaction with local or central
23 controls of traditional regulating devices (e.g., voltage regulator,

1 capacitor bank), propose potential updates for better coordination
2 and further improve the operation's effectiveness. The study began
3 in the fourth quarter of 2022 and is currently in progress. A
4 description of the study can be found in Presson Confidential
5 Exhibit No. 12.

- 6 • NC State University's Future Renewable Electric Energy Delivery
7 and Management ("FREEDM") Systems Center – Duke Energy
8 supports NC State University's FREEDM Center through annual
9 membership dues. The FREEDM partnership provides Duke Energy
10 with the ability to influence and focus research on materials,
11 technology, and products that will enable the utility industry to
12 transform the electric grid into a two-way power flow system
13 supporting distributed generation.
- 14 • Power Flow Analysis to Improve Integrated Volt/Var ("IVVC") and
15 Energy Efficiency Programs – In late 2021 the Company contracted
16 with UNCC to address the issue of inaccurate power flow analysis
17 results in the current Distribution Management System when there
18 are DER on a distribution system. This research will directly benefit
19 IVVC programs and enable utilities to operate IVVC more
20 effectively on systems with high levels of DERs. The project is
21 ongoing, and no costs were incurred during the Test Period.
22 Although the study is not yet complete, 2 papers were submitted to
23 the Institute of Electrical and Electronics Engineers Texas Power

1 and Energy Conference. The papers can be found in Presson Exhibit
2 Nos. 13 and 14.

- 3 • Reliability Assessment for Utility PV Inverter System – In late 2021
4 the Company contracted with UNCC to conduct phase one of a
5 research study on the Reliability Assessment for Utility PV Inverter
6 Systems. The goal of this project was to develop a reliability
7 assessment tool to support the development of safer and more
8 reliable PV, quantitatively assess the PV system reliability based on
9 field data provided by Duke Energy, and provide recommendations
10 for failure mechanism identification, predictive maintenance, and
11 lifetime extension strategy. The study was completed in December
12 2022. Results can be found in Presson Exhibit No. 15.

13 In December 2022 the Company kicked off a second phase
14 of the project which will support the development of safe and
15 reliable utility PV and energy storage systems. The extended project
16 will conduct technology and standard reviews on PV and utility
17 battery arc fault and fire prevention, evaluate the current arc fault
18 detection and arc flash prevention methods, research real-time arc
19 fault detection and battery fire detection technology and provide
20 technical recommendations to reduce fire hazards, enhance
21 electrical safety, and increase PV and utility energy storage system
22 fire resilience. The project scope can be found in Presson Exhibit
23 No. 16.

- 1 • Resilient Community Microgrids with Dynamic Reconfiguration to
2 Serve Critical Loads in the Aftermath of Severe Events – In 2021
3 the Company supported UNCC in the research project awarded by
4 the Department of Energy’s Office of Energy Efficiency and
5 Renewable Energy under DE-FOA-0002243. Duke Energy supports
6 this project with the expectation that it addresses all topics of
7 interest: (1) the study will recommend a methodology which
8 specifies relay-protection elements and settings for utilization in
9 island mode of operation; (2) the study will recommend
10 methodologies for island black start sequences; and (3) a
11 performance evaluation of the microgrid-control will be provided.
12 This is a three-year project expected to be complete in April 2024,
13 and no charges were incurred in the Test Period. The progress for
14 this project can be found in Presson Confidential Exhibit No. 17.
- 15 • Smart Electric Power Alliance (“SEPA”) – The Company renewed
16 its membership to the Smart Electric Power Alliance in 2022. SEPA
17 provides its members with exclusive whitepapers and working
18 group event opportunities on various topics including DER
19 integration, DER management systems, energy efficiency and
20 demand response, electric vehicle development, microgrid and grid
21 resiliency. Please visit SEPA’s website at <https://sepapower.org/> for
22 more information on SEPA.

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

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

19 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

20 A. Yes.