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**VIA ELECTRONIC FILING**

The Honorable Jocelyn G. Boyd  
Chief Clerk/Administrator  
Public Service Commission of South Carolina  
101 Executive Center Drive, Suite 100  
Columbia, South Carolina 29210

Re: **Joint Application of Duke Energy Carolinas, LLC,  
Duke Energy Progress, LLC and South Carolina  
Electric & Gas Company for Approval of the Revised  
South Carolina Interconnection Standard  
Docket No. 2015-362-E**

Dear Mrs. Boyd:

Please find enclosed for filing the Direct Statement of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC in regard to the to the Workshop scheduled in the above-referenced docket.

Should you have any questions regarding this matter, please do not hesitate to contact me at 803.988.7130.

Sincerely,

A handwritten signature in blue ink that reads "Rebecca Dulin".

Rebecca J. Dulin

Enclosure

cc: Parties of Record

**DIRECT STATEMENT OF DUKE ENERGY CAROLINAS, LLC, AND DUKE ENERGY PROGRESS, LLC IN REFERENCE TO WORKSHOP REGARDING THE EFFECT OF THE INTERCONNECTION STANDARD IN COMPLYING WITH THE DISTRIBUTED ENERGY RESOURCES ACT IN DOCKET NO. 2015-362-E**

**I. INTRODUCTION**

Pursuant to Order No. 2016-658, the Commission’s Notice of Workshop issued September 28, 2016, and Amended Notice of Workshop issued September 29, 2016, Duke Energy Carolinas, LLC (“DEC”) and Duke Energy Progress, LLC (“DEP,” collectively with DEC, the “Companies”) submit the following direct statement to the Commission regarding their progress in meeting the requirements of the South Carolina Distributed Energy Resources Program Act (“Act 236”). The Companies also discuss herein their progress and the challenges associated with interconnecting the influx of new, customer-owned or third-party-owned renewable generation to the Companies’ system.<sup>1</sup>

**II. ACT 236 UPDATE AND COMPLIANCE**

The Companies are on track to meet the goals of Act 236 by 2021. In October of 2015, the Companies conducted a competitive solicitation for approximately 53,000 kilowatts (kW)<sup>2</sup> of “Tier I” or “Utility Scale” solar capacity.<sup>3</sup> The Companies received a strong response to the solicitation, and earlier this year notified short-listed bidders and requested additional documentation from each. Power Purchase Agreement (“PPA”) negotiations will occur once interconnection cost estimates are firm. As of this filing, the Companies expect all 53,000 kW of capacity to be energized by the fourth quarter of 2017.

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<sup>1</sup> While it is difficult to discuss the Companies’ experiences with the South Carolina Interconnection Standard in the narrow vacuum of generation interconnection specific to Act 236, the Companies’ comments are intended to be limited to the interconnection of resources to comply with Act 236 and exclude the discussion of system operational and reliability challenges in connection with the volume of the must-take renewable resource obligations of PURPA.

<sup>2</sup> All capacity figures, such as megawatts (“MW”) and kilowatts (“kW”), are quoted in alternating current or “AC” capacity in this document.

<sup>3</sup> Tier I refers to the renewable energy facilities whose nameplate capacity is at least 1,000 kW AC but no larger than 10,000 kW AC and conform to S.C. Code § 58-39-130 (C)(1). DEC’s Tier I solar goal is 40,000 kW; this is equal to approximately one percent of the Company’s previous five year (2012-2016) average of its South Carolina retail peak demand. Similarly, DEP’s Tier I solar goal is 13,000 kW; equal to one percent of the utility’s previous five year average of its South Carolina retail peak demand.

The Companies will meet their “Tier II” or “Customer Scale” solar capacity goals<sup>4</sup> through the Solar Rebate Program, launched in October of 2015. Through the Solar Rebate Program, DEC and DEP endeavor to induce the development of (a) 13,250 kW of aggregate capacity from customer-sited solar facilities equal to or less than 20 kW, and (b) 39,750 kW of aggregate capacity from customer-sited solar facilities greater than 20 kW and less than 1,000 kW, consistent with the goals of Act 236.

As shown in Table 1 below, customer interest in the Solar Rebate Program has been robust in the past 12 months. Customer interest has been strongest among residential customers in the DEC retail service area rather than customers in the DEP service area.

**Table 1: Summary of Participation in the Solar Rebate Program (as of October 27, 2016)**

	Facilities ≤20 kW	Facilities > 20 kW and < 1 MW	Total	Act 236 Goal	% of Act 236 Goal
<b>Duke Energy Progress LLC</b>	251 kW	4,888 kW	5,139 kW	13,000 kW	40%
<b>Duke Energy Carolinas LLC</b>	6,701 kW	16,979 kW	23,680 kW	40,000 kW	59%

The majority of those facilities less than or equal to 20 kW are located at residential customer premises and configured as net-metered facilities.

Since the Commission approved the Companies’ DER Program applications in July of 2015, the Companies have utilized various communication and outreach tools to ensure that solar stakeholders and retail customers have access to information about the Companies’ programs and a means to communicate with representatives from the Companies. For example, the Companies have engaged in the following activities:

<sup>4</sup>Tier II refers to renewable energy facilities whose nameplate capacity is less than 1,000 kW AC, of which of which twenty-five percent must be from facilities less than or equal to 20 kW in capacity and conform to the requirements of S.C. Code § 58-39-130 (C)(2). DEC’s Tier II solar goal is 40,000 kW; this is equal to approximately one percent of the Company’s previous five year (2012-2016) average of its South Carolina retail peak demand. Similarly, DEP’s Tier II solar goal is 13,000 kW; equal to one percent of the utility’s previous five year average of its South Carolina retail peak demand.

- a) **Quarterly Collaborative Meetings:** Conducted quarterly meetings of the Distributed Energy Resource Program Collaborative, which includes a diverse group of stakeholders representing the environmental community, low income community, solar installers, solar developers, The Alliance for Solar Choice, SolarCity, Sunrun, Walmart, Nucor, and the Office of Regulatory Staff;
- b) **Industry Engagement:** Conducted multiple educational sessions for solar installers and developers at meetings of the South Carolina Solar Council and South Carolina Solar Business Alliance;
- c) **Webinars:** Conducted multiple online webinars for solar installers and developers; and
- d) **Call Center Support:** Provided support to retail customers and solar installers via its Renewable Service Center (tel. 866.233.2290), which is staffed with 22 professionals.

As a result of these outreach efforts and regular communication with the solar advocacy community, and with the assistance of the Office of Regulatory Staff, the Companies have modified their Solar Rebate Program tariffs to provide enhanced benefits for specific customer groups and to provide greater clarity to both the customer and the solar installer.

### **III. GENERATOR INTERCONNECTION PROGRESS AND CHALLENGES**

#### **A. VOLUME OF CUSTOMERS INTERCONNECTED TO-DATE**

The number of renewable generators (including customer-sited generation that is load-centered and net-metered (referred to herein as “Net-Metered” generation) as well as those

generators certified as a Qualifying Facility (“QF”)<sup>5</sup>) interconnected to the Companies’ distribution system in South Carolina has grown from less than 100 customers in 2011 to more than 1,000 customers in 2016. As shown in Table 2 below, the number of generators interconnected to the Companies’ distribution system increased nearly 1,800 percent from 2011 to the present and continues to grow rapidly. In the first 10 months of 2016, the Companies interconnected and energized nearly three times as many customers as in 2015. The notable growth in 2016 interconnections can be correlated to the passage of Act 236 and the launch of the Companies’ Solar Rebate Programs, which were introduced in the fall of 2015.

Ninety-five percent of the generators interconnected to date (shown in Table 2) are small (less than 20 kW) Net-Metered generators.

**Table 2: DEP and DEC South Carolina Distribution System-Interconnected Renewable Energy Capacity and Facilities, 2011-2016**

<i>Cumulative</i>	2011	2012	2013	2014	2015	2016
<b>Capacity interconnected (kilowatts-AC)</b>	525 kW	734 kW	1,051 kW	1,371 kW	2,057 kW	10,125 kW
<b>Number of generators</b>	59	89	134	186	303	1,047

In 2016, the average size of a Net-Metered solar generator interconnected to the Companies’ South Carolina distribution system was 9.7 kW and the median size was 7.4 kW. The largest single facility interconnected to the DEP or DEC South Carolina distribution system and energized to-date is approximately 430 kW.

**B. VOLUME OF CUSTOMERS SEEKING INTERCONNECTION**

<sup>5</sup> A Qualifying Facility is a small power production facility that is capable of generating 80 megawatts or less of power and whose primary energy source is renewable such as hydro, wind, solar, biomass, waste, or geothermal resources. In order to be considered a qualifying small power production facility, a facility must meet all of the requirements of 18 CFR 292.203(a), 292.203(c), and 292.204 for size and fuel use, and be certified pursuant to 18 CFR 292.207.

There are three general categories of proposed renewable generators seeking interconnection to the Companies' South Carolina electrical system today: (i) Net-Metered, solar generators; (ii) solar QF generators seeking to interconnect to the *distribution system* and sell energy and capacity pursuant to PPAs; and (iii) solar QF generators seeking to interconnect to the *transmission system* and sell energy and capacity pursuant to PPAs. Below, the Companies discuss the growth in each of these categories of generators and later, in Section IV, responses to this growth.

- i) **Net-Metered Solar Generators:** The number of proposed net-metered solar generators seeking interconnection has grown from a half-dozen per month in 2011 to several hundred per month in 2016. Today, the Companies are processing interconnection applications from more than 500 proposed generators representing 32 MW of Net-Metered solar capacity.
- ii) **QF Solar Generators (Distribution System):** The number of proposed QF solar generators seeking interconnection to the Companies' distribution system has grown from four (4) proposed projects in 2014 to 133 proposed projects as of September 30, 2016. In aggregate, the proposed solar projects total 1,269 MW of capacity. The notable growth in the number of proposed interconnections can be correlated to the passage of Act 236 and the Companies' solicitation of capacity to meet its Tier I combined goal of 53 MW. Notably, 22 of these facilities, representing more than 600 MW, are greater than 10 MW in size and therefore exceed the maximum renewable energy facility size set forth in Act 236.
- iii) **QF Solar Generators (Transmission System):** The number of proposed QF solar generators seeking interconnection to the Companies' transmission system has

grown from zero (0) proposed generators in 2014 to 15 proposed generators in 2016.

In aggregate, the proposed solar projects total 671 MW of total capacity.

#### **IV. THE COMPANIES' MANAGEMENT OF INTERCONNECTION REQUESTS**

Due to the dramatic increase in interconnection request volume in South Carolina since 2014, the Companies have undertaken a number changes within their interconnection business unit. Each of these changes has been implemented with the goal of expediting overall interconnection request processing time, increasing interconnection customer communication and satisfaction, reducing time lost due to incomplete or incorrect information, complying with State and Federal interconnection requirements, and ensuring the safe interconnection of these facilities in a manner that does not compromise system reliability.

The Companies' interconnection improvements fall into these general categories: staffing, software, procedures, process improvement, and communication and education.

- i. **Staffing:** A large (greater than 20 kW) solar generator interconnection request can require as few as months or as many as two or three years to move through the process of interconnection request to interconnection agreement. For example, large solar generators that requested interconnection in 2014 are now nearing interconnection. The speed at which a proposed generator moves through this process is determined by three factors: the volume of requests received by the interconnecting utility at that time, the resources available to the interconnecting utility to process and study the proposed generators, and the interconnection policies and procedures to which the generator and utility must adhere. In response to the exponential growth in the volume of large solar generator interconnection requests

received in late 2015, in the past twelve months, the Companies have dedicated a number of individuals to oversee the processing of South Carolina-specific interconnection requests from small generators. A number of teams “touch” an interconnection request before the a generator is actually energized. Such teams include the Renewable Service Center representatives (who manage retail customer calls and emails and shepherd small generator interconnection applications through the process); account management and operations representatives (who are responsible for large generator interconnection study, billing associated with the study, the interconnection agreement, and PPA processes); distribution planning engineers who conduct the System Impact Studies (five individuals are assigned to work on South Carolina-based distribution system interconnection requests); transmission planning engineers (who conduct studies of the impact of the proposed generator on transmission system operation; two transmission engineers are assigned to work on South Carolina-based transmission interconnection requests); field engineers (who inspect generators prior to energizing); and meter technicians (who set the appropriate meter prior to energizing the generator).

- ii. **Software:** Regarding software, in the past twelve months, the Companies have customized and rolled out software known as PowerClerk, which is designed to decrease the processing time of small generator interconnection requests, and software known as Salesforce, which is designed to reduce the processing time of large generator interconnection requests through the use of a single, electronic repository for interconnection applications. These software tools should also increase

the accuracy of tracking interconnection applications and improve communication between customer and the Companies.

- iii. **Process improvements:** The Companies have re-engineered their processes, creating separate queues for small (less than 20 kW) generator interconnection requests versus large (greater than 20 kW) generator interconnection requests. Additionally, the Companies have implemented the Interdependent Project Review Process, as required in Order No. 2016-191. Furthermore, the Companies have implemented an account management to shepherd large generator interconnection requests through the Fast Track process (if applicable) and/or the System Impact Study process and then to report the results of that study back to the solar developer so that an informed decision can be made about whether to proceed with the interconnection process.
- iv. **Communication and education:** In the past six months, and with the help of the Solar Business Alliance and the encouragement of the Office of Regulatory Staff, the Companies have worked to increase communication and transparency in the overall interconnection process for stakeholders. For example, the Companies update and post on their websites a searchable document listing all of the large generator interconnection requests that it has or is currently processing, thus allowing solar developers visibility into the length of the queue and their projects' position relative to others on that circuit. Additionally, the Companies have invested in education of its internal workforce as well as retail customers and solar developers. Over the past twelve months, representatives from the Companies have addressed educational sessions for solar installers at meetings of the South Carolina Solar Council and

South Carolina Solar Business Alliance. The Companies have also conducted multiple on-line webinars for the local solar installer community. The Companies have found that the more knowledgeable interconnecting customers are about the complex process of interconnection, the higher the quality of the interconnection application is (*i.e.*, fewer errors, fewer incomplete applications).

## **V. INTERCONNECTION QUEUE BACKLOG AND WAIT TIMES**

The Companies recognize the need for improvement with regard to the length of time it takes a project in the DEC or DEP queue to move from initial interconnection request to interconnection agreement. The Companies have taken a number of actions to address these concerns, as described in Section IV herein, and continue to examine and evaluate tools to reduce queue wait times. Those proposed facilities that must undergo a System Impact Study (“SIS”) pursuant to either the FERC Small Generator Interconnection Procedure or the South Carolina Generator Interconnection Procedure are most impacted by queue wait times. Small (<20 kW), Net-Metered solar generator interconnection requests are unaffected by the System Impact Study. Commission Order No. 2016-191 required the Companies to reduce by 10 percent the amount of time taken to complete a SIS. In 2016, the Companies required 60 days, on average, to complete a SIS. Going forward, the Companies endeavor to reduce the required time from 60 days to 54 days through the actions described in Section IV.

## **VI. IMPACTS ON SYSTEM OPERATION AND RELIABILITY**

Ideally, a thorough interconnection process and procedure should result in safe interconnection of these solar generation facilities in a manner that neither reduces reliability nor increases costs. The Companies, and particularly DEP, have experienced events that suggest that large solar generators interconnected to the distribution circuits have the potential to

detrimentally impact normal distribution system operations and reliability. Together with solar developers, the Companies have implemented a technical screen standard known as Circuit Stiffness Ratio (CSR) review to prevent such events in the future by ensuring that the electric distribution system has sufficient capability, often termed “stiffness” by engineers, to support a proposed generating facility interconnection. Should a proposed project fail the CSR review, interconnection customer may be presented with options such as: pursuing the solar project at its desired location and desired capacity upon agreeing to pay for upgrades to the distribution circuit; withdrawing the project from the distribution interconnection queue and instead submitting a transmission interconnection request; or reducing the requested capacity to see if such reduction permits interconnect at the desired location.

Additionally, the Companies examine a proposed solar generator and its proposed point of interconnection relative to the Companies’ distribution grid modernization plans. For example, if the Companies have invested in or plan to invest in voltage support equipment, specifically, integrated volt/VAR control (IVVR) equipment, the addition of a solar generator on that circuit will adversely affect the precision with which that equipment operates, diminishing the capacity of the IVVR to control voltage and reverse power flow. If a proposed solar generator seeks to interconnect to such a circuit, the Companies are now able to flag the interconnection request, inform the interconnection customer, and present the customer with a set of options similar to those discussed above. The goal is to present the interconnection customer with information and options earlier in the interconnection process rather than later, so that an informed decision can be made regarding the size and location of the project. The addition of these two screens, CSR and point of interconnection, address the interconnection

customer's need for information to guide the proposed project while also ensuring safe, reliable interconnection on the Companies' systems.

Recognizing that the challenges associated with the interconnection process are ever evolving, the Companies look forward to continuing to work with interested stakeholders to improve the processes for interconnection customers while adhering to the reliability and safety standards of the Companies.

Respectfully submitted this 10<sup>th</sup> day of November, 2016.



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