Jason A. Higginbotham
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Jan 25 2023

January 25, 2023

VIA ELECTRONIC FILING

Ms. Shonta A. Dunston
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

RE: Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's First Submission of Responses to the Public Staff's Data Request No. 2 re: Winter Storm Elliott
Docket No. M-100, Sub 163

Dear Ms. Dunston:

Please find enclosed for filing Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC's ("DEP", and together with DEC, "Duke Energy") First Submission of Reponses to the Public Staff's Data Request ("PSDR") No. 2 re: Winter Storm Elliott ("1st Data Request Responses") in the above-referenced docket. Included with this submission are responses to PSDR Item Nos. 1, 4, 5, 9, 10, 16, 17, 23, 24, 28, 29, 30, 31, and 32.

If you have any questions, please let me know.

Sincerely,

Jason Higginbotham

Jason A. Higginbotham

Enclosure
cc: Parties of Record

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CERTIFICATE OF SERVICE

I certify that a copy of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Winter Storm Elliott First Submission of Responses to the Public Staff's Data Request No. 2 re Winter Storm Elliott, in Docket No. M-100, Sub 163, has been served by electronic mail, hand delivery, or by depositing a copy in the United States Mail, 1st Class Postage Prepaid, properly addressed to parties of record.

This the 25th day of January, 2023.

Jason A. Higginbotham
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Jan 25 2023

DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

1. Provide a general description and list of the Company's policies and procedures for routine winter preparedness.

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

Overview

Duke Energy has in place detailed and comprehensive winter preparedness plans. This response provides an overview of Duke Energy's winter preparedness plans and the Company's response to Public Staff Data Request ("PSDR") No. 2-2 provides further details regarding related procedures.

In addition, Duke Energy has previously submitted comprehensive information to the North Carolina Utilities Commission ("Commission") and the Public Service Commission ("PSCSC") on the Company's policies and procedures for winter preparedness. Specifically, in Commission Docket No. M-100 Sub 163, Duke Energy responded to questions submitted by the Commission and Public Staff on winter preparedness. Those responses are attached to this response and marked as, "M-100 Sub 163 DEC DEP Initial Comments" and "M-100 Sub 163 E-100 Sub 173 Duke Response to Public Staff DR_040822," respectively. The Company also submitted comments to the PSCSC on winter preparedness in PSCSC Docket No. 2021-66-A, which are attached and marked as "21.06-11 DEC DEP DEC DEP Initial Response to Commission Order No. 2021-163 (21-66-A)".

Additionally, Duke Energy provided an overview of its winter preparedness plans on April 19, 2022, in a Technical Conference before the Commission, the Public Staff, and other parties in this docket (No. M-100, Sub 163). During the Technical Conference Duke Energy presented its responses to questions from the Commission regarding the Company's preparedness for winter weather events. As the Company stated during the Technical Conference, Duke Energy continuously pursues operational excellence by learning from past events. The Company has incorporated learnings from numerous extreme weather events, including the 2011 Electric Reliability Council of Texas ("ERCOT") cold weather, the 2014 Polar Vortex, the 2015 Polar Vortex, the January 2018 cold weather event, and the 2021 ERCOT event. The Company will also incorporate lessons learned from Winter Storm Elliott into future winter preparedness policies and procedures.

The following narrative provides further overview of the Company's winter preparedness plans.

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Procedures for Duke Energy Organizations

In general, winter preparedness includes actions and input from many organizations within the Company. Below is a description of the actions taken by certain key organizations within the Company that are involved in winter preparedness.

Regulated and Renewable Energy

The Regulated and Renewable Energy ("RRE") organization developed Seasonal Preparation Guidelines in 2017 to formally document the expectations for the generation stations. See the attachment named, "RRE-OPR-NA-GDLN-OP-0005.pdf" for a copy of those guidelines. Each site has a corresponding winter preparation plan that is consistent with these guidelines. For each site, the preventative maintenance ("PM") and seasonal local procedures are based on historical data and lessons learned and are implemented annually prior to winter operations. In 2018, RRE included a standing agenda in the Operation Working Team meetings item regarding lessons learned after each Winter and Summer season. Most recently, RRE has implemented North American Electric Reliability Corporation ("NERC") Reliability standard EOP-011-2 for the stations. That standard resulted in Duke Energy taking the following actions:

- Formalizing the Company's cold weather preparedness plan (by unit) to mitigate operating emergencies related to extreme winter weather;
- Providing training on the cold weather preparedness plan; and
- Implementing the cold weather preparedness plan for each unit prior to the cold weather season annually.

Customer Delivery

Duke Energy's Customer Delivery organization implements the following additional procedures to prepare for the winter season:

- Limiting Hot Line Tags until morning peak has been realized
- Isolating faults and restoring equipment to maintain normal grid conditions
- Applying step restoration as needed to mitigate cold load pickup issues,
- Remotely opening midpoint reclosers for feeder outages to prepare for load pickup based on long duration events to improve efficiency,
- Preparing for Distribution System Demand Response ("DSDR") runs as requested by the Energy Control Center ("ECC")
- Preparing demand side load management tools
- Making seasonal changes to conductor ratings and transformer loading alarms.

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Transmission/Energy Control Center

The Company Energy Control Center ("ECC") holds a Winter Preparedness Webinar with appropriate business units presenting the preparations that have been taken and addressing any challenges that have been identified. These webinars are held prior to December each year. See the Company's response to PSDR No. 2-3 for additional information and copies of the webinars for the last three years.

Transmission & Fuels Supply Planning / Fuel Systems Optimization

The TFSP/FSO organization incorporates meteorology and forecasting into its winter preparedness. This organization is also responsible for fuel supply planning & procurement. Below is a description of these activities as they pertain to winter preparedness.

Meteorology and Forecasting

Meteorology and forecasting leverage forecasting and planning strategies across the transmission, distribution, fuels, and nuclear/non-nuclear generation systems to routinely mitigate the threat of extreme weather. To effectively manage and respond to extreme weather threats, Duke Energy maintains a meteorology staff that provides both short and long-term weather forecasts and weather statements specific to each of the Companies and to its affiliates in other states.

Duke Energy has access to data from a National Oceanic and Atmospheric Administration ("NOAA") satellite system, called NOAAPort, which receives a one-way broadcast of NOAA environmental data and information in near-real time. This is the same data being used by the National Weather Service to produce weather forecasts. Our internal systems process and analyze this data and our team of meteorologists use this data along with data provided by contracted vendors to produce a 15-day forecast of hourly weather parameters (e.g., temperature, dew point) for key locations across the Carolinas Service Area. These 15-day forecasts are produced each day and updated, as needed, throughout the day. Forecasts are then blended using a weighted average that is representative of each load base (e.g., Duke Energy Carolinas and Duke Energy Progress) and ingested into the load forecasting models.

These weather reports are provided across the Company including to the Reliability Coordinator ("RC"), Balancing Authority ("BA"), Transmission Owner ("TO"), Transmission Operator ("TOP"), Generator Owner ("GO"), Generator Operator ("GOP"), distribution, load forecasting/unit commitment, power marketing and fuel trading functions all of whom review and assess operating conditions, including, but not limited to the: weather, load forecasts, system conditions, generating unit availability with capacity reductions, power generation reserves, energy sales, and energy purchases as part of normal business operations. In addition, each day a seven-day commitment model is generated that produces a security-constrained economic unit commitment plan. These models aid in ensuring that adequate and appropriate generating units are committed so that reliability is maintained with the lowest production cost.

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Fuel Supply Planning & Procurement

Natural Gas

For physical natural gas supply deliverability, the Companies purchase greater than 100 percent of the firm physical natural gas forecasted to be needed to supply their combined cycle generation, with a particular focus on procuring additional firm physical gas supply flexibility during the months of December through February in order to be prepared for higher than forecasted combined cycle generation. Given the greater variability in natural gas burn at the Companies' dual fuel units and Combustion Turbine ("CT") facilities, the Companies purchase the rights to call on daily firm natural gas supply that can be utilized when both the dual fuel units and the natural gas combustion turbines are needed to meet system demand or run for economics. In addition, in periods where actual gas prices exceed fuel oil prices, the Companies will utilize more fuel oil for CTs for economic and reliability reasons to reduce exposure to extreme natural gas prices. Going into each month, Duke Energy makes additional procurement decisions as needed based on monthly fuel forecast updates.

Fuel Oil

The Companies' fuel oil inventory purchasing targets have been developed based on maintaining system reliability needs, meeting coal generation start-up needs, and allowing for an immediate response should a forecasted event require a ramp up of fuel oil deliveries. The Companies have a fuel oil emergency procedure that provides guidance on actions to be taken when projected consumption levels show inventory being depleted before deliveries can restore it.

Coal

The Companies have continued to execute a strategy of contracting for coal supply at the upper end of projected procurement needs to ensure adequate delivered supply and build station coal inventories going into periods of high demand, such as winter to mitigate intermittent coal supply disruptions. Finally, during the winter, the Companies treat coal to prevent freezing as it is loaded into the rail cars to minimize disruptions in the supply chain.

Purchase Power

The Companies actively monitor the power market for opportunities to make power purchases to support system load demands when economic and/or needed for reliability.

Nuclear

The policies and procedures the nuclear generation fleet uses to ensure winter readiness are listed and described below. Please see Duke Energy's response to PSDR2-2 for completed winter readiness checklists.

- **All Nuclear Fleet**: AD-WC-ALL-0203 "Seasonal Readiness" is an administrative guidance document used in conjunction with site specific seasonal readiness procedures and work instructions to prepare the Duke Energy Nuclear Fleet for reliable operation

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Jan 25 2023

during the summer and winter periods. Winter readiness activities are expected to be completed by November 1. Oversight is provided by fleet senior leaders through weekly reviews and report outs. AD-WC-ALL-0260 "Nuclear Generation Response To High Or Low Grid System Load" provides expectations for Nuclear Generation response to high or low grid system load, which can be caused by extreme weather conditions.

- **Brunswick Nuclear Plan (BNP):** Winter readiness actions are completed prior to cold weather season via a recurring work order (PMID 27468-09 "Prepare areas & buildings for cold weather"). Real time cold weather checks are built into Operator Rounds with specific checks occurring at different temperature thresholds.

- **Catawba Nuclear Station (CNS):** Winter readiness actions and real time cold weather checks are driven by PT/0/B/4700/038 "Cold Weather Protection". Actions are completed prior to cold weather season (Enclosure 13.1 and 13.2), periodically during the winter season (Enclosure 13.3), or based off actual lowering ambient temperatures (Enclosure 13.4).

- **Harris Nuclear Plant (HNP):** Winter readiness and real time cold weather checks are driven by AP-301 "Seasonal Weather Preparations and Monitoring". Actions are completed prior to cold weather season (Attachment 1), periodically during the winter season (Attachment 2), or based off actual lowering ambient temperatures.

- **McGuire Nuclear Station (MNS):** Initial and periodic winter readiness actions are driven by PT/0/B/4700/038 "Verification of Freeze Protection Equipment and Systems". Initial actions are completed prior to cold weather season. Real time cold weather checks are driven by PT/0/B/4700/0070 "On Demand Freeze Protection Verification Checklist".

- **Oconee Nuclear Station (ONS):** Winter readiness actions are driven by PT/0/A/0110/017 "Cold Weather Protection". Actions are completed prior to cold weather season (Enclosure 13.1) and periodically during the winter season (Enclosure 13.2). Real time cold weather checks are built into Operator Rounds with specific checks occurring at different temperature thresholds.

- **Robinson Nuclear Plant (RNP)**: Initial, periodic, and real time winter readiness actions are driven by OP-925 "Cold Weather Operation". Initial actions are completed prior to cold weather season. AP-058 "Seasonal Readiness" describes the process for seasonal readiness at RNP and is used in conjunction with OP-925.

Responder: Mandi Brigman, Director Plant Reliability

Responder: Barbara Coppola, Dir. Planning & Reg. Support

Responder: Mitchel Beason, COSO General Manager

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Responder: Tom Pruitt, Principal Engineer

Responder: Tiffany Weir, Dir. Rates & Regulatory Filing

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

4. Please describe the Company's typical actions and planning for an anticipated winter storm.

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

Duke Energy's actions and planning for a winter storm include both long-term planning and planning for imminent weather events. Long-term planning involves using probabilistic reliability assessments to ensure resource adequacy during peak demand periods. Based on these probabilistic assessments, the Companies propose an appropriate reserve margin target to use in the integrated resource planning ("IRP") process for resource adequacy. Reserve margin is subject to Commission review and approval. The Company plans for adequate reserve capacity to account for unplanned outages of generating equipment, economic load forecast uncertainty, and higher than projected peak demand due to extreme weather.

In general, planning for an imminent winter storm involves several organizations within the Company. Below is a summary of actions taken by the organizations that have key roles in planning for an imminent winter storm.

RRE

Please refer to Duke Energy's Reponses to Data Request Nos. 2-1 and 2-2 for responses from the Company's RRE organization.

Customer Delivery

When a weather event is anticipated, the Company's meteorological team prepares forecasts and monitors severe weather threats that could lead to damage to infrastructure and challenge the ability of the system to serve peak loads. As severe weather threats emerge (e.g., hurricanes, ice storms, and high wind events), the meteorological team develops predictions of storm impacts using regression models that are trained using historical storm activity. These models predict the peak outage events, customers impacted, and resource requirements by operating area with low, medium, and high impacts defined. DEC and DEP's Customer Delivery organization use this predictive modeling to generate situational awareness and to begin proactively preparing resource plans, pre-deploying resources (line technicians, vegetation workers, associated logistic personnel, damage assessors, etc.) as necessary, validating inventories of critical materials/equipment, developing

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messages for customer awareness, reviewing critical customer lists and initiating communications with county or state emergency management.

Transmission/ECC

The Company's Transmission organization reviews the weather forecast and holds readiness calls to determine current staffing plans and determine if adequate resources are available to respond to the storm. Transmission will also evaluate the need to reposition crews based on weather forecasts if needed. Transmission will also activate its Incident Management Team ("IMT") based on projected impact or if local areas will be able to manage the upcoming storm. The Company's Energy Control Center will also staff in accordance with potential impacts and determine if support staff are needed.

Nuclear

For Nuclear generation, the on-duty shift manager is informed of pending winter storm events through reviewing weather forecast data each shift as well as communications from the Nuclear Corporate Duty Manager and/or the ECC. Depending on the nature of the event (extreme cold temperatures, ice accumulation, wind, etc.), the affected nuclear sites would take preparation actions in accordance with procedures required to ensure equipment important to plant operation is well protected and staffing levels are adequate to respond. If necessary, the sites may choose to activate their Emergency Response Organization proactively. Site senior leaders report plans and actions to fleet senior leadership for anticipated weather events. Procedures for severe weather preparation can be entered in advance of a storm.

TFSP/FSO

As noted above, Duke Energy's meteorological team monitors severe weather threats that could lead to damage to infrastructure and challenge the ability of the system to serve peak loads due to extreme cold. If the Meteorology team identifies an extreme cold event developing within the 7 to 14-day horizon, it will communicate with the Reliability Coordinator ("RC"), Balancing Authority ("BA"), Transmission Owner ("TO"), Transmission Operator ("TOP"), Generator Owner ("GO"), Generator Operator ("GOP") load forecasting/unit commitment, power marketing and fuel trading functions regarding their preparedness and planning and begin to incorporate the extreme weather event into the specific forecasts for each Duke Energy BA. Additionally, when an extreme event is forecasted within the near-term horizon, a tailgate meeting is typically established to bring together different personnel under the RC, BA, TO, TOP, GO, Load Forecasting/Unit Commitment, power marketing, fuel trading and Meteorology functions to discuss the forecasted event and the preparedness of the Duke Energy system.

If a winter weather event is forecasted the fuel oil trader will typically begin preparing to get increased fuel oil deliveries planned prior to the forecasted weather event. During a winter weather event the fuel oil trader actively monitors the on-site inventory at each station daily and receives on-going updates of expected fuel oil consumption for the next seven days. In the event of very high oil usage around the clock and across the fleet, the physical tank replenishment at the plants

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Jan 25 2023

would be accomplished via fuel oil truck deliveries as part of delivered supply arrangements and dedicated emergency reservation trucking arrangements that utilize off-site inventory that have been contracted with for such purposes.

During normal operations the coal transportation team meets, at a minimum, weekly with station personnel and the railroads to monitor and review on-going operational matters that can impact delivery schedules and station inventories. During a severe weather event, the frequency of calls with station personnel and railroads may, if needed, increase to a minimum of daily and in some cases periodically throughout the day to work through on-going delivery concerns.

Responder: Barbara Coppola, Dir. Planning & Reg. Support

Responder: Mitchel Beason, COSO General Manager

Responder: Tom Pruitt, Principal Engineer

Responder: Mandi Brigman, Director Plant Reliability

Responder: Tiffany Weir, Dir. Rates & Regulatory Filings

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

5. Please describe the Company's typical actions and planning for an anticipated high wind event. To the extent possible, please note the differences in actions and planning for a hurricane/tropical storm with high winds versus a storm with straight-line winds (e.g., the storm that occurred during December 2022, Derecho, etc.)

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

Below is a summary of the perspectives of key organizations that are involved in planning for a high wind event.

RRE

For RRE, where wind has impacted our generation stations in the past, our PMs are directed to install wind breaks for wind-chill/cold weather protection. Additionally, sites will walk down their areas and tie down loose material and/or equipment in high wind events. These actions are similar to measures taken in anticipation of a high wind event such as a hurricane, tropical storm, or wind-producing thunderstorms

Customer Delivery

From a planning perspective, the approach for Duke Energy's Customer Delivery organization event response is uniform for all major weather events and is as described in response to question PSDR2-4. The major difference between events is that the regression model the meteorology team uses to predict required restoration resources has different inputs for a straight line wind event versus a hurricane/tropical storm event. These variable inputs allow us to take into account how heavy rains and flooding associated with a hurricane or tropical storm will create different challenges to our system than a purely wind event. Proactive customer communications will also differ for each unique weather event.

Where wind has impacted Duke Energy's generation stations in the past, the Companies have developed preventative maintenance ("PM") programs, which are implemented prior to the winter season. These PMs direct various actions such as the installation of wind breaks for wind-chill/cold weather protection. Additionally, those with responsibility for each of the generation sites will walk down their areas and tie down loose material and/or equipment in high wind events. The actions Duke Energy takes to plan for high wind events are similar to those the Company takes in anticipation of a hurricane, tropical storm, or wind-producing thunderstorm.

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Transmission/ECC

In general, storms with straight-line winds do not pose the same threat to the system as hurricanes or tropical storms. As a result, the Company's Transmission organization anticipates lesser impacts, as compared to a hurricane or tropical storm, and tasks local areas with managing the event and restoration, if any. Because high wind events appear in many forms with varying degrees of severity, it is more challenging to forecast their potential impacts. As a result, the Transmission organization develops a response plan to address the expected impacts of a high wind event, which occurs closer in time to the event than preparations for a hurricane or a tropical storm.

Nuclear

Within nuclear generation, severe weather preparation and emergency response actions are directed by site/fleet procedures based on windspeed. The expected actions a site would take for hurricane winds and straight-line winds do not differ. However, there are additional compensatory actions specified if the wind event also places the site at risk for ice accumulation.

TFSP/FSO

See response to PSDR 2-4, as the procedures are the same from the perspective of the Company's TFSP/FSO organization.

Responder: Tiffany Weir, Dir. Rates & Regulatory Filings

Responder: Tom Pruitt, Principal Engineer

Responder: Mitchel Beason, COSO General Manager

Responder: Barbara Coppola, Dir. Planning & Reg. Support

Responder: Mandi Brigman, Director Plant Reliability

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

9. For the last five years, list annually by county and utility service territory the number of internal transmission and distribution craft employees (or equivalent titles and designations) that the Company has available and employed.

a. Please list the total number of equivalent deployable work crews.

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

The requested information, employee headcount by county and utility service territory, is provided in Attachment: "WSE PS DR 2-9 20230117 - Lineworker YE Headcount 2018-2022".

Responder: Barbara Coppola, Dir. Planning & Reg. Support

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

10. For the last five years, list annually by county and utility service territory the number of external (contractor) transmission and distribution craft employees (or equivalent titles and designations) that the Company has utilized (represented in full time equivalent employees).

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

Customer Delivery (Distribution) headcount reporting data is available starting in 2020. The requested information, contractor headcount by county and utility service territory, is provided for 2020-2022 in the attached file named "WSE PS DR 2-10 Contractor Headcount".

Responder: Barbara Coppola, Dir. Planning & Reg. Support

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

16. Please discuss how the Company was coordinating or prioritizing storm (wind) restoration efforts versus cold weather restoration efforts.

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

As noted in response to Public Staff Data Request Item No. 2-15, impacts of the combined wind event and the cold weather event differed from prior cold weather events and because the Company was required to balance restoration of customer impacted by the wind event with the need to address the generation/load imbalance caused by the cold weather event. At the time the wind event impacted the DEC and DEP service territories, all DEC and DEP Distribution Control Center ("DCC") resources were engaged with recovery from the cold weather event. This added a layer of complexity to the wind event restoration because the Companies were required to manage that restoration in a manner that isolated it from the system so that the Companies did not bring on unexpected load while addressing the cold weather event. To meet this requirement, field restoration was only performed on devices under field control that had a visual open point and grounds on the tap.

Responder: Barbara Coppola, Dir. Planning & Reg. Support

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

17. Identify the actual hourly loads observed for December 24, 2022. This response should include a timeline of the long-range load forecast, the seven-day ahead forecast, the three-day ahead forecast, and the day-ahead forecast showing the loads that the Company was anticipating prior to December 23, 2022, through December 28, 2022. In the Company's response, please distinguish between retail loads, firm wholesale loads, and total balancing area loads.

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

See attachments "NC PS DR2-17 DEC Actual Hourly Load including Forecast", "NC PS DR2-17 DEP Actual Hourly Load including Forecast" and "NC PS DR2-17 DEC_DEP Actual Hourly Loads Graph."

The Company does balancing area load forecasting for its demand. It does not separate out different customer profiles or perform short-term load forecasting for different customer profiles.

Responder: Tiffany Weir, Dir. Rates & Regulatory Filings

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

23. For DSDR, DSM, IVVC, and Load Reduction programs, please provide:

a. A list of programs and their respective MW reduction that were called upon from December 23, 2022, through December 28, 2022. Include the date, hour(s) of activation, and MW reduction;

b. A list of programs and their respective MW reduction amount that were expected to be online or available, but failed to respond when called upon from December 23, 2022, through December 28, 2022; and

c. A list of programs that underperformed.

i. The underperformance amount in MWs and the hours impacted for program.

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

IVVC is not enabled in the Carolinas at this time. Customer Delivery does not have any other Load Reduction programs.

a. The table below provides the dates and times certain programs were activated. For the Company's Distribution System Demand Response ("DSDR") program, megawatt reduction calculations are projected to be completed by February 10, 2023 to align with existing reporting requirements to the Commission. The Company will supplement its response to this item when those calculations are final.

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Jan 25 2023

Program	Date and Time	Status
DSDR	12/24 @ 6:00	EM1 level (emergency level 1) of DSDR activated
DSDR	12/24 @ 6:15	EM2 level (emergency level 2) of DSDR activated
DSDR	12/24 @ 11:42	Both EM levels of DSDR were deactivated
DSDR	12/25 @ 6:00	DSDR activated
DSDR	12/25 @ 9:00	DSDR was deactivated
DSDR	12/25 @ 9:00	DSDR was deactivated
DSDR	12/26 @ 6:00	DSDR activated
DSDR	12/26 @ 9:00	DSDR was deactivated

For Load Reduction programs, see the file titled "PSDR-23A

b. DSDR in Distribution worked as expected from December 23, 2022 through December 28, 2022.

There were no Demand Response programs that were expected to be online or available, but failed to respond when called up

c. DSDR in Distribution worked as expected from December 23, 2022 through December 28, 2022.

Meter data during curtailment event periods for non-residential participants was analyzed and compared to contracts and rate tariffs, depending on the program. The underperformance represents the quantity of megawatts that were out of compliance with either the contract or the tariff for each customer. Those that did not meet their reduction obligation will be penalized according to the appropriate contract or tariff. The Company notes the dates of the events represented a challenge for some customers that require on-site staff to perform actions required for load reduction.

The following Load Reduction Programs under performed

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  - PowerShare
  - Interruptible Service
  - Power Manager - Thermostats
- DEP
  - Demand Response Automation
  - Large Load Curtailable

i. For underperformance of Load Reduction programs, see attachment titled "PSDR2-23C(i)."

Responder: Barbara Coppola, Dir. Planning & Reg. Support

Responder: Stacy Phillips, Dir. Demand Side Management

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DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

24. For all units/resources/programs that failed to perform, perform as expected, or perform at full nameplate potential from December 23, 2022, through December 28, 2022, please provide: (a) the time at which they failed/tripped/derated; (b) period of time associated therewith; (c) the root cause of the failure/trip/derate or most likely suspected cause; and (d) amount of lost generation at each unit.

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

Please see the table below. Also refer to the attached timeline, "Carolinas Unit Capability_Timeline_Load Curve 12_22_2022 to 12_28_2022_Rev0" for additional derate information:

Unit	**Status (incl. Time of Incident, if available)**
Belews Creek – U1	1B Booster Fan – High vibration due to imbalance. W/O 46688680 Balance Shot in progress.
Blewett CT– U1	Fuel Card issue – Tuned DCS and RTS 12/24 at 0538
Blewett CT– U2	Fuel Card issue – Fuel Card Replaced RTS 01/04/2023
Blewett CT– U4	Thermocouple Reset – RTS 12/24 at 0710

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Jan 25 2023

Buck CC	Transco Gas Supply Pressure at 0700 120MWs
Dan River CC – U9	Frozen LP Drum Level Transmitter – Heat trace was present and working, evaluating additional measures. Transco Gas Supply Pressure.
Mayo	Derate 1B Boiler trip - Frozen drum level transmitter sensing line. Heat trace was working, and line was insulated. Additional temporary heat trace and insulation applied.
Mayo	Derate Absorber low pH - Low density in the Absorber. Started second LSBM, Increased Oxidation Air Flow, Started 5th AR Pump, and swapped Ball Mill Hydro-cyclones. LSBM rebuilds are scheduled in 2023 and work orders written to rebuild hydro-cyclones in 2023
Roxboro 1 & 2	7B Conveyor failed. The belt burned in two when a speed switch failed to take the belt out, allowing the drive pulley to run with the belt locked up. The belt was replaced. The Tech Team is exploring alternatives to chute plug and speed switches.
Roxboro	3B BFP Turbine control issues – seized control linkages from the pilot valve. Linkages were lubricated and freed up which alleviated the controls issue.
Smith Unit 1	Failed Start – No apparent cause found during troubleshooting. Work order #47623702 written to investigate the root cause. OEM contacted to provide onsite technical support
Smith	PB4 Derate – HRH attemperator pressure transmitters failed due to a small portion of exposed tubing freezing causing the transmitters to fail and ultimately derate the powerblock by 273MWs. The small gap was on the bottom of the transmitter box and was not found during winter preparation PMs. Temporary insulation was installed, and the line thawed. Derate was prolonged due to the condensate line feeding the RH bypass valve attemperator being frozen. This line had functional heat trace installed and adequate insulation. WO #47645047 written to address insulation gap. Solid flooring

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Jan 25 2023

	installed in the RH bypass valve tents to mitigate wind impacts to the condensate lines.
Cliffside	On 12/18 the 5E FWH level could not be lowered. Operations attempted to isolate the FWH due to a suspected leak however the isolation valves leaked by, and the heater had to be bypassed. Tube leaks were located and repaired during a recent maintenance outage. Load restriction was not noticed until 12/24 when the unit was fully loaded.
Jocassee Hydro U4	Was in a Forced Outage (195MW) from 12/23 1645 to 12/23 1900 due to generator gang not operating properly. Transmission was engaged to resolve the issue.
Cedar Cliff Hydro U1	Was in a Forced Outage (6.4MW) from 12/23 0551 to 12/23 0940 due to a Power Deliver Line trip as a result of high wind.
Cedar Cliff Hydro U2	Was in a Forced Outage (0.4MW) from 12/23 0545 to 12/23 0928 due to a Power Deliver Line trip as a result of high wind.
Tennessee Creek Hydro	Was in a Forced Outage (11.5MW) from 12/24 0500 to 12/24 0905 after a failed startup occurred. Troubleshooting revealed a switchgear door permissive failure. The contact for the door switch was cleaned, and the unit was returned to service.
Oxford Hydro U2	Was in a Forced Outage (20MW) since 12/21 1154 and remained out though the entire time period due to broken gate links. An investigation is in progress.
Mountain Island Hydro U2	Was in a Forced Outage (14MW) from 12/24 0418 to 12/24 0715 due to low oil flow supply. This was the result of cold air reaching the turbine deck from an access area used in the overhaul of an adjacent unit. The coal air increased the oil

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Jan 25 2023

	viscosity which prevented it from achieving the permissive for startup.
Wylie Hydro U1	Was in a Forced Outage (18MW) from 12/28 1604 to 12/29 1035 due to control block becoming wet from an adjacent cooling water leak. The leak was the result of a fatigued threaded connection which has since been replaced.

Responder: Mitchel Beason, COSO General Manager

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Jan 25 2023

DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

28. Provide a timeline of the Company's NERC EEA status and changes from December 23, 2022, through December 28, 2022.

Response:

The tables below provide the NERC EEA status and changes for Duke Energy Carolinas ("DEC") and Duke Energy Progress ("DEP") through December 25, 2022 given that the EEA was terminated on December 25.

DEC	
Time and Date	**EEA Status**
2025 EPT on 12/23/2022	DEC declared an EEA level 1
0430 EPT on 12/24/2022	DEC escalated to an EEA level 2
0610 EPT on 12/24/2022	DEC escalated to an EEA level 3
1545 EPT on 12/24/2022	DEC declared an EEA level 1
1100 EPT on 12/25/2022	DEC terminated the EEA (EEA level 0)

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Jan 25 2023

DEP	
Time and Date	**EEA Status**
0537 EPT on 12/24/2022	DEP declared an EEA level 1
0606 EPT on 12/24/2022	DEP escalated to an EEA level 2
0618 EPT on 12/24/2022	DEP escalated to an EEA level 3
1620 EPT on 12/24/2022	DEP declared an EEA level 1
1715 EPT on 12/24/2022	DEP escalated to an EEA level 2
0504 EPT on 12/25/2022	DEP declared an EEA level 1
0900 EPT on 12/25/2022	DEP terminated the EEA (EEA level 0)

Responder: Linwood Ross, Manager, System Operations Engineering Carolinas

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Jan 25 2023

DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

29. To the extent that it is known, please provide the NERC EEA statuses of adjacent utilities and utilities in the southeast and a timeline of changes to the statuses from December 23, 2022, through December 28, 2022.

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

NERC EEA data is non-public information that is made available to utilities pursuant to confidentiality agreements with NERC and members of the Eastern Interconnect Data Sharing Network ("EISDN"). As a result of those agreements, Duke Energy is not authorized to share EEA statuses for other utilities without their consent.

Responder: Linwood Ross, Manager, System Operations Engineering Carolinas

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Jan 25 2023

DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

30. Provide any notifications, request for relief, or emergency operations to or from the Department of Energy from December 23, 2022, through December 28, 2022.

Response:

Response for Duke Energy Carolinas ("DEC"):

DEC submitted required reports to the Department of Energy ("DOE") related to the December 2022 wind event and the load shed event in the Carolinas. Those forms are attached as:

- "DEC-Wind-Form OE-417-subm2022-12-25-1630.pdf".and
- "DEC-LoadShed-Form OE-417-subm2022-12-25-2204.pdf".

Response for Duke Energy Progress ("DEP"):

DEP also submitted required reports to the DOE related to the December 2022 wind event and the load shed event in the Carolinas. Those forms are attached as:

- "DEP-Wind-Form OE-417-subm2022-12-25-1700.pdf" and
- "DEP-LoadShed-Form OE-417-subm2022-12-25-2033.pdf".

Responder: Tom Pruitt, Principal Engineer

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Jan 25 2023

DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

31. Did the Company reduce or derate nuclear generation at any time from December 23, 2022, through December 28, 2022? If so, please describe the event and explain why the action had to take place and what other exhaustive actions had taken place prior to the reduction. (Note: EIA data indicates that a DEP nuclear plant had a unit derate on December 27 around noon and lasting a few hours while a slow up ramp occurred over a few hours.)

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

Brunswick Nuclear Unit 2 derated from 97.5% to 94% power beginning at 1200 on December 27, 2022. The activity was performed in order to return the unit to 100% power and occurred in approximately 7 hours. The activity performed an adjustment of final feedwater temperature through a controlled valve manipulation. A derate is required prior to manipulating this valve to ensure adequate margin to fuel safety limits. If this evolution had not been performed, power would have continued to lower as fuel was depleted. This is a planned activity that is performed periodically near the end of a boiling water reactor fuel cycle to maximize power output and was unrelated to the cold weather and wind events.

Responder: Mandi Brigman, Director Plant Reliability

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Jan 25 2023

DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC

Request:

32. When did Robinson Nuclear Station start up and sync to the grid? In regard to maintaining ACE of near zero and stability of the Company's system from December 23, 2022, through December 30, 2022, please discuss how the Company was considering ramping, managing LROL, afternoon peaks, low load conditions as the temperatures started to increase, additional stressors of the system other than just the morning peak, unit start-up time requirements, minimum loading, etc., and provide any additional information, on a daily basis, which the Company believes is important for a complete understanding or to highlight.

Response:

[Unless otherwise noted, the response below pertains to both Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (together with DEC, "Duke Energy" or the "Company".]

Robinson Nuclear Startup and Sync

Robinson Nuclear Station synced to the grid on January 1, 2023 following planned refueling outage. Power escalation to 98% completed on January 3, 2023. The Robinson Nuclear Station startup did not impact the decision making for maintaining grid status in the December 23, 2022 through December 30, 2022 timeframe as it was known that the unit would not be online.

System Management

As many of the other questions in this request address the challenges to meet the morning peak, Duke Energy understands this request to be focused instead on the "stressors of the system other than just the morning peak".

Following the peak on December 24, 2022 (at approximately 0700-0800), both the DEC and DEP Balancing Authorities (BAs) were faced with declining load, quickly increasing solar generation, and the return of load previously shed to meet the peak. As shown in the graphs provided in the Company's responses to Public Staff Data Request ("PSDR") Item No. 18, the load did decrease through mid-day. The load restoration continued until approximately 1600 of both outages due to the wind experienced on December 23 and the shedding actions on the morning of December 24.

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Jan 25 2023

ECC operators continually monitored all the key parameters (Area Control Error (ACE), frequency, load, generation, Joint Dispatch Algorithm (JDA), Balancing Authority ACE Limits (BAAL), etc.) and modified generation and interchange to keep ACE and frequency as close to nominal as possible. After the peak, the operators were required to address the change from low frequency and under-generation to high frequency and over-generation. DEC and DEP coordinated to use pumped storage units and the JDA to aid in balancing load and generation in the two BAs.

On the morning of December 24, as load fell, ramping constraints were addressed in the same manner as they are in a typical winter demand profile. Operators used normal operational tools to meet the mid-day valley (unit ramp rates/min load capability, pumped storage, JDA, and block scheduled exports). Because the December 24 mid-day valley was still much higher than normal mid-day valleys, there were no concerns with Lowest Reliability Operating Limits (LROLs) or over-generation. Therefore, there was no need for reliability related solar curtailments in relation to the mid-day valley. The curtailments that occurred on December 23 and December 28 were economic curtailments based on Fuels Systems Optimization (FSO) price targets. As shown in the graphs provided in response to PSDR Item No. 18, the subsequent days' loads were noticeably lower but still did not pose any minimum demand concerns.

Start-up requirements were not as much a concern following the December 24 morning peak since all available generation was committed to meet that peak. The return of units on outage (forced or planned) in the following days improved reserve margins, but constraints due to start-up was not a significant concern in the days following December 24**.**

Responder: Mandi Brigman, Director Plant Reliability

Responder: Tom Pruitt, Principal Engineer