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March 28, 2018

VIA ELECTRONIC FILING

M. Lynn Jarvis Chief Clerk North Carolina Utilities Commission 4325 Mail Service Center Raleigh, North Carolina 27699-4300

RE: Duke Energy Progress, LLC Western Carolinas Modernization Project Annual Progress Report Docket No. E-2, Sub 1089

Dear Ms. Jarvis:

Pursuant to the Commission's March 28, 2016 Order Granting Application in Part, with Conditions, and Denying Application in Part (the "Order"), I enclose the Annual Progress Report of Duke Energy Progress, LLC ("DEP") for the two 280 MW combined cycle natural gas-fueled electric generating units at the Company's Asheville Steam Electric Generating Plant in Buncombe County, for filing in connection with this matter. In compliance with ordering paragraph No. 5 of the Order, DEP reports on the progress of construction activities and the current cost estimate. In compliance with ordering paragraph No. 6 of the Order, DEP reports accomplishments to date on efforts to work with customers in the Western Region to reduce peak load through demand-side management, energy efficiency and other measures and on DEP's efforts to site solar and storage capacity in the Western Region.

Thank you for your attention to this matter. If you have any questions, please let me know.

inderely,

Lawrence B. Somers

Enclosure

cc: Parties of Record



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I. <u>Construction</u>

The Asheville Combined Cycle Project ("ACC Project") is a nominal 560 MW dual-fuel generation facility construction project comprised of two separate 1x1 combined cycle units (280 MW each) authorized to be constructed and placed in service by the end of 2019 as a component of the larger Western Carolinas Modernization Project ("WCMP"). Progress on the ACC Project over the past year has focused on contract execution, detailed engineering, procurement activities for balance of plant equipment, remaining permitting activities, site prep, and planning for construction contractor mobilization to site.

DEP continues to monitor actual expenditures and forecast the project's cost at completion on a monthly basis. At this point in time, the project's cost at completion is forecasted to be within the previously authorized and stated \$893.2 million filed in DEP's CPCN application and found to be appropriate by the Commission in its CPCN Order. This authorized estimate includes all required engineering, procurement, construction, and commissioning costs as well as required oversight costs from DEP as owner, transmission interconnect costs, and AFUDC.

Site prep has been completed. Both DEP and CB&I North Carolina, Inc. ("CB&I") have mobilized to the site. Construction underground and civil activities are in progress. In the upcoming year, DEP will continue to work with CB&I, the major equipment suppliers, and other key stakeholders to complete detailed engineering and continue construction of the facility. Deliveries of major equipment to the site are planned to be complete in 2018. The DEP commissioning team will begin mobilizing to the site mid-year.

II. <u>Community Engagement: Marketing, Outreach and Organization</u>

The 2016 Annual Progress Report described the formation and initial activities of the Energy Innovation Task Force ("EITF"), the advisory and innovation group of community leaders co-convened by the City of Asheville, Buncombe County, and Duke Energy. In 2017 the EITF made steady progress toward achieving its objectives. Following are the most significant accomplishments:

1. With support from the Rocky Mountain Institute ("RMI") completed analysis to determine primary drivers of peak load growth in the DEP Western ("DEP-W") service area. Today, we know more about how customers in DEP-W use electricity than ever before.

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- a. Analysis revealed that residential heating load is the top contributor to peak load growth in the region.
- b. Residential HVAC accounts for 37% of peak demand during extremely cold weather. Heat pumps with electric resistive strip heating are the technology of choice for both new construction and retrofits. Other significant contributors to load growth include residential electric water heating (5%), commercial lighting (6%), and commercial HVAC (6%).
- c. The analysis also revealed that Buncombe County and the DEP-W service area in general have a greater percentage of low-income households than NC overall. Over 40% of DEP-W households are low income. Four geographic areas in particular were identified as having a higher fraction of low-income households than the rest of the region.
- d. Almost 20% of Buncombe County housing are manufactured homes which tend to be significantly less efficient than traditional houses.
- e. Based on the analysis, the EITF determined that efforts should focus on the expansion of targeted energy efficiency and shifting when customers use electricity. Specifically, it advised the convening partners to focus on increasing participation in energy efficiency programs, improving penetration of demand-side management programs, and expanding the application of renewables and other advanced solutions.
- f. Specific actions were recommended as follows:
 - i. Establish a brand and launch a campaign to inform, educate, and engage the community.
 - ii. Leverage, expand, and bundle existing programs and efforts.
 - iii. Increase investment and focus on low-income programs.
 - iv. Develop and implement new programs in response to customer feedback and needs.
 - v. Establish goals/targets to track progress.
- 2. Developed a comprehensive work plan to guide the efforts of the EITF and the convening partners. Projects and initiatives comprising the plan are reflected throughout this report.
- 3. With support from the Shelton Group, the EITF finalized plans for the Blue Horizons Project community engagement campaign. Official launch date for campaign is 3/21/2018. A project manager has been hired by the Green Built Alliance, a local non-profit focused on the promotion of green building, to coordinate campaign activities. The position is being co-funded by the City of Asheville and Buncombe County. Duke Energy is supporting the campaign through the involvement of the Shelton Group and integration of Blue Horizons

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branding with Duke Energy communication and marketing materials as appropriate. A web site (<u>https://bluehorizonsproject.com/</u>) has been developed that provides useful information and links for customers and other interested people to learn how they can support the goals and objectives of the EITF partnership.

- 4. Established goals for all activities related to EITF focus areas for 2018 as follows:
 - a. The near-term goal remains to reduce peak power demand by 17 MW per year through a combination of all strategies. The long-term goal is to create a cleaner, affordable, and smarter energy future for Asheville and Buncombe County, rooted in community engagement and collaboration.
 - b. Community Engagement:
 - i. Conduct a minimum of 25 formal community conversations about the Blue Horizons Project. Community meetings will be held throughout Asheville and Buncombe County, including in racially and economically diverse neighborhoods.
 - ii. Hold a minimum of 6 small-to-medium business seminars on programs and offerings to reduce energy use.
 - iii. We will endeavor to be inclusive, including a conscious effort to be racially and economically inclusive, in our partnerships and planning work, and to focus on lowering energy costs for the lower-income households most burdened by utility costs.
 - c. Energy Efficiency and Demand Management:
 - i. EnergyWise Home = 1,000 new measures installed over 2 years. 300 in 2018 and 700 in 2019. (This is in addition to the 1500 planned additions included in DEP's plan) EnergyWise Business = 100 new businesses signed up annually.
 - ii. SmartSaver = 50 new businesses or 100 new measures installed.
 - iii. Neighborhood Energy Saver = 75% of residents within the selected geographic area.
 - iv. Pilot project: Cold Climate Heat Pump = 4 retrofits and 4 new construction installations.
 - v. Technology group to evaluate and recommend a goal specific to promoting the scalable deployment of better HVAC technologies to reduce peak demand.
 - vi. Energy Savers Network = 200+ households annually to receive basic retrofits with the intent to scale up over time.
 - vii. Community Action Opportunities deep retrofits = 15 deep retrofits.
 - d. Workforce development and trade partners:
 - i. Trade Ally Growth = 2x increase in trade ally participation.

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- ii. Support training partnerships to build a stronger workforce for energy efficiency and renewable sectors, especially within lower income communities with high unemployment and underemployment.
- e. Renewables:
 - i. Raise awareness of new state incentives and declining costs of solar to increase distributed generation (residential and commercial) solar installations in Buncombe County by 50% year to year.
 - ii. Support creation of a Community Solar project in Buncombe County to enable participation of residents who do not own property that can accommodate solar.
 - iii. Convene meetings with city and county planning officials to explore and adopt strategies to significantly reduce permitting and other soft costs for solar. Possible example: waive requirement for engineering report for solar installations on stick-built homes built within the past 20 years.
- f. Local Government:
 - i. Buncombe County Programs = Complete solar feasibility study, define kWh reductions once audits to community facilities are complete. Develop plans to meet 100% renewable goal for county facilities and operations by 2030.
 - ii. City of Asheville Program Goals = Energy efficiency upgrades to city facilities (HVAC, lighting), solar installation on ART Station, review of building audits to determine next investments.
- g. Duke Energy:
 - i. Continue to explore new programs, pilot programs, and other offerings for the community.
 - ii. Advance work at Duke Energy to better integrate and cross-promote programs, reduce customer barriers to participation, and increase number of local installers.
 - iii. Successful AMI deployment.
 - iv. Significant deployment of battery storage to reduce peak and enhance grid management and services.

III. Programs: Energy Efficiency and Demand-Side Management

Focus and efforts associated with existing and new programs offered by the convening partners of the EITF continued in 2017. Notable accomplishments in this area were as follows:

1. Early on, the EnergyWise Home program was identified as a priority to drive peak demand reductions in the region. In 2017 efforts to increase participation

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in the program continued. Total new enrollments in EnergyWise Home for the DEP-W service area were 4,418 for the year. New enrollments in the winter program increased the curtailable winter load by 1.4 MW for a total of 13.75 MW of winter load being controlled. The focus on EnergyWise home in the region has clearly made a difference. Program participation in DEP-W grew by 17% in 2017. By comparison, program participation grew by 11% in the rest of the DEP service territory.

- 2. Conducted a joint workshop with Duke Energy program managers and EITF members to identify opportunities to improve existing program offerings, generate ideas for new programs, and determine how all stakeholder organizations can work together more effectively. Work is underway on many of the recommendations that came from the workshop. Some highlights/results are as follows:
 - a. Identified significant opportunity to "bundle" program offerings to provide customers with a "one stop shop" for their energy efficiency needs. Proposed to leverage the existing Home Energy House Call program as the gateway for customers to get engaged.
 - b. Proposal for a pay-per-performance measure program for EE improvements made by qualified non-profit organizations focused on low-income households.
 - c. Recommendation to conduct Neighborhood Energy Saver event in Asheville/Buncombe County in 2018 (event launched on 3/15/2018).
 - d. Partner with the City, County, and Chamber of Commerce to conduct segment focused EE and DSM workshops with area small and medium businesses to promote and better leverage the EnergyWise Business, Small Business Energy Saver, and Smart \$aver programs.
 - e. Engage with area trade allies & vendors to educate them on the EITF, what it is working to accomplish, and how they can help promote and support the effort.
 - f. Leverage Blue Horizons brand and campaign to raise awareness of, and promote participation in City, County, and Duke Energy programs.
 - g. Creation of an aggregated program improvement and development plan to combine results of workshop with recommendations developed by EITF Programs Committee.
- 3. Buncombe County and the City of Asheville were awarded a \$300k grant from the Global Philanthropy Partnership. Based on feedback from the grant administrators, the Buncombe/Asheville application was selected based largely on the EITF partnership which was viewed as a key enabler for successful

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execution of grant-related objectives. The funds from the grant will target weatherization and efficiency improvements for low-income households.

IV. Technology: Solar, Storage, Grid Modernization and Microgrid Development

- 1. Mt. Sterling Microgrid: Construction of the Mt. Sterling Microgrid project approved by the NCUC in 2017 has been completed. The microgrid is operating as intended with only a few minor issues encountered with control and monitoring equipment and software. The site is still connected to utility power but will be permanently disconnected once all systems are confirmed to be working as intended.
- 2. Solar PV: It is still Duke Energy's plan to install as much solar PV on the Asheville Plant site as it will accommodate. The expectation is that the site will accommodate between 8 and 10 MW of solar capacity. Work is on-going to identify sites to install the balance of solar PV to meet the 15 MW commitment that was made. No new sites were announced during 2017.
- 3. Cold Climate Heat Pump Proof-of-Concept: As stated previously in this update, residential winter heating load has been identified as the number one driver of peak load growth in the DEP-W service territory. The primary reason for this is that the majority of new and retrofit HVAC systems being installed are airsource heat pumps that utilize strip heating during extremely cold weather. The Technology working group of the EITF has identified cold-climate heat pumps as a potential technology that would mitigate this issue. These heat pumps are capable of operating at lower outside temperatures without requiring the use of strips. To confirm that this solution is indeed viable for the DEP-W territory, a proof-of-concept project has been developed. The EITF Technology committee is partnering with Advanced Energy, Habitat for Humanity, Carrier, Gentry Heating & Cooling, and Duke Energy to conduct the proof-of-concept. The portion of the project focused on new construction is underway. Construction of houses should be complete by end of 3rd quarter 2018 so data for the winter of 2018/2019 can be gathered. Planning is now underway for the retrofit portion of the project.
- 4. AMI Deployment: AMI has been endorsed by the Technology committee of the EITF as an important tool to enable customers to better understand how they use electricity. As a result, AMI deployment in the DEP-W territory has been expedited so that this important tool can be put to use sooner than later. Deployment is scheduled to begin in May of 2018 with completion by the

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middle of 2019. Duke Energy's AMI team has been engaged with the Technology Committee to share plans and get feedback and ideas for functionality and apps that will be available as part of AMI capabilities. The committee has also provided Duke Energy feedback on ways to minimize customer resistance to the technology. The AMI deployment will leverage the Blue Horizons Campaign to inform and educate customers of the benefits that the technology will provide.

- 5. Utility Scale Storage: Following is an update on utility scale storage activities associated with the Western Carolinas Modernization Project:
 - a. Battery Storage Overview:
 - i. The Company is committed to supporting emerging technologies that can complement more conventional technologies to supply the electricity needs of the Company's customers. Recent pilot projects and approved deployments, such as the Mt. Sterling Microgrid, led by the Company have demonstrated the viability of battery technologies to provide multiple system benefits, including but not limited to renewable smoothing, essential reliability services, capacity, and improved resiliency. The Company is in a prime position to optimize the investment in batteries by dispatching the systems in a manner that directly benefits customers.
 - ii. As described in recent announcements and consistent with the Western Carolinas Modernization Project in DEP, specifically the Commission's 2016 order regarding the deployment of solar and storage in the Asheville region, the Company intends to continue investing in multiple systems dispersed throughout its Western North Carolina service territory that will be located on property owned or leased by the Through a cost-effective and prudent battery storage Company. deployment plan, the Company will evaluate the impacts of deploying batteries of a significant scale on the electric system, explore the nature of new offerings desired by customers, and fill knowledge gaps. Utilityowned and operated batteries will enable the Company to leverage bulk purchases of equipment and material, build relationships with battery developers, manufacturers, and installers, and develop capabilities as an owner and operator of a battery fleet. The Company will also meet the demands of customers, especially in the Western Carolinas, who have shown an interest in the benefits of batteries, allowing customers and the community to play an active role in promoting new technology development for the purpose of ensuring a cleaner, smarter, and more flexible grid.

Duke Energy Progress, LLC

Western Carolinas Modernization Project

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- b. WCMP Battery Storage Deployment Plan:
 - i. The current deployment plan includes a total battery storage capacity of approximately 50 MW owned and operated by the Company. Each battery storage facility will consist of the following basic components, which are necessary to store and dispatch electricity:
 - Batteries A system containing the battery modules, racks, interconnection hardware, and all additional equipment required for proper battery functionality.
 - Battery Management System ("BMS") All hardware and software necessary to monitor and manage charge, discharge, state of charge ("SOC"), and all such operating parameters as necessary for the proper operation of the system.
 - Power Conversion ("PCS") All hardware, software, and telemetry necessary to support bidirectional power conversion. The PCS will also provide communication between the BMS and Energy Management System.
 - Energy Management System ("EMS") All hardware, software, and telemetry necessary to provide communication and control between all systems.
 - Interconnection Equipment All equipment such as circuit breakers, fuses, protective relays, transformers, and switches used to connect the battery storage facility to the electric grid and automatically disconnect the battery storage facility from the electric grid in the event of an outage.
 - ii. The Company plans to connect each facility directly to the grid (in front of the meter) at the appropriate voltage and interconnection points. The Company selects the appropriate interconnection points in order to optimize system performance, project costs, and overall value to customers.
 - iii. The Company will contract with reputable component manufacturers and service providers. The Company will seek to purchase components and services from North Carolina providers – to the extent that they provide the required functionality and are cost competitive in relation to other options – so as to promote economic development in the State. The Company has started discussions with suppliers but not yet signed any binding agreements related to the Facilities. It will also employ competitive solicitation when reasonable.
 - iv. There currently are several competing chemistries and technologies in the battery storage market, ranging from lithium-ion to flow batteries. Each technology has distinct advantages and disadvantages. By

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selectively deploying commercial and standardized technologies, the Company can obtain comparative cost, performance, and reliability data which will be used to drive out the true cost and benefits for deploying batteries in the DEP service territory.

- v. Operation of the batteries will have no emissions or pollutants. In addition, each facility shall be designed in accordance with State of North Carolina environmental requirements with regard to materials.
- c. Need and Explanation of Storage Deployment Plan:
 - i. The deployment plan will enable the Company to diversify its resources and encourage investment in distributed energy technologies. Additionally, DEP envisions battery storage as an integral part of its present and future distributed energy technology portfolio. High penetration of intermittent generation, including renewable energy, requires a flexible capacity portfolio in order to reduce adverse grid impacts and support compliance with NERC Reliability Standards, including the BAL standards. Battery storage can absorb energy during instances of over-generation as well as avoid curtailments of renewable generation, such as wind and solar, that contribute to meeting DEP's renewable portfolio standard requirements.
 - ii. Batteries are especially effective at smoothing out rapid fluctuations in generation and supply because of their ability to precisely and near-instantaneously charge and discharge. Using batteries to provide regulation enables thermal generators to avoid operating at inefficient levels and reduce fuel and startup costs. This newly available thermal generation can then be diverted to provide capacity during peaking conditions. Furthermore, DEP intends for the deployment plan and future utility-owned batteries to support the deferral of new capacity required for the region.
 - iii. The deployment plan also represents an opportunity for DEP to provide a safe, cost-effective and reliable solution for serving customers in lieu of performing costly upgrades to and ongoing maintenance of conventional grid equipment, such as feeders and transformers, in remote and land constrained regions in Western North Carolina. For example, batteries can be deployed as non-wires alternatives to building miles of distribution equipment in order to mitigate outages for customers connected to a single feeder. Distribution deferral through battery storage is a proven method adopted by multiple utilities and battery owners around the country, including the Mt. Sterling Microgrid owned and operated by DEP in the Great Smokey Mountains.

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- iv. The Company anticipates increasing its reliance on these types of distributed energy technologies to serve its customers over time. The deployment plan will focus on filling knowledge gaps to address the integration of distributed energy technologies into the grid in order to maximize its value to customers. Additionally, the deployment of batteries at various points in the Company's transmission and distribution systems will allow the Company to gain operational knowledge concerning the effects of battery technologies.
- v. The Company submits that its deployment plan will bolster the evolution of North Carolina's nascent battery market in a manner that is most beneficial to all customers. The significant commitment to storage within the deployment plan is expected to attract potential suppliers of battery components to establish their businesses in this State. Furthermore, the Company's volume purchases will allow it to develop business relationships with low-cost component manufacturers. The Company also believes this deployment plan is of sufficient scale to enable it to benefit from economies of scale in the pricing of components and costs of installation.
- vi. The Company intends to take all reasonable steps to ensure that the costs incurred in connection with the deployment plan are reasonable and for the provision of adequate, reliable, and cost-effective electricity to its customers. The Company anticipates to begin constructing the initial systems in 2018 and will ramp up deployments over the next five years at other locations on the Company's transmission and distribution system.
- d. Approval:

Because N.C. Gen. Stat. § 62-110.1 requires a CPCN from the Commission prior to beginning the construction of a facility "for the generation of electricity," the Company plans to request a CPCN for any solar generation-related components of the deployment plan, but not for the battery storage facilities. DEP does respectfully request, however, that the Commission review and give appropriate approval for the Company's decision to construct the complete deployment plan as appropriate projects on behalf of the Company's customers, and as consistent with the Commission's urging of the Company in its March 28, 2016 Order Granting Application in Part, with Conditions, and Denying Application in Part in Docket No. E-2, Sub 1089, to move forward in a timely manner on DEP's commitment to site battery storage as part of the Western Carolinas Modernization Project.

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ATTACHMENT A - Project Milestone Dates

Milestone	EPC Baseline (Nov. 2017)	Current Plan
Receipt of Air Permit	01/09/2017	01/09/2017
82 Basin Dam	10/31/2017	11/29/2017
Decommissioning		
Site Prep/Fill Completion	10/31/2017	12/06/2017
Full Notice to Proceed to	10/23/2017	10/23/2017
EPC		
Transmission Complete for	01/01/2019	12/01/2018
Backfeed		
Backfeed	02/16/2019	02/16/2019
EPC Contractor Mechanical	06/15/2019	06/15/2019
Completion		
Commercial Operation Date	11/15/2019	11/15/2019

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CERTIFICATE OF SERVICE

I certify that a copy of Duke Energy Progress, LLC's Annual Progress Report, in Docket No. E-2, Sub 1089, has been served by electronic mail, hand delivery or by depositing a copy in the United States mail, postage prepaid to the following parties:

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This is the 28th day of March, 2018. By:

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