

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 190

In the Matter of	)	DIRECT TESTIMONY OF JOHN
Biennial Consolidated Carbon Plan and	)	VERDERAME, DANIEL
Integrated Resource Plans of Duke Energy	)	DONOCHOD, AND PETER
Carolinas, LLC, and Duke Energy Progress,	)	HOEFLICH ON BEHALF OF
LLC, Pursuant to N.C.G.S. § 62-110.9 and	)	DUKE ENERGY CAROLINAS,
§ 62-110.1(c)	)	LLC AND DUKE ENERGY
	)	PROGRESS, LLC
	)	

I. INTRODUCTION AND OVERVIEW

1 **Q. MR. VERDERAME PLEASE STATE YOUR NAME AND BUSINESS**
2 **ADDRESS.**

3 A. My name is John A. Verderame. My business address is 525 South Tryon Street,
4 Charlotte, North Carolina 28202.

5 **Q. BY WHOM AND IN WHAT CAPACITY ARE YOU EMPLOYED?**

6 A. I am employed as Vice President, Fuels & Systems Optimization for Duke
7 Energy Corporation (“Duke Energy”).

8 **Q. MR. VERDERAME, BEFORE INTRODUCING YOURSELF**
9 **FURTHER, WOULD YOU PLEASE INTRODUCE THE PANEL?**

10 A. Yes. I am appearing on behalf of Duke Energy Carolinas, LLC (“DEC”) and
11 Duke Energy Progress, LLC (“DEP”) (and together with DEC, the
12 “Companies”), together with Daniel Donochod and Peter Hoeflich on the
13 Dispatchable Generation and Fuel Supply Panel (“Panel”). Witnesses
14 Donochod and Hoeflich will introduce themselves.

15 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL AND PROFESSIONAL**
16 **BACKGROUND.**

17 A. I received a Bachelor of Arts degree in Economics from the University of
18 Rochester in 1983, and a Master’s of Business Administration in Finance from
19 Rutgers University in 1985. I have worked in the energy industry for 22 years.
20 Prior to that, from 1986 to 2001, I was a Vice President in the United States

1 (“U.S.”) Government Bond Trading Groups at the Chase Manhattan Bank and
2 Cantor Fitzgerald. My responsibilities as a U.S. Government Securities Trader
3 included acting as the Firm’s market maker in U.S. Government Treasury
4 securities. I joined Progress Energy, Inc. (“Progress Energy”) in 2001 as a Real-
5 Time Energy Trader. My responsibilities as a Real-Time Energy Trader
6 included managing the real-time energy position of the Progress Energy
7 regulated utilities. In 2005, I was promoted to Manager of the Power Trading
8 group. My role as manager included responsibility for the short-term capacity
9 and energy position of Progress Energy’s regulated utilities in the Carolinas and
10 Florida. In 2012, upon consummation of the merger between Duke Energy and
11 Progress Energy (“Duke Progress Merger”), Progress Energy Carolinas, Inc.
12 became Duke Energy Progress, Inc. (and later, Duke Energy Progress, LLC)
13 and I was named Managing Director, Trading and Dispatch. As Managing
14 Director, Trading and Dispatch, I was responsible for Power and Natural Gas
15 Trading and Generation Dispatch on behalf of Duke Energy’s regulated utilities
16 in the Carolinas, Florida, Indiana, Ohio, and Kentucky. I assumed my current
17 position in November 2019.

18 **Q. WHAT ARE YOUR RESPONSIBILITIES IN YOUR CURRENT**
19 **POSITION?**

20 A. As Vice President, Fuels & Systems Optimization, I oversee the strategic
21 direction and commercial management of the purchase, delivery, and storage of

1 fossil fuels that the Duke Energy regulated utilities use for the generation of
2 electricity. This includes monitoring and providing strategic guidance in the
3 various areas of fuel markets, including feedback regarding supply and demand,
4 price, quality, availability, economics, and deliverability. I am also responsible
5 for the strategic direction of the fleet's power trading, system optimization,
6 energy supply analytics, and contract administration functions.

7 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE NORTH**
8 **CAROLINA UTILITIES COMMISSION ("COMMISSION")?**

9 A. Yes. I have testified before the Commission several times, most recently in
10 support of DEP's 2022 fuel and fuel-related cost recovery application in Docket
11 No. E-2, Sub 1292.

12 **Q. MR. DONOCHOD, PLEASE STATE YOUR NAME AND BUSINESS**
13 **ADDRESS.**

14 A. My name is Daniel Donochod, and my business address is 525 South Tryon
15 Street, Charlotte, North Carolina 28202.

16 **Q. BY WHOM AND IN WHAT CAPACITY ARE YOU EMPLOYED?**

17 A. I am employed by DEC as General Manager ("GM"), Fleet Transition Strategy.

18 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL AND PROFESSIONAL**
19 **BACKGROUND.**

20 A. I earned a Bachelor of Science in Civil Engineering from North Carolina State
21 University in 1991 and a Master of Business Administration from the

1 University of North Carolina at Chapel Hill in 2001. I have been a registered
2 Professional Engineer in the state of North Carolina since 1997. Prior to joining
3 Duke Energy, I worked in the Town of Cary Engineering Department and then
4 in private sector engineering consulting for a total of 13 years. I have 20 years
5 of experience with the Companies. I joined Progress Energy in 2003 as a Lead
6 Engineer. In that role, I performed technical analysis and business case
7 development for major DEP strategic initiatives allowing the generation units
8 to expand their fuel mix and deliver customers savings. In 2007, I was promoted
9 to Regional Engineering Manager, where I managed a multi-discipline team of
10 engineers providing tactical support to seven generating stations. I served as
11 Finance Manager from 2009-2010, where I prepared business evaluations of
12 transformative DEP initiatives, and from 2010-2012, I served as Manager of
13 Outage Support, where I helped overhaul the long-range planning and
14 budgeting tool and refine DEP's outage scheduling process. In 2012 and after
15 completion of the Duke Progress Merger, I was promoted to Fuel Flexibility
16 Strategy Manager, where I was responsible for outlining the strategy of the
17 Companies' respective coal fleets burning non-traditional fuels to deliver fuel
18 savings to customers. In 2014, I was promoted to Director, Generation and
19 Regulatory Strategy, where I oversaw new generation and power generation
20 unit retirement strategy, as well as the development of the Companies' fuel
21 hearing testimony. I was promoted to GM – Strategic Engineering in 2017,

1 where I led enterprise teams providing strategic, tactical, analytical engineering,
2 process and environmental engineering, new integration and generation, and
3 regulatory strategy support to multiple business units. I was promoted to my
4 current role in 2021.

5 **Q. WHAT ARE YOUR RESPONSIBILITIES IN YOUR CURRENT**
6 **POSITION?**

7 A. I lead a team that helps prepare the generation fleet transition strategy and
8 coordinates the execution of the generation transition. My team works closely
9 with many cross-departmental teams to ensure the Companies' comprehensive
10 and orderly energy transition, which is discussed more broadly in the
11 Companies' Carolinas Resource Plan ("Resource Plan"), which constitutes the
12 2023-2024 Carbon Plan and Integrated Resource Plan ("CPIRP" or "the Plan").
13 Our scope includes proposing strategic decisions, preparing business cases
14 and/or seeking approvals of special projects (e.g., gas co-firing), coal
15 retirements, and significant new builds. My team also helps inform and then
16 execute the Companies' integrated resource plans. Additionally, my team
17 supports the Regulated and Renewable Energy ("RRE") department in rate
18 cases and fuel-related cost recovery hearings.

19 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?**

20 A. No.

1 **Q. MR. HOEFLICH, PLEASE STATE YOUR NAME AND BUSINESS**
2 **ADDRESS**

3 A. My name is Peter C. Hoeflich. My business address is 525 South Tryon Street,
4 Charlotte, North Carolina 28202.

5 **Q. BY WHOM AND IN WHAT CAPACITY ARE YOU EMPLOYED?**

6 A. I am employed as Director of Generation Technology, Generation &
7 Transmission Strategy for Duke Energy.

8 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL AND PROFESSIONAL**
9 **BACKGROUND.**

10 A. I earned a Bachelor of Science in Mechanical Engineering from Grove City
11 College in 1981 and a Master of Business Administration from The Ohio State
12 University in 1993. I am a registered Professional Engineer in the states of
13 North Carolina and Ohio. Prior to joining Duke Energy, I worked for over 20
14 years in the industrial, power and energy sectors, including significant
15 Combustion Turbine (“CT”) experience, as a project engineer, operations
16 manager and project manager with Cooper Energy Services and United McGill
17 Corporation. I joined Progress Energy in 2004 as a lead engineer. My
18 responsibilities included the evaluation and testing of new fuels, as well as the
19 evaluation and testing of new and emerging generation technologies. In 2006, I
20 was promoted to manager of Strategic Engineering. In this role, I led a team of
21 engineering professionals who developed generation environmental

1 compliance strategies, led the successful coal generation fuel flexibility and
2 efficiency programs, and supported the Progress Energy generation fleet.
3 Following the Duke Progress Merger, I was promoted to Manager of Analytical
4 Engineering. In this role, I led a team of engineers that provided generation
5 technology inputs to Duke Energy's system modeling groups and developed
6 environmental compliance strategies. In 2014, I was promoted to the Director
7 of Fuel Flexibility and Efficiency, where I led a team that completed the coal
8 fuel flexibility transition for the Companies, developed numerous generation
9 efficiency improvement projects, and analyzed the impact of shale gas
10 utilization to the CT fleet. In 2016, I was promoted to Director of Analytical
11 and Process Engineering, where I was responsible for analytical and business
12 support for the Regulated and Renewable Energy generation fleet, as well as
13 chemical engineering support. In 2021, I was promoted to my current position
14 of Director of Generation Technology.

15 **Q. WHAT ARE YOUR RESPONSIBILITIES IN YOUR CURRENT**
16 **POSITION?**

17 A. My responsibilities include the identification and evaluation of zero- and low-
18 carbon generation and storage technologies, leading critical studies, pilots, and
19 demonstrations of emerging zero- and low-carbon technologies, including
20 hydrogen, carbon capture and sequestration, and providing emerging
21 technology system modeling inputs that facilitate accurate future potential

1 utilization of these technologies.

2 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?**

3 A. No.

4 **Q. IS THE PANEL SPONSORING ANY EXHIBITS?**

5 A. No.

6 **Q. MR. VERDERAME, ON BEHALF OF THE PANEL, PLEASE**
7 **DESCRIBE THE PURPOSE OF THE PANEL'S TESTIMONY.**

8 A. The purpose of the Panel's testimony is to sponsor and highlight key areas in
9 Chapter 4 (Execution Plan) and Appendices F (Coal Retirement Analysis) and
10 K (Natural Gas, Low Carbon Fuels and Hydrogen) of the Companies' CPIRP
11 that explain the important role that dispatchable generation will play in
12 executing a reliable, least cost, and least risk energy transition in the Carolinas.
13 Thematically, the Panel's testimony expands upon issues covered in Chapter 4,
14 where the Companies describe planned near- and intermediate-term actions for
15 increasing operational flexibility of the Companies' existing natural gas
16 generation fleet, adding additional dispatchable natural gas generation as the
17 Companies retire aging coal units over the next decade, and assessing the role
18 of hydrogen resources in both near- and intermediate-term action plans. The
19 Panel also supports Appendices F and K to the Plan, where the Companies
20 describe the current and future risks and planning considerations for retiring

1 dispatchable coal generation facilities, while simultaneously considering the
2 addition of dispatchable hydrogen-capable natural gas generation resources.

3 More specifically, the Panel's testimony updates the Commission on the
4 Companies' efforts to ensure reliable coal supply through the Companies'
5 proposed coal retirement timelines, as well as their procurement strategy for
6 reliable gas transportation capacity and supply as discussed in the
7 Commission's December 31, 2022, Order Adopting Initial Carbon Plan and
8 Providing Direction for Future Planning ("Carbon Plan Order") in Docket No.
9 E-100, Sub 179. Finally, the testimony provides additional background on the
10 Companies' plans for new natural gas generation assets, as well as the steps that
11 they have taken to continue evaluating the role of hydrogen as a future
12 generation fuel for the Companies' planned new dispatchable gas assets.

13 **Q. PLEASE EXPLAIN HOW THE REMAINDER OF THIS PANEL'S**
14 **TESTIMONY IS ORGANIZED.**

15 A. Section II of the Panel's testimony identifies the portions of the Plan and the
16 Companies' Requests for Relief presented to the Commission for approval in
17 support of the Plan that this Panel sponsors.

18 Section III of the testimony addresses the importance of the "changing
19 energy landscape" described in the CPIRP as it relates to fuel transportation and
20 supply.

1 Section IV of the testimony addresses the Companies' plans for
2 executing new dispatchable natural gas generation assets.

3 Section V addresses the Companies' plans for the evaluation of the
4 future use of hydrogen for generation purposes, including how the Companies
5 are meeting directives from the Commission's Carbon Plan Order.

II. SPONSORSHIP OF THE PLAN

6 **Q. MR. VERDERAME, PLEASE IDENTIFY WHICH SECTIONS OF THE**
7 **CPIRP THE PANEL IS SPONSORING WITH ITS DIRECT**
8 **TESTIMONY.**

9 **A. The Dispatchable Generation and Fuel Supply Panel sponsors the following**
10 sections of the Companies' CPIRP as filed on August 17, 2023:

- 11 • Chapter 4, Execution Plan, Detailed Execution Plans: Existing Supply-
12 Side Resources, Expanding Flexibility of the Existing Gas Fleet (pg.
13 14). This section describes the outlined steps for increasing the
14 flexibility of the existing gas fleet in the Companies' near- and
15 intermediate-term action plans, as presented in Table 4-4.
- 16 • Chapter 4, Execution Plan, Detailed Execution Plans: New Supply-Side
17 Resources, Transitioning with Additional Dispatchable Natural Gas
18 Resources (pg. 28). This section describes the outlined steps for adding
19 additional dispatchable natural gas generation in the Companies' near-
20 and intermediate-term action plans, as presented in Table 4-13.

- Chapter 4, Execution Plan, Detailed Execution Plans: New Supply-Side Resources, Assessing the Viability of Hydrogen Resources (pg. 30).

This section describes the outlined steps for assessing the viability of hydrogen resources in the Companies' near- and intermediate-term action plans, as presented in Table 4-14.

- Appendix F – Coal Retirement Analysis, Changing Energy Landscape – Impacts of Industry Exit from Coal (pg.1-6). This section describes the current and future risks and planning considerations for retiring the Companies' dispatchable coal generation assets.

- Appendix K – Natural Gas, Low-Carbon Fuels & Hydrogen. This Appendix describes the current and future planning considerations for additional dispatchable natural gas and hydrogen in the Carolinas, including how dispatchable natural gas and hydrogen help meet the Companies' generation needs as they retire their combined coal fleet and as existing load continues to grow by providing a zero-carbon or low-carbon generation resources. It also describes the risks and risk mitigations associated with additional natural gas and hydrogen.

Q. PLEASE IDENTIFY THE REQUESTS FOR RELIEF PRESENTED IN THE COMPANIES' CPIRP PETITION AND BOWMAN EXHIBIT 1 THAT THE PANEL IS SUPPORTING THROUGH ITS TESTIMONY.

- 1 A. The Panel supports three aspects of the CPIRP Petition's Request for Relief:
- 2 • Section 2(a)(iv), seeking acknowledgement of the proposed 900 MW of
- 3 CTs for which the Companies plan to achieve commercial operation by
- 4 2032;
- 5 • Section 2(a)(v), seeking acknowledgement of the proposed 2,800 MW
- 6 of combined cycle generating units ("CC") for which the Companies
- 7 plan to achieve commercial operation by 2031; and
- 8 • Section 3, seeking approval of proposed actions with respect to the
- 9 planned CC unit flexibility projects as described in Appendix K.¹

III. CHANGING ENERGY LANDSCAPE

10 **Q. MR. VERDERAME, CAN YOU BRIEFLY DESCRIBE THE**

11 **CHANGING ENERGY LANDSCAPE THAT THE COMPANIES HAVE**

12 **REFERRED TO IN THEIR CPIRP?**

13 A. Yes. As stated generally in the Companies' CPIRP, the electric utility industry

14 is undergoing a significant energy transition by retiring coal units and moving

15 towards increasingly clean energy resources. The Companies, along with many

16 utilities across the country, continue to reduce reliance on coal resources and

17 replace them with lower-emitting resources. In connection with this

18 transformation of the generation resource mix, the Companies must bring into

¹ Verified Petition for Approval of 2023-2024 Carbon Plan and Integrated Resource Plans of Duke Energy Carolinas LLC and Duke Energy Progress LLC, Docket No. E-100, Sub 190 at 27, 29 (Aug. 17, 2023).

1 service enough diverse and equally reliable resources to keep pace with and
2 accommodate the growth needs of North Carolina's businesses and economy
3 while maintaining or improving the reliability of the grid at all times, including
4 during extreme weather events.

5 **Q. IN LIGHT OF THE CARBON PLAN ORDER'S DIRECTIVE TO**
6 **CONTINUE TO EVALUATE NATURAL GAS FIRM**
7 **TRANSPORTATION ("FT") AND SUPPLY IN DEVELOPING THE**
8 **CPIRP UPDATE,² HOW DO THE COMPANIES VIEW THE**
9 **IMPORTANCE OF NATURAL GAS FT AND SUPPLY TO EXECUTING**
10 **THEIR ENERGY TRANSITION?**

11 A. As the Companies discuss in Appendix K of the CPIRP, additional natural gas
12 FT into the Carolinas is needed to support demand growth, fuel security, system
13 reliability, and coal retirements. FT contracts establish the highest service
14 priority for fuel deliverability to a generation facility in order to provide
15 generation facility operators with a highly reliable, agreed-upon volume of
16 natural gas. Reliable natural gas FT is needed to meet growing load profiles and
17 is particularly important as increasing levels of renewable generation connect
18 to the grid to achieve the ongoing energy transition. As the Companies also
19 discuss in Appendix K, in addition to increased levels of renewable generation
20 proliferation on their system, the Companies also need fast ramping,

² Carbon Plan Order at 38, 132 (Ordering Paragraph No. 15).

1 dispatchable resources to maintain and improve reliability. To that end, the
2 Companies concur with many of the Commission's findings in its Carbon Plan
3 Order related to FT and the Companies' ability to execute their combined
4 energy transition. Specifically, the Commission stated:

- 5 • "[N]atural gas-fired generation is dispatchable; capable of providing
6 baseload, intermediate, and peaking capacity; and supports system
7 reliability during periods of high customer demand. Further, new
8 natural gas-fired generation was selected by a number of the proposed
9 portfolios submitted for the Commission's consideration."³
- 10 • "Firm transportation capacity is essential to manage the natural gas
11 supply security necessary for reliable, cost-effective generation and for
12 the reliable operation of the electric system at this time."⁴
- 13 • "Duke shall analyze and incorporate, in future modeling efforts, realistic
14 assumptions regarding the availability of firm natural gas transportation
15 capacity and shall work with the Public Staff in achieving those
16 assumptions."⁵
- 17 • "[I]n any future CPCN [Certificate of Public Convenience and
18 Necessity] filing for natural gas-fired generating resources, Duke shall

³ Order Adopting Initial Carbon Plan and Providing Direction for Future Planning, Docket No. E-100, Sub 179 at 38 (Dec. 30, 2022) ("Carbon Plan Order").

⁴ *Id.*

⁵ Carbon Plan Order at 132 (Ordering Paragraph No. 15).

1 provide an analysis of the sufficiency of firm natural gas transportation
2 capacity for the proposed facility.”⁶

3 The Companies will continue to pursue additional long-term FT capacity for
4 existing and potential new gas generation, and such opportunities may include
5 greenfield or brownfield projects and expansions through entities such as
6 Mountain Valley Pipeline (“MVP”) and Transco. Finally, the Companies have
7 implemented natural gas procurement practices that include periodic Requests
8 for Proposals and shorter-term market engagement activities to procure and
9 actively manage a reliable, flexible, diverse, and competitively priced natural
10 gas supply. These procurement practices include contracting for volumetric
11 optionality to provide flexibility in responding to changes in forecasted fuel
12 consumption.

13 **Q. CAN YOU PROVIDE THE COMMISSION WITH A SUBSTANTIVE**
14 **PROJECT UPDATE ON MVP SINCE THE CPIRP FILING?**

15 A. At this time, there is no substantive project update on the status of MVP from
16 when the Companies filed the CPIRP on August 17, 2023.

17 **Q. CAN YOU PROVIDE THE COMMISSION WITH AN OVERVIEW FOR**
18 **HOW THE COMPANIES PLAN TO MITIGATE THE RISKS TO COAL**
19 **FIRE GENERATOR RELIABILITY DURING THE TRANSITION?**

⁶ Carbon Plan Order at 132 (Ordering Paragraph No. 18).

1 A. Yes. In the Carbon Plan Order, the Commission directed the Companies to
2 “proactively address risks to system reliability in [their] upcoming first
3 proposed biannual CPIRP[.]”⁷ With respect to mitigating the risks discussed in
4 CPIRP Appendix F, the Companies have actively pursued longer term strategic
5 alliances with viable long-term coal producers in the Central (“CAPP”) and
6 Northern Appalachian (“NAPP”) coal regions to ensure adequate coal supply.
7 Additionally, the Companies continue to evaluate fuel flexibility to reduce
8 reliance on CAPP coal and substitute more readily available NAPP and Illinois
9 Basin coals through the Companies’ energy transition. Finally, the Companies
10 recently implemented an enhanced model-driven unit commitment and dispatch
11 coal price input process. This process is designed to maintain plant inventories
12 within safety and reliability limits, while enabling coal supply chain continuity
13 and maintaining least cost economics for customers.

IV. PLANNING FOR NATURAL GAS GENERATION ASSETS

14 **Q. MR. DONOCHOD, PLEASE DISCUSS THE COMPANIES’ NEAR-**
15 **TERM PLANS FOR EXPANDING THEIR GAS GENERATION**
16 **ASSETS.**

17 A. As described in Chapter 4, the Companies are moving forward with the
18 preparation and filing of preliminary Certificates of Public Convenience and
19 Necessity (“pre-CPCN”) and, ultimately, CPCNs for Commission approval to

⁷ Carbon Plan Order at 132 (Ordering Paragraph No. 8).

1 install new hydrogen-capable dispatchable gas assets on their respective
2 systems. The pre-CPCNs and CPCNs will contain more detailed and specific
3 information regarding these respective new generating facilities.

4 **Q. WHAT ARE THE PLANNED LOCATIONS AND TIMING FOR THESE**
5 **PRE-CPCNS FOR NEAR-TERM GAS ASSETS?**

6 A. As discussed in Appendix K, DEP will locate its next CC at the Person County
7 Energy Complex and is contemporaneously filing a pre-CPCN with the
8 Commission on or around September 1, 2023. DEC will locate its next CTs at
9 Marshall steam station, with plans to file a pre-CPCN with the Commission on
10 or around November 1, 2023.

11 **Q. WHY ARE NEW GAS GENERATION ASSETS IMPORTANT TO**
12 **SYSTEM RELIABILITY?**

13 A. As discussed in Chapter 3 (Portfolios) and in Appendix M (Reliability and
14 Operational Resilience) of the CPIRP, firm, dispatchable gas generation plays
15 a critical role in effectively managing operational risks and allowing the
16 Companies to continue to provide reliable electric service to their customers,
17 especially during prolonged extreme weather events. The IRP and Near-Term
18 Actions Panel sponsors Chapter, 3 and the Reliability and Operational
19 Resilience Panel sponsors Appendix M. The Commission's initial Carbon Plan
20 as well as the Companies' updated Near-Term Action Plan presented in CPIRP
21 Table 4-2 also identifies new natural gas generating assets as needed to reliably

1 serve the Companies' growing system needs as part of the least cost path to
2 achieving the State's carbon reduction goals.

3 **Q. HOW LONG DOES IT TAKE FOR THE COMPANIES TO BUILD NEW**
4 **GAS ASSETS?**

5 A. Although the critical path will vary from project to project, the Companies' rule
6 of thumb is to assume five years for CT project execution and six years for CC
7 project execution from selection through designing, permitting, constructing,
8 and placing in-service. Our Project Management & Construction group
9 oversees and manages the design and construction processes.

10 **Q. WHY IS IT IMPORTANT TO MAINTAIN THE PROPOSED**
11 **SCHEDULE FOR NEW GAS GENERATION ASSET**
12 **CONSTRUCTION?**

13 A. The Carbon Plan Order requires the Companies to transition the fleet while
14 maintaining system reliability. Therefore, new hydrogen-capable gas assets
15 need to be in-service and available for dispatch prior to the retirement of
16 existing coal assets. For example, once in-service and commissioned, the
17 Marshall Advanced Class CTs will allow DEC to retire Marshall coal Units 1
18 and 2. Also, the planned Person County Energy Complex CC will allow DEP
19 to retire Roxboro Units 1 and 2. Any delay of the new gas assets in-service
20 dates, however, will result in a direct extension of coal unit lives and, therefore,
21 continued coal-based CO₂ emissions. Additionally, schedule delays in

1 permitting, supply chain, and construction could also result in additional
2 reliability and/or environmental compliance projects on the coal units even
3 though the unit may be close to retirement.

4 **Q. WHAT WORK IS NEEDED TO BRING A NEW GAS GENERATION**
5 **ASSET INTO SERVICE?**

6 A. In order to bring a new gas asset into service after the CPIRP has identified a
7 need, the Companies execute several high level workstreams, some in parallel
8 and others in series. Workstreams include site selection and, if needed, land
9 acquisition, site studies, permitting (state and federal), regulatory approval,
10 engineering design/specifications, equipment procurement, construction,
11 transmission studies (off-site) and resulting transmission improvements (both
12 on-site and off-site), and fuel supply/storage.

13 **Q. DID THE COMPANIES ANALYZE WHETHER EXPANDING THE**
14 **DUAL FUEL BELEWS CREEK UNITS TO OPERATE ON 100% GAS**
15 **AND RETIRING COAL PORTIONS OF THE PLANT WOULD BE**
16 **ECONOMICALLY FEASIBLE?**

17 A. Yes. In the Carbon Plan Order, the Commission directed the Companies to “re-
18 study the potential costs and benefits of a further conversion of Belews Creek
19 as part of its upcoming proposed biennial CPIRP.”⁸ As discussed in CPIRP
20 Chapter 3 (Portfolios), the Companies performed modeling to assess the
21 economics of converting the Belews Creek units from coal to 100% gas, which

1 is technically feasible and was previously evaluated in 2021. From a practical
2 perspective however, the Companies would have to contract for year-round
3 interstate FT to provide reliable capacity after removing coal as a back-up fuel.
4 At a combined 2,220 MW, firming up such a large quantity of gas would be
5 expensive (approximately \$5 billion) for the Companies' customers. The
6 Companies do not believe it to be prudent to invest approximately \$5 billion for
7 the right to year-round FT gas even if running Belews Creek until 2040, which
8 would be more than five years beyond the recommended retirement dates in the
9 CPIRP. As a result, the CPIRP team's analysis in Appendix C (Quantitative
10 Analysis) showed unfavorable economics for the potential expansion project.
11 Removing coal as a potential fuel would also negate the economic optionality
12 to vary the coal/gas fuel mix based on fuel prices. Additionally, without
13 increased interstate FT rights, the Companies could not count the approximately
14 2,220 MWs of winter capacity of Belews Creek toward their reserve margin.

15 **Q. WHAT DO THE COMPANIES BELIEVE IS A BETTER COURSE OF**
16 **ACTION?**

17 A. The Companies believe a more prudent and cost-effective use of any
18 incremental interstate gas FT rights would be for more efficient CC units given
19 the better heat rates and longer asset life as compared to the Belews Creek units.

20 **Q. CPIRP APPENDIX K, FIGURE K-1 DEMONSTRATES THE**
21 **POTENTIAL BENEFITS OF PLANNED CT FLEXIBILITY AND**

1 **UPDATES. CAN YOU EXPLAIN THE BENEFITS OF THESE**
2 **PROJECTS?**

3 A. The Carbon Plan Order directed Duke Energy to “[p]ursue expansion of
4 flexibility of its existing natural gas fleet and target specific natural gas plants
5 or regions of its service areas that would benefit the most from flexibility
6 expansion projects[,]” and “identify least cost flexibility expansion projects that
7 will improve or maintain system operability and reliability[.]”⁸ The seven
8 projects identified in Appendix K, Figure K-1 each have three important
9 benefits: lowering heat rate (better efficiency), increasing capacity, and
10 increasing turndown. Lowering the heat rate increases the unit efficiency which
11 in turn lowers fuel costs and the CO₂ emissions rate. The capacity increase will
12 provide for winter peaks as well as benefit the system in all seasons.
13 “Turndown” is the ability of a unit to reduce load to a certain point without
14 coming offline, which is an important feature to reduce unit maintenance costs
15 and startup costs. The projects will allow the CCs to operate at lower loads
16 thereby allowing increased carbon-free renewable energy, such as solar, on the
17 system.

18 **Q. WHAT IS THE GENERATOR REPLACEMENT REQUEST AND HOW**
19 **ARE THE COMPANIES USING IT TO BENEFIT CUSTOMERS?**

⁸ Carbon Plan Order at 132 (Ordering Paragraph No. 14).

1 A. In September 2022, the Federal Energy Regulatory Commission officially
2 approved the Companies to use a Generator Replacement Request process that
3 allows retention of existing interconnection rights at existing sites for
4 replacement generation (i.e., brownfield) as long as the request is made at least
5 one year before the official retirement, and replacement generation is in service
6 within three years after the unit retirement.⁹ The Companies can retain the
7 interconnection service up to the current MW rating of the generation to be
8 retired. Customers benefit through the reuse of the interconnection service that
9 the Companies built to support original plant operation, thereby lowering
10 execution costs of replacement generation. Any proposed capacity in excess of
11 existing capacity will be evaluated in the Definitive Interconnection System
12 Impact Study process for needed to transmission network upgrades.

13 **V. FUTURE ROLE OF HYDROGEN IN ENERGY TRANSITION**

14 **Q. MR. HOEFLICH, RECOGNIZING THE CARBON PLAN ORDER'S**
15 **FINDING THAT IT IS APPROPRIATE FOR THE COMPANIES TO**
16 **PLAN FOR HYDROGEN FUEL TO REPLACE NATURAL GAS,¹⁰ CAN**
17 **YOU HIGHLIGHT RECENT EXAMPLES OF DOMESTIC**
18 **HYDROGEN ADVANCEMENT AT THIS TIME?**

⁹ CPIRP Appendix L at 20.

¹⁰ Carbon Plan Order at 38 (Finding of Fact No. 24).

1 A. Yes. Within the domestic electric utility industry, studies and demonstration
2 projects concerning the use of hydrogen as an electric generation fuel have
3 accelerated.¹¹ Examples of this acceleration include the Department of
4 Energy's ("DOE") issuance of a Funding Opportunity Announcement in
5 September of 2022 for regional hydrogen hubs which resulted in at least 22
6 applications submitted in April 2023.¹²

7 Plans for domestic clean hydrogen production are also increasing, with
8 year-end 2022 announced projects totaling over 12 million metric tons.
9 Additionally, numerous power sector-focused studies, pilots, and
10 demonstrations that have been planned, commenced, or completed recently
11 include the following:

- 12 • New York Power Authority demonstration of a 44% hydrogen blend
13 with natural gas co-firing in a GE LM6000 peaker;¹³

¹¹ As the Companies stated in Chapter 4 of the CPIRP with regard to hydrogen, "studies" refer to "paper" studies which can include engineering, estimates, and evaluations, while "demonstrations" involve the actual installation and operations of systems typically for an extended period of time to realize both short term and long-term impacts and operational learnings.

¹² Rachel Parkes, *The top ten US hydrogen hubs most likely to win \$7bn of government funding*, Hydrogen Insight (Aug. 1, 2023), available at https://www.hydrogeninsight.com/analysis/exclusive-the-top-ten-us-hydrogen-hubs-most-likely-to-win-7bn-of-government-funding/2-1-1493421?zephyr_sso_ott=ADJx9I.

¹³ Sonal Patel, NYPA, *GE Successfully Pilot Hydrogen Retrofit at Aero-derivative Gas Turbine*, Power (Sep. 26, 2022), available at <https://www.powermag.com/ny-pa-ge-successfully-pilot-hydrogen-retrofit-at-aero-derivative-gas-turbine/>.

- 1 • Georgia Power’s demonstration of a 20% hydrogen blend with natural
2 gas co-firing in a Mitsubishi Power advance class CC unit at the
3 McDonough-Atkinson Plant;¹⁴
- 4 • Long Ridge Energy’s demonstration of a 5% hydrogen blend with
5 natural gas co-firing in a General Electric advanced class CC unit at
6 Long Ridge Energy Terminal;¹⁵ and
- 7 • Florida Power and Light’s (“FP&L”) announcement of the Cavendish
8 NextGen Hydrogen Hub, which plans to include hydrogen production
9 from a 25 MW electrolyzer that FP&L will then blend with natural gas
10 and fire in a CT for electric generation.¹⁶

11 These projects are in addition to earlier announced Intermountain Power
12 Project’s plan to transition two advanced class CC units to 100% hydrogen by
13 2045.¹⁷

14 **Q. WHAT ARE THE COMPANIES DOING TO ADVANCE HYDROGEN**
15 **AS A FUEL?**

¹⁴ Sonal Patel, Southern Co. Gas-Fired Demonstration Validates 20% Hydrogen Fuel Blend, Power (June 16, 2022), *available at* <https://www.powermag.com/southern-co-gas-fired-demonstration-validates-20-hydrogen-fuel-blend/>.

¹⁵ *Id.*

¹⁶ FPL Starts Green Hydrogen Pilot Project (Feb. 28, 2022), *available at* <https://www.smartenergydecisions.com/energy-management/2022/02/28/fpl-starts-green-hydrogen-pilot-project>.

¹⁷ Intermountain Power Agency, IPP Renewed, <https://www.ipautah.com/ipp-renewed/> (last visited Sept. 1, 2023).

1 A. The Companies have been active on multiple hydrogen advancement fronts,
2 leveraging relationships with our major combustion turbine vendors and
3 providing feedback regarding the operational and timing requirements for high
4 hydrogen blend and 100% hydrogen capable units. In particular, the
5 Companies' reference their collaboration on the Clemson H₂ Orange project,
6 the benefits of which are described in Appendix K to the CPIRP. Other affiliates
7 of the Companies, namely Duke Energy Florida, LLC ("DEF") and Duke
8 Energy Indiana, LLC ("DEI"), are also involved in various studies and projects.
9 DEF, for example, is implementing a green hydrogen production and
10 combustion turbine project that is planned to be operational in 2024, while DEI
11 has participated in a detailed 100% hydrogen-fired combined cycle unit study
12 with Wabash Valley Resources in Indiana. In addition, the Companies continue
13 to be an active member in the Electric Power Research Institute's Low Carbon
14 Research Initiative, part of which is focused on hydrogen production and
15 utilization as a low or zero carbon fuel.

16 **Q. WHICH UTILITIES ARE INCLUDED IN THE PROPOSED**
17 **SOUTHEAST HYDROGEN HUB?**

18 A. The Southeast Hydrogen Hub is a coalition of utilities including Duke Energy,
19 Dominion Energy, Southern Company, Tennessee Valley Authority, Louisville
20 Gas and Electric, and Kentucky Utilities that was formed to develop and submit
21 an application to the DOE for hydrogen hub funding and implementation.

1 Battelle, a non-profit organization, was the prime applicant, and, if successful,
2 would oversee the Southeast Hydrogen Hub funding allocations and work
3 scope. The Southeast Hydrogen hub is based on clean hydrogen production
4 provided by the coalition with multiple end users across the Southeast including
5 power generation, transportation and industry.

6 **Q. HOW DOES THE POSSIBLE DOE APPROVAL OF THE SOUTHEAST**
7 **HYDROGEN HUB AFFECT THE COMPANIES' EVALUATION OF**
8 **USING HYDROGEN AS A FUEL SOURCE?**

9 A. Besides the obvious impact of obtaining grant funds to use to accelerate
10 hydrogen studies and demonstration, the approval of the Southeast Hydrogen
11 Hub does not change the Companies' position and engagement in studying
12 hydrogen as a future fuel. The Companies intend to continue on their current
13 course to determine uses for hydrogen as a clean fuel source for the future.

14 **Q. DO YOU HAVE ANY CONCLUDING STATEMENTS?**

15 A. Yes. The Companies are advancing their development of hydrogen as a
16 generation fuel as well as the ability to effectively utilize hydrogen fuel in
17 generation assets through the many activities I discussed above. As the fuel is
18 studied both domestically and abroad, the Companies will continue to leverage
19 an expanded knowledge base to continue to develop hydrogen as a potential
20 alternative fuel to serve our customers.

VI. CONCLUSION

1 **Q. MESSRS. DONOCHOD, VERDERAME, AND HOEFLICH, DOES THIS**
2 **CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

3 **A. Yes.**