BEFORE THE SOUTH CAROLINA PUBLIC SERVICE COMMISSION
DOCKET NO. 2020-264-E
DOCKET NO. 2020-265-E

In the Matter of:	**)**
Duke Energy Carolinas, LLC and	**)**
Duke Energy Progress, LLC's	**)**
Establishment of Solar Choice	**)**
Metering Tariffs Pursuant to S.C.	**)**
Code Ann. Section 58-40-20	**)**

DIRECT TESTIMONY OF
JUSTIN R. BARNES
ON BEHALF OF
NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION AND
SOLAR ENERGY INDUSTRIES ASSOCIATION

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND CURRENT POSITION.

A. My name is Justin R. Barnes. My business address is 1155 Kildaire Farm Rd., Suite 202, Cary, North Carolina, 27511. My current position is Director of Research with EQ Research LLC.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING TESTIMONY?

A. I am submitting testimony on behalf of the Solar Energy Industries Association ("SEIA") and the North Carolina Sustainable Energy Association ("NCSEA").

Q. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY BEFORE THE SOUTH CAROLINA PUBLIC SERVICE COMMISSION ("THE COMMISSION")?

A. Yes. Most recently I submitted testimony on behalf of SEIA and NCSEA in Commission Docket No. 2020-229-E on Dominion Energy South Carolina's proposed Solar Choice Tariff, and in Commission Docket No. 2019-182-E pertaining to the Commission's evaluation of the costs and benefits of net metering. Prior to that, I submitted testimony on behalf of The Alliance for Solar Choice in Docket Nos. 2014-246-E, 2015-53-E, 2015-54-E, and 2015-55-E relating to the implementation of 2014 Public Act 236, and on behalf of Vote Solar in Docket Nos. 2018-318-E and 2018-319-E, which addressed the Duke Energy affiliates' most recent South Carolina rate case applications.

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Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND OCCUPATIONAL BACKGROUND.

A. I obtained a Bachelor of Science in Geography from the University of Oklahoma in Norman in 2003 and a Master of Science in Environmental Policy from Michigan Technological University in 2006. I was employed at the North Carolina Solar Center at N.C. State University for more than five years as a Policy Analyst and Senior Policy Analyst.[1] During that time I worked on the *Database of State Incentives for Renewables and Efficiency ("DSIRE")* project, and several other projects related to state renewable energy and energy efficiency policy. I joined EQ Research in 2013 as a Senior Analyst and became the Director of Research in 2015. In my current position, I coordinate and contribute to EQ Research's various research projects for clients, assist in the oversight of EQ Research's electric industry regulatory and general rate case tracking services, and perform customized research and analysis to fulfill client requests.

Q. PLEASE SUMMARIZE YOUR RELEVANT EXPERIENCE AS RELATES TO THIS PROCEEDING.

A. My professional career has been spent researching and analyzing numerous aspects of federal and state energy policy, spanning more than a decade. Throughout that time, I have reviewed and evaluated trends in regulatory policy, with some degree of focus on distributed energy resource ("DER") policy, net metering, and rate design. For example, I have closely followed regulatory

[1] The North Carolina Solar Center is now known as the North Carolina Clean Energy Technology Center.

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evaluations of net energy metering ("NEM"), DER customer cost of service, and DER compensation regimes and the refinements to DER policies that have in some cases arisen from these evaluations.

Outside of South Carolina, I have submitted testimony before utility regulatory commissions in Colorado, Hawaii, Georgia, Kentucky, New Hampshire, New Jersey, New York, North Carolina, Oklahoma, Texas, Utah, and Virginia as well as to the City Council of New Orleans, on various issues related to clean energy policy, rate design, and cost of service.[2] These individual regulatory proceedings have involved a mix of general rate cases and other types of contested cases. My *curriculum vitae* is attached as **Exhibit JRB-1**. It contains a full list of proceedings where I have submitted testimony and related information such as docket numbers and the subject matter addressed.

Q. PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY.

A. The purpose of my testimony is to offer *conditional* support for the Solar Choice Tariffs proposed by Duke Energy Progress ("DEP") and Duke Energy Carolinas ("DEC") (jointly referred to herein as "the Companies"). My support of the proposed Solar Choice Tariffs is conditional on the adoption of the complete terms of the Memorandum of Understanding ("MOU") entered into by the Companies and several other organizations (collectively, "the Clean Energy Advocates" and together with the Companies as "the Parties") for a NEM Solar

[2] The City Council of New Orleans regulates the rates and operations of Entergy New Orleans in a manner equivalent to state utility regulatory commissions.

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Choice Program and Solar Choice Tariffs, which includes an up-front incentive for residential DER customers eligible for Schedule RE that participate in a winter smart thermostat energy efficiency program (the "Solar BYOT EE Incentive"). The MOU is attached to my testimony as **Exhibit JRB-2**.

The Solar BYOT EE Incentive is a critical element of both the MOU and the ability of the Companies' Solar Choice Tariffs to successfully achieve the South Carolina Legislature's intent for Solar Choice Tariffs under Act 62, which targets achieving the following policy goals:

1. [B]uild upon the successful deployment of solar generating capacity through Act 236 of 2014 to continue enabling market-driven, private investment in distributed energy resources across the State by reducing regulatory and administrative burdens to customer installation and utilization of onsite distributed energy resources;
2. [A]void disruption to the growing market for customer-scale distributed energy resources.
3. [R]equire the commission to establish solar choice metering requirements that fairly allocate costs and benefits to eliminate any cost shift or subsidization associated with net metering to the greatest extent practicable.[3]

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. My testimony specifically focuses on the important role of enabling technologies, such as smart thermostats, in producing consumer responses to the price signals

[3] Act 62, Section 5.

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provided by time-of-use ("TOU") tariffs. In Section II(A) I present findings from past evaluations of TOU rates and the differences in results achieved depending on whether rate offers were complemented by the provision of enabling technologies. In Section II(B) I discuss the importance of enabling technologies and the Solar BYOT EE Incentive in the context of the whole of the Companies' Solar Choice Tariff proposal to illustrate the pivotal role it plays in achieving the Legislature's Act 62 goals.

Q. WHAT ARE YOUR RECOMMENDATIONS TO THE COMMISSION?

A. While the Companies' Solar Choice Tariffs and the Stipulation accompanying the filing of those tariffs does not include the Solar BYOT EE Incentive, I recommend that the Commission consider it to be a critical aspect of overall structure of the proposed Solar Choice Tariffs in the context of Act 62 goals. The Commission should also more generally recognize the important role that enabling technologies such as smart thermostats can play in helping consumers respond to time-varying rate designs and producing benefits for all ratepayers. To effectuate this recognition, it should seek to foster Solar Choice Tariff mechanisms that offer creative solutions for addressing both sides of the cost-benefit and cost-shift equation.

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II. SOLAR BYOT EE INCENTIVE

A. Role of Enabling Technologies in TOU Rate Offerings

Q. DO THE COMPANIES' SOLAR CHOICE TARIFF PROPOSALS INCLUDE THE SOLAR BYOT EE INCENTIVE OR ANY OTHER MENTION OF ENABLING TECHNOLOGIES?

A. No.

Q. WHY IS CONSIDERATION OF ENABLING TECHNOLOGIES RELEVANT TO THE COMPANIES' SOLAR CHOICE TARIFF PROPOSALS?

A. One of the goals of Solar Choice Tariffs is to align the cost to serve DER customers with what they pay for electric service. The combination TOU rate and Critical Peak Pricing ("CPP") structure, such as what the Companies have proposed, can help achieve that goal by causing customers to pay more or less depending on their energy usage patterns. While both possibilities may produce better cost of service alignment, the preferred outcome is that customers modify their usage patterns in such a way that system costs are reduced from what they would otherwise be. This outcome benefits both the customers on the TOU rate as well as other ratepayers in the long run.

In the present context of Solar Choice Tariffs, this outcome produces an additional benefit of supporting the attractiveness of DERs and the economic impacts associated with the continued private investment in DERs. The use of

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enabling technologies, such as smart thermostats, has been shown to be a key element for improving customers' ability to respond to TOU and CPP rates.

Q. WHAT EVIDENCE IS THERE TO SUPPORT YOUR ASSERTION THAT ENABLING TECHNOLOGIES IMPROVE CUSTOMER RESPONSES TO TIME VARYING RATES SUCH AS TOU RATES AND CPP?

A. There is ample evidence. One of the more comprehensive studies of time-varying pricing design evaluated a total of 24 residential pricing pilots conducted by utilities in North America, Europe, and Australia from 1997 – 2011, involving a total of 109 combinations of differing time-varying pricing designs and enabling technologies. Figure 1 below shows the differences in results in terms of total peak use reduction, while Figure 2 shows the response curve in relation to the peak and off-peak price ratio.[4] Both figures illustrate that different types of time-varying pricing designs perform better at reducing peak usage when paired with enabling technology(ies).[5]

[4] Faruqui, Ahmad, Ryan Hledik, and Jennifer Palmer, Time-Varying and Dynamic Rate Design. Global Power Best Practice Series, The Regulatory Assistance Project (RAP), 2012. Figure 1 at p. 28 (Figure 2 in the report) and Figure 2 at p. 32 (Figure 6 in the report), *available at*: https://www.raponline.org/wp-content/uploads/2016/05/rap-faruquihledikpalmer-timevaryingdynamicratedesign-2012-jul-23.pdf.

[5] For the purposes of this evaluation "enabling technologies" included smart thermostats, air conditional switches, and in-home energy displays.

Figure 1

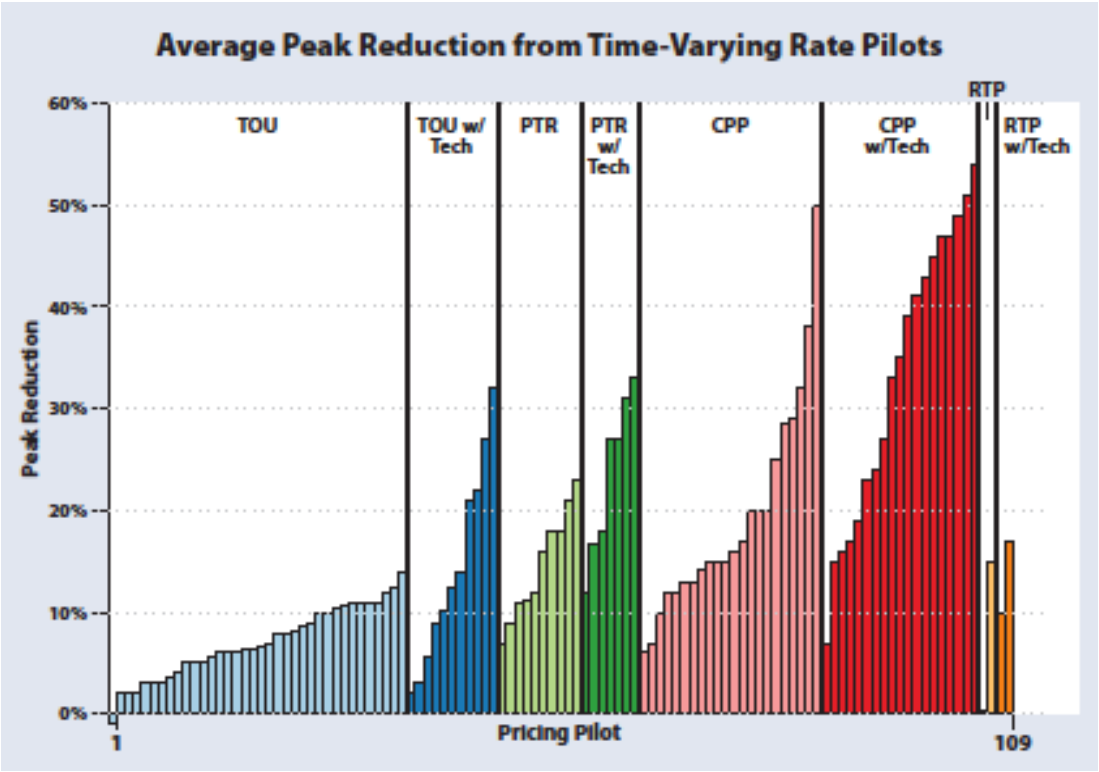
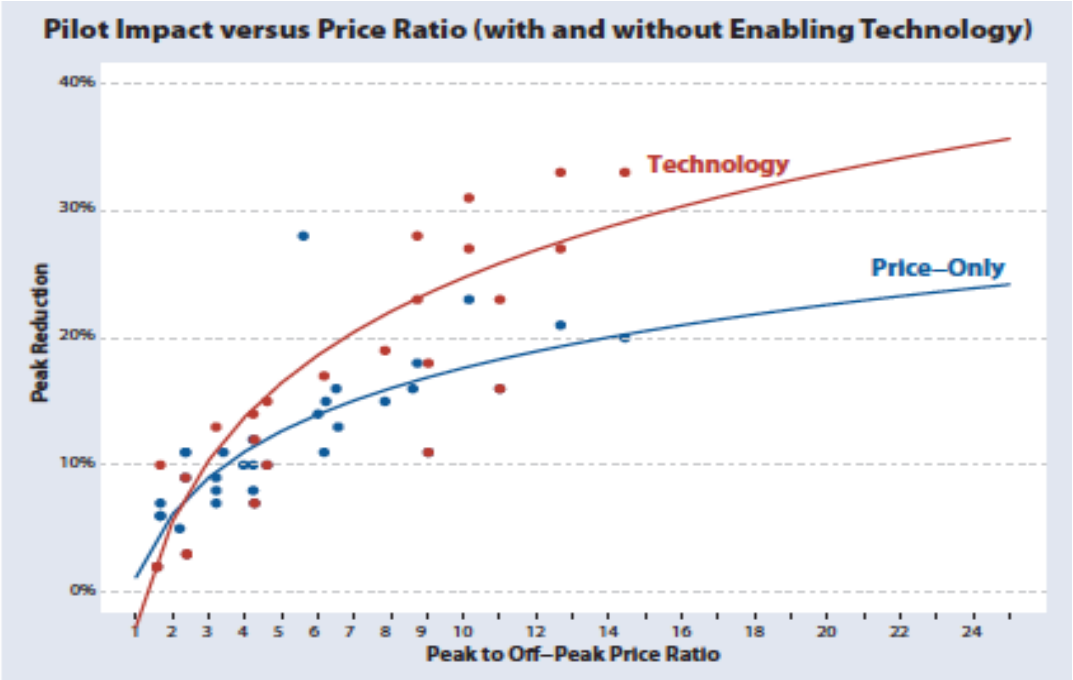


Figure 2



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Q. HAVE ANY MORE RECENT STUDIES PRODUCED SIMILAR RESULTS TO THE METASTUDY OF EARLY TIME-VARYING PRICING PILOTS?

A. Yes. One of the more detailed recent studies was undertaken to evaluate the effectiveness and general suitability of different time-varying rate designs for deployment as default residential TOU rates in California.[6] One aspect of this evaluation included a study of how the use of smart thermostats influenced customer responsiveness in the territory of Southern California Edison ("SCE") for one of the rate structures being tested. These so-called "technology" customers responded better than customers that did not utilize smart thermostats. Figure 3 shows the incremental impacts of technology-enabled response in terms of the percentage and peak demand impacts. In Figure 3 positive values represent load reductions (*e.g.*, during peak hours) while negative values represent load increases (*e.g.*, during super off-peak time periods). The shaded cells indicate that the referenced incremental impact was not statistically significant.[7]

[6] The term "default" in this context refers to the standard residential rate on which all customers are placed.
[7] Figure 3 is sourced from Nexant. California Statewide Opt-in Time-Of-Use Pricing Pilot: Final Report. March 30, 2018. Table 4.3-4 at p. 80, *available at*: https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442457172.

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Figure 3: SCE Incremental Technology-Aided Load Impacts

Day Type	Period	Hours	Technology		
			Ref. kW	Impact kW	% Impact
Average Weekday	Peak	2 PM to 8 PM	1.99	0.13	6.7%
	Off Peak	8 AM to 2 PM, 8 PM to 10 PM	1.34	0.06	4.4%
	Super Off Peak	10 PM to 8 AM	0.91	-0.05	-5.2%
	Day	All Hours	1.32	0.03	2.5%
Average Weekend	Off Peak	8 AM to 10 PM	1.75	0.07	4.2%
	Super Off Peak	10 PM to 8 AM	0.93	-0.04	-4.8%
	Day	All Hours	1.41	0.02	1.7%
Monthly System Peak Day	Peak	2 PM to 8 PM	3.06	0.14	4.7%
	Off Peak	8 AM to 2 PM, 8 PM to 10 PM	2.04	0.04	1.8%
	Super Off Peak	10 PM to 8 AM	1.21	-0.11	-8.7%
	Day	All Hours	1.95	0.00	0.2%

Q. COULD THE USE OF ENABLING TECHNOLOGIES EXTEND BEYOND SMART THERMOSTATS?

A. Absolutely. A smart thermostat program that targets winter electric heating load or summer air-conditioning load (or both) is limited in terms of overall load impact because it can only address the space conditioning end use, and is capped at an amount of customer load associated with this end use. For instance, winter peak load reduction potential will be confined to electric heating use and fail to address other loads that contribute to early morning winter peaks from either electric heating or non-electric heating customers.

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Energy storage as an enabling technology offers a much broader reach that extends to non-space conditioning loads and presents the opportunity to not only reduce on-site loads but also export to the grid. So-called Bring Your Own Battery ("BYOB") or Bring Your Own Device ("BYOD") programs have been deployed by numerous utilities under models that utilize full dispatch of the energy storage capacity during winter and summer peak load conditions. A BYOB or similar program in South Carolina for the same purpose, with the additional benefit that enrolled energy storage devices could be used for more general TOU rate management by participating customers. **Exhibit JRB-3** contains a table providing high-level details on several state and utility programs for dispatchable customer-owned battery systems.[8]

Q. HOW SHOULD THE COMMISSION REGARD THE USE AND SUPPORT OF ENABLING TECHNOLOGIES AS A COMPONENT OF SOLAR CHOICE TARIFF PROPOSALS?

A. The Commission should recognize that enabling technologies, including but not limited to smart thermostats and energy storage, increase the ability of consumers to respond to time-varying rates, and can consequently play an important supporting role in achieving the balance of cost of service alignment and a sustained private investment in DERs that the Legislature sought in enacting Act 62. In implementing this recognition, the Commission should view measures that

[8] *See*, New Jersey Board of Public Utilities, Docket No. EO18101111, Direct Testimony of Justin R. Barnes on Behalf of Sunrun Inc. Public Version at pp 22-23, Exhibit JRB-2 Table 2: Residential BYOD Program Examples" (Sept. 4, 2020) (listing multiple state and utility programs for customer owned batteries (*i.e.*, BYOB) to provide peak reduction benefits).

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attempt to facilitate DER customers' ability to adapt to new rate structures as tools that can be harnessed to produce a win-win outcome for both DER and non-DER customers and seek to foster solutions that address both sides of the cost-benefit and cost-shift equation.

Q. WHEN YOU SAY A "WIN-WIN OUTCOME" DO YOU MEAN THAT NON-PARTICIPANT CUSTOMERS WOULD ALSO BENEFIT FROM THE USE OF ENABLING TECHNOLOGIES BY DER CUSTOMERS?

A. Yes. Assuming that a program that provides support for customer use of enabling technologies is cost-effective, non-participant customers accrue benefits in the form of reductions in future costs (*i.e.,* avoided costs) that ultimately translate to lower rates. The "win-win outcome" in this context is that both DER customers and non-DER customers are better off if DER customers participate in a program supportive of the use of enabling technology to improve responsiveness to time-varying price signals.

B. Solar BOYT EE Incentive in the Context of the Solar Choice Tariffs

Q. WHAT ARE THE MAJOR CHARACTERISTICS OF THE SOLAR BYOT EE INCENTIVE DEFINED IN THE MOU?

A. The Solar BYOT EE Incentive would provide a total incentive of $0.39/W-DC of solar DER installed capacity to customers eligible for Schedule RE (electric heating) that install a qualifying smart thermostat and participate in the program for a period of 25 years. While the MOU does not expressly say so, the program appears to operate similar to a utility-controlled air-conditioner cycling program

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because the MOU provides for recapture of a pro-rated portion of the incentive if a customer "overrides more than the Winter BYOT program allows[.]" One could look at the program as a purchase of long-term winter demand response ("DR") capacity by the Companies, which is actually quite similar to the growing number of energy storage BYOB program designs that I previously mentioned. The smart thermostat itself could of course be used by the customer outside of the program to more generally manage the timing of energy use for space conditioning under the time-varying rate design of the Companies proposed Solar Choice Tariffs.

Q. PLEASE BRIEFLY DESCRIBE THE COMPONENTS OF THE COMPANIES' PROPOSED SOLAR CHOICE TARIFFS AS THEY COMPARE TO THE CURRENT RETAIL NET METERING STRUCTURE FOR RESIDENTIAL CUSTOMERS.

A. There are numerous aspects of the proposed Solar Choice Tariffs that considerably diminish the effective value of DERs to customers relative to net metering, as follows:

- Monthly rollover takes place at the avoided cost rate rather than the retail rate as a kWh credit.
- The value of solar generation used immediately on-site is reduced slightly relative to the current standard tariffs based on the off-peak (*i.e.*, daytime) pricing of the TOU rates relative to standard non-TOU rates.

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- The On-Peak rate design will charge DER customers substantially more than standard rates for evening (6 – 9 PM) and winter morning use (6 – 9 AM from December – February) that is largely outside of solar production periods.
- The CPP aspect of the rate structure results in even higher prices than the On-Peak periods if customers cannot minimize electricity use during times of particular high demand.
- DER customers will pay an incrementally higher monthly basic facilities charge ("BFC") due to the TOU rate requirement.
- DER customers will pay fixed non-bypassable fees based on system size for certain "public purpose" type charges that are volumetric under standard rates.
- DER customers are subject to a monthly minimum bill ("MMB") of $30, which is significantly in excess of the otherwise applicable BFC.
- The Grid Access Fee ("GAF") applied to system nameplate capacity in excess of 15 kW-DC reduces economics for the largest solar systems that might otherwise benefit from economies of scale.

Q. HOW DO THESE CHANGES COMPARE TO NET METERING SUCCESSOR REGIMES THAT HAVE BEEN ADOPTED IN OTHER JURISDICTIONS?

A. Taken together, they are considerably more complex and far-reaching than successor regimes adopted in a number of some of the higher penetration solar markets. In Table 1 I show the attributes of several of these successor regimes in comparison to the Companies' proposed Solar Choice Tariffs, with DEC and DEP

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listed at the bottom of the table. As shown in Table 1, while a number of the jurisdictions check off one or more "boxes" in terms of setting special conditions for DER service, none cover nearly as much ground as the Companies' proposed Solar Choice Tariffs. For instance, no successor regime (including those in some jurisdictions not reflected in Table 1) requires DER customers to take service under a CPP rate, let alone in combination with an incremental minimum bill and a reduction in the rollover rate for monthly excess generation.[9]

Table 1: Comparison of NEM Successor Attributes

State/Utility	TOU	CPP	NBC/PP Charges	Added DER Minimum Bill	Grid Access Charge	Monthly Rollover Practice
Arizona (APS)	Yes	No	Gross Imports	No	$0.93/kW	Monetary Export Rate
Arizona (TEP)	No	No	Gross Imports	No	No	Monetary Export Rate
California	Yes	No	Gross Imports	No	No	Retail by TOU Period
Hawaii	No	No	Gross Imports	No	No	Monetary Export Rate
Massachusetts	No	No	Net Monthly Use	Potentially, for on-peak use	No	Retail Less Public Purpose Charges
Nevada	No	No	Gross Imports	No	No	75% of Retail Rate[10]
New Hampshire	No	No	Gross Imports	No	No	Retail Less 75% of Distribution Rate
New York	No	No	$0.69 - $1.09/kW	No	No	Retail Rate
Texas (EPE)	No	No	Net Monthly Use	$30.00 (Std); $26.50 (TOU)	No	Avoided Cost
Vermont	No	No	Total Monthly Use	No	No	Retail Rate
South Carolina (DEC)	Yes	Yes	$0.42/kW	$30.00	$5.86/kW (15 kW or larger)	Avoided Cost
South Carolina (DEP)	Yes	Yes	$0.49/kW	$30.00	$3.95/kW (15 kW or larger)	Avoided Cost

[9] California and Hawaii both use minimum bills for residential customers that are higher than the monthly fixed charge, but DER customers pay the same minimum bill as non-DER customers.
[10] Current rate. Successor started at 95% of retail and declined in accordance with installed capacity benchmarks.

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Q. PLEASE EXPLAIN WHY YOU LIMITED TABLE 1 TO WHAT YOU REFER TO AS "HIGH PENETRATION" STATES.

A. There are two main reasons. First, states with relatively higher net metering penetration offer a better comparison to South Carolina than those with lower penetration rates because they represent states where the DER industry is larger and therefore has a more significant economic impact. In other words, they are jurisdictions where the potential negative economic impacts may have influenced decisions even if evaluations did not expressly consider economic impacts as Act 62 requires the Commission to do.

Second, including jurisdictions with lower DER penetration rates that have in some cases adopted highly punitive DER compensation regimes would be incomplete without also including other jurisdictions, including those with sizable DER penetration (*e.g.*, New Jersey, Maryland), that continue to offer traditional retail net metering without additional conditions or charges.

Q. ARE THERE ANY ASPECTS OF THE PROPOSED SOLAR CHOICE TARIFFS THAT COULD BE PARTICULARLY PROBLEMATIC OR PUNITIVE FOR DER CUSTOMERS WITHOUT THE SUPPORT OF ENABLING TECHNOLOGIES?

A. Yes. Both the annual and winter on-peak periods, which run from 6 – 9 PM year-round and 6 – 9 AM from December – February, are primarily during hours of little or no solar production. Consequently, solar DER customers will not be able to rely "passively" on production from an on-site solar system to reduce their net

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usage during these time periods. The on-peak hours also align with time periods where home occupancy and space conditioning needs may be inconsistent from day to day and many things are competing for the attention of residents. A programmable thermostat provides some level of assistance in managing space conditioning use under these conditions, but a smart thermostat provides a more flexible management platform because it allows adjustments to be made any time from any location (*e.g.*, if schedules shift). In addition, a smart thermostat can be utilized to provide an automatic and specialized response to CPP events, which cannot be easily "programmed" into a simple programmable thermostat because they are typically not known with much advance notice.

Furthermore, the 6 – 9 AM winter on-peak period places customers with electric heating at a potentially significant disadvantage because electric heating loads tend to be large, less discretionary than other uses, and are likely to consistently fall within the on-peak period, as well as any CPP events that are called during the winter. The impacts of CPP events could be particularly pronounced because a winter CPP event is likely to be on the coldest winter mornings when air source heat pumps are less effective and auxiliary resistance heating is employed. In other words, a typical winter CPP event is likely to align with times when the space conditioning need is greatest and the electric heating mechanism is least efficient. This combination could result in extraordinarily large and volatile bills during some winter months. Managing the winter on-peak period and winter CPP events will be a critical aspect of DER economics, and the

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use of a smart thermostat will in turn be critical to helping customers accomplish this peak management.

Q. PLEASE SUMMARIZE HOW THE SOLAR BYOT EE INCENTIVE ADDRESSES THE CHALLENGES YOU HAVE IDENTIFIED FOR DER ECONOMICS OF THE PROPOSED SOLAR CHOICE TARIFFS.

A. It effectively kills three birds with one stone. First, the up-front "incentive" aspect works to offset at least a portion of the reduction in the DER value proposition for prospective customers. Second, it provides a pathway to the use of enabling technology that will assist consumers in responding to the price signals sent by the TOU and CPP rate structure, in particular customers that utilize electric heating. Finally, it provides the Company with a valuable service in the form of long-term committed winter DR capacity that benefits all ratepayers. An energy storage program under the BYOB model could further enhance DER customers' ability to install energy storage and respond to the TOU and CPP rate structures, while also providing additional long-term committed DR capacity.

III. CONCLUSION

Q. WHAT ARE YOUR GENERAL IMPRESSIONS OF THE SOLAR CHOICE TARIFF MOU AND STIPULATION?

A. I think it is fair to view both collectively as fairly unique in the arena of policy discussions of net metering, DER compensation, and cost shifts, which tend to be highly antagonistic. The end result is more complex than any other DER tariff regime that I am aware of, but I regard the complexity to some degree as a

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positive attribute because it illustrates the results than can be achieved by collaborative, creative problem solving. Nowhere is this more evident than in the inclusion of the Solar BYOT EE Incentive, which addresses a perceived system need while also providing an avenue for customers to adapt more effectively to the CPP TOU rate design and supporting the economics of future DER installations.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS TO THE COMMISSION?

A. The Commission should consider the Solar BYOT EE Incentive to be a critical component of the Companies' proposed Solar Choice Tariffs and their ability to achieve Act 62 goals of enabling continued private investment in DERs, avoiding disruption of the DER industry, and eliminating any identified cost-shift associated with net metering to the greatest extent practical. The Commission should also more generally recognize the important role that enabling technologies such as smart thermostats and energy storage can play in addressing both DER customers' ability to adapt to new rate structures and alleged net metering cost-shifts, and seek solutions that utilize all such potential tools to the greatest degree possible.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

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JUSTIN R. BARNES

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EDUCATION

Michigan Technological University Houghton, Michigan
Master of Science, Environmental Policy, August 2006
Graduate-level work in Energy Policy.

University of Oklahoma Norman, Oklahoma
Bachelor of Science, Geography, December 2003
Area of concentration in Physical Geography.

RELEVANT EXPERIENCE

Director of Research, July 2015 – present
Senior Analyst & Research Manager*,* March 2013 – July 2015
EQ Research, LLC and Keyes, Fox & Wiedman, LLP Cary, North Carolina

- Oversee state legislative, regulatory policy, and general rate case tracking service that covers policies such as net metering, interconnection standards, rate design, renewables portfolio standards, state energy planning, state and utility incentives, tax incentives, and permitting. Responsible for service design, formulating improvements based on client needs, and ultimate delivery of reports to clients. Expanded service to cover energy storage.
- Oversee and perform policy research and analysis to fulfill client requests, and for internal and published reports, focused primarily on drivers of distributed energy resource (DER) markets and policies.
- Provide expert witness testimony on topics including cost of service, rate design, distributed energy resource (DER) value, and DER policy including incentive program design, rate design issues, and competitive impacts of utility ownership of DERs.
- Managed the development of a solar power purchase agreement (PPA) toolkit for local governments, a comprehensive legal and policy resource for local governments interested in purchasing solar energy, and the planning and delivery of associated outreach efforts.

Senior Policy Analyst, January 2012 – May 2013;
Policy Analyst*,* September 2007 – December 2011
North Carolina Solar Center, N.C. State University Raleigh, North Carolina

- Responsible for researching and maintaining information for the Database of State Incentives for Renewables and Efficiency (DSIRE), the most comprehensive public source of renewables and energy efficiency incentives and policy data in the United States.
- Managed state-level regulatory tracking for private wind and solar companies.
- Coordinated the organization's participation in the SunShot Solar Outreach Partnership, a U.S. Department of Energy project to provide outreach and technical assistance for local governments to develop and transform local solar markets.
- Developed and presented educational workshops, reports, administered grant contracts and associated deliverables, provided support for the SunShot Initiative, and worked with diverse group of project partners on this effort.
- Responsible for maintaining the renewable portfolio standard dataset for the National Renewable Energy Laboratory for use in its electricity modeling and forecasting analysis.
- Authored the *DSIRE RPS Data Updates*, a monthly newsletter providing up-to-date data and historic compliance information on state RPS policies.

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- Responded to information requests and provided technical assistance to the general public, government officials, media, and the energy industry on a wide range of subjects, including federal tax incentives, state property taxes, net metering, state renewable portfolios standard policies, and renewable energy credits.
- Extensive experience researching, understanding, and disseminating information on complex issues associated with utility regulation, policy best practices, and emerging issues.

SELECTED ARTICLES and PUBLICATIONS

- EQ Research and Synapse Energy Economics for Delaware Riverkeeper Network. *Envisioning Pennsylvania's Energy Future*. 2016.
- Barnes, J., R. Haynes. *The Great Guessing Game: How Much Net Metering Capacity is Left?*. September 2015. Published by EQ Research, LLC.
- Barnes, J., Kapla, K. *Solar Power Purchase Agreements (PPAs): A Toolkit for Local Governments*. July 2015. For the Interstate Renewable Energy Council, Inc. under the U.S. DOE SunShot Solar Outreach Partnership.
- Barnes, J., C. Barnes. *2013 RPS Legislation: Gauging the Impacts*. December 2013. Article in Solar Today.
- Barnes, J., C. Laurent, J. Uppal, C. Barnes, A. Heinemann. *Property Taxes and Solar PV: Policy, Practices, and Issues*. July 2013. For the U.S. DOE SunShot Solar Outreach Partnership.
- Kooles, K, J. Barnes. *Austin, Texas: What is the Value of Solar; Solar in Small Communities: Gaston County, North Carolina*; and *Solar in Small Communities: Columbia, Missouri*. 2013. Case Studies for the U.S. DOE SunShot Solar Outreach Partnership.
- Barnes, J., C. Barnes. *The Report of My Death Was An Exaggeration: Renewables Portfolio Standards Live On*. 2013. For Keyes, Fox & Wiedman.
- Barnes, J. *Why Tradable SRECs are Ruining Distributed Solar*. 2012. Guest Post in Greentech Media Solar.
- Barnes, J., multiple co-authors. *State Solar Incentives and Policy Trends*. Annually for five years, 2008-2012. For the Interstate Renewable Energy Council, Inc.
- Barnes, J. *Solar for Everyone?* 2012. Article in Solar Power World On-line.
- Barnes, J., L. Varnado. *Why Bother? Capturing the Value of Net Metering in Competitive Choice Markets*. 2011. American Solar Energy Society Conference Proceedings.
- Barnes, J. *SREC Markets: The Murky Side of Solar*. 2011. Article in State and Local Energy Report.
- Barnes, J., L. Varnado. *The Intersection of Net Metering and Retail Choice: an overview of policy, practice, and issues*. 2010. For the Interstate Renewable Energy Council, Inc.

TESTIMONY & OTHER REGULATORY ASSISTANCE

South Carolina Public Service Commission. Docket No. 2020-229-E. January 2021. On behalf of the Solar Energy Industries Association and the North Carolina Sustainable Energy Association. Docket for establishing a Solar Choice tariff for customers of Dominion Energy South Carolina. Provided an analysis of the proposed Solar Choice tariff from the standpoint of NEM successor best practices, alignment with the enabling statute, and cost of service basis. Offered an alternative Solar Choice tariff proposal based on this analysis.

Virginia State Corporation Commission. Docket No. PUR-2020-00134. January 2021. On behalf of the Behind the Meter Solar Alliance. Docket for Dominion Virginia's 2020 RPS Plan. Offered testimony supporting the designation of small-scale resource carve-out eligibility being limited to behind the meter resources, based on the underlying Virginia statute and other public policy reasons.

South Carolina Public Service Commission. Docket No. 2019-182-E. October 2020. On behalf of the Solar Energy Industries Association and the North Carolina Sustainable Energy Association. Docket for establishing a cost-benefit analysis methodology and protocols for net metering and DERs. Provided

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discussion of historic regulatory use of DG cost-benefit and cost of service studies, how results should be viewed, and a discussion of the role of economic benefits and resiliency in DER cost-benefit analyses.

Kentucky Public Service Commission. Docket No. 2020-00174. October 2020. On behalf of the Kentucky Solar Industries Association. Kentucky Power general rate case. Provided an evaluation and critique of the cost of service support for, and design of, Kentucky Power's proposed net metering successor tariff and offered recommendations for developing cost-based DER rate designs. Also recommended changes to the utility's QF tariff and calculation of capacity costs.

New Jersey Board of Public Utilities. Docket No. EO18101111. September 2020. On behalf of Sunrun, Inc. Public Service Gas and Electric energy storage deployment plan proposal. Offered alternative proposal for a program utilizing non-utility owned energy storage assets under an aggregator model with elements for benefits sharing and ratepayer risk reduction.

Virginia State Corporation Commission. Docket No. PUR-2020-00015. July 2020. On behalf of Appalachian Voices. Appalachian Power Company general rate case. Analysis of the cost basis for the residential customer charge, the Company's winter declining block rate proposal, and a proposed Coal Asset Retirement Rider (Rider CAR) providing for advance collection of anticipated accelerated depreciation of coal generation assets. Provided an alternative residential customer charge recommendation and an alternative rates proposal for addressing winter bill volatility for electric heating customers.

North Carolina Utilities Commission. Docket No. E-7 Sub 1219. April 2020. On behalf of the North Carolina Sustainable Energy Association. Duke Energy Progress general rate case. Provided analysis of available rate options for electric vehicle charging and recommended the adoption of residential and non-residential EV-specific rate options and appropriate design characteristics for those rate options.

North Carolina Utilities Commission. Docket No. E-7 Sub 1214. January 2020. On behalf of the North Carolina Sustainable Energy Association. Duke Energy Carolinas general rate case. Provided analysis of available rate options for electric vehicle charging and recommended the adoption of residential and non-residential EV-specific rate options and appropriate design characteristics for those rate options.

Virginia State Corporation Commission. Docket No. PUR-2019-00060. November 2019. On behalf of Appalachian Voices. Old Dominion Power Company general rate case application. Analysis of the cost basis for the residential customer charge, proposal to change the residential customer charge from a monthly charge to a daily charge, and design of proposed customer green power program and utility owned commercial behind the meter solar proposal. Proposed modified optional rate structure for mid- to large-size non-residential customers with on-site solar and/or low load factors.

Georgia Public Service Commission. Docket No. 42516. October 2019. On behalf of Georgia Interfaith Power and Light, Southface Energy Institute, and Vote Solar. Georgia Power Company general rate case application. Analysis of the cost basis for the residential customer charge, the validity of the utility's minimum-intercept study, and a proposal to change the residential customer charge from a monthly charge to a daily charge.

Hawaii Public Utilities Commission. Docket No. 2018-0368. July 2019. On behalf of the Hawaii PV Coalition. Hawaii Electric Light Company (HELCO) general rate case application. Provided analysis of HELCO's proposed changes to its decoupling rider to make the decoupling charge non-bypassable and the alignment of the proposed modifications with state policy goals and the policy rationale for decoupling.

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Virginia State Corporation Commission. Docket No. PUR-2019-00067. July 2019.* On behalf of the Southern Environmental Law Center. Appalachian Power Company residential electric vehicle (EV) rate proposal. Provided review and analysis of the proposal and developed comments discussing principles of time-of-use (TOU) rate design and proposing modifications to the Company's proposal to support greater equity among rural ratepayers and greater rate enrollment. ***This work involved comment preparation rather than testimony.**

New York Public Service Commission. Case No. 19-E-0065. May 2019. On behalf of The Alliance for Solar Choice. Consolidated Edison (ConEd) general rate case application. Provided review and analysis of the competitive impacts and alignment with state policy of ConEd's energy storage, distributed energy resource management system, and earnings adjustment mechanism (EAM) proposals. Proposed model for improving the utilization of customer-sited storage in existing demand response programs and an alternative EAM supportive of utilization of third party-owned battery storage.

South Carolina Public Service Commission. Docket No. 2018-318-E. March 2019. On behalf of Vote Solar. Duke Energy Progress general rate case application. Analysis of the cost basis for the residential customer charge and validity of the utility's minimum system study, AMI-enabled rate design plans, excess deferred income tax rider rate design, and grid modernization rider proposal, including the reasonableness of the program, class distribution of costs and benefits, and cost allocation.

South Carolina Public Service Commission. Docket No. 2018-319-E. February 2019. On behalf of Vote Solar. Duke Energy Carolinas general rate case application. Analysis of the cost basis for the residential customer charge and validity of the utility's minimum system study, AMI-enabled rate design plans, excess deferred income tax rider rate design, and grid modernization rider proposal, including the reasonableness of the program, class distribution of costs and benefits, and cost allocation.

New Orleans City Council. Docket No. UD-18-07. February 2019. On behalf of the Alliance for Affordable Energy. Entergy New Orleans general rate case application. Analysis of the cost basis for the residential customer charge, rate design for AMI, DSM and Grid Modernization Riders, and DSM program performance incentive proposal. Developed recommendations for the residential customer charge, rider rate design, and a revised DSM performance incentive mechanism.

New Hampshire Public Utilities Commission. Docket No. DE 17-189. May 2018. On behalf of Sunrun Inc. Review of Liberty Utilities application for approval of customer-sited battery storage program, analysis of time-of-use rate design, program cost-benefit analysis, cost-effectiveness of utility-owned vs. non-utility owned storage assets. Developed a proposal for an alternative program utilizing non-utility owned assets under an aggregator model with elements for benefits sharing and ratepayer risk reduction.

North Carolina Utilities Commission. Docket No. E-7 Sub 1146. January 2018. On behalf of the North Carolina Sustainable Energy Association. Duke Energy Carolinas general rate case application. Analysis of the cost basis for the residential customer charge and validity of the utility's minimum system study, allocation of coal ash remediation costs, and grid modernization rider proposal, including the reasonableness of the program, class distribution of costs and benefits, and cost allocation.

Ohio Public Utilities Commission. Docket No. 17-1263-EL-SSO. November 2017*. On behalf of the Ohio Environmental Council. ***Testimony prepared but not filed due to settlement in related case.** Duke Energy Ohio proposal to reduce compensation to net metering customers. Provided analysis of capacity value of solar net metering resources in the PJM market and distribution of that value to customers. Also analyzed the cost basis of the utility proposal for recovery of net metering credit costs, focused on PJM settlement protocols and how the value of DG customer exports is distributed among ratepayers, load-serving entities, and distribution utilities based on load settlement practices.

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North Carolina Utilities Commission, Docket No. E-2 Sub 1142. October 2017. On behalf of the North Carolina Sustainable Energy Association. Duke Energy Progress general rate case application. Analysis of the cost basis for the residential customer charge and validity of the utility's minimum system study, allocation of coal ash remediation costs, and advanced metering infrastructure deployment plans and cost-benefit analysis.

Public Utility Commission of Texas, Control No. 46831. June 2017. On behalf of the Energy Freedom Coalition of America. El Paso Electric general rate case application, including separate DG customer class. Analysis of separate DG rate class and rate design proposal, cost basis, DG load research study, and analysis of DG costs and benefits, and alignment of demand ratchets with cost causation principles and state policy goals, focused on impacts on customer-sited storage.

Utah Public Service Commission, Docket No. 14-035-114. June 2017. On behalf of Utah Clean Energy. Rocky Mountain Power application for separate distributed generation (DG) rate class. Provided analysis of grandfathering of existing DG customers and best practices for review of DG customer rates and DG value. Developed proposal for addressing revisions to DG customer rates in the future.

Colorado Public Utilities Commission, Proceeding No. 16A-0055E. May 2016. On behalf of the Energy Freedom Coalition of America. Public Service Company of Colorado application for solar energy purchase program. Analysis of program design from the perspective of customer demand and needs, and potential competitive impacts. Proposed alternative program design.

Public Utility Commission of Texas, Control No. 44941. December 2015. On behalf of Sunrun, Inc. El Paso Electric general rate case application, including separate DG customer class. Analysis of separate rate class and rate design proposal, cost basis, DG load research study, and analysis of DG costs and benefits.

Oklahoma Corporation Commission, Cause No. PUD 201500271. November 2015. On behalf of the Alliance for Solar Choice. Analysis of Oklahoma Gas & Electric proposal to place distributed generation customers on separate rates, rate impacts, cost basis of proposal, and alignment with rate design principles.

South Carolina Public Service Commission, Docket No. 2015-54-E. May 2015. On behalf of The Alliance for Solar Choice. South Carolina Electric & Gas application for distributed energy programs. Alignment of proposed programs with distributed energy best practices throughout the U.S., including incentive rate design and community solar program design.

South Carolina Public Service Commission, Docket No. 2015-53-E. April 2015. On behalf of The Alliance for Solar Choice. Duke Energy Carolinas application for distributed energy programs. Alignment of proposed programs with distributed energy best practices throughout the U.S., including incentive rate design and community solar program design.

South Carolina Public Service Commission, Docket No. 2015-55-E. April 2015. On behalf of The Alliance for Solar Choice. Duke Energy Progress application for distributed energy programs. Alignment of proposed programs with distributed energy best practices throughout the U.S., including incentive rate design and community solar program design.

South Carolina Public Service Commission, Docket No. 2014-246-E. December 2014. On behalf of The Alliance for Solar Choice. Generic investigation of distributed energy policy. Distributed energy best practices, including net metering and rate design for distributed energy customers.

AWARDS, HONORS & AFFILIATIONS

- Solar Power World Magazine, Editorial Advisory Board Member (October 2011 – March 2013)

- Michigan Tech Finalist for the Midwest Association of Graduate Schools Distinguished Masters Thesis Awards (2007)
- Sustainable Futures Institute Graduate Scholar Michigan Tech University (2005-2006)

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BEFORE THE SOUTH CAROLINA PUBLIC SERVICE COMMISSION
DOCKET NO. 2020-264-E
DOCKET NO. 2020-265-E

In the Matter of:	**)**
Duke Energy Carolinas, LLC and	**)**
Duke Energy Progress, LLC's	**)**
Establishment of Solar Choice	**)**
Metering Tariffs Pursuant to S.C.	**)**
Code Ann. Section 58-40-20	**)**

DIRECT TESTIMONY OF
JUSTIN R. BARNES
ON BEHALF OF
NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION AND
SOLAR ENERGY INDUSTRIES ASSOCIATION

EXHIBIT JRB-2

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MEMORANDUM OF UNDERSTANDING

This **MEMORANDUM OF UNDERSTANDING** (this "MOU") is made as of September 16, 2020 (the "Effective Date"), by and among Duke Energy Carolinas, LLC ("DEC"); Duke Energy Progress, LLC ("DEP" and together with DEC, the "Companies"); North Carolina Sustainable Energy Association; Southern Environmental Law Center on behalf of South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, and Upstate Forever; Sunrun Inc.; and Vote Solar (collectively, "Clean Energy Advocates") (the Clean Energy Advocates together with the Companies are referred to as the "Parties" and individually as a "Party").

Background: S.C. Act No. 62 of 2019 ("Act 62") requires the Public Service Commission of South Carolina (the "PSCSC") to approve requirements for a new net energy metering ("NEM") program in South Carolina (the "Solar Choice Program"). The Companies are required to submit to the PSCSC proposed tariffs for both residential and non-residential customers under the Solar Choice Program (each such tariff, a "Solar Choice Tariff").

The Parties have worked in good-faith to develop a common set of terms to (i) advance the next generation of NEM under Act 62, (ii) provide customers an opportunity to manage demand and reduce strain on the power grid, and (iii) ensure a better energy future in North Carolina and South Carolina. The Parties describe herein the proposed, comprehensive resolution of issues related to the Solar Choice Tariffs.

The Parties intend to work collaboratively to advance the terms of this MOU, including engaging other stakeholders on this matter in advance of filing the Solar Choice Tariffs in South Carolina and to obtain the PSCSC and the North Carolina Utilities Commission ("NCUC") approvals necessary to effectuate this MOU. The Parties ultimately desire to avoid a contentious adversarial proceeding before the PSCSC or the NCUC by collaborating to implement the Solar Choice Tariffs within the spirit of Act 62 and North Carolina law.

This MOU sets forth certain non-binding understandings and certain binding agreements among the Parties intended to cooperatively advance the Solar Choice Program. Except as expressly set forth in the section of this MOU titled "Binding Agreements," nothing in this MOU constitutes a legally binding agreement of the Parties.

NON-BINDING UNDERSTANDINGS

The following paragraphs numbered 1 through 5 in this non-binding understandings section do not constitute legally binding agreements of any Party.

1. The Companies would propose interim Solar Choice Tariffs (the "Interim Solar Choice Tariffs") to the PSCSC upon the terms and conditions on Exhibit A. The Interim Solar Choice Tariffs would be available for customers submitting applications for the Solar Choice Program from June 1, 2021, through and including December 31, 2021.

2. The Companies would propose permanent Solar Choice Tariffs (the "Permanent Solar Choice Tariffs") to the PSCSC upon the terms and conditions on Exhibit B. The Permanent

Solar Choice Tariffs would be available to customers submitting applications for the Solar Choice Program after December 31, 2021.

3. The Companies would propose incentives (the "Incentives") in conjunction with the Permanent Solar Choice Tariffs to the PSCSC and the NCUC upon the terms and conditions on Exhibit C.

4. The Parties would also undertake the following:

a. The Companies would explore a Solar Choice program tailored to low-income customers as a potential future energy efficiency ("EE") or demand response program, in consultation with stakeholders.

b. The Parties would review and provide feedback on the Companies' marketing materials and disclosures for customers to ensure customer communications are transparent and understandable, and that customers are educated on the Solar Choice Tariffs and Incentives, including the mechanics of the rate structure therein.

c. The Companies agree to be included in a list of supporters for efforts in South Carolina to pass a residential property tax exemption via budget proviso or standalone legislation in the 2021 legislative session. This does not obligate the Companies to lobby for or otherwise explain the rationale for such exemption to legislators or policy makers. This support is only available if no new net metering-related legislation by efforts of the Parties is pending when the property tax exemption is proposed. In addition, the Companies shall have the right to review and approve any written documents that list it as a supporter.

d. The Parties would support the classification of the Companies' costs to pursue and effectuate the proposed resolution described in this MOU as appropriate for deferral and recovery consistent with Sections 15 and 16 of Act 62.

e. The Parties would support the proper collection of monthly avoided cost bill credits through the Fuel Clause.

f. Under the proposed resolution, at the transfer year (2025 for NEM customers under Act 236 and 2029 Solar Choice Program customers under Act 62), existing NEM solar customers would be given the option to switch to the Permanent Solar Choice Tariffs. If the NEM solar customers elect not to be on that rate, they could stay on the standard residential tariff but any volumetric price increase after the transfer year would be placed in a non-bypassable charge based on their system size for the remaining life of the system, as well as be put on monthly netting. The existing NEM customer would also be assessed a minimum bill set at $10 more than the Basic Facilities Charge ("BFC") at that time. This minimum bill will be applied in the same manner as the Monthly Minimum Bill ("MMB") in the Permanent Solar Choice Tariffs, in that it will recover customer and distribution

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costs. The minimum bill charge is reduced by the Basic Facilities Charge (BFC) and the portion of the customer's monthly volumetric energy charges specific to customer and distribution costs.

5. **Interconnection**. The Companies and Sunrun Inc. intend to continue to work together to enhance and streamline NEM interconnection processes in South Carolina.

BINDING AGREEMENTS

The following paragraphs numbered 1 through 9 in this binding agreements section are the only binding agreements of the Parties in this MOU.

1. **Advocacy**. All Parties will support and advocate for the approval of the proposed resolution described in this MOU before media, stakeholders, social media outlets, the PSCSC, Office of Regulatory Staff, NCUC, and Public Staff. Regardless of whether the proposed resolution is approved by the PSCSC or the NCUC or both, no Party will publicly disparage the efforts of any other Party relating to the proposed resolution or this MOU.

2. **Media**. During ongoing negotiations and during subsequent stakeholder engagement (pre-filing or post-filing of NEM-related filings at the PSCSC or NCUC), the Parties agree to positively characterize each other's collaboration at public events and in the media (including social media) and will refer to this proposal as the next evolution of retail rate NEM and a major advancement to the solar industry and energy efficiency efforts in South Carolina and/or North Carolina. The Parties agree to cooperate in good faith and in support of all required approvals of this effort and each other on this matter until the time the PSCSC and the NCUC issue a final order.

3. **Joinder**. The Parties acknowledge and agree that additional entities (each, a "Joining Party") may, from time to time, execute a Joinder Agreement (a "Joinder") substantially in the form of Exhibit D to join the Parties' collaborative efforts under this MOU. The Parties further acknowledge that upon agreement by the Parties, execution of such a Joinder by DEC, DEP, and a Joining Party, such Joining Party shall be considered a "Party" hereunder without any further action on behalf of the other Parties.

4. **Governing Law**. This MOU shall be governed by the laws of the State of South Carolina, excluding its conflict of laws principles. Any claim or action arising out of or relating to this letter of intent shall be commenced and heard in the state and federal courts for Greenville County, South Carolina, and the Parties consent and submit to the jurisdiction and venue of those courts.

5. **Relationship between the Parties**. Nothing in this MOU shall be construed as creating a partnership, association or joint venture between or among any Parties. No Party shall have any power or authority to enter into any commitment on behalf of or otherwise bind any other on any matter. No employee of Party shall be deemed to be an employee of any other.

6. **No Assignment**. Neither this MOU, nor any rights or obligations hereunder, may be assigned, delegated, or conveyed by any Party without prior written consent of each other Party.

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7. **No Third-Party Beneficiaries**. Nothing herein is intended or shall be construed to confer upon any person or entity other than the Parties and their respective successors and permitted assigns, any rights or remedies under or by reason of this MOU.

8. **Counterparts**. This MOU may be executed in any number of counterparts. Each counterpart shall constitute an original, and all such counterparts shall constitute one and the same agreement.

9. **Entire Agreement**. This binding agreements section is the entire agreement of the Parties relating to the subject matter herein and supersedes all prior agreements, understandings and negotiations regarding the same. This MOU may be amended only by a written agreement signed by all Parties.

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The Parties execute this MOU as of the Effective Date.

DUKE ENERGY CAROLINAS, LLC

By:_ Heather Shirley Smith
Name: Heather Shirley Smith
Title: Deputy General Counsel

DUKE ENERGY PROGRESS, LLC

By: Heather Shirley Smith
Name: Heather Shirley Smith
Title: Deputy General Counsel

NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

By:_____
Name:
Title:

SOUTHERN ENVIRONMENTAL LAW CENTER (on behalf of South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, and Upstate Forever)

By:_____
Name:
Title:

SUNRUN INC.

By:_____
Name:
Title:

VOTE SOLAR

By:_____
Name:
Title:

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DUKE ENERGY CAROLINAS, LLC

By:_____
Name:
Title:

DUKE ENERGY PROGRESS, LLC

By:_____
Name:
Title:

NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

By:_____
Name: Peter H. Ledford
Title: General Counsel and Director of Policy

SOUTHERN ENVIRONMENTAL LAW CENTER (on behalf of South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, and Upstate Forever)

By:_____
Name:
Title:

SUNRUN INC.

By:_____
Name:
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VOTE SOLAR

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DUKE ENERGY CAROLINAS, LLC

By:_____
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Title:

DUKE ENERGY PROGRESS, LLC

By:_____
Name:
Title:

NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

By:_____
Name:
Title:

SOUTHERN ENVIRONMENTAL LAW CENTER (on behalf of South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, and Upstate Forever)

By:_____
Name: David L. Neal
Title: Senior Attorney

By:_____
Name: Katherine Lee
Title: Staff Attorney

SUNRUN INC.

By:_____
Name:
Title:

VOTE SOLAR

By:_____
Name:
Title:

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DUKE ENERGY CAROLINAS, LLC

By:_____
Name:
Title:

DUKE ENERGY PROGRESS, LLC

By:_____
Name:
Title:

NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

By:_____
Name:
Title:

SOUTHERN ENVIRONMENTAL LAW CENTER (on behalf of South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, and Upstate Forever)

By:_____
Name:
Title:

SUNRUN INC.

By: _____
Name: Tyson Grinstead
Title: Director, Public Policy

VOTE SOLAR

By:_____
Name:
Title:

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The Parties execute this MOU as of the Effective Date.

DUKE ENERGY CAROLINAS, LLC

By:_____
Name:
Title:

DUKE ENERGY PROGRESS, LLC

By:_____
Name:
Title:

NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION

By:_____
Name:
Title:

SOUTHERN ENVIRONMENTAL LAW CENTER (on behalf of South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, and Upstate Forever)

By:_____
Name:
Title:

SUNRUN INC.

By:_____
Name:
Title:

VOTE SOLAR

By: Thadeus B. Culley
Name: Thadeus B. Culley
Title: Sr. Regional Director and Regulatory Counsel, Vote Solar

PPAB 5812479v8

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Exhibit A

Proposed Resolution
Interim Solar Choice Tariffs for South Carolina Residential Customers

- In South Carolina, applications received from June 1, 2021, through and including December 31, 2021, all residential customers will remain on their existing rate schedule (e.g. RS, RES, R-TOUD, etc.) until May 31, 2029. These customers will be placed on a new net metering rider, which will include monthly netting with net excess energy credited at avoided cost (i.e. the new netting policy) and non-bypassable charges for costs not directly related to the provision of electric service for each applicant. This includes costs such as energy efficiency costs, cyber security costs, storm cost recovery and similar costs.

- This interim rate period is necessary for the Companies to continue to offer an option for customers to adopt solar while the Companies work to switch over to their new billing system to efficiently bill the new Permanent Solar Choice Tariffs effective January 1, 2022. NEM under the Interim Solar Choice Tariffs will be billed manually for applications received during that interim period.

- Customers under the Interim Solar Choice Tariffs will be allowed on this structure until May 31, 2029, at which point they will be given the option to switch to the Permanent Solar Choice Tariffs. If they elect not to be on the Permanent Solar Choice Tariffs, they can stay on the standard residential tariff but any volumetric price increase after their transfer year will be placed in a non-bypassable charge based on the estimated total solar energy production of their system size for the remaining life of the system. The solar customer will also be assessed a minimum bill set at $10 more than the BFC at that time. This minimum bill will be applied in the same manner as the Monthly Minimum Bill ("MMB") in the Permanent Solar Choice Tariffs, in that it will recover some portion of the Companies' estimated customer and distribution costs. The minimum bill charge is reduced by the Basic Facilities Charge (BFC) and the portion of the customer's monthly volumetric energy charges specific to customer and distribution costs.

- Between June 1, 2021, and December 31, 2021, there will be a monthly cap on solar applications of 1.2 MW for DEC and 300 kW for DEP per month. If the monthly cap is reached and a customer still wants to install solar under an Interim Solar Choice Tariff through 2029, the customer must withdraw its application and submit it again the next month, but there is no assurance that capacity will be available. There will not be a waiting list due to the acknowledged administrative burden. If there is no capacity available under the Interim Solar Choice Tariff at the end of the Interim Solar Choice Tariff period, the Parties will consider whether adjustments to the interconnection process are required to ensure the customer's interconnection request is not prematurely withdrawn from the interconnection queue until the period of time when a Permanent Solar Choice Tariff is available and the customer will be placed on that tariff once it is available.

- The Interim Solar Choice Tariffs may be incorporated into the Permanent Solar Choice Tariff if the Companies determine this is prudent. This provision is relevant to the form of the Solar Choice Tariffs but will not change any of the policies or pricing.

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Exhibit B

Proposed Resolution
South Carolina Permanent Solar Choice Tariffs

Residential Customer Generators

- The sole Permanent Solar Choice Tariff for residential solar PV customer generators is a Critical Peak Pricing ("CPP") Time of Use ("TOU") tariff and residential solar customer generators must receive service under this tariff (with the exception of the Interim Solar Choice Tariff outlined above). This rate schedule will only apply to partial requirements rooftop solar customers.

	Prices without Riders and before future fuel cost adjustments (c/kWh)	
	DEC SC	DEP SC
Peak	15.4444	16.140
Off-Peak	9.0270	9.805
Super-Off-Peak	6.2952	7.294
Critical Peak*	25	25

* Price for peak hours on up to 20 Company-designated Critical Price days per year

- TOU Periods (all times in Eastern Prevailing Time)
  - Annual On-peak period will be from 6:00 pm – 9:00 pm
  - Additional December-February On-peak from 6:00 am – 9:00 am
  - March-November Super Off-peak from 12:00 am – 6:00 am
- A Monthly Grid Access Fee ("GAF") is intended to recover distribution costs of customers with system sizes greater than 15 kW-dc, which are larger than for the average customer. To design the GAF, the average maximum demand for customers with greater than 15 kW-dc systems was determined and applied the distribution unit cost to estimate the total distribution cost. The GAF was then set to the level that would recover this cost minus the portion already recovered in through the minimum bill. The GAF would be applied to the nameplate capacity in excess of 15 kW-dc. The GAF until the implementation of any future rate cases in DEC-SC or DEP-SC will be:
  - DEC GAF: $5.86/kW - dc/month
  - DEP GAF: $3.95/kW - dc/month
- Monthly Minimum Bill ("MMB") recovers customer and distribution costs applied after riders but before GAF, any non-bypassable charges, or excess energy credit. The MMB would be $30 to ensure recovery of customer and distribution costs from solar choice

customers. The $30 MMB is reduced by the Basic Facilities Charge (BFC) and the portion of the customer's monthly volumetric energy charges specific to customer and distribution costs. If the combination of the BFC, specific volumetric energy charges, and bypassable riders is less than $30, then the MMB charge is equal to the difference. Any avoided cost bill credits for net excess energy can be used to reduce a customer's bill after the MMB has been applied.

- BFC of $13.09 for DEC and $14.63 for DEP and will change in accordance with any future changes in the BFC for the residential TOU rate schedules. The Parties are not limited in their ability to litigate issues related to the amount or calculation of the BFC.

- Monthly excess net exports are credited at an annualized rate (weighted average rate for all hours assuming a fixed block of energy) for avoided energy cost as specified by the per kWh rates and charges in Schedule PP - Purchased Power (DEC) and SC Schedule PP – Purchased Power (DEP).

    - The Companies will maintain the fixed block of energy methodology that is used in Rider RNM but reserves the right to use a solar energy profile instead.

    - The Companies will maintain the practice of using an annualized rate but reserve the right to use different rates for each month instead.

- All costs related to Demand Side Management ("DSM")/EE, storm cost recovery, and cyber security are non-bypassable with the option of proposing new components to the non-bypassable list of charges with no direct link to customer kWh usage. Inclusion of additional possible Solar Choice Program costs would be handled in separate proceedings and rate cases.

    - Unless the Commission requires production meters to measure the actual solar production at each location, non-bypassable cost recovery would be a monthly non-volumetric charge based on customer-generator system capacity with a modeled annual capacity factor representing the system's entire output.

- Imports and exports will be netted within each TOU pricing period initially, and net exports during that pricing period are credited at avoided cost as explained above. CPP applies to all imports during the CPP hours. Any energy exports during the CPP hours will be netted against peak imports, not the Critical Peak imports

- Renewable energy certificate ("RECs") for all solar generation will be transferred to the Companies upon being placed on the rate for the length of time the customer enrolls in a Permanent Solar Choice Tariff.

- The designation of critical peak pricing days and hours will be set daily and will be posted daily on the Companies' website as the official customer notification. Additionally, the designation of CPP will be communicated to Customers by other means, including but not limited to email if desired and optionally through text message, again as desired by such Customers.

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- The Companies could shift the CPP hours (but not the TOU hours) by 1 hour if it becomes necessary to avoid snap-back. The total number of CPP hours per day would remain the same regardless of any shift.
    - The peak hours would be used to provide flexibility for system operations.
- The Companies will maintain the TOU hours as defined above for enrolled customers (re: peak/off-peak/super-off-peak) for at least 10 years.
- The Companies will keep the general rate structure consisting of volumetric time varying rates and no demand charges described in this Permanent Solar Choice Tariff open to customers for at least 10 years.
- The Companies will develop an online savings calculator that will be shared and previewed with the settling parties for feedback within two years of the Permanent Solar Choice Tariff's implementation.

Non-Residential Customer Generators

- Non-residential customer generators applying for interconnection after June 1, 2021, will be served under their existing tariff and the Solar Choice Program rider, which will include monthly netting of excess energy.
- Monthly net excess energy will be applied as a bill credit at the same rate as residential customer generators. At the Companies' discretion, non-residential customer generators with systems less than 30 kW may be transitioned to a mandatory TOU rate and, prior to filing, Duke would work with interested stakeholders to develop a plan for this transition.

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Exhibit C

Proposed Resolution
The Incentives

- The Companies will offer a cumulative $0.39/Watt-dc incentive for new NEM customers eligible for rate schedule RE under the Solar Choice Program. The upfront rooftop solar incentive is $0.36/Watt-dc (the "Rooftop Incentive") and may be assigned to a solar leasing company if the customer is in a lease arrangement. In order to be eligible for the Rooftop Incentive, the customer must also participate in a winter smart thermostat program ("Winter BYOT") and will be compensated for its participation in accordance with the Winter BYOT program rules (the "Winter BYOT Incentive"). The proposed Winter BYOT Incentive provides an initial one-time bill credit of $75, and after 12 months of participation, customers receive an additional annual bill credit of $25. Together, these two programs comprise the cumulative $0.39/Watt-dc incentive mentioned above.
- If a customer overrides more than the Winter BYOT program allows, they must pay back a prorated share of the Rooftop Incentive for every year that allowance is exceeded (total incentive divided by 25 years).
    - If a customer unenrolls in the Winter BYOT program, the customer must pay a prorated portion of the Rooftop Incentive back to the Companies.
- Customers not willing or able to install a qualified smart thermostat enrolled in a Winter BYOT program are not eligible for the Rooftop Incentive.
- Customers must sign a contractual agreement to remain enrolled in the Companies' Winter BYOT program for 25 years. There will be no penalty if customers move out of the residence before the expiration of this provision.
- Solar Choice Program customers will be provided a 25-year contract with grandfathering tied to the system for the incentive and other components of the Solar Choice Tariff structure including monthly netting, TOU-CPP (though time windows may change after 10 years), and no demand charges.
- To ensure broad technology inclusion, the Companies will work with stakeholders to identify other peak load reduction technologies that can be paired with solar in addition to a Winter BYOT enrolled thermostat. The minimum qualification is that the technology must lead to a reliable reduction of at least ~1 kW per hour during peak winter hours. The Companies are to file such a program by June 1, 2022.
- System performance metrics for the Incentives will be determined at a later date.
- Both the Rooftop Incentive and Winter BYOT Incentive must be approved by both the PSCSC and the NCUC in order to be offered by the Companies. DSM/energy efficiency

programs costs are allocated across both jurisdictions in order for the program to be cost effective under traditional tests. Thus, the Incentives will not be available in South Carolina until both PSCSC and the NCUC approve.

- The Parties agree that in order to address potential changes in market conditions that may negatively impact free-ridership and program cost effectiveness, the Companies may adjust programmatic incentive levels. Such incentive adjustments may occur no earlier than January 1, 2024.
- The Parties agree that the CPP TOU tariff structure will be effective January 1, 2022 whether the Incentives are approved by that time or not.
- The Parties understand that the Companies' "basic" option is the TOU rate, and the Incentives are an overlay to that rate. If the Incentives, as contemplated in this MOU, do not receive approval from both the PSCSC and the NCUC, the TOU rate structure will remain in effect as the basic option.

The Parties would vigorously advocate in North Carolina and South Carolina for approval of the incentives described above as well as full lost revenue recovery and shared savings incentives that are part of the EE program. The Parties would vigorously advocate for the TOU rate as a combined offering which complies with Act 62, and would work in good faith to ensure that the details of the combined offering submitted to the PSCSC and the NCUC complies with the requirements of Act 62 and supportive of advancement of these options in accordance with North Carolina law. Furthermore, the Parties recognize that their support of the proposed resolution is based on the interlocking components of the entire proposal and that if the PSCSC or the NCUC rejects any one aspect of the proposed resolution, then it may require renegotiation of other aspects of the proposed resolution. The Parties would work in good faith to negotiate any changes that may be necessitated by a rejection or amendment by the PSCSC or the NCUC of any material aspect of the proposed resolution.

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Exhibit D

Joinder Agreement

JOINDER AGREEMENT

The undersigned, _____ (the "Joining Party"), hereby acknowledges receipt and an opportunity to review that certain Memorandum of Understanding entered into by and among Duke Energy Carolinas, LLC; Duke Energy Progress, LLC; North Carolina Sustainable Energy Association; Southern Environmental Law Center on behalf of South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, and Upstate Forever; Sunrun Inc.; and Vote Solar dated _____ 2020 (the "MOU"). The undersigned further agrees to be bound by the terms of the MOU in accordance with its terms in consideration for the non-binding understandings and binding agreements set forth therein. As such, the Joining Party shall be considered a "Party" under the MOU.

This Joinder Agreement is made effective this __ day of _____, 2020.

_____
By:

ACKNOWLEDGED AND AGREED:

DUKE ENERGY CAROLINAS, LLC

By:_____
Name:
Title:

DUKE ENERGY PROGRESS, LLC

By:_____
Name:
Title:

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JOINDER AGREEMENT

The undersigned, Solar Energy Industries Association (the "Joining Party"), hereby acknowledges receipt and an opportunity to review that certain Memorandum of Understanding entered into by and among Duke Energy Carolinas, LLC; Duke Energy Progress, LLC; North Carolina Sustainable Energy Association; Southern Environmental Law Center on behalf of South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, and Upstate Forever; Sunrun Inc.; and Vote Solar dated September 16, 2020 (the "MOU"). The undersigned further agrees to be bound by the terms of the MOU in accordance with its terms in consideration for the non-binding understandings and binding agreements set forth therein. As such, the Joining Party shall be considered a "Party" under the MOU.

This Joinder Agreement is made effective this 2nd day of December, 2020.

SOLAR ENERGY INDUSTRIES ASSOCIATION

By:_____
Name: Sean Gallagher
Title: VP, State Affairs

ACKNOWLEDGED AND AGREED:

DUKE ENERGY CAROLINAS, LLC

By: Heather Shirley Smith
Name: Heather Shirley Smith
Title: Deputy General Counsel

DUKE ENERGY PROGRESS, LLC

By: Heather Shirley Smith
Name: Heather Shirley Smith
Title: Deputy General Counsel

BEFORE THE SOUTH CAROLINA PUBLIC SERVICE COMMISSION
DOCKET NO. 2020-264-E
DOCKET NO. 2020-265-E

In the Matter of:	**)**
Duke Energy Carolinas, LLC and	**)**
Duke Energy Progress, LLC's	**)**
Establishment of Solar Choice	**)**
Metering Tariffs Pursuant to S.C.	**)**
Code Ann. Section 58-40-20	**)**

DIRECT TESTIMONY OF
JUSTIN R. BARNES
ON BEHALF OF
NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION AND
SOLAR ENERGY INDUSTRIES ASSOCIATION

EXHIBIT JRB-3

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Table 1: Residential BYOD Program Examples[1]

State	Utility	Program	Compensation	Use Case
Connecticut[2]	Eversource	Connected Solutions – Targeted Seasonal	$225/kW-summer & $50/kW-winter (avg. per peak event), locked in for five years.	Reduction in ISO-NE capacity charges.
Connecticut[3]	United Illuminating	ConnectSun	$0.05/kWh from June – Sept. on-peak energy, locked in for five years, plus $500 rebate for additional metering.	Distribution deferral on two circuits.
Massachusetts[4]	National Grid	Connected Solutions – Targeted Seasonal	$225/kW-summer & $50/kW-winter (avg. per peak event), locked in for five years.	Reduction in ISO-NE capacity charges.
Massachusetts[5]	Eversource	Connected Solutions – Targeted Seasonal	$225/kW-summer & $50/kW-winter (avg. per peak event), locked in for five years.	Reduction in ISO-NE capacity charges.
Massachusetts[6]	National Grid, Unitil, Eversource	Connected Solutions – Daily Dispatch	$/kW for dispatch on a daily basis. Further details of permanent program forthcoming.	Reduction in ISO-NE capacity charges.
New Hampshire[7]	Liberty Utilities	Residential Battery Storage Pilot	Phase 1 (Utility-Owned): Arbitrage via new TOU rate. Phase 2 (BYOD): TBD	Reduction in ISO-NE transmission and potentially capacity charges.
New York[8]	PSEG Long Island	Dynamic Load Management Tariff	$/kW-month capacity reservation payment (May – September), differentiated by location. 10-year rate lock-in for energy storage systems.	CSRP: System-wide distribution deferral

[1] Program details are current as of September 6, 2020.
[2] Eversource Connecticut. Application for ConnectedSolutions: Small Scale Batteries, available at: https://www.eversource.com/content/ct-c/residential/save-money-energy/manage-energy-costs-usage/demand-response/battery-storage-demand-response
[3] Energize Connecticut. ConnectSun, available at: https://www.energizect.com/connectsun-home
[4] National Grid Massachusetts. Program Materials for Connected Solutions for Small Scale Batteries, available at: https://www.nationalgridus.com/media/pdfs/resi-ways-to-save/program-materials-for-connectedsolutions-for-small-scale-batteries-ma.pdf
[5] Eversource Massachusetts East. Application for ConnectedSolutions: Small Scale Batteries, available at: https://www.eversource.com/content/docs/default-source/save-money-energy/battery-demand-response-application.pdf?sfvrsn=3e03d362_4
[6] Massachusetts Department of Public Utilities. Docket Nos. 20-33, 20-34, 20-35, and 20-36. Order dated July 28, 2020 at p. 6, available at: https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/12489986
[7] New Hampshire Public Utilities Commission ("NH PUC"). Docket No. DE 17-189. Order No. 26,209. January 17, 2019. A BYOD version of the currently active utility-owned battery storage program is slated to be developed upon the successful demonstration of the current program. New Hampshire is also pursuing the development of a statewide BYOD program via its 2021-2023 energy efficiency and demand response program development process. *See* NH PUC Docket No. DE 20-092, available at: https://www.puc.nh.gov/Regulatory/Docketbk/2020/20-092.html
[8] Long Island Power Authority. Tariff for Electric Service, Section XIII: Dynamic Load Management and accompanying Commercial System Relief Program and Distribution Load Relief Program Payment Statements, available at: https://www.lipower.org/about-us/tariff/

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			Minor $/kWh payment during events.	DLRP: Local distribution network reliability emergencies
New York[9]	Consolidated Edison NY	Commercial Demand Response Programs	$/kW-month capacity reservation payment (May – September) differentiated by location & number of event calls per peak season. Rates may change annually. Minor $/kWh payment during events.	CSRP: System-wide distribution deferral DLRP: Local distribution network reliability emergencies
Rhode Island[10]	National Grid	Connected Solutions – Targeted Seasonal	$400/kW-summer season (avg. per peak event), locked in for five years.	Reduction in ISO-NE capacity charges.
Vermont[11]	Green Mountain Power	Bring Your Own Device	Up-front payment of $850/kW for 3-hour storage discharge capability or $950/kW for 4-hour discharge capability (10% event performance tolerance subject to clawback), plus $850 for systems installed under solar self-consumption option. Adder of $100/kW for standalone systems and additions to existing solar in certain locations. 10-year program commitment.	Reduction in ISO-NE transmission and capacity charges; solar production shifting.

[9] Consolidated Edison New York. Schedule for Electric Delivery Service, Rider T, available at: https://www.coned.com/_external/cerates/documents/elecPSC10/electric-tariff.pdf

[10] National Grid Rhode Island Program Materials for Connected Solutions for Small Scale Batteries, available at: https://www.nationalgridus.com/media/pdfs/resi-ways-to-save/ri-program-materials-for_-connectedsolutions-for-small-scale-batteries-v16.pdf

[11] Green Mountain Power. BYOD – Terms and Conditions, available at: https://greenmountainpower.com/bring-your-own-device/battery-systems/

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