PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

Annual Review of Base Rates for Fuel Costs for Duke Energy Carolinas, LLC	} } } } }	**Docket No. 2018-3-E**

Surrebuttal Testimony of Devi Glick

On Behalf of South Carolina Coastal Conservation League and Southern Alliance for Clean Energy

On the Topic of Annual Review of Base Rates for Fuel Costs for Duke Energy Carolinas, LLC

August 31, 2018

Q. Please state your name and business address for the record.

A. My name is Devi Glick. I work at Synapse Energy Economics, Inc., located at 485 Massachusetts Avenue in Cambridge, Massachusetts.

Q. On whose behalf are you testifying in this proceeding?

A. I am testifying on behalf of the South Carolina Coastal Conservation League (CCL) and Southern Alliance for Clean Energy (SACE).

Q. What is the purpose of your surrebuttal testimony in this proceeding?

A. The purpose of my testimony is to discuss the rebuttal testimony of Glen Snider on behalf of Duke Energy Carolinas (DEC), in response to my direct testimony in this docket.

Avoided T&D Capacity Costs

Q. Do you agree with Witness Snider that the intermittency, nondispatchability and uncertainty in Net Energy Metered (NEM) Distributed Energy Resource (DER) locations and quantity justify DEC's decision not to value avoided T&D capacity?

No. DEC is required by the terms of the 2014 Settlement Agreement to Docket No. 2014-246-E to update the placeholder values of NEM DERs when it becomes possible to quantify them. The concerns that Witness Snider discussed with coincidence, intermittency, nondispatchability and uncertainty in NEM DER locations and quantity all would have been present in 2014 when the Company agreed to a NEM DER valuation framework that included avoided T&D capacity as a component. This component is presently quantifiable, and DEC has had ample time to conduct the necessary studies and analysis needed to quantify this value consistent with the 2014 NEM DER settlement agreement, which allows for placeholders to be used until components can be "reasonably quantif[ied]."[1]

[1] Settlement Agreement, Docket No. 2014-246-E, at pages 4-5, paragraph III.8.

Q. Witness Snider asserts that NEM DERs do not avoid any transmission or distribution investments by the Company.[2] Do you agree with this assessment?

A. No. I do not agree with Witness Snider's assertion that NEM DERs cannot avoid transmission or distribution system investments.[3] In particular, his statements in defense of the Company's assessment focus almost exclusively on the impact of solar photovoltaics (PV) on the distribution system and fail to accurately differentiate transmission from distribution system impacts. This is significant because my testimony primarily focuses on the ability of NEM DERs like rooftop solar to avoid or defer *transmission* system projects and expenditures.

In his limited testimony regarding avoided *transmission* system costs, Witness Snider asserts that the impact of solar PV on the transmission system is similar to the impact seen on the distribution system. This statement is incorrect. The transmission and distribution systems are often grouped together and treated as one because they both deal with wires and the movement of electricity, but they are very different. Not only are the two systems operated and planned for in separate processes with distinct requirements, but more to the point: DERs such as rooftop solar PV connected to the *distribution* system reduce the total load of electricity on the upstream *transmission* system. It does not necessarily do the same for the distribution system.

Q. Please elaborate on the difference between transmission and distribution systems impacts.

A. The transmission system aggregates up many smaller distribution systems (see Figure 1). At low penetrations of NEM DERs including rooftop solar PV, such as the level seen in South Carolina, the electricity produced by the NEM DERs installed on the distribution system will be consumed wholly within the distribution circuit or area network. This NEM DER generation—even in the aggregate for a particular distribution circuit—would in almost all circumstances

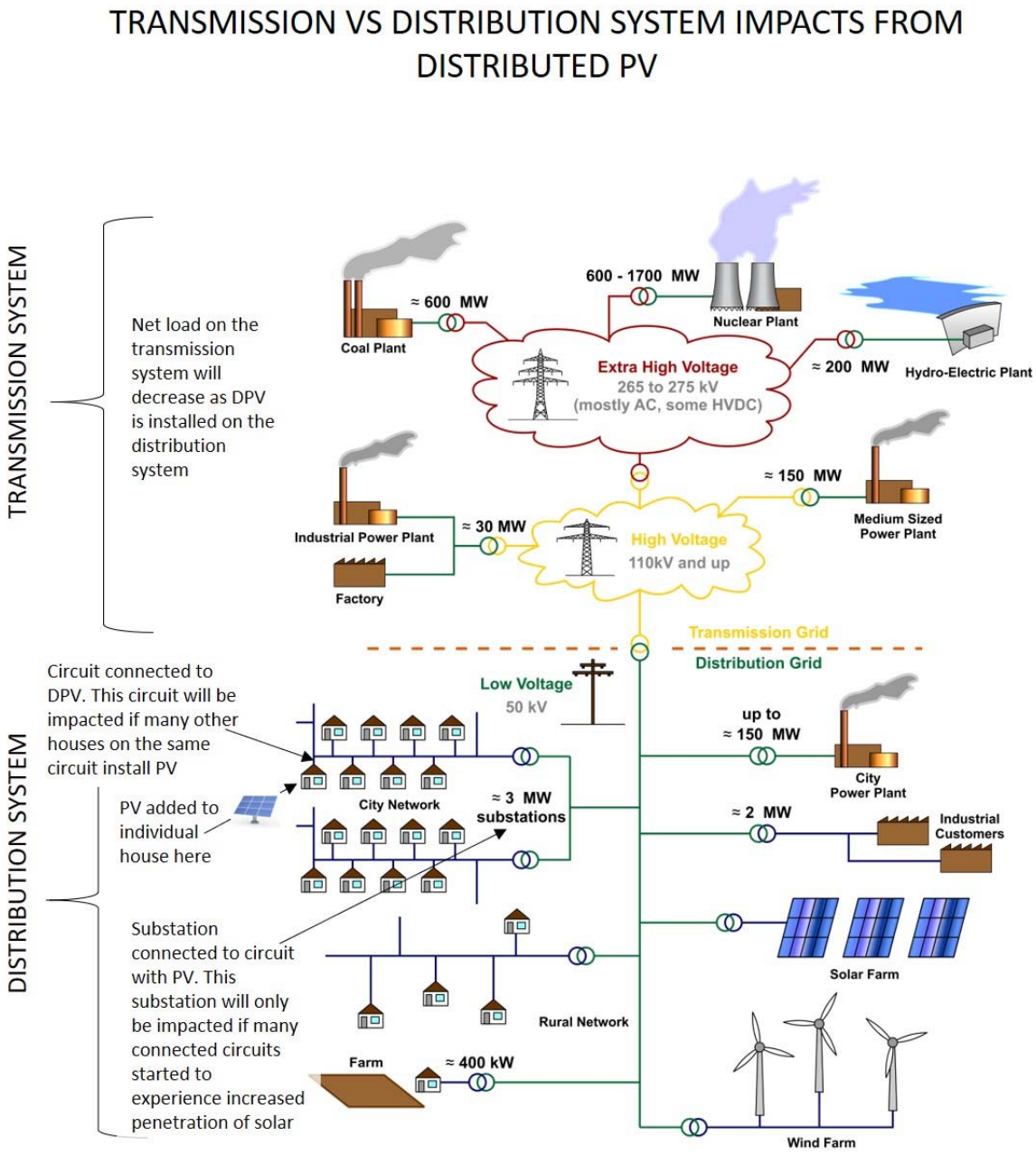
[2] Rebuttal Testimony of Glen Snider, Duke Energy Carolinas, Docket No. 2018-3-E, at page 2.

[3] Rebuttal Testimony of Glen Snider, Duke Energy Carolinas, Docket No. 2018-3-E, at page 2.

be small enough to avoid any back-feed onto the transmission system. This is particularly true for rooftop solar systems that are net energy metered and typically sized to meet a customer's load. The transmission system will experience a reduction in load akin to what it would experience with increased demand-side energy efficiency (EE) investments made at the distribution level. This reduction in load, whether by distribution-level energy efficiency measures or net metered resources like rooftop solar, contributes to avoiding or deferring upstream *transmission* system expenditures that would otherwise be needed to meet load absent the reduction.

Witness Snider argues that "[p]lanners have no guarantee that a solar NEM will be producing coincident with the peak demand needs of a circuit."[4] But this reference is to the distribution system rather than the transmission system. Because solar photovoltaic (PV) DERs are distributed across many circuits in the distribution system, the set of PV DERs act as a larger generator with a smooth generation profile when aggregated. Witness Snider fails to consider that the transmission system interacts with the aggregation of all DERs in the region, and that the aggregation does not show the same variation seen on individual NEM DERs.

Figure 1:Transmission and Distribution System Impacts from Distributed Solar PV.[5]



[5] https://commons.wikimedia.org/wiki/File:Electricity_Grid_Schematic_English.svg

Q. How do you respond to Witness Snider's solar profile that shows a variable generation profile rather than a smooth profile?

A. On page 4 of his testimony, Witness Snider shows a solar profile from May 22, 2018 to illustrate the intermittency of solar. This is limited to a single solar PV generator on a single day. Across DEC's system, distributed solar PV production will vary based on highly localized factors such as cloud cover, but those factors only impact a small portion of the service territory at any given time. When NEM DERs like rooftop solar PV are spread over a larger area, the production variability smooths out. This distributed nature of NEM DERs like rooftop solar can make them even more secure, reliable, and predictable than a centralized power plant. Their distributed nature means they are less likely to be compromised by a single power plant outage, act of nature, cyber-attack, or other large event, and there is never the risk that unexpected maintenance needs will take them all down at once.

Q. Do you agree with Witness Snider's characterization of your comparison of distributed solar PV and energy efficiency?

A. No. Witness Snider's testimony misstates my position. I did not assert, as Witness Snider suggested, that "distributed solar generation has an identical impact to the system as demand-side energy efficiency."[6] This is incorrect.

What I did testify to is that the *load reduction* that the transmission system experiences will be identical between EE and DPV.[7] This statement is specific to load (not impacts broadly) and the transmission system (not the entire system). This is important because NEM DERs like rooftop solar impact the transmission system and the distribution system in very different manners. Notably, Witness Snider does not respond to this point regarding load reduction for the transmission system in his rebuttal testimony. He instead sidesteps the issue to discuss how solar PV and EE have different impacts on the *distribution* system. This is not

[6] Rebuttal Testimony of Glen Snider, Duke Energy Carolinas, Docket No. 2018-3-E, at page 5, lines 1-4.

[7] Direct Testimony of Devi Glick, Duke Energy Carolinas, Docket No. 2018-3-E, at page 9, lines 7-12.

something I disputed in my Direct Testimony, and in fact is exactly why I recommended that DEC conduct a study of the impacts DPV has on the distribution system. Studying impacts on the distribution system should not delay quantification and adoption of a value that represents the ability of NEM DERs to avoid or defer transmission system costs.

Finally, to the limited extent Witness Snider does discuss impacts to the transmission system, his testimony focuses on the impacts of large or utility-scale solar PV rather than the net energy metered DERs like rooftop solar that the NEM DER methodology seeks to value. His assertion that NEM DERs may in some limited cases impose costs rather than avoid costs for the transmission system also undercuts the argument that the value should be zero.

Q. Witness Snider cites the intermittency, non-dispatchability, and uncertainty of distributed solar PV location as the primary reasons it is impossible for NEM DERs to avoid T&D investments. Are these factors unique to DEC's service territory?

A. No they are not. Distributed solar PV in DEC's service territory is not fundamentally different from distributed solar PV elsewhere in the country, including the multiple jurisdictions where avoided T&D values have been quantified, both in the energy efficiency context and in the distributed solar PV context. There is no reason that DEC could not also calculate an avoided T&D value, particularly the value of NEM DER like rooftop solar's ability to avoid or defer transmission system costs.

Q. Can you provide examples of avoided T&D calculations and values from other jurisdictions?

NEM DERs like rooftop solar are regularly assigned a value for avoiding T&D capacity costs by utilities across the US. For a full list of examples please see my direct testimony[8] and the accompanying study I authored for Rocky Mountain

[8] Direct Testimony of Devi Glick, Duke Energy Carolinas, Docket No. 2018-3-E, at pages 8-11.

Institute which was filed with the Commission in Docket No. 2018-2-E.[9] Additionally I offered several examples of DER valuation by system planners, including PJM and CAISO. Witness Snider is right that CAISO and DEC's service territories are different, but that does not change the fact that NEM DERs like rooftop solar are providing quantifiable and tangible benefits in the form of avoiding transmission and distribution system expenditures that would otherwise be incurred and passed on to ratepayers. The values may differ by region and territory, but the fact that there is value is consistent across jurisdictions.

Q. Witness Snider also claims that generation from distributed solar PV cannot be guaranteed to match with peak. Does distributed solar PV generation ever align with DEC's system peak?

A. Yes, as evidenced by DEC's own planning documents. DEC assigns solar a generating capacity credit in its Integrated Resource Plan (IRP) (46% of nameplate in summer, 5% of nameplate in winter) because it is expected that solar PV will provide generating capacity during times of peak demand.[10] Because transmission peak requirements are consistent with generation peak requirements, distributed PV should be credited with this value.

Q. Witness Snider claims that you based your avoided T&D capacity calculations on the 46% summer peak capacity contribution of solar. Is this accurate?

A. No. I based my calculation of the avoided transmission capacity value on the conservative assumption that the system is dual peaking. I used the winter peak capacity contribution of 5% not the 46% summer peak capacity contribution in

[9] Hansen, L, Lacy, V, and Glick, D. 2013. *A Review of Solar PV Benefit and Cost Studies.* Rocky Mountain Institute. This study is available at https://rmi.org/wp-content/uploads/2017/05/RMI_Document_Repository_Public-Reprts_eLab-DER-Benefit-Cost-Deck_2nd_Edition131015.pdf

[10] Duke Energy Carolinas, 2017 Integrated Resource Plan Annual Report, Docket No. 2017-8-E, at page 22.

my calculations. This methodology was outlined in my Direct Testimony[11] and the accompanying Exhibit DG-3.

Q. Witness Snider asserts that your reliance on historic data for your calculations will produce inaccurate results. Do you agree?

A. No. This criticism is unavailing because DEC's transmission system is not projected to fundamentally change over the next few years. For this reason, it is appropriate to assume that historical spending on avoided transmission capacity is a reasonable approximation for future spending on transmission capacity.

Q. What is your recommendation with regards to the avoided T&D capacity costs?

A. I maintain my recommendation that the Commission direct the Company to incorporate into its NEM DER valuation an avoided transmission capacity value of $0.005028/kWh as outlined in my Direct Testimony.[12] This value represents the ability of NEM DERs like rooftop solar to avoid or defer transmission system costs by reducing the overall load on the transmission system. Witness Snider's rebuttal does not change this recommendation. The concerns he discusses in rebuttal are primarily focused on the distribution system, in contrast to my focus on the transmission system benefits of NEM DERs. His limited testimony regarding the transmission system ~~misconstrues~~ misstates my testimony and calculation methodology and discusses potential impacts of large or utility-scale solar PV rather than the net energy metered DERs like rooftop solar that the NEM DER methodology seeks to value.

[11] Direct Testimony of Devi Glick, Docket No. 2018-3-E, at page 13, lines 18-24.

[12] Direct Testimony of Devi Glick, Docket No. 2018-3-E, at page 13, line 23.

Avoided Environmental Costs

Q. Witness Snider states that the variable operating costs associated with coal ash disposal are included within the avoided energy component of NEM DER.[13] Are you satisfied with this treatment of variable coal ash disposal costs?

A. No. To the extent that DEC is including the handling costs of coal ash in the avoided energy calculation, the Company should separately state or break out the value and represent it transparently for the Commission and intervenors as an avoided environmental cost. The Company already separately reports avoided criteria pollutants. For transparency, coal ash handling costs should similarly be reported separately in the avoided environmental cost category. At a minimum, the 2014 NEM settlement requires a clearer indication for any avoided environmental costs that are included in the avoided energy component: "[t]he Avoided Energy component must specify if [avoided environmental costs] are included."[14]

Q. Witness Snider defends DEC's exclusion of the capital costs associated with building new coal ash impoundments from the NEM calculation, stating that value is small and effectively rounds to zero, and would not begin to accrue until 2023. Are you satisfied with this answer?

A. No. The avoided capital cost associated with coal ash landfills is on the same order of magnitude as the avoided cost of criteria pollutants, which is reported separately by the Company. The 2014 Settlement Agreement requires that placeholder categories will be updated when the capability to reasonably quantify the values becomes available. The settlement agreement does not give DEC discretion to choose not to quantify something it views as having too small a value.

Additionally, Witness Snider states that the value will not begin to accrue until 2023. He cites 2023 because this is the date that one of the existing coal ash

[13] Rebuttal Testimony of Glen Snider, Duke Energy Carolinas, Docket No. 2018-3-E, at page 10, lines 10-11.

[14] Settlement Agreement, Docket No. 2014-246-E, Attachment A (description of environmental costs).

landfills is projected to be full and no longer usable. This assessment of when value will begin to accrue is incorrect. When aggregated, NEM DERs like rooftop solar can delay the need for a new dry coal ash lined landfill or expansion. Deferring the date that a new landfill is needed saves ratepayers money in the interim period and has a real and quantifiable value.

The Company should update its NEM DER methodology calculations to account for these avoided costs.

Q. Does this conclude your testimony?

A. Yes.